

Scope of Work Narrative

Needs and Problem:

The 8th and 9th Voter Districts in the City of Richmond are located on the southside of the James River. These districts capture historically redlined and annexed neighborhoods which face continuous flooding issues due to disparities in necessary stormwater infrastructure. These flooding issues are visualized in the below heat map (Figure 1) which shows the past 20 years of residential flooding complaints submitted to the City of Richmond.

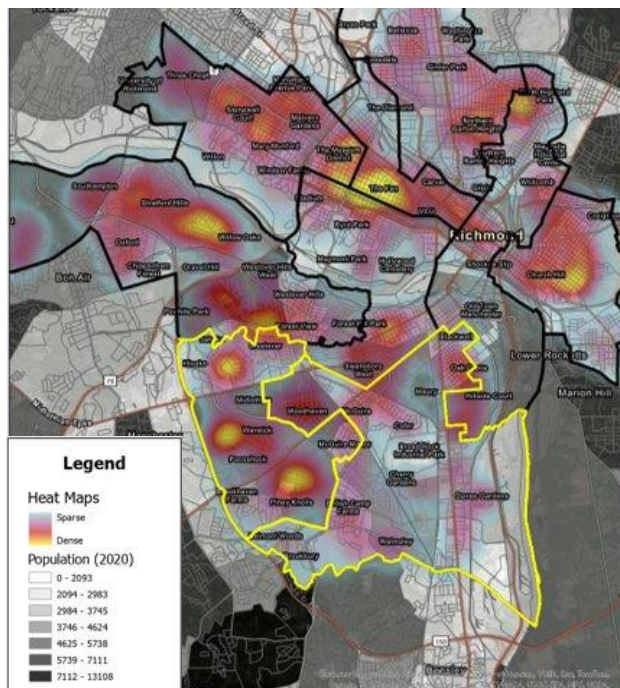


Figure 1: Residential stormwater and flooding complaints heat map. The 8th and 9th voter districts are outlined in yellow.

The City owns a geodatabase which has digitized available as-built drawing for all asset types. During a previous capital improvement project on Norborne Road in the 8th Voter District, it was discovered that a significant amount of the stormwater assets in the area was missing from the City's geodatabase. The Norborne Road mapping and improvement pilot project performed a full desktop review of all available records and field investigations. At the conclusion of this project over 10,000 linear feet and 64 structure were discovered and the added to the geodatabase. This resulted in a 53% increase of stormwater assets in the project area.

The lack of full stormwater infrastructure records presents an obstacle to accurately understand the recurring flooding issues in these neighborhoods and create difficulties for current and future capital improvement projects to address flooding issue at the full system level. Complete asset information is necessary to make the best data-driven decisions possible, and a full understanding of the existing stormwater system will ensure that the City of Richmond is able to operate more equitably and efficiently. Up to date infrastructure mapping will aid in the following ways:

1. Improved Flood Resilience Planning: Accurate mapping will assist in the planning and development of future stormwater capital improvement projects
2. Equitable Resource Allocation: Vulnerable neighborhoods lacking appropriate stormwater infrastructure can be better identified with complete mapping and capital improvement funding can be better allocated to identified neighborhoods in need
3. Informed Disaster Preparedness: Accurate mapping is crucial for developing and enacting disaster response plans to protect vulnerable residential communities
4. Enhanced Environmental Management: Accurate stormwater mapping is critical for understanding sub-watershed boundaries and informs surface water modeling to track potential pollutants

It is essential that the City of Richmond's stormwater geodatabase accurately reflects all existing assets to best plan for the future, serve residents in an equitable manner, enhance public safety, and understand and manage environmental impacts. Without this work, the 8th and 9th districts would remain uninformed and at risk.

The City of Richmond's stormwater inventory update Phase 2 will focus on priority sub-watersheds 11-30, which span across 13 census tracts. This area is predominantly disadvantaged, with a median household income of \$47,152, only 52% of the state median household income of \$89,931. The census blocks groups within the sub-watersheds have a range of social vulnerability scores, ranging from -0.24 to 2.89. The average social vulnerability score is 1.91, resulting in a classification of Very High Social Vulnerability.

Goals and Objectives:

The City of Richmond was awarded the DCR CFPF Round 4 Capacity Building and Planning Grant – City of Richmond Proposal to update The City of Richmond's stormwater inventory. The purpose of this grant was to prioritize the neighborhoods within the 8th and 9th districts in a meaningful way and update the stormwater inventory in priority neighborhoods through desktop data review and field investigations.

The work plan for the Round 4 grant project kicked off with the creation of the neighborhood prioritization list to appropriately prioritize flood prone and socially vulnerable neighborhoods. With input from the City of Richmond's Capital Improvement Projects department and Operations and Maintenance department, a GIS scenario builder tool was created which broke down the 8th and 9th districts by sub-watersheds and applied weighted attributes to create a neighborhood prioritization list based on residential flooding risk and vulnerability. A pilot study area was reviewed by a desktop team and field investigation team, and approximately 30% additional stormwater assets were identified and recorded.

A Scope Clarification Memorandum was submitted to the DCR Grant Managers on January 24th, 2025, to clarify that the Round 4 grant was not intended to update all stormwater asset inventory within the 8th and 9th districts, rather the update would occur within the 8th and 9th districts and the exact boundaries of the project could only be known after the neighborhood prioritization list was created. This memorandum states that the Round 4 grant is only intended to initiate the project and review and update priority neighborhoods (subwatersheds) 1-10 as listed below:

1. PcshmCrk_E_11
2. PcshmCrk_E_12
3. PcshmCrk_E_14
4. RdyCrk_08
5. RdyCrk_05
6. RdyCrk_06
7. GrndllCrk_01
8. BrdRckCrk_10
9. PcshmCrk_E_13
10. GdesCrk_11

This DCR CFPF Round 5 Grant titled The City of Richmond's stormwater inventory update Phase 2 intends to review and update the priority neighborhoods (sub-watersheds) 11-30, defined in the DCR CFPF Round 4 Grant, as listed below:

11. RdyCrk_02
12. RdyCrk_03_OC
13. GrndllCrk_15
14. PcshmCrk_E_06
15. FlIngCrkDS_18
16. GrndllCrk_03
17. BrdRckCrk_13
18. BrdRckCrk_04
19. GrndllCrk_05
20. GrndllCrk_20
21. GdesCrk_02
22. GrndllCrk_30_DD
23. PcshmCrk_E_10
24. FlIngCrkDS_16
25. GrndllCrk_02
26. BrdRckCrk_15
27. PcshmCrk_E_05
28. GrndllCrk_11
29. GdesCrk_06
30. GdesCrk_01

A map of sub-watersheds 11-30 can be found in the CID510129_CityOfRichmond_CFPF_ProjectAreaMap attachment.

The purpose of pursuing the Round 5 grant is to continue updating the stormwater inventory database to better plan for future capital improvement projects, allocate resources equitably, enhance public safety, and manage environmental impacts.

The goal for this capacity building and planning project is to develop an accurate and comprehensive stormwater asset geodatabase by adding a significant percentage of additional stormwater assets through desktop review and field investigation. Additional assets found will be recorded and reported

to the City to inform future projects. This project aims to be completed within 3 years of the notice to proceed.

Work Plan:

Based on the work done in the Round 4 project, the following technical plan of operations has been created to continue updating the existing City of Richmond stormwater geodatabase:

1. For each priority neighborhood, the desktop review team will identify and flag all stormwater assets missing from the original City of Richmond stormwater geodatabase. Google Street Maps, existing as-builts, and recent available survey information will be used for this process.
 - a. The desktop review team will perform level 1 peer-reviews of missing stormwater assets to confirm all flagged assets and raise any questions regarding areas of interest.
2. The desktop team will create polygons within the Field Maps application that will draw clear boundaries in which the identified missing stormwater assets are located. The desktop team will also identify areas of uncertainty where further field investigation is necessary.
3. A pre-field investigation meeting will be held with the desktop team and field investigation team. The desktop team will present their findings and describe where and what the missing assets are within the priority neighborhood. The desktop team will also present the areas of uncertainty and describe what information they are unable to obtain from the desktop review.
4. The field investigation team will enter the field to capture all identified and flagged missing stormwater assets within the boundary lines and investigate areas of uncertainty.
 - a. The field investigation team will also be able to make professional judgment decisions in-field to capture additional non-flagged stormwater assets as necessary. If the field investigation team determines that there are extensive additional assets beyond the boundaries drawn by the desktop team, then a priority neighborhood review meeting will take place between the desktop team and field investigation team to discuss those additional areas and stormwater assets.
 - b. The field investigation team will flag all stormwater maintenance issues. These flagged issues will be recorded and sent to the City of Richmond Operations and Maintenance team via an informal quarterly memorandum.
 - c. The field investigation team may perform as needed thorough sub-surface stormwater asset investigation including subsurface videoing and storm drain system sketches. If extensive sub-surface investigation is suggested, then a priority neighborhood review meeting will take place between the desktop team and field investigation team to determine required efforts.
5. The desktop team will review the field maps updates by the field investigation team at the end of each in-field day. The desktop team will identify any missing asset updates or areas and communicate those data gaps to the field investigation team before the beginning of the next in-field day.
6. After the completion of the field investigation for the priority neighborhood, both the desktop team and field investigation team will perform a full QA/QC review.
 - a. The desktop team will review each type of additional asset and report the percentage of additional assets to the City in regular progress updates.
7. The desktop team will build a geodatabase with the additional recorded assets and submit quarterly updated geodatabase files to the City of Richmond's GIS department. These

updated geodatabases will then be added to the master City of Richmond asset geodatabase. Once the updated geodatabases are sent to the City of Richmond's GIS department, they will be the responsibility of the City of Richmond, and the file maintenance will follow their standard protocol.

8. Once the process is completed, this technical plan of operations will be repeated for the next priority neighborhood. Each priority neighborhood will follow different timelines as no two neighborhoods are the same size.

Evaluation

Successful completion of this work will result in a unified source of stormwater asset inventory for priority neighborhoods 11-30. The expected result will be a reliable stormwater asset inventory that will improve stormwater capital improvement project planning, allocate resource equitably across neighborhoods, increase disaster preparedness, and enhance environmental management.

Based on the Norborne Road mapping and improvement pilot project and the Round 4 pilot study, it is expected that each neighborhood will have between 30%-53% additional assets identified and recorded. This range will be the benchmark used to determine the success of each neighborhood.

Quarterly updated geodatabases will be submitted to the City of Richmond's GIS department for integration into the master geodatabase. If any delays in the quarterly submittals take place, they will be communicated to the City of Richmond's GIS department promptly.