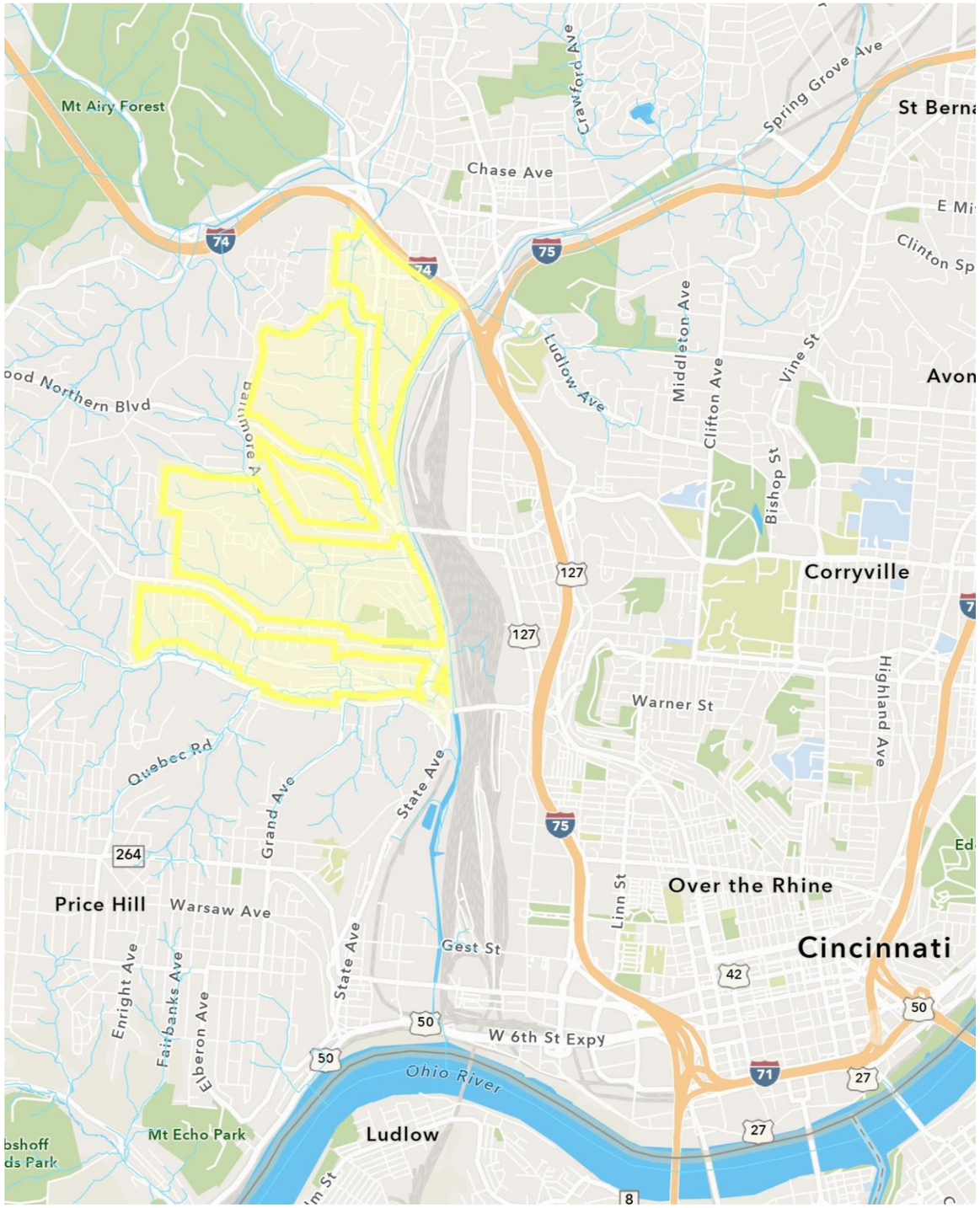
CUFA – Cincinnati EPA Technical Assistance Services for Communities

Beekman Corridor Neighborhoods



Project Overview

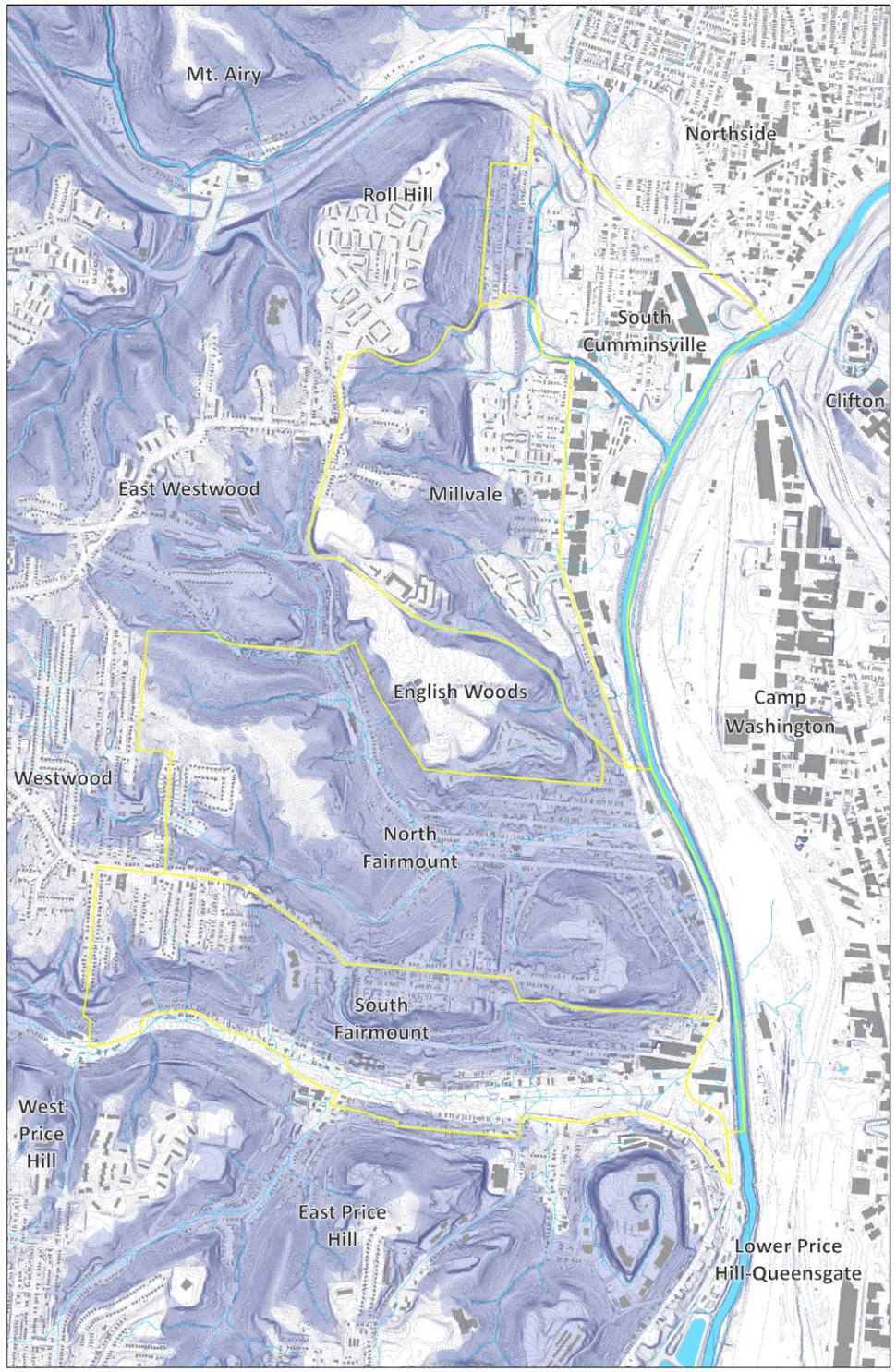
- EPA's Technical Assistance Services for Communities Program is providing technical assistance to Communities United For Action (CUFA). The EPA Environmental Justice department is providing ongoing support for our work.
- Assistance includes facilitating meetings with local government, residents, community organizations and others to identify potential solutions to address overland flooding issues at the residential and community scale.
- Project focuses on five Beekman Corridor neighborhoods within the Mill Creek Watershed: South Fairmount, North Fairmount, English Woods, Millvale, South Cumminsville.

Project Outcomes

- Document flooding and stormwater conditions, issues, and possible solutions in a **Flood Management Analysis**.
- Develop an **Overland Flooding Assistance Program Proposal** to fund a range of resident and community stormwater management projects to mitigate health and property impacts of overland flow.
- Collaborate with City Stormwater Utility to identify resources, communications, and ongoing activities that support residents' needs.
- Create an **Action Plan** that identifies priorities and recommendations for the five Beekman Corridor neighborhoods within the watershed and highlights broader considerations across the watershed.

Flood Management Analysis

- **Existing Conditions:** Site conditions and flooding issues related to residential flood experience in Beekman Corridor neighborhoods.
- **Issues and Concerns:** Issues and concerns residents experience related to overland flooding.
- **Potential Strategies and Solutions:** Potential best management practices, projects and tools to mitigate flooding at the residential property scale and neighborhood scale.

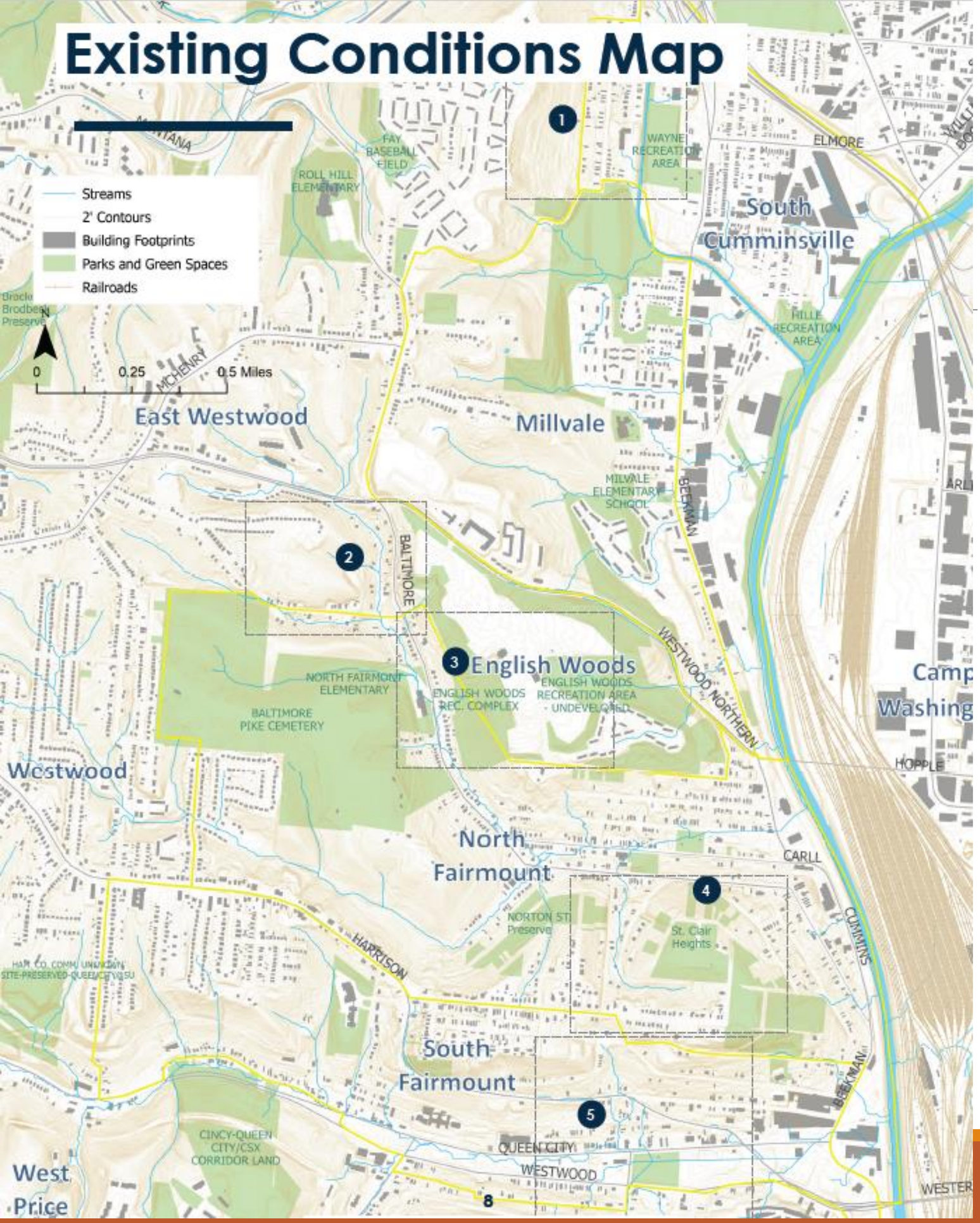


Existing Conditions Natural Features

The natural physical characteristics of the land, combined with the extreme weather events caused by climate change, increase the neighborhoods' susceptibility to landslides and flooding.

- **Steep slopes**. Much of the project area comprises land of over 20% slope.
- **Streams and creeks.** Streams and creeks flow over land and through culverts and pipes under houses and roads toward Mill Creek.
- **Soil.** Dense development in the project area has compacted the soil, even in demolished areas. Additionally, the high clay content of many soils in the area impedes water infiltration.

Existing Conditions Map



During the initial site visit, the project team observed and learned about several conditions and features that can inform understanding of flood dynamics and potential solutions.

1 South Cumminsville

- A concrete street gutter recently installed on east side of Tappan significantly reduced overland flooding and damage.
- Green infrastructure practices implemented at residence on Cass including a bioswale, native plantings, and rain barrel.

2 English Woods West (Yoast, Harkness, Baltimore)

- Significant overland flow from north and west of Harkness, causing road flooding and sewer backups.
- French drain and trench inlet installed behind house on west side of Harkness convey overland runoff away from house.

3 English Woods East (east of Baltimore)

- Runoff from existing parking lots and compacted soil of former development floods properties east of Baltimore Avenue.
- A natural swale appears to direct overland flow towards homes visited during site tour where flooding is a significant issue.
- Paper street, Merrel, connects English Gardens to Baltimore Avenue, extending along natural stream. Storm drain inlet and pipe appears to convey stream under private lot.

4 North Fairmount

- High vacancy around St. Clair Heights Park due to overland flooding and hillside erosion
- Heavy water flow down Trevor Place.
- Denham Street Raingarden captures stormwater runoff from two catch basins on Denham and overland flow; designed to capture 250,000 gallons of stormwater a year.

Diagram key

5 South Fairmount

- High vacancy along Waverly, Tremont, Knox due to overland flooding and hillside erosion.
- Uphill runoff causing overland flooding in homes and basements.

Existing Conditions
Built Features

Development patterns and vacancy

- Many of the houses built require significant reinvestment to withstand increasing flood exposure and landslide susceptibility.
- Stormwater runoff from the compacted soil and remaining impervious surfaces on vacant and commercial properties exacerbate stormwater management issues.

Drainage infrastructure

- Residents question the condition of the aging infrastructure, and the role leaks (likely caused by clogs, deterioration or damage) play in the property damage, erosion, and landslide activity.

Existing Conditions
Flood experience observations

Three types of flood scenarios are prevalent across the Beekman Corridor neighborhoods:

1. Stormwater runoff flowing from adjacent upland areas floods homes, erodes property, and contaminates waterways.

2. Flooding occurs in houses and ponding on property developed over underground streams.

3. Flooding and sewer back up regularly occurs in areas where infrastructure capacity is limited.

Neighborhood Issues and Concerns

- More than half of the residents of these neighborhoods are low- to moderate-income and face an average life expectancy much lower than that in other areas of Cincinnati.
- We know communities in Cincinnati like those in the Beekman Corridor will continue to be disproportionately impacted by climate change.
- Environmental health is influenced by chemical and physical stressors. Erosion, transport of bacteria and sediment and toxins are few examples of the impacts of overland flows.

Key concerns for residents are:

- **Flooding**. Residents are concerned about ongoing damage to homes, potential contamination, and erosion caused by overland flooding.
- **Housing**. Damage caused by overland flooding continues to negatively affect property value. Residents worry about losing their homes and about being priced out of their neighborhoods by gentrification as vacant properties are redeveloped. Most homeowners' wealth is held in their homes.

Neighborhood Priorities

Residents identified the following priorities during site visit discussions. While this project focuses specifically on overland flood mitigation, all three priorities are linked to the communities' long history of flood experience.

1. Reduce overland flooding at residences and neighborhood scale.

2. Stabilize homes to preserve property values.

3. Create opportunities for positive collaboration with City leadership and services.

Flood Mitigation & Management Challenges

- Flooding issues often extend between private and public property.
- Management responsibility for stormwater runoff flowing from upland to downhill properties is not distributed equally.
- Lack of technical and financial resources limit proactive measures. Repairs to existing homes can be difficult to diagnose, and costly to fix.
- Uncertainty and complexity of dealing with buried, aging infrastructure hampers repairs. Many potential issues such as leaks, cracks and clogs in pipes or connections cannot be identified without digging up infrastructure.
- Because flood mitigation measures and benefits typically extend across a sewer shed or watershed, residents may not experience benefits at an individual property level.
- The efficacy of flood mitigation practices and tools can be difficult to quantify given the wide range of variables such as weather patterns and site conditions.

Strategies and Solutions

Stormwater solutions can be implemented at the residential and neighborhood scale to mitigate issues associated with overland flooding. These practices can also reduce overall input to the combined sewer system, reducing the risk of overflows that can cause sewer backups and discharges to streams and rivers.

Capture and store water. Rainwater storage systems collect and store stormwater for specific purposes, such as irrigation, and often can hold water for a significant period.

Redirect water. Collect and move runoff along a pipe or open channel to safe areas.

Capture and detain water. Capture runoff in a garden, basin or pond to hold it temporarily for infiltration or slow release after rain event has passed.

Proposed Solutions

- On a residential scale, installation of features such as **French drains, flood barriers, cisterns and downspout extensions** can protect homes from overland flooding.

- On a larger scale, widespread vacant lots across the neighborhoods might be reused for green infrastructure such as **dry detention ponds, bioswales or infiltration areas** to mitigate downhill flow and ponding on developed properties.

- Vacant and undeveloped parcels and right of way can also house infrastructure such as **underground storage tanks or detention ponds** to protect surrounding properties.

The following examples illustrate how a multi-prong approach can be used at two scales to address one of the most common flood experiences in the Beekman Corridor: stormwater runoff flowing from adjacent upland areas that causes flooding in homes and eroding property.

Neighborhood & Residential Scale

Features to stop water as it flows toward the house

Interventions to capture water uphill include removing unused paved lots and replacing with amended soil, trees, vegetation, and bioretention facilities.

As noted on the existing conditions map, swales direct runoff from remaining parking lots, compacted soil and streets that serviced the former English Woods housing development toward homes downhill along Baltimore Avenue. Water gushes down the slope which drops 150 feet between the houses and the vacant land.

Overland Flood Assistance Program Overview

Program Description

An Overland Flood Assistance Program can provide financial and technical assistance to qualifying private property owners to implement flood mitigation strategies (including repairs) to protect existing homes and reduce the stormwater burden on the City's combined wastewater infrastructure.

Geography

The program is limited during the pilot phase to properties within the five Beekman Corridor neighborhoods.

Overland Flood Assistance Program Services

Assessment

- Diagnose issues. *Depending on nature of issue and scale, could include preparatory check list, self-diagnosis, and/or site visit.*
- Identify opportunities for flood mitigation measures (including stormwater BMPs, infrastructure repairs).

Report/Plan

- Prioritize and select flood mitigation measures to implement.
- Develop design/specifications documentation.
- Create a work plan including tasks, costs, and resources.
- Identify monitoring and maintenance requirements.

Construction/Implementation

Evaluation

Monitoring and maintenance

Overland Flood Assistance Program Providers

Partners are needed to administer the program, perform services, and implement solutions.

Administrator

- Designated City or County agency with experience administering programs.
- Funding for the pilot program should include resources for designated staff to manage the program.

Service providers

- Non-profit organizations with expertise at stormwater management, colleges/universities, cooperative extensions
- Subcontractors
- Municipal departments or agencies with engineering expertise
- Property owners

City permitting and inspection (as needed)

Overland Flood Assistance Program Funding Sources

Identifying funding sources for the pilot program is a critical path. The pilot program plan should include efforts and partners committed to secure new funding sources for long-term delivery.

Funding examples from other programs:

- Local: bonds, stormwater utility fee, other development fees
- State and Federal funding

Housing development or HUD funding programs

- Community Development Block Grant (CDBG) Program

Private, public-private grants

Estimated Costs for Stormwater Retrofits

Draft for internal review. Please do not distribute.

Costs for stormwater management BMPs and other proposed tools and repairs to mitigate flooding vary significantly based on site conditions, scale/extent, nature of flooding and more. The following ranges are used to estimate potential costs for typical BMPs and tools used to mitigate stormwater. Due to broad variability, estimates for repairs are not included.

- Costs v… condit…
- Costs e… permitting fees.
- Private property estimates assume retrofits for existing typical lot size.
- Only 2-3 BMPs or tools likely to be recommended per site.
- Neighborhood scale assumes size of typical vacant lot as a scale for reference.

BMP or Tool	Installation and Materials	Maintenance (annual)	Private property retrofit estimates	Neighborhood scale retrofit estimates
Rain garden	$35-40/SF	$3-4/SF	$3,500	$75,000
Bioswale	$55/LF (8’-14’ w)	$3-4/SF	$5,000-8,000	$10,000
Trees/plantings	$10-20/tree	$3-6/tree	$150	$300-$600
Dry pond	$1-$1.50/CF	n/a	n/a	$15,000 (15,000 CF)
French drain	$20-$60/SF	n/a	$2,000-$4,000	n/a (no structure)
Cistern	Variable	n/a	$1,200 (custom size)	Variable by size
Rain barrel	$200	n/a	$200	n/a

Sources: *US EPA Costs and Benefits of Storm Water BMPs, Terrascope 2023, Puget Sound Stormwater BMP Cost Database.*

Draft for internal review. Please do not distribute.

Potential Program Budgeting

Private property stormwater management BMP retrofit budgeting considerations:

- **Approx. $3,000-$10,000 per property can provide flexibility in type and scale of installation(s) to meet variety of conditions and needs.**
- Budget to consider number of properties to include in pilot period.
- Maintenance, permitting (if applicable), design and administrative fees not included in installation estimates.

Neighborhood-scale retrofit (private or public property) considerations:

- **Based size of typical vacant lot (as a reference, location and scale will vary), approx. $10,000-$75,000 per site can provide flexibility in type and scale of installation(s) to meet variety of conditions and needs.**
- Maintenance, permitting (if applicable), design and administrative fees not included in installation

Calculating the quantity of stormwater prevented from entering the combined wastewater system and associated cost savings and risk reduction will be important to consider in budget considerations.

Next Steps

Gather input on Program Proposal and Flood Analysis

- Neighborhood Residents and Stakeholders – mid-November
- Community Groups – mid-November
- MSD and SMU – ongoing
- Other County and City agencies – TBD (identify potential partners)

Research financial, technical assistance resources

- Federal, state and local funding opportunities
- Funding models (alternatives to grants)
- Potential partners