

ROUND 5 CFPF GRANT APPLICATION

2025

# VIRGINIA COMMUNITY FLOOD PREPAREDNESS FUND

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RICHLANDS FIRE RESCUE STATION 3  
CLAYPOOL HILL STUDY



TAZEWELL COUNTY  
COMMUNITY ID #510160

## Introduction

Tazewell County (County) is respectfully requesting Community Flood Preparedness Fund assistance to complete the “**Claypool Hill Study**,” a comprehensive study of **Richlands Fire & Rescue Station 3** (3 Honey Rock Road, Richlands, VA 24641) on Claypool Hill in the Town of Richlands (**Figure 1**). The purpose of the study is to determine the cause of **persistent flooding** and to provide a list of **potential stormwater alternatives to mitigate flood risk**. The Richlands Fire Rescue Station 3 is a **critical facility** that protects public safety in Tazewell County and has experienced frequent flooding due to stormwater intrusion. There are three main factors potentially contributing to flooding: topographical challenges, improper drainage on nearby properties, and undersized stormwater collection pipes. As a recognized **low-income geographic area with moderate social vulnerability index scores**, the study will help to promote the health, safety, and welfare of all community members. Identified in the **2023 Tazewell County Flood Resilience Plan (a comprehensive, cohesive plan funded by the CFPF)**, the proposed study aims to identify a **long-term nature-based solution** based on **best available science** acknowledging the **consequences of climate change**. The solution selection process will **address socioeconomic inequities to enhance equity and be developed with transparency and input from the public**. The County is requesting **grant funding of \$193,146** to be matched with in-kind County expenses of \$21,461 for a study **total cost of \$214,607**. This breakdown meets the requirements for a 90%/10% cost share.

This grant application has been **authorized** by C. Eric Young, the Tazewell County Administrator, and **supported** by Shanna Plaster, the Chair of the Tazewell County Board of Supervisors.

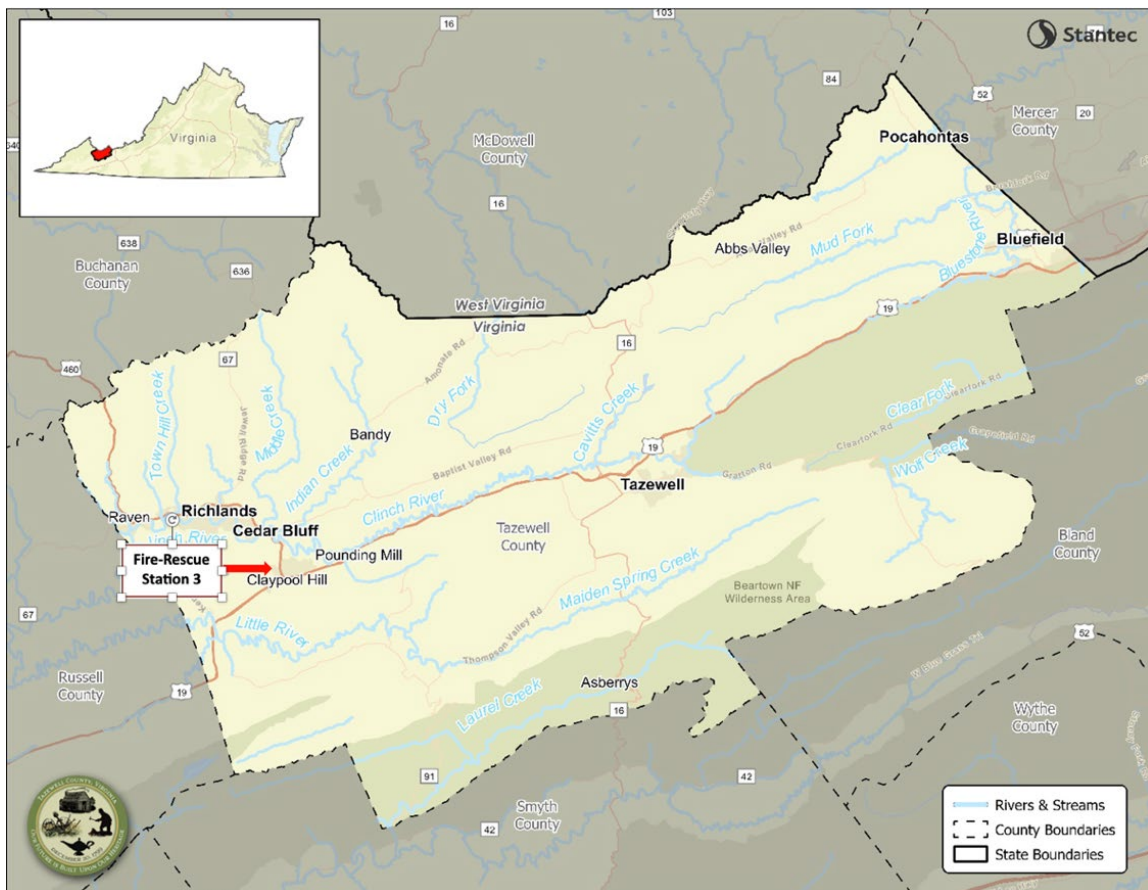


Figure 1. Map of Tazewell County showing location of fire station.

## Needs and Problems

The fire station is located in a valley on Honey Rock Road. Stormwater runoff flows down into the valley from higher elevations (**Figures 2 and 3**). The area around the fire station is developed and includes several businesses, parking areas, a church, and a cemetery. These land uses increase the amount of impervious surfaces and increase the surface flow of stormwater. In addition to the surrounding land uses, nearby landowners pipe stormwater off their properties and onto roadways, including Honey Rock Road. Such pumping and piping may be in violation of local ordinances.

The water on the roadway enters stormwater collection pipes that exceed capacity. Most pipes in the area are eight to twelve inches in diameter and were designed to handle natural stormwater runoff into the road. They were not designed to handle the additional water pumped and piped from surrounding residential properties.

**The fire station cannot function and respond to public safety emergencies when it is flooded (Figures 3 and 5). Flooding at the station is common during storm events. When the station and the road in/out of the station are flooded, firefighters cannot easily respond to emergencies. High water levels on the road and on the fire station property compromise access to the station, increase response times to emergencies and threaten the safety of fire professionals and the public. As storms become less predictable, more frequent, and more severe due to the changing climate, the flooding will worsen in frequency and intensity.**

The local watershed includes several small waterways/drainages that flow near the fire station. The surrounding area is moderately developed with a large amount of impermeable surface for businesses, residences, and parking. Flooding negatively impacts water quality in the watershed because excess and standing floodwaters pick up debris and contaminants from surrounding properties. Nearby businesses of particular concern include multiple autobody shops, light industry facilities, and a shopping mall. Improving stormwater drainage decreases the risk of contamination due to excess and standing floodwater in this developed area. Decreasing flood risk protects fire station employees, nearby business owners, and the public.

Flooding in this area threatens public safety in multiple ways. It causes dangerous road conditions and increases the risk of collision and breakdowns. It impedes access to and from local businesses and residences, isolating people from potentially lifesaving support. It threatens people's safety as they go about their daily activities by increasing the risk of slips and falls, drowning, moisture intrusion in buildings and related mold concerns, and intrusion of contamination into properties and into buildings.





Figure 2. Map of watershed in the vicinity of fire station.

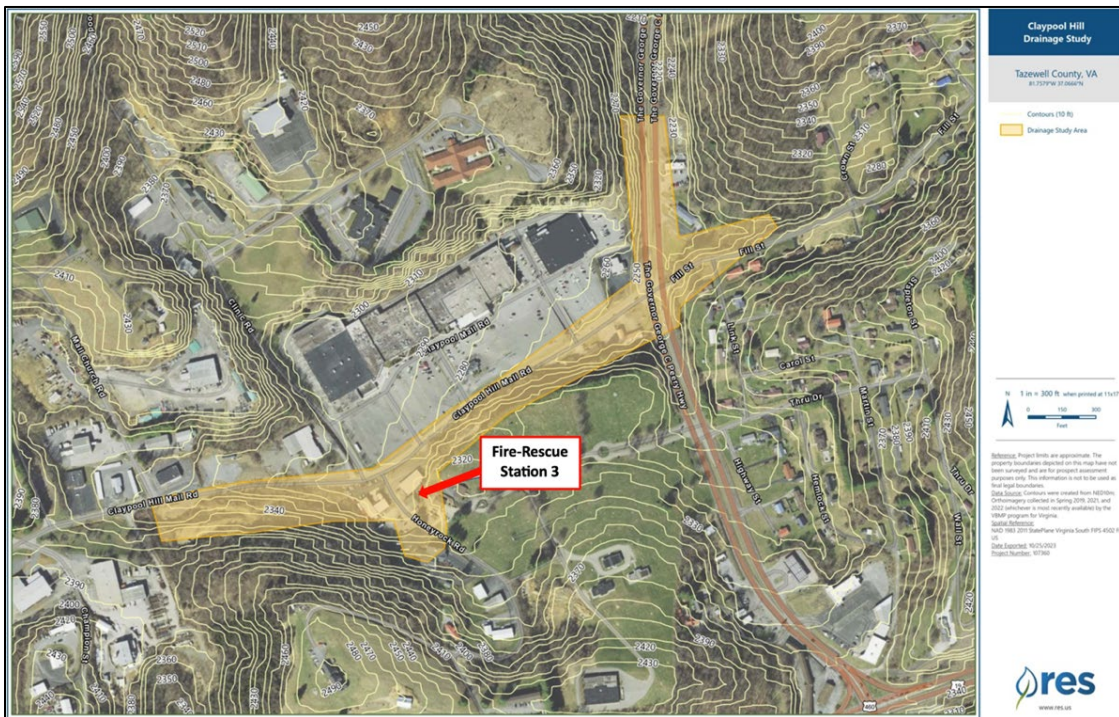


Figure 3. Topographic map of fire station and surrounding area.



*Figure 4. Typical road flooding.*



*Figure 5. Fire and Rescue #3.*

The environmental concerns due to flooding are centered on the local watershed. In a stormwater system that functions well, stormwater flows efficiently over impermeable surfaces and into permeable areas or collection pipes. In a flood event in this valley, stormwater does not move efficiently into collection areas. It sits stagnant, and water levels rise to cover surfaces that were not meant to be inundated. Nearby businesses including autobody shops, light industrial facilities, and a shopping mall may introduce debris and chemical contaminants into flood waters that build up. Eventually, the flood waters recede into stormwater collection and the local watershed. Reducing flood risk reduces contamination of the watershed.



Without funding, Tazewell County will face a challenge in conducting this stormwater study and related improvements. Funds for this unexpected need would have to be built into County budgets and may not ever be available or be available after several years, delaying the project through one or more rainy seasons. Funding from CFPF would ensure that flood risk is addressed efficiently and effectively in this specific area with a high impact on public health and safety.

The proposed project is a study to understand the options for alleviating flood risk in the area of interest. The study itself will identify and analyze potential stormwater alternatives. The alternatives analysis will evaluate potential solutions on criteria including the degree of flood risk protection.

Another part of the study is developing hydrologic models of the area to inform design. The project team considered several different methods for watershed modeling. The team has identified Base Level Engineering (BLE) as its preferred method. BLE is an emerging technology that couples a 2-dimensional hydrologic model with a stormwater infrastructure model, and it is the preferred option for the project team due to improved results.

The County has a median household income of \$42,937. This is not greater than 80% of \$80,615, the median household income in Virginia. Therefore, Tazewell County meets the definition of a **low-income geographic area**. In addition, the area has a **moderate social vulnerability index score** according to the VIMS Vulnerability Viewer available in AdaptVA and VFRIS (**Figure 6**). In addition, the CDC Social Vulnerability Index future rates the themes of socioeconomic status as high, household characteristics as high-moderate, racial, and ethnic minority status as low, and housing type/transportation as high-moderate.

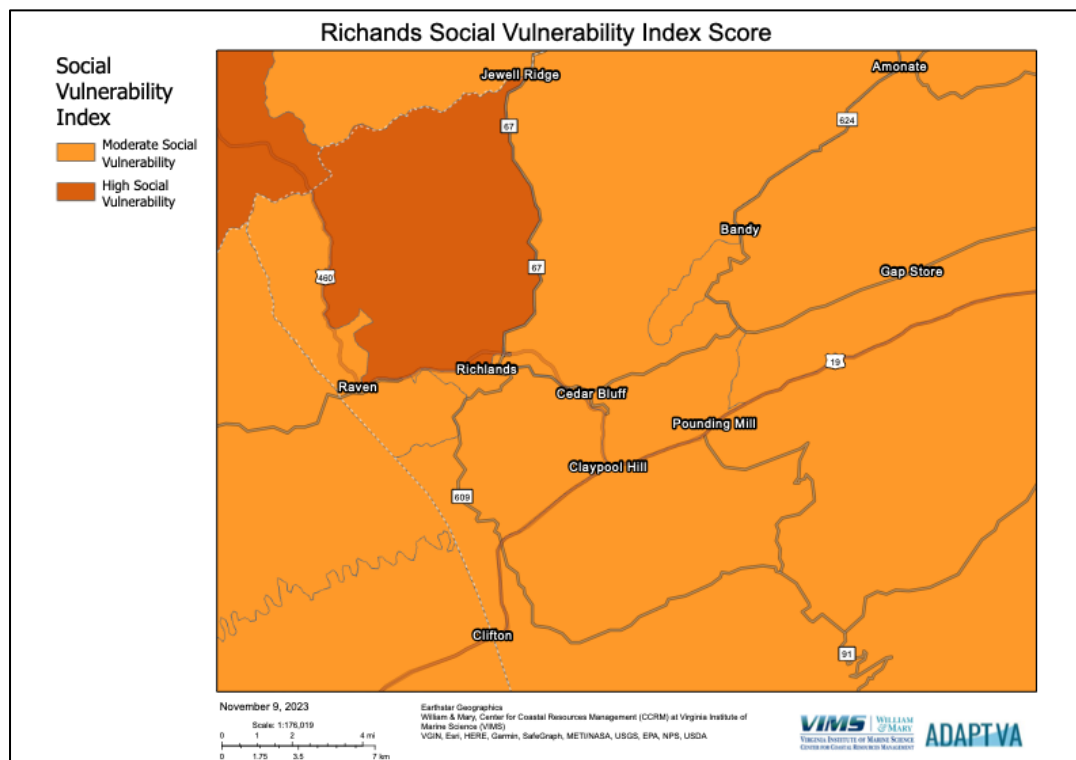


Figure 6. Social Vulnerability Index

## Goals and Objectives

The main goals for the proposed study has the following main goals and objectives:

**Goal 1:** Better understand the root cause of flooding in the vicinity of the Richlands Fire Rescue Station 3.

- **Objective 1a:** Perform a baseline and initial conditions review of existing conditions in the area.
- **Objective 1b:** Perform a preliminary hydrologic study using **best available science** and accounting for the **consequences of climate change** to identify a target reduction volume for the improvements.
- **Objective 1c:** Develop a Baseline two-dimensional (2D) Base Level Engineering (BLE) to understand the factors contributing to flooding.

**Goal 2:** Provide a comprehensive list of potential stormwater alternatives including community-wide solutions to help mitigate flood risk in the area.

- **Objective 2a:** Identify and assess three alternatives to achieve target reduction volume.
- **Objective 2b:** Use the alternative assessment to **prioritize one** or more future projects with a focus on **nature-based solutions**.

## Work Plan

The proposed study is scheduled to be completed within 16 months from the commencement date. This includes the tasks of planning, data collection, analysis, and evaluation. The following outlines the proposed tasks and activities as well as the anticipated timeframe for completion and deliverables:

### TASK 1: TOWN PLANNING AND COMMUNICATION

**Estimated Time:** 2 Months

Tazewell County will procure a design consultant team with qualifications to successfully complete the work, including **engineering (PE) and floodplain management (CFM) credentials**. The consultant will engage County and Town staff to determine **roles and responsibilities** for planning and managing the proposed study. Part of this task is determining what the County needs and setting clear goals and timelines. The consultant will schedule necessary coordination with County and Town staff to ensure all planning and project management **activities** are clearly defined. Activities may include stakeholder identification and engagement, resource allocation and budgeting, data collection and analysis, and monitoring and evaluation. **Outreach efforts** with a **targeted focus on reaching low-income, socially vulnerable, and other disadvantaged or previously unengaged groups to address socioeconomic inequities and enhance equity**.

**Deliverables:** Consultant contract, project management plan, list of stakeholders, and engagement plan

## **TASK 2: BASELINE AND INITIAL CONDITIONS REVIEW**

**Estimated Time:** 2 Months

The consultant will lead data collection by providing expertise on stormwater management and flood mitigation. The consultant will perform an initial assessment of the flooding issues and provide all available information about the infrastructure in the area, which includes as-builts of any stormwater infrastructure, as-built plans of the fire station, photos from previous flood events, and existing hydraulic models of the area. The consultant will review the existing data, perform a site visit to provide an initial assessment of the flooding issues, and advise the Town on implementation options.

**Deliverables:** Summary of Data

## **TASK 3: PRELIMINARY HYDROLOGIC STUDY**

**Estimated Time:** 2 Months

The consultant will perform a preliminary hydrologic study in accordance with the **best available science** and **future climate change projections** to identify and target reduction volume for potential improvements. Tazewell County has areas at risk of karst, or land made up of limestone at risk of sinkholes, and additional surveys and/or soil assessments may be needed. The main activities associated with a hydrologic study include data collection, modeling, analysis, and assessment. Findings from the study would help to determine appropriate stormwater alternatives for the area.

**Deliverables:** Hydrologic Study Results

## **TASK 4: BASELINE 2D BASE LEVEL ENGINEERING (BLE)**

**Estimated Time:** 3 Months

The consultant will complete a 2D BLE to better understand the existing flooding and will assist in determining the potential stormwater alternatives. 2D BLE hydraulic modeling is an emerging type of modeling that has many benefits. 2D BLE models are developed using LiDAR data to visualize the entire area. The use of LiDAR data allows for better integration of both overland and underground structures, multi-directional water flow, and velocity visualization. 2D BLE models show the interaction of a modeled area with both riverine flooding and stormwater flooding. For areas with complicated flooding issues, 2D BLE models allow for a more detailed understanding of the flooding occurring and the factors influencing it.

**Deliverables:** 2D BLE Model Results with Flow Pattern and Impoundment Mapping



#### **TASK 5: STUDY EXISTING CONDITIONS**

**Estimated Time:** 2 Months

All data collected in the above-mentioned tasks will be summarized into an existing conditions assessment. The assessment will allow the consultant to better understand the topography of the area, locate the source of flooding concerns, and determine potential stormwater alternatives for implementation.

**Deliverables:** Conditions Assessment

#### **TASK 6: DEVELOP STORMWATER MANAGEMENT ALTERNATIVES**

**Estimated Time:** 3 Months

Based on the identified target reduction volume and flow study, the consultant will identify three alternatives to reach the target reduction volume. The consultant will assess the viability of each option and provide a comparison of the alternatives to assist with selection.

**Deliverables:** Alternatives Assessment Report

#### **TASK 7: COMMUNICATE AND DOCUMENT RESULTS**

**Estimated Time:** 2 Months

After the potential stormwater alternatives are selected, the consultant will work with county and town staff to identify potential projects for flood reduction to be designed, permitted, and constructed. Depending on the results, consider moving the fire station as an additional alternative to the three identified in the previous step.

**Deliverables:** Design Report

The total timeline for the study is 16 months. Major deliverables are:

1. Preliminary Hydrologic Report
2. 2D BLE Model Results with Flow Pattern and Impoundment Mapping
3. Existing Conditions Assessment
4. Alternative Assessment Report

This project is a study and does not require a maintenance plan.

## Evaluation

The indicators of success for the Claypool Hill Drainage Study are as follows:

- **Completion of Preliminary Hydrologic Study:** The successful completion of the preliminary hydrologic study to identify target reduction volume is important in determining appropriate solutions.
- **Development of BLE and 2D Hydraulic Model:** The successful development of the BLE 2D Hydraulic Model is essential to assess the existing flood Risk and determine a list of potential solutions.
- **Evaluation of Alternative Solutions:** The successful evaluation of at least three alternatives for reaching the target reduction volume, with a detailed assessment of the feasibility of each option will assist with selecting the most effective solution to mitigating flood risk for the area.
- **Identification of Potential Projects and Flood Reduction:** The successful identification of potential projects for flood reduction that can be designed, permitted, and constructed. This will help to ensure that flooding impacts are reduced in the Claypool Hill area.
- **Compliance with Project Timeline and Budget:** Success can be measured by assessing the project's adherence to the outlined timeline and budget. This can be determined by monitoring the completion of various tasks within the stipulated timeframes and comparing the actual project costs with the budget allocated for each task.

The following data points will be collected and used to measure success:

- **Hydrological Data:** Collecting data on water levels, flow rates, and precipitation patterns will allow the engineer to determine the existing conditions of the area.
- **Geospatial Data:** Information on the topography and elevation of the area will allow the engineer to determine how water flows and accumulates during flooding events, as well as how the changes in the landscape affect flooding.
- **Stakeholder and Community Engagement Data:** Collecting data on feedback, input, and concerns from stakeholders and community members throughout the planning and implementation process is important to ensure their needs and priorities are considered and addressed. This data will also help to measure the success of the study.
- **Project Timeline and Budget Data:** Monitoring the timeline and expenses associated with the study will help to ensure the study stays on schedule and within budget.

Cost-effectiveness will be ensured by the County's use of competitive procurement and the study's partners' experience and knowledge of market costs for nature-based projects such as the proposed.

Potential products, services, meetings, and outreach efforts that may be conducted to ensure the success of the study include but are not limited to, public meetings and workshops, information materials, stakeholder engagement, engineering services, and progress reports and updates. These efforts will help to evaluate the effectiveness of the study and ensure that all tasks are completed.

To ensure that the proposed study meets the requirements of the agreement and is delivered on time the following can be used to monitor its progress:

- Timeline and milestones to ensure all deliverables are met within the agreed-upon timeframe.
- Regular progress meetings with project team to review the status of the study.
- Communication plan with all project team members, locality staff, and other stakeholders to ensure effective communication and clear understanding of roles and responsibilities.
- Quality control measures to ensure all deliverables meet the required standards and specifications.
- Contingency planning to prepare for any unforeseen delays or findings that may affect the progress of the study.

When these elements are incorporated into the project monitoring plan, any potential delays or challenges that arise can be addressed and utilized to modify or improve the outcomes and deliverables. Regular assessment of progress will ensure that project objectives are being met. The project team understands that all activities must begin within 12 months of the agreement date and must be completed within 36 months. Progress will be reported to DCR within the required quarterly reports.

## **ATTACHMENTS**

As required, in addition to this Scope of Work, the funding application package includes information provided in the online submittal form and the following attachments:

- Budget Narrative
- Detailed map of the project area
- FIRMette of the project area
- Historic Flooding data and Hydrologic Studies
- Social Vulnerability Index
- Hazard Mitigation Plan
- Comprehensive Plan
- Floodplain Ordinance
- Resilience Plan
- Authorization to request funding and Ability to Provide Share of Cost
- Letter of Support