

FY 22 HMA – Grant Application Review Summary

Subapplication Number	EMA-2022-BR-001-0036		
Project Title	Fayetteville, NC - Person & Russell St Bridge and Stream Improvement Project		
Applicant Name	North Carolina Department of Public Safety		
Subapplicant Name	City of Fayetteville		
Project Type	Flood Risk Reduction		
Recommendation	Yes with Conditions		
Federal Cost (FEMA GO)	\$15,400,875	Phased Project	Yes
BCR (subapplication)	2.26	Duplicate Project	No
BCR (reanalysis)	1.24	Benefits (reanalysis)	\$28,589,232

Summary

This is a technical feasibility and cost-effectiveness review in support of the National Technical Review process. Additional Environmental Planning and Historic Preservation (EHP), eligibility and completeness, and funding limitation considerations may affect the selection of this subapplication for further consideration and funding. No contact was made with the applicant or subapplicant; this review is solely based on information provided in the subapplication.

Scope of Work

The scope of work is well-defined and clearly explains the activities necessary to complete the work. The subapplicant has submitted a subapplication to replace four bridges and complete stream enhancements along Blounts Creek in Fayetteville, North Carolina. The bridge replacements will encompass installing longer bridges and roadway approaches to reduce or eliminate roadway loss of function up to a 100-year level of protection and to provide greater flow capacity in the channel. Stream enhancements along approximately 4,000 feet of Blounts Creek will include bank stabilization, floodplain benches, and riparian habitat improvements.

Technical Feasibility

Project Schedule

The schedule duration is 60 months. The schedule includes all items in the scope of work and is reasonable.

Cost Estimate

The cost estimate includes sufficient line items consistent with the scope of work. There are several line items in the cost estimate that were submitted as lump sums.

Technical Design Information

The following information and documentation were provided to support the project:

Item	Documentation	Evaluation
Proposed Level of Protection	H&H Analysis, Subapplication narrative	The project proposes to eliminate flood risk to 270 structures during the 100-year recurrence interval (RI) event and reduce flood risk for an additional 235 structures.

Item	Documentation	Evaluation
Flood Risk Data	FEMA FIRM, H&H Analysis	The proposed project is in the Special Flood Hazard Area. The provided documentation does show how the proposed project will reduce risk. An H&H analysis shows a reduction in flooding risk and water surface elevations.
Residual Risk	H&H Analysis, Subapplicant narrative	The subapplication indicates that residual risk will remain for some structures and that an event greater than the 100-year RI would still result in flooding. Proposed condition H&H results indicate residual risk after project completion.
Design and Performance Standards	H&H Analysis, Subapplication narrative	Subapplicant indicates that all relevant codes, standards, guidelines, and regulations will be adhered to during design and construction.
Design Drawings, Maps, Photographs	Project maps/photos	Documentation was provided to support the project. Project maps and photos are included in the subapplicant narrative. No conceptual drawings were included the documentation, but production of drawings is included in the list of technical information to be produced in Phase 1.
Upstream and Downstream Impacts	Scope of work narrative	The documentation indicates that the proposed project will not have adverse upstream or downstream impacts, and that a no-rise analysis will be performed in Phase 1.
CLOMR/LOMR	Subapplicant narrative	The documentation indicates a CLOMR/LOMR is necessary. A letter to the floodplain manager is included in the subapplication documentation that indicates a CLOMR/LOMR will be necessary for this project.

Based on the documentation provided, the project is technically feasible and effective at reducing risk to individuals and property from natural hazards. The following conditions were identified:

- The cost estimate should not be submitted as a lump sum. Amend the cost estimate to contain sufficiently detailed information. Refer to HMA Guidance, Part IV, Section H.1. for guidance on creating a cost estimate.

Provide the following Phase 1 deliverables needed to determine technical feasibility:

- Hydrologic and hydraulic data/modeling and/or other relevant technical data
- Engineering design (typically 30/60/90) and cost estimate
- Technical body of information needed to support the desired level of effectiveness/protection or amount of risk reduction.

Cost-Effectiveness

The Benefit-Cost Analysis (BCA) was completed based on modeled damages.

The following was found during review of the submitted BCA:

Cost Estimation

Input	Value	Evaluation
Project Useful Life (PUL)	50 years	This value is consistent with the FEMA standard value for bridges but is not consistent with the FEMA standard PUL value for stream restoration of 30 years.
BCA Toolkit Initial Project Cost	\$21,561,225	This amount is consistent with the subapplication project cost estimate. Management costs were included in the initial project cost.
Annual Maintenance Cost	\$107,806	This amount is reasonable.
BCA Toolkit Total Project Cost	\$23,049,028	This amount is calculated based on the initial project cost, the annual maintenance costs, and the PUL.

Flood Data

Input	Value	Evaluation
Lowest Floor Elevations (LFEs)	No documentation	No documentation was provided to support these inputs. The values used in the BCA are not consistent with the supporting documentation because no LFE documentation was provided. Flood depths were provided but could not be verified because of the lack of supporting documentation.
Flood Hazard Data	BCA narrative	A brief discussion of the stormwater modeling approach was provided to support this input. It is unknown whether the values used in the BCA are consistent with the supporting documentation because no discharge or WSE documentation was provided. Flood depths were provided but could not be verified because of the lack of supporting documentation.
Depth-Damage Functions	USACE Generic, including: one-story without basement, industrial light, non-fast food, office one-story, protective services,	These curves are consistent with the structure types and mitigation actions.

Input	Value	Evaluation
	recreation, religious facilities, retail-clothing, service station, warehouse, non-refrigeration	
Building Size	505 – 91,383 sq ft	Cumberland County tax assessor documentation was used to support this input. It is unknown if the values used in the BCA are consistent because supporting documentation (e.g., tax assessor data, building addresses, GIS database) was not included and thus could not be verified.
Building Replacement Value (BRV)	\$61.65 – \$280.99/sq ft	The BRVs used in the BCA are non-default values obtained from the Hazus technical manual.
Building Occupancy	Census data	Block census data were provided to support this input; a narrative described the calculations used to distribute residents across structures.
Contents Value	100% BRV (residential) 50%, 100%, 150% BRV (non-residential)	Non-default values were used for non-residential contents damages. Supporting documentation was not provided.
Loss of Rental/Business Income	Hazus displacement costs	The displacement costs used in the BCA are non-default values obtained from the Hazus technical manual. One-time displacement costs, daily displacement costs, and building first-floor areas were used to calculate damages for commercial structures.

Professional Expected Damages

Input	Evaluation
Before-Mitigation Damages	Damages for the before-mitigation 5-, 10-, 25-, 50, and 100-year RI events were calculated externally. Structure, contents, and displacement damages were calculated based on Hazus BRVs, contents, and displacement values; Cumberland County building footprints flood depths; and USACE riverine damage curves; and then entered into the BCA as lump sums. Before-mitigation flood depths were reported but WSEs and LFEs were not included in the subapplication documentation.

Input	Evaluation
After-Mitigation Damages	<p>Damages for the after-mitigation 5-, 10-, 25-, 50, and 100-year RI events were calculated externally. Structure, contents, and displacement damages were calculated based on Hazus BRV and displacement cost values; Cumberland County building footprints flood depths; and USACE riverine damage curves; and then entered into the BCA as lump sums.</p> <p>After-mitigation flood depths were reported but WSEs and LFEs were not included in the subapplication documentation.</p>

Additional Benefits

Input	Documentation	Evaluation
Social Benefits	Census data and BCA narrative	It is unknown if the number of residents and workers per household is consistent with the project description and supporting documentation. The subapplication stated that block census data were used, and calculations associated with the number and distribution of residents and workers were described in the BCA narrative, but no additional documentation was provided to verify the information.
Environmental Benefits	Map showing project area, subapplication narrative	The project envelop is stated as 13.01 acres, of which 7 percent (0.91 acres) is claimed as new or enhanced riparian habitat. The total project area and percentage of land use of the project area is not consistent with the project description and supporting documentation.

Reanalysis BCA

A reanalysis BCA was performed, and the following edits were made:

Input	Value	Explanation
Damages were recalculated externally	Various	The subapplication provided a PDF of damages calculations. Values associated with the building, contents, and displacement damages calculations were recreated so that a new BCA could be run with the changes listed in this table.
BRV	\$100/sq ft	The reanalysis includes the default BRV value of \$100/sq ft versus using Hazus data to calculate losses. This approach is more consistent with the methodology in the FEMA BCA Toolkit 6.0.
Contents Value	6% – 100%	The reanalysis includes the FEMA standard default contents damages percentages for residential and non-residential structures versus using Hazus data to calculate losses. This approach is more consistent with the methodology in the FEMA BCA Toolkit 6.0.

Input	Value	Explanation
Displacement Damages (residential)	100%	The reanalysis includes the FEMA standard default contents damages percentages for residential structures versus using Hazus data to calculate losses. This approach is more consistent with the methodology in the FEMA BCA Toolkit 6.0.
Displacement Damages (non-residential)	Removed from reanalysis BCA	Displacement damages for non-residential displacement were removed from the reanalysis versus using Hazus data. The BCA remained cost-effective.
Social Benefits	2.42 residents and 51.5% workers per residential structure 864 residents, 445 workers	The reanalysis BCA used U.S. Census data for residents (2.42 persons/household) and workers (51.5% persons/household) and multiplied this by the number of residential structures (357) impacted by the 100-year RI event.
Ecosystem Services	7 percent of 9.18 acres using a 30-year PUL	A separate mitigation action was created for ecosystem services because the FEMA standard PUL value is 30 years for stream restoration. A calculation of the project envelop (4000 linear ft × 100 ft riparian corridor width) yields a 9.18-acre extent. As a conservative approach, the 7 percent value of new or enhanced ecosystem benefits, as provided by the subapplication, was kept for the analysis. According to subapplication documentation, a larger proportion than 7 percent of the creek corridor is expected to be enhanced as either riparian habitat or urban open space.

Based on the reanalysis BCA, the total benefits associated with this project, \$28,589,232, are greater than the total project cost of \$23,049,028, producing a BCR of 1.24.

Based on the documentation provided, the project is cost-effective. The following conditions were identified:

- Provide documentation to support the LFEs for each structure. Documentation can include elevation certificates, survey data from qualified professionals, or topographical maps with a maximum contour increment of 2 feet.
- Provide documentation to support that the WSEs used to calculate damages are consistent with model results.
- Provide documentation to support the total area used to estimate the value of ecosystem services.

Provide the following Phase 1 deliverables needed to determine cost-effectiveness:

- Refinement of the BCA

Conclusion

Based on the information provided, the project is technically feasible and cost-effective; therefore, it is recommended for further consideration with the following conditions:

- Cost estimate should not be submitted as a lump sum. Amend the cost estimate to contain sufficiently detailed information. Refer to HMA Guidance, Part IV, Section H.1. for guidance on creating a cost estimate.
- Provide documentation to support the lowest floor elevation. Documentation can include elevation certificates, survey data from qualified professionals, or topographical maps with a maximum contour increment of 2 feet.
- Provide documentation to support that the WSEs used to calculate damages are consistent with model results.
- Provide documentation to support the total area used to estimate the value of ecosystem services.

Provide the following Phase 1 deliverables needed to determine technical feasibility and cost-effectiveness:

- Hydrologic and hydraulic data/modeling
- Engineering design (typically 30/60/90) and cost estimate
- Technical body of information needed to support the desired level of effectiveness/protection or amount of risk reduction
- Refinement of the BCA
- Additional documentation required to support compliance with eligibility, technical feasibility, cost-effectiveness, and EHP requirements.

This review is an evaluation of the project's technical feasibility and cost-effectiveness. Additional EHP, eligibility and completeness, and funding limitation considerations may affect the selection of this subapplication for further consideration and funding.