

New Decision Making Tools for Communities & Residents: the RainReady Approach



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**US Army Corps
of Engineers®**

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The Problem: Urban Flooding



Overbank



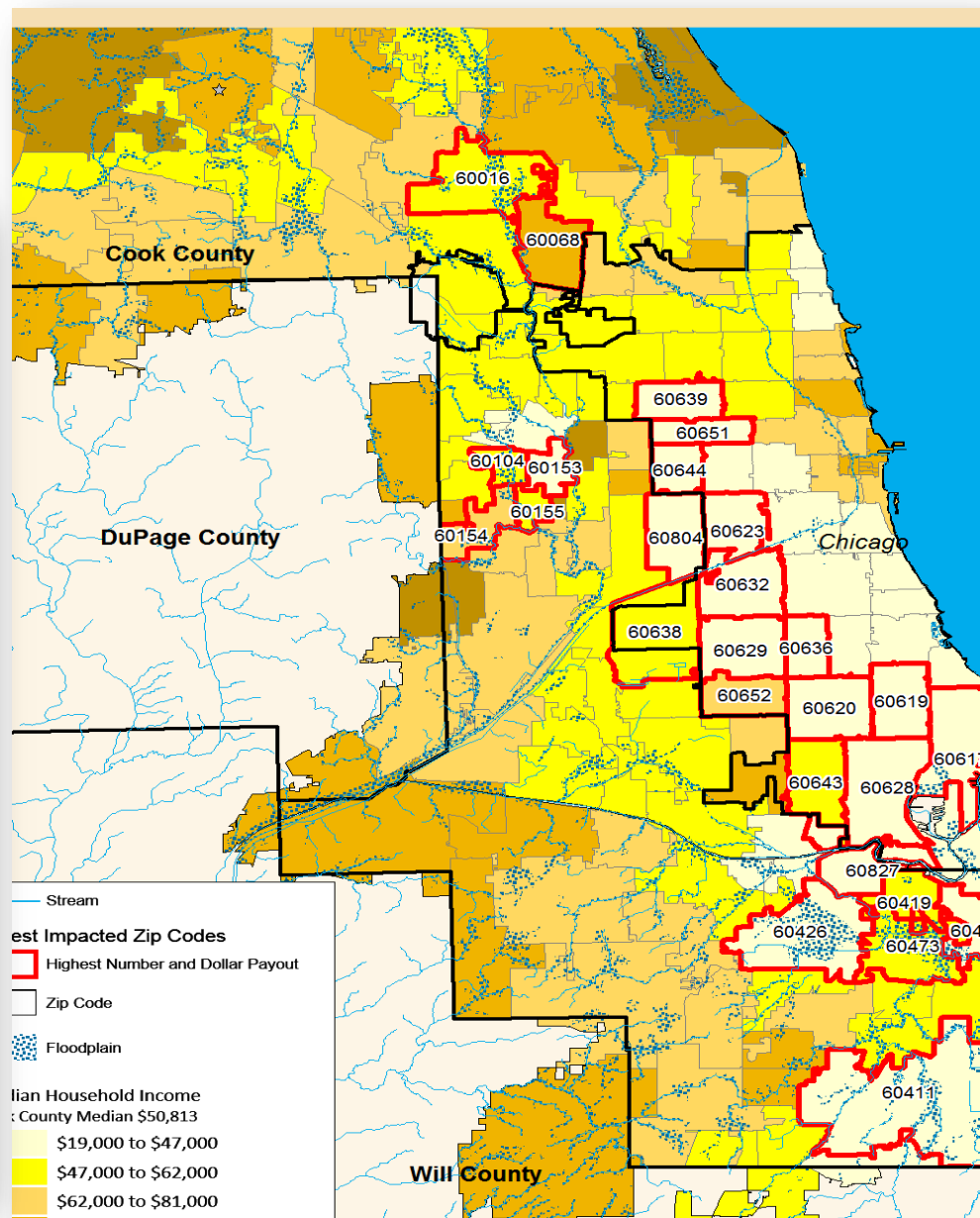
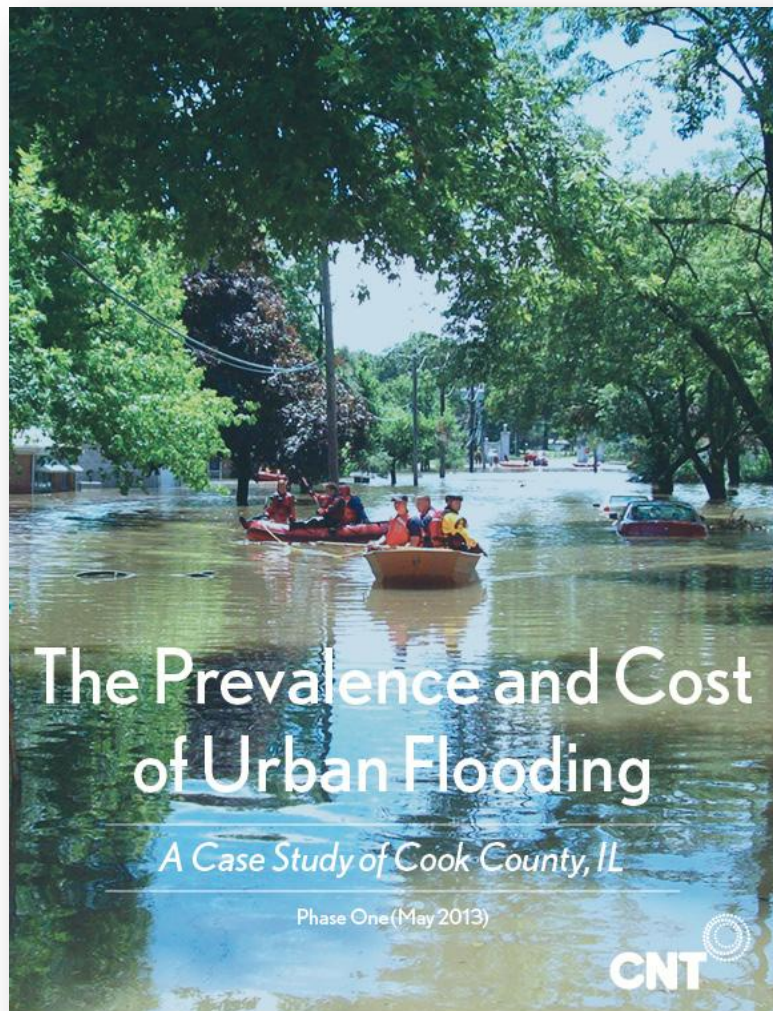
Basement Backup



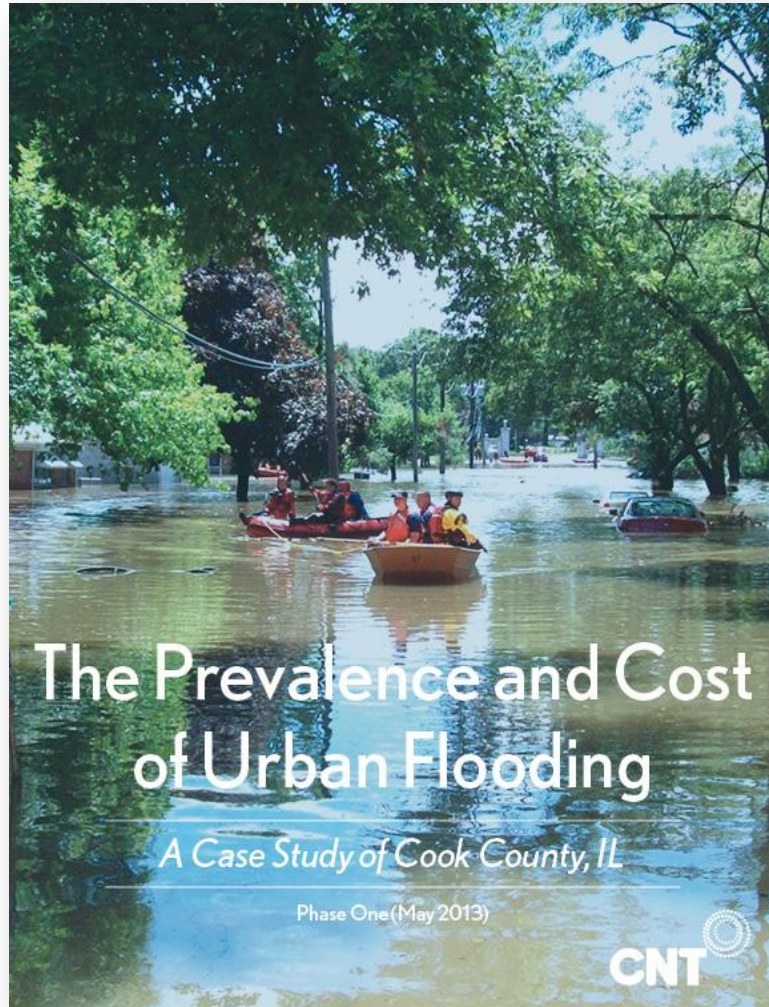
Seepage



Overland



Select Recommendations for Local Governments

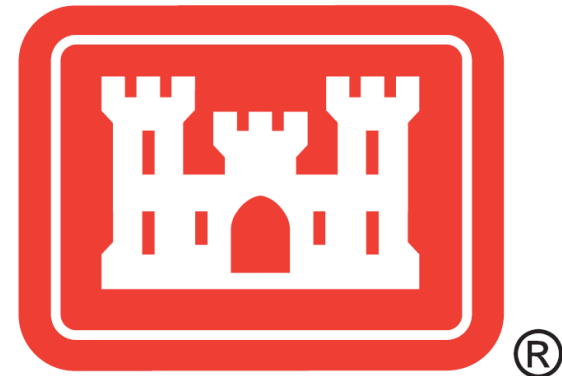


- Communities should **investigate existing property evaluation programs** to help homeowners
- Communities should improve stormwater management in redeveloping areas by adopting stormwater ordinances that **incentivize reduction of imperviousness and updating storm water systems**, especially in known flood problem areas.
- Within a reasonable timeframe, communities should **update their storm sewer atlas** with storm sewer location, infrastructure sizes and design data to allow for evaluation of the effect of changing rainfall patterns on system capacity to more accurately identify areas at risk for urban flooding, and to better inform stormwater management planning.
- Non-CRS **municipalities should consider using CRS principles** in stormwater management to make their communities more resilient

U.S. Army Corps of Engineers

Planning Assistance to States (PAS)

- Authorized by: *Section 22 of WRDA, as amended*
- Partner with Tribes and other non-Federal entities
 - %50 Federal /%50 non-Federal cost share
 - Work-in-kind or cash
- Preparation of comprehensive plans for the development, use, and conservation of water and related land resources
- Needed planning assistance is determined by non-Federal partners
- Initiated upon request and approval
- Studies conducted at planning-level of detail only
 - No feasibility-level studies or detailed design

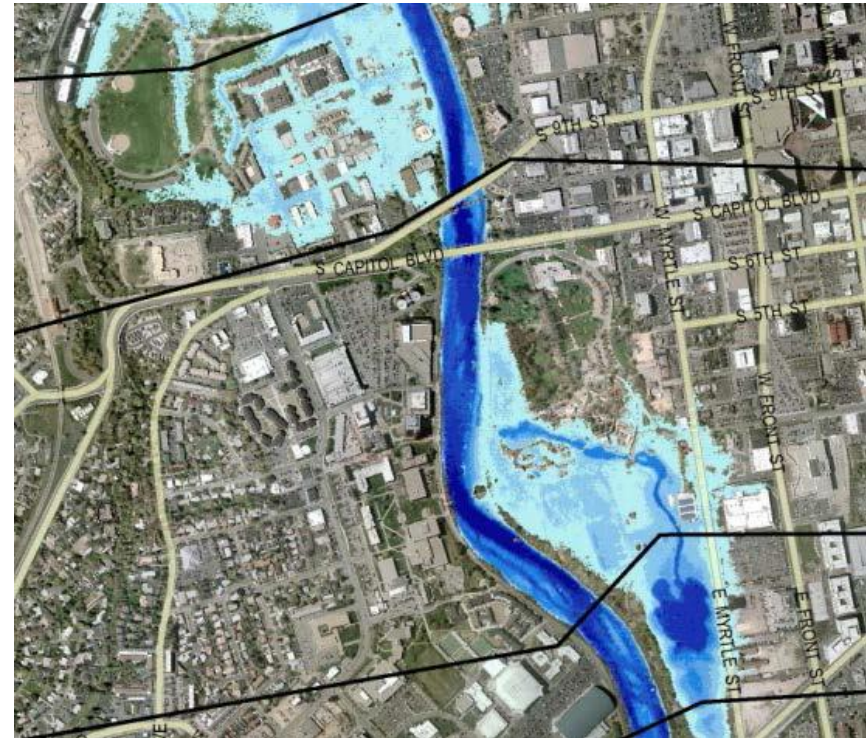


Typical Planning Assistance Studies

The program can encompass many types of studies dealing with water resources issues.

Examples include:

- Flood damage reduction assessments
- Flood inundation mapping
- Dam safety and failure modeling
- Water supply and demand analysis
- Water quality assessments
- Environmental restoration concepts
- Wetlands delineation and biological assessments
- Coastal Zone Management/ Protection



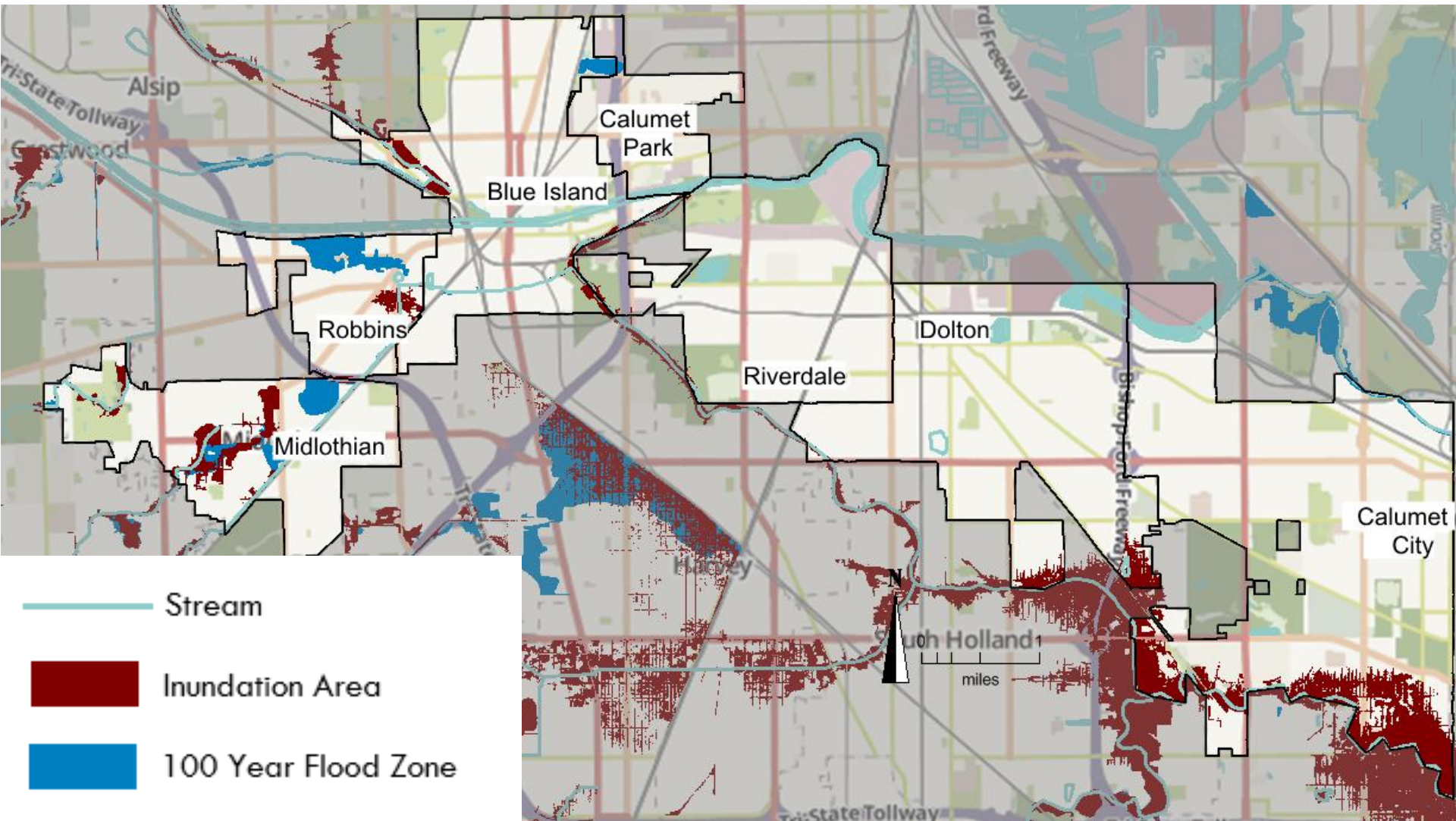
PAS Case Study

RainReady, Heart of the Calumet

- **Non-Federal Sponsor:**
Cook County Bureau of Economic Development
- **Work-in-kind:**
Funding for Center for Neighborhood Technology (CNT)
- **Agreement initiated:**
September 30, 2015
- **Study Description:**
To develop a shared plan, with specific actions for each of the six high flood risk communities within the Watersheds of the Little Calumet River and the Cal Sag Channel in the south suburbs of Cook County, Illinois, and find solutions to mitigate risks of future flooding and build broader community resiliency



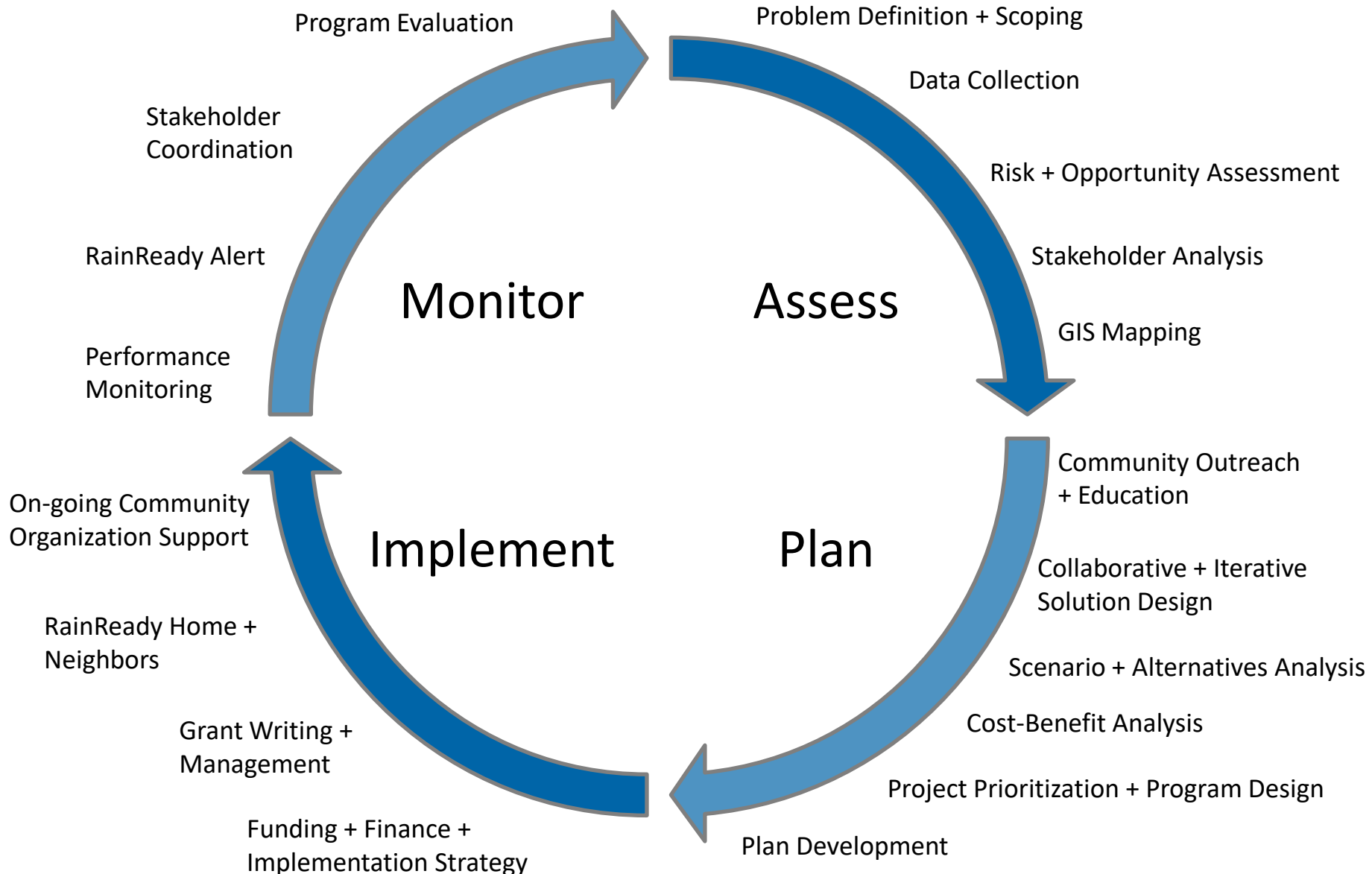
SUBURBAN COOK COUNTY PROJECT AREA



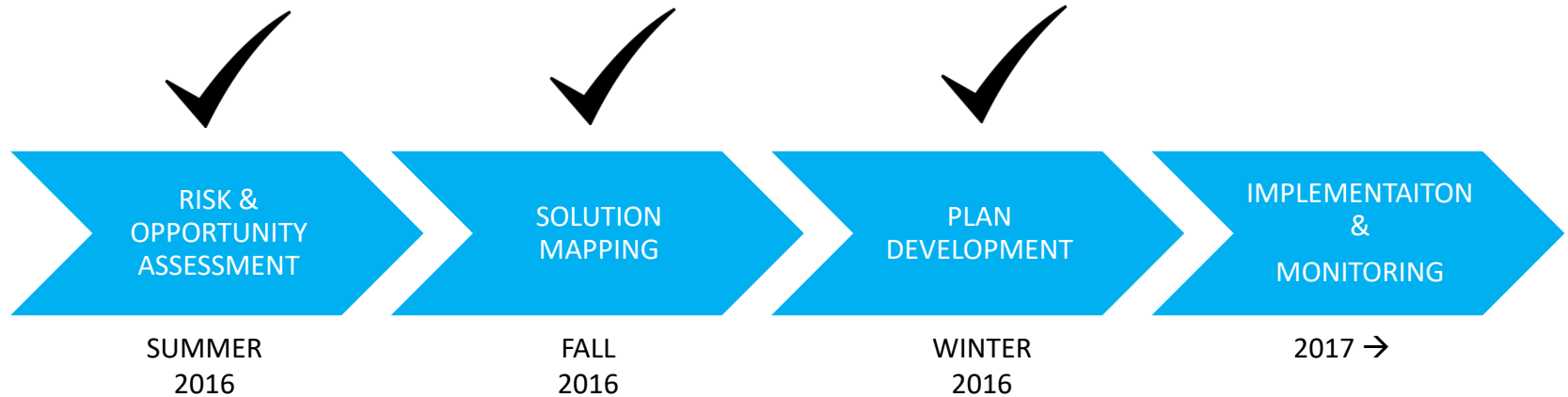
Planning Objectives

- Establish shared understanding of flood risks and opportunities
 - Public Outreach
 - Planning-level Engineering
 - Hydrologic & Hydraulic Modeling
 - **Achieve consensus on priorities**
 - **Provide municipalities with roadmap for implementation**
 - **Empower residents to own the plan**
 - **Prepare community to create sustainable financing mechanisms**
- 

Resiliency Process

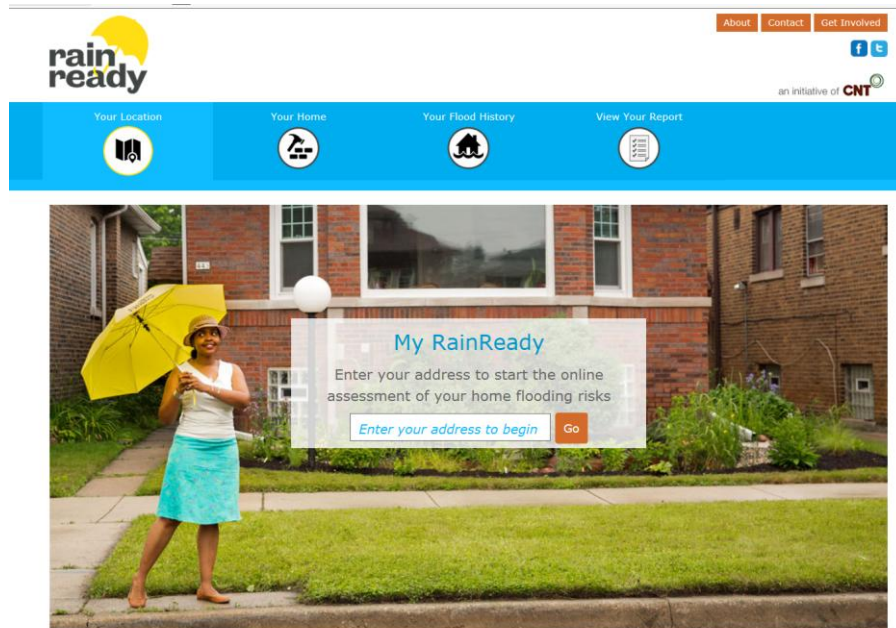


THE RAINREADY PLANNING PROCESS

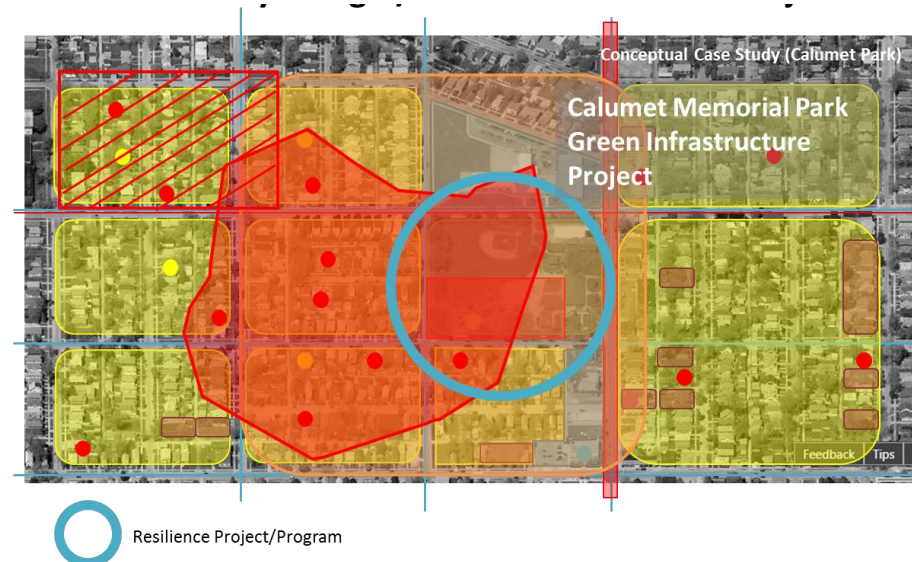


New Decision-Making Tools for Communities and Homeowners

For Homeowners My RainReady



For Communities/ Planners Flooding Solutions Tool



Map Risk: **Problem Points**

Phase 1



Identified through prior risk assessments (e.g. NDRC, MWRD, Millennium Reserve) and stakeholder meetings



CMAP Stormwater Analysis Tool Output



RRC Survey Results



Problem Areas



Problem Catchments



Problem Points

Map Resilience Opportunities: **Assets**

Phase 1



Community Flood Solutions Scenario Planning Tool

RainReady Community Risk Tool

Catchment: 420
 Area: 962,156 sqft [view data](#)
 FLOOD RISK SCORE: 5 [expand](#)
 OPPORTUNITY SCORE: 2 [expand](#)

Priority Score **7**
[Print Snapshot](#)
[Generate Permalink](#)

AVERAGE ANNUAL RAINFALL

Annual Rainfall (in): 26.77 [edit](#)
 Design Storm Rainfall (in): 2.44 [edit](#)
 Design Storm Time (hrs): 6.0 [edit](#)

REDUCTION GOAL

Precipitation Depth Capture (in): **0.5**

Volume Needed to Capture:
40,090cuft (299,894 gallons)

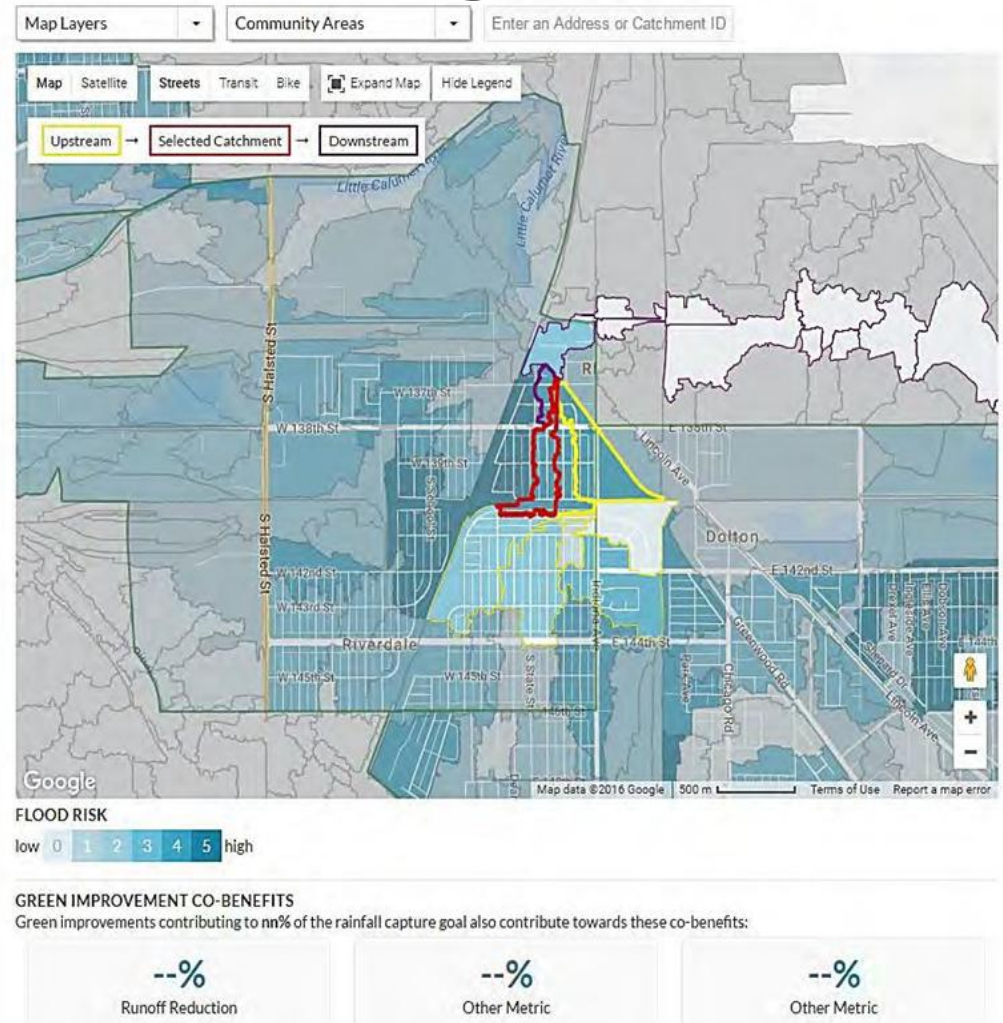
49.1%

0 Goal Reached 100

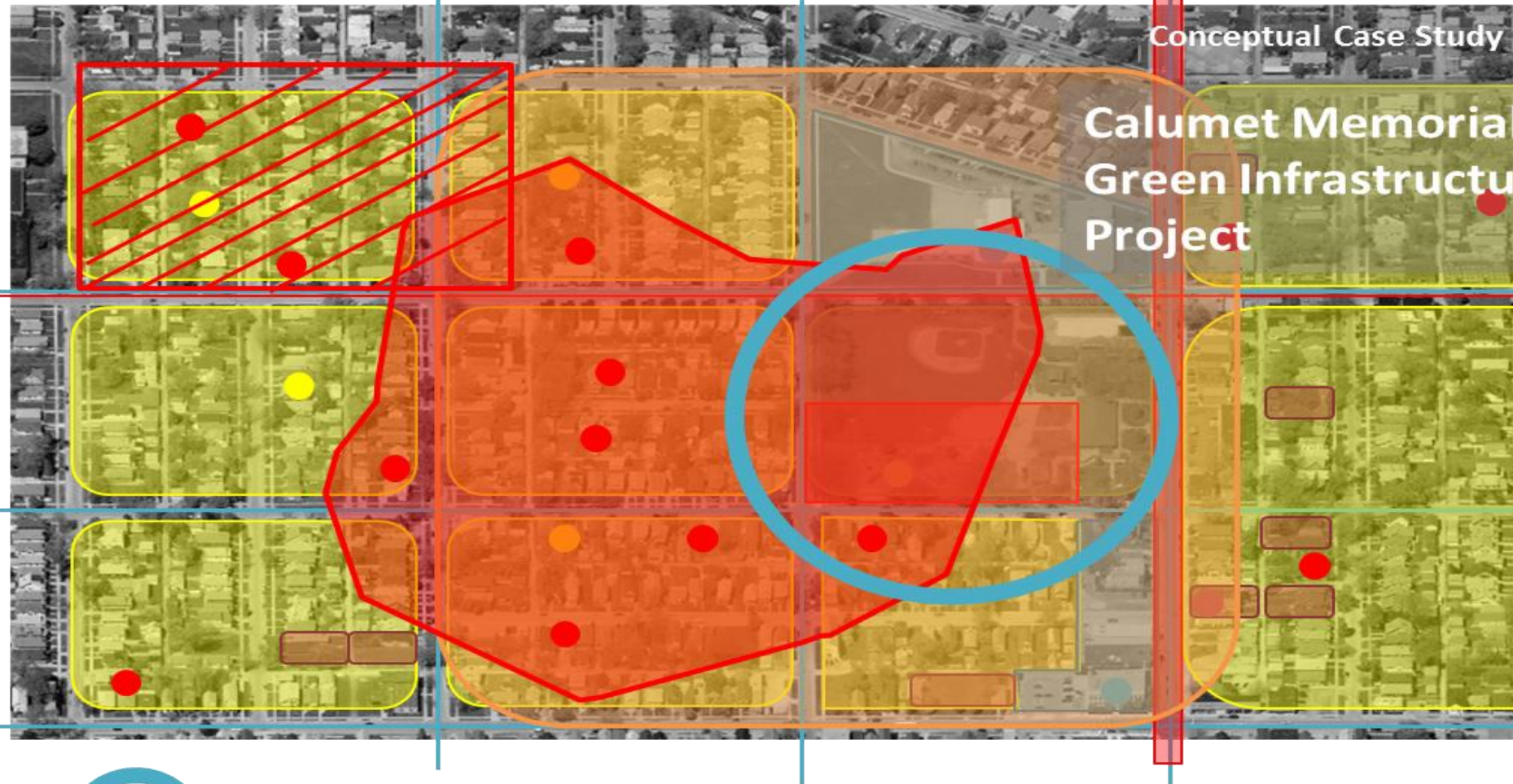
Total Cost: \$533K
[show detail](#)

GREEN IMPROVEMENTS	Lifecycle Cost	% Towards Goal
Roof Water Capture: <input type="checkbox"/> Green Roof	\$0	0%
Roof Water Redirection: <input type="checkbox"/> Planter Boxes	\$0	0%
<input checked="" type="checkbox"/> Rain Garden Coverage: 32808 Sq. Ft. (13%) of 259,342 Sq. Ft.	\$533K show details	49.1% show details

[show advanced options](#)



Collaboratively Design / Advance Resilience Pro



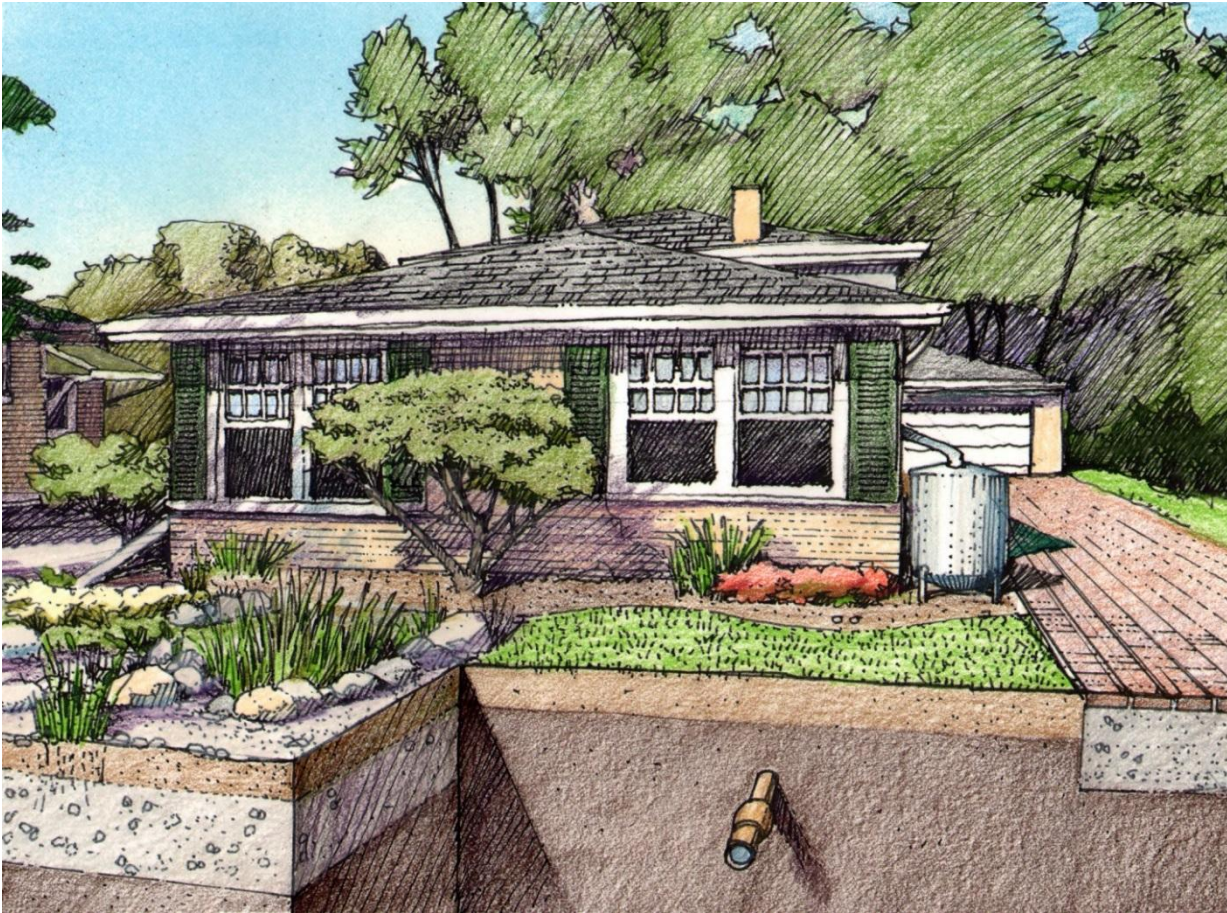
Resilience Project/Program

RAINREADY HOME

objective: *reduce risk of basement flooding in homes through coordinated action on private property*




strategies:

- Promote Home Retrofit Programs
 - maintain lateral lines
 - check for inflow issues
 - install backwater valves /overhead sewers
 - green infrastructure
 - seal foundation cracks
- Short-Term Solutions
 - floodproofing garage
 - directing water
 - DIY
 - RainReady Alert



My RainReady

Virtual Home Flood Risk Assessment


an initiative of 

Your Location

Your Home

Your Flood History

View Your Report

Your Home

Survey Summary

What year was your home built?

1950

Tip! All homes require regular maintenance in order to prevent water from entering the building. Problems can be hidden from view. For example, if you have a finished basement, wall cracks or other issues can develop behind the drywall. You can reduce your risk of flooding and water damage though preventative maintenance.

Has it been more than 1 year since last [rodding and televising](#) your home's sewer line?

☒ Yes ☐ No ☐ I don't know

Tip! Homes are connected to the municipal sewer system through a home sewer pipe ("[lateral line](#)"). The sewer pipe may become clogged by fats, oils or grease; leaves or litter; or tree roots. It can also crack or collapse over time.

Are your drains or [catch basin](#) always full, look collapsed, or have a [sheen](#) inside or nearby?

☐ Yes ☒ No ☐ I don't know

Your Location

- Located in a flood zone: no
- Home is at lower elevation
- Served by old sewer system
- Flooding in streets

Your Home

- Year Built: **Not available** (older building)
- Lot: **81%** impervious (high risk)
- Backyard ponding / erosion
- Yard or concrete slopes towards building
- More than one year since rodding home's sewer line
- Connected downspouts
- Inadequate downspout discharge
- Foundation damage (efflorescence, mold, spalling or water stains)

Your Flood History

- None reported

My RainReady

Virtual Home Flood Risk Assessment

My RainReady Recommendations

Based on the conditions you reported, here are some suggestions to look into. Plumbing, electrical and other such construction work should be performed by a licensed professional, and may be subject to building permit and other requirements.

Add nature-based solutions to your yard

Recommended because you indicated:

- Your property has a high percentage of surfaces that are impervious to rain
- Your backyard has ponding or erosion
- Your home has areas that show efflorescence, mold, spalling or water stains or damage

Your yard offers many opportunities to manage flooding. Many of these solutions are do-it-yourself and cost-effective. Others should be done by an experienced landscape contractor.

- Let rain soak into a rain garden or bioswale that uses porous soil and water-loving plants. Rain gardens are bowl-shaped; bioswales are line-shaped.
- Capture and store rain in a rain barrel, cistern or dry well. Rain barrels and cisterns sit above ground; dry wells are an underground chamber.
- Reduce [stormwater runoff](#) by replacing concrete or asphalt with [permeable](#) paving.

Nature-based solutions work best when they capture the rain water from your roof. You can do this by disconnecting your downspout and directing it into the rain garden or bioswale. If you use a rain barrel or cistern, be sure to empty it before heavy rains. Some homes use multiple rain barrels to increase the amount of rain that can be stored. Stored rain can be used to water your yard.

See our factsheets, "[Making Your Yard RainReady](#) (PDF)" and "[Options for Flood Prevention](#) (PDF)" to learn more about nature-based solutions. Check out [our videos](#) of homeowners using nature-based solutions to address seepage and yard ponding.

Typical costs (Chicago, IL):

- Rain garden or Bioswale: \$500 to \$4,000, depending on size and if you want to do-it-yourself
- Dry well: \$2,500

Rake sewer grates to clear out any leaves and litter

Recommended because you indicated:

- Your neighborhood streets flood when it rains

Maintain your foundation walls with tuckpointing, crack repair and/or waterproofing

Recommended because you indicated:

- Your home has areas that show efflorescence, mold, spalling or water stains or damage

It's important to regularly maintain your foundation walls. A regular maintenance schedule, including [tuckpointing](#) and repairing cracks, may help prevent seepage. Focus on horizontal cracks and cracks near L-shaped sections of your walls, not hairline fractures. If your home's [foundation drain](#) is in good condition, a moisture-proof fabric can be applied against the walls, allowing seepage to be directed into the foundation drain.

Foundations are typically made of stone, brick or concrete. These materials are designed to "breathe" and allow moisture to move in and out. In some cases, it might not be possible to have an entirely dry basement. If you have an unfinished basement, consider leaving it unfinished. If you decide to finish your basement, be sure to use moisture-resistant construction materials and building practices. Damage from seepage is not typically covered by home insurance, sewer backup riders, or NFIP.

Read our factsheet, "[Options for Flood Prevention](#) (PDF)," for more information about addressing seepage.

Typical Cost (Chicago, IL): Foundation crack repair (epoxy injection): \$500 to \$800

Install foundation drain with sump pump and sump pit

Recommended because you indicated:

- Your home has areas that show efflorescence, mold, spalling or water stains or damage

A foundation drain is an underground pipe that runs along the bottom of a home's foundation and helps keep the basement free of excess moisture from groundwater. Homes are built with a foundation drain, but the pipe may become clogged or collapsed. A sump pump and pit collects water, typically groundwater, from the basement floor or foundation drain and pumps it outside the home.

Typical Cost (Chicago, IL): Sump pump and pit (attach to existing foundation drain): \$800 to \$1,200

Repair or repour concrete, or regrade soil, to drain away from the building ("positive drainage")

Questions?

