

FY 22 HMA – Grant Application Review Summary

Subapplication Number	EMA-2022-BR-001-0017		
Project Title	Sewer Force Main, Raw Water Intake, & Stream Bank Stabilization		
Applicant Name	North Carolina Department of Public Safety		
Subapplicant Name	Town of Forest City		
Project Type	Soil Stabilization		
Recommendation	Yes with Conditions		
Federal Cost (FEMA GO)	\$2,598,450	Phased Project	Yes
BCR (subapplication)	1.00	Duplicate Project	No
BCR (reanalysis)	1.04	Benefits (reanalysis)	\$4,147,752

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 for the rehabilitation and replacement of existing sewer lines, replacement of a sewer force main, rehabilitation of 12 manholes, sewer pump station floodproofing, and stream restoration/streambank stabilization in three locations to protect a raw water intake for a water treatment plant (WTP), sewer pump station, and sewer force main. The proposed project will provide protection up to the 100-year event for all components of the project.

Erosion along Brackett Creek and Second Broad River has exposed sewer lines and sewer force mains, causing ruptures and loss of service in the past. Further erosion will increase the risk of failure, cost of repairs, and duration of outages. Erosion along Brackett Creek also threatens the slope stability adjacent to a sewer pump station, which could result in a loss of wastewater service. Flooding of the sewer pump station is also a recurring risk. Erosion along a settling channel for a WTP raw water intake adjacent to Second Broad River could result in the channel losing conveyance capacity and restricting flow to the WTP intake, which would cause a loss of potable water service.

Technical Feasibility

Project Schedule

The schedule duration is 36 months. The schedule does not include all items in the scope of work, but appears reasonable. The subapplication states design and permitting will occur prior to construction, but only lists permitting as a line item in the schedule. The task description for "State Contracting and Procurement" includes design, and the task description for "Permitting" states that "applying for and receiving permits during the design phase" will occur, yet no design phase is listed in the schedule.

Cost Estimate

The cost estimate does not include sufficient line items consistent with the scope of work. The WTP raw water intake channel stabilization does not have a detailed cost estimate provided with the supporting documentation. The cost estimate included a contingency cost of 16 percent, which is greater than the

contingency cost range (1–5 percent; up to 7 percent for historical structures) recommended by the HMA Guidance.

Technical Design Information

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

Item	Documentation	Evaluation
Proposed Level of Protection	BCA narrative	The project proposes to protect sewer pipelines, a water treatment plant intake, and a wastewater pump station during the 100-year event. No documentation was provided to support the proposed level of protection.
Risk Information	FEMA FIRM, photos	The proposed project is in the Special Flood Hazard Area. Proposed construction activities would occur within the regulatory floodway. The provided documentation does show how the proposed project will reduce risk. Photographs provided with the subapplication show sewer pipelines exposed owing to streambank erosion, prior flooding of the sewer pump station, and sedimentation in the raw water intake channel. No H&H study was included, so the flood risk is not clearly identified, but the proposed project components would address the streambank erosion, pump station flooding, and sedimentation in the raw water intake channel.
Residual Risk	No documentation was provided to support this item	No documentation or indication of the residual risk for the project but an event larger than the 100-year event could cause streambank failure that results in loss of service for potable water and/or wastewater. An event larger than the 100-year event could also result in flooding of the sewer pump station which would also result in loss of wastewater service.
Design and Performance Standards	No documentation was provided to support this item	Subapplication does not indicate the applicable codes and design standards the project will adhere to.
Design Drawings, Maps, Photographs	Project maps and photos	Documentation was not provided to support the project. No design drawings or conceptual layout of the proposed project were provided. Maps and photos of existing conditions were provided to show the project locations, level of streambank erosion, and temporary measures enacted to prevent erosion and safeguard sewer pipelines.
Upstream and Downstream Impacts	No documentation was provided to support this input	The documentation does not indicate whether the proposed project will have adverse upstream or downstream impacts.

Item	Documentation	Evaluation
CLOMR/LOMR	No documentation was provided to support this item	The documentation does not indicate a CLOMR/LOMR is necessary.

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:

- Verify that the proposed schedule includes all appropriate line items.
- 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.
- Projects that affect the hydrologic or hydraulic characteristics of a flooding source may require a Conditional Letter of Map Revision (CLOMR) and/or a Letter of Map Revision (LOMR) if they result in changes to the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA).
- Provide documentation verifying how the proposed project will increase the level of protection.
- Provide documentation to support that the streambank stabilization, pump station floodproofing, and sewer lines/sewer force main will be designed and built in compliance with all applicable federal and local standards.
- Provide documentation to support that the proposed project will not have adverse upstream or downstream impacts.

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

- Hydrologic and hydraulic data/modeling and/or other relevant technical data (e.g., geomorphic assessment, geotechnical analysis).
- 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 professional expected damages. The submitted BCA contains three mitigation actions: (1) sewer line replacement, streambank stabilization, and pump station floodproofing at Brackett Creek, (2) streambank stabilization at the WTP raw water intake channel off the Second Broad River, and (3) sewer force main and streambank stabilization along Second Broad River.

The following was found during review of the submitted BCA:

Cost Estimation

Input	Value	Evaluation
Project Useful Life (PUL)	30 years and 50 years	Thirty years was used for streambank stabilization at the raw water intake and 50 years was used for the sewer line, sewer

Input	Value	Evaluation
		force main, and pump station improvements. These values are consistent with the FEMA standard values.
BCA Toolkit Initial Project Cost	\$3,464,600	This amount is consistent with the subapplication project cost estimate.
Annual Maintenance Cost	\$41,000	This amount is reasonable. However, no supporting documentation was provided to support the maintenance costs.
BCA Toolkit Total Project Cost	\$3,988,679	This amount is calculated based on the initial project cost, the annual maintenance costs, and the PUL.

Professional Expected Damages

Input	Evaluation
Facility Type	The facility type of utilities was used in the BCA. This input is consistent with the proposed project in the subapplication.
Loss of Function	<p>Loss of potable water service costs are included for customers served by the WTP. The number of customers used in the BCA is based on the WTP providing service to 10,500 customers (accounts) and multiplied by 2.61 persons per household, based on Census Bureau data, to estimate 27,405 people served by the WTP. No documentation was provided to support the number of customers (accounts) served by the WTP.</p> <p>Loss of wastewater service costs are based on the estimated population served by the sewer line and pump station. The number of customers used in the BCA is 10,440 for the Brackett Creek sewer line/pump station and 2,182 for the Second Broad River sewer force main. No documentation was provided to support the number of customers served by these components of wastewater infrastructure.</p>
Before-Mitigation Damages	Loss of potable water service is assumed to occur in the 25-, 50-, and 100-year events owing to flooding which may cause erosion of the intake channel and restrict flow to the WTP intake/pump station. The 100-year event flood levels result in channel overtopping and the subapplicant assumes the 25- and 50-year events would result in channel overtopping too. Each event is assumed to result in two days loss of potable water service (impact days) for the time required to get a backup intake in service. However, additional comments added in the BCA indicate that emergency storage is available for 1.5 days and it is not clear if this was accounted for when estimating the number of impact days for loss of potable water service. Additional damages of \$75,000 were included for each event for excavation and repair of the intake channel, but no documentation was provided to support those costs.

Input	Evaluation															
	<p>Loss of wastewater service for the Brackett Creek sewer line and pump station is assumed to occur in the 25-, 50-, 100-, and 500-year events with additional damages/costs for each event, as shown in the table below.</p> <ul style="list-style-type: none"> The 25-year event is assumed to damage the sewer inceptor and cause loss of service. The 50- and 100-year events are assumed to damage pumps and require installation of temporary bypass pump equipment after floodwaters recede. The 500-year event would damage pumps and flood the electrical building which is assumed to result in longer duration for loss of service and additional damages to electrical equipment. <table border="1" data-bbox="521 674 1334 936"> <thead> <tr> <th>Recurrence Interval (years)</th> <th>Impact Days</th> <th>Additional Damages</th> </tr> </thead> <tbody> <tr> <td>25</td> <td>5</td> <td>\$50,000</td> </tr> <tr> <td>50</td> <td>7</td> <td>\$150,000</td> </tr> <tr> <td>100</td> <td>7</td> <td>\$200,000</td> </tr> <tr> <td>500</td> <td>9</td> <td>\$275,000</td> </tr> </tbody> </table> <p>No documentation was provided to support the number of impact days or additional damages for each event.</p> <p>Loss of wastewater service for the Second Broad River sewer force main is assumed to occur in the 25-, 50-, and 100-year events with five impact days and \$600,000 in additional damages for each event. The sewer force main is currently exposed due to erosion so the subapplicant assumes a 25-year event or larger will damage the sewer force main and require replacement with a new pipeline. The same number of impact days and additional damages are used for each event based on the time to install a new force main and cost for installation. No documentation was provided to support the number of impact days. The estimated cost for a new force main in the subapplication supporting documentation is lower than the damages in the BCA for a new force main.</p>	Recurrence Interval (years)	Impact Days	Additional Damages	25	5	\$50,000	50	7	\$150,000	100	7	\$200,000	500	9	\$275,000
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25	5	\$50,000														
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After-Mitigation Damages	No after-mitigation damages were included in the BCA which is not reasonable.															

Additional Benefits

Input	Documentation	Evaluation
Environmental Benefits	BCA narrative	The project used 0.16 acres of riparian land. The total project area and percent land use of the project area is consistent with the project description and supporting documentation. However, no documentation was provided to verify the amount of riparian land that would be created by the proposed project.

Reanalysis BCA

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

Input	Value	Explanation
Before-Mitigation Damages	Removed from BCA	The number of impact days and before-mitigation damages were removed for the three mitigation actions due to lack of supporting documentation.
Environmental Benefits	Removed from BCA	The environmental benefits from riparian land were removed from the BCA due to lack of supporting documentation.
Social Benefits	600 residents; 307 workers	Added the minimum number of residents and workers to reach cost-effectiveness. The ratio of residents to workers is based on Census Bureau data for Forest City which shows that 51.1 percent of the population in the labor force.

Based on the reanalysis BCA, the total benefits associated with this project, \$4,147,752, are greater than the total project cost of \$3,988,679, producing a BCR of 1.04.

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

- Provide documentation to support the annual maintenance costs.
- Provide documentation to support the number of residents and workers used to estimate social benefits. This can be supported by providing documentation for customers served by the WTP and/or customers served by the sewer line/pump station.

Provide the following Phase 1 deliverable 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:

- Verify that the cost estimate reflects the full cost to implement the project.
- 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.
- Projects that affect the hydrologic or hydraulic characteristics of a flooding source may require a Conditional Letter of Map Revision (CLOMR) and/or a Letter of Map Revision (LOMR) if they result in changes to the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA).
- Provide documentation verifying how the proposed project will increase the level of protection.
- Provide documentation to support that the streambank stabilization, pump station floodproofing, and sewer lines/sewer force main will be designed and built in compliance with all applicable federal and local standards.

- Provide documentation to support that the proposed project will not have adverse upstream or downstream impacts.
- Provide documentation to support the annual maintenance costs.
- Provide documentation to support the number of residents and workers used to estimate social benefits. This can be supported by providing documentation for customers served by the WTP and/or customers served by the sewer line/pump station.

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

- Hydrologic and hydraulic data/modeling, and/or other relevant technical data (e.g., geotechnical analysis).
- 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.