FY 21 HMA – Grant Application Review Summary

Subapplication Number	EMA-2021-BR-005-0004		
Project Title	Blood Run Pump Station Relocation and Sewer Line Replacement		
Applicant Name	North Carolina Department of Public Safety		
Subapplicant Name	Town of Siler City		
Project Type	Infrastructure Retrofit		
Recommendation	Yes with Conditions		
Federal Cost (FEMA GO)	$5,001,399	**Phased Project**	No
BCR (subapplication)	1.56	**Duplicate Project**	No
BCR (reanalysis)	1.41	**Benefits (reanalysis)**	$10,158,881

Summary

This is a technical feasibility and cost-effectiveness review in support of the National Technical Review process. No contact was made with the applicant or subapplicant; this review is solely based on information provided in the subapplication. The project was found to be technically feasible and cost-effective; therefore, it is recommended for further consideration with the conditions listed in the conclusion.

This review only constitutes an evaluation of the technical feasibility and cost-effectiveness of the proposed project. 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.

Scope of Work

The scope of work is well-defined and clearly explains the activities necessary to complete the work. The Town of Siler City (subapplicant) has submitted a subapplication for the relocation of the Blood Run Creek sewer pump station, the replacement of existing sewer mains with larger pipes, and streambank rehabilitation efforts along Loves Creek. The project includes five main elements:

- Relocate the Blood Run Creek pump station outside the floodplain limits of Blood Run Creek
- Replace 3,339 linear feet (LF) of 12-inch truss pipe with 24-inch polyvinyl chloride pipe (PVC)
- Replace 5,763 LF of 15- and 18-inch vitrified clay pipe (VCP) with 30-inch PVC
- Replace 4,064 LF of 24-inch VCP with 36-inch PVC
- Replace 9,949 LF of 8-inch ductile iron pipe (DIP) with 18-inch PVC, and perform 2,977 LF of streambank enhancement along Loves Creek

The proposed project is intended to reduce risk to 5,488 residents in the Town of Siler City and provide for the town's future growth. The proposed project will reduce risk by mitigating potential sewage overflow, and direct damages to and loss of function of the Blood Run Creek pump station.

Technical Feasibility

Project Schedule

The schedule provided indicates the project would be completed in 38 months. The schedule does include all items in the scope of work and is reasonable. No documentation was provided to substantiate the length of the schedule.

Cost Estimate

The cost estimate includes sufficient line items. Line items included a variety of sewer line replacements, jack and bore activities, pump station demolition, pump station relocation, engineering design, construction, traffic control, mobilization, streambank stabilization, backfill, and contingencies. The cost estimate is not consistent with the scope of work. There are no line items for surveying, nor the jack and bore activities of a 36-inch PVC sewer line, a pipe size noted in the scope of work. There are lump-sum costs for engineering design, permitting, bidding, miscellaneous concrete work, and the installation of the relocated pump station that are not explained.

The cost estimate included a contingency cost of 11 percent, which is greater than the recommended contingency cost in the HMA Guidance. The source of the cost estimate is not clear.

Technical Design Information

To achieve improved resilience of the pump station, reduced risk of sewage overflow, and reduced erosion potential, the following information and documentation were provided to support the project:

- Maps from an engineering consultant showing the project area. The maps included the 100-year and 500-year floodplain boundaries, the floodway along Loves Creek, the location of the existing pump station, the location of existing sewer lines, and the proposed location of the new pump station and sewer lines.
- Three photographs of the existing pump station, associated manholes, sewer lines and Blood Run Creek were included to show the existing conditions of the pump station and the nearby infrastructure. The photographs do not have a date or time stamp.
- Three photographs of the streambank area surrounding Loves Creek were included with the project files. The photos included show educational signs that have been erected and show the rehabilitation area of Loves Creek from previous efforts. The photographs do not have a date or time stamp.
- Upstream and downstream impacts were not supported by documentation; however, the impacts appear to be minimal or negligible. The subapplicant states that the new pump house will be relocated outside the 100-year floodplain, and that sewer lines will be located outside the floodplain where feasible. The subapplicant states that project plans will call to restore disturbed stream beds and banks to their original conditions.
- Subapplication narrative states that permits will be obtained from all appropriate local, state, and federal agencies for construction activity, stormwater discharges, floodplain management land disturbance, drainage review and approval, and environmental quality reviews. The subapplicant states that the new pump house will be located approximately 4.2 feet above the 100-year floodplain, which exceeds the minimum of 2 feet above the current 100-year flood elevations standards.
- There was no information provided to confirm whether the new pump station will be designed to meet the existing pump capacity or to exceed it.

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:

- Documentation should be provided to verify the length of the schedule.
- Documentation to support the new pump station and its pump capacity should be provided.
- Cost estimate line items such as design, permitting, bidding, and pump station installation should not be submitted as a lump sum and should contain sufficient detailed information, such as a budget narrative based on HMA Guidance, Part IV, Section H.1.
- Documentation should be provided to explain the cost for miscellaneous concrete work.
- Verification should be provided that surveying and the jack and bore activities of a 36-inch PVC sewer line are included in the cost estimate.

Cost-Effectiveness

The Benefit-Cost Analysis (BCA) for this project was completed based on professional expected damages using the damage-frequency assessment (DFA) module of the FEMA BCA Tool. The BCA evaluated the floodplain and stream restoration mitigation action at the Blood Run Creek pump station.

The following was found during review of the submitted BCA:

- *Project Useful Life (PUL):* PUL utilized was 50 years, which is consistent with the FEMA standard value for the project.
- *Annual Maintenance Cost:* Annual maintenance cost is estimated at $4,243.20, which appears reasonable. Costs were estimated based on 10 percent of the 14,144 LF of gravity sewer lines that need inspection and routine cleaning at $3 per foot of sewer line. A new operation and maintenance (O&M) plan, to be completed, will identify and specify typical maintenance activities for the streambank (e.g., vegetation repair, the control and repair of animal burrows, and the corrosion prevention exercising of gates), but costs for each of these were not provided. The subapplicant indicates that the cost to maintain the new pumping equipment and sewer mains will be less than the current cost to maintain the current infrastructure, but no documentation was provided to quantify the maintenance costs. The Town of Siler City is responsible for all maintenance after the project is complete.
- *Total Mitigation Project Cost:* Total mitigation project cost (including maintenance) indicated in the BCA was $7,203,416. The initial project cost in the BCA is consistent with the project cost estimate.
- *Lowest Floor Elevations (LFEs):* The subapplicant identifies the pump station having an elevation of 572.3 feet. The vertical datum was not listed. Before- and after-mitigation pump station elevations and datums should be provided to compare to the flood hazard data.
- *Flood Hazard Data:* The subapplicant uses the 2-, 5-, 25-, 50-, 100-, and 500-year recurrence intervals (RIs) to determine inundation depths at the Blood Run Creek pump station. It appears that an H&H report was completed, but it was not attached with the subapplication.
- *Loss of Function:* The subapplicant utilized wastewater loss of service. The subapplicant identified that the proposed project area services approximately 2,095 residences of the 2,749 total residential customers (76.2 percent) located in Siler City. The subapplicant used U.S. Census data to determine that 5,488 residents would be affected. Default loss of wastewater service values were used for the value of unit of service. The outage duration was

determined by adding the total flood drainage duration to the repair time. The inundation depths for each RI were used to establish a drainage duration in days based on previous sanitary sewer overflow information and from previous storms in 2016, 2018, and 2019, which were no greater than a 5-year storm. Repair times were estimated based on the 2- and 5-year RIs. The documentation for the repair times for the 25-, 50-, 100-, and 500-year RIs were not provided.

- *Before-Mitigation Damages:* Before-mitigation damages include loss of function and the cost of damages incurred by the pump station and sewer interceptors for each RI. The subapplicant identified the type of damages the pump house and interceptors would sustain for each RI, but did not provide the inundation depths or calculations used to develop these damages.
- *After-Mitigation Damages:* The subapplicant used the same methodology from the before-mitigation damages to determine the after-mitigation damages. Since the Blood Run Creek pump station is proposed to be relocated 4.2 feet above and outside 100-year floodplain, only the 500-year RI was included.
- *Environmental Benefits:* The subapplicant indicates that the project area will impact approximately 16.7 acres of land and that 12.4 percent of the total area be improved and classified as a riparian area. No documentation was provided to show which areas will be riparian after the mitigation. The streambank enhancement work includes an area of Loves Creek that the Town of Siler has previously rehabilitated.

Reanalysis BCA

A reanalysis BCA was performed for this subapplication and the following edits were made:

- Riparian environmental benefits were removed from the analysis. It was unclear what area was being claimed for this benefit and if it was being converted from another type or was already riparian.

The total benefits associated with this project, $10,158,881, are greater than the total project cost of $7,203,416, producing a BCR of 1.41.

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

- Documentation to support the annual maintenance costs should be provided.
- Documentation to support the lowest floor elevation at the pump station before and after mitigation—such as elevation certificates, survey data from qualified professionals, or topographic maps with a maximum contour increment of 2 feet—should be provided.
- Documentation to support flooding durations, repair durations, and damages incurred by the pump station and interceptors for each RI should be provided.
- Documentation to support the total area of improvement for the determination of the ecosystem benefits should be provided. Documentation to support the classification of riparian land use for the ecosystem should be provided.

Conclusion

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

- Documentation should be provided to verify the length of the schedule.
- Documentation to support the new pump station and its pump capacity should be provided.

- Cost estimate line items, such as design, permitting, bidding, and pump station installation should not be submitted as a lump sum and should contain sufficient detailed information, such as a budget narrative based on HMA Guidance, Part IV, Section H.1.
- Documentation should be provided to explain the cost for miscellaneous concrete work.
- Verification should be provided that surveying and the jack and bore activities of a 36-inch PVC sewer line are included in the cost estimate.
- Documentation to support the annual maintenance costs should be provided.
- Documentation to support the lowest floor elevation at the pump station before and after mitigation—such as elevation certificates, survey data from qualified professionals, or topographic maps with a maximum contour increment of 2 feet—should be provided.
- Documentation to support flooding durations, repair durations, and damages incurred by the pump station and interceptors for each RI should be provided.
- Documentation to support the total area of improvement for the determination of the ecosystem benefits should be provided. Documentation to support the classification of riparian land use for the ecosystem should be provided.

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