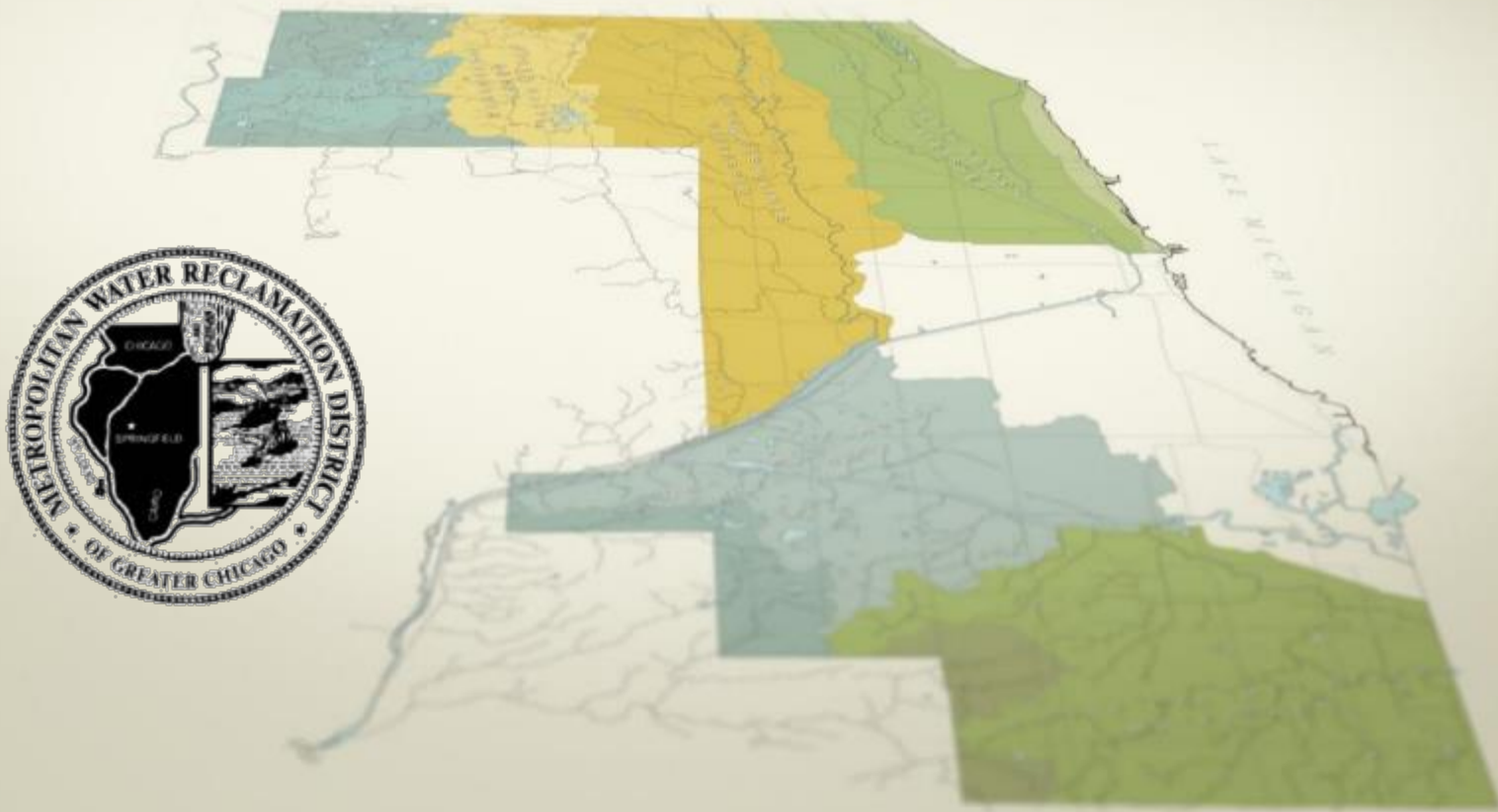


Physical Approaches to Flood Mitigation



Chicago Area Before Development



Widespread Flooding

Waterways and Marshes

Absorbent Ground

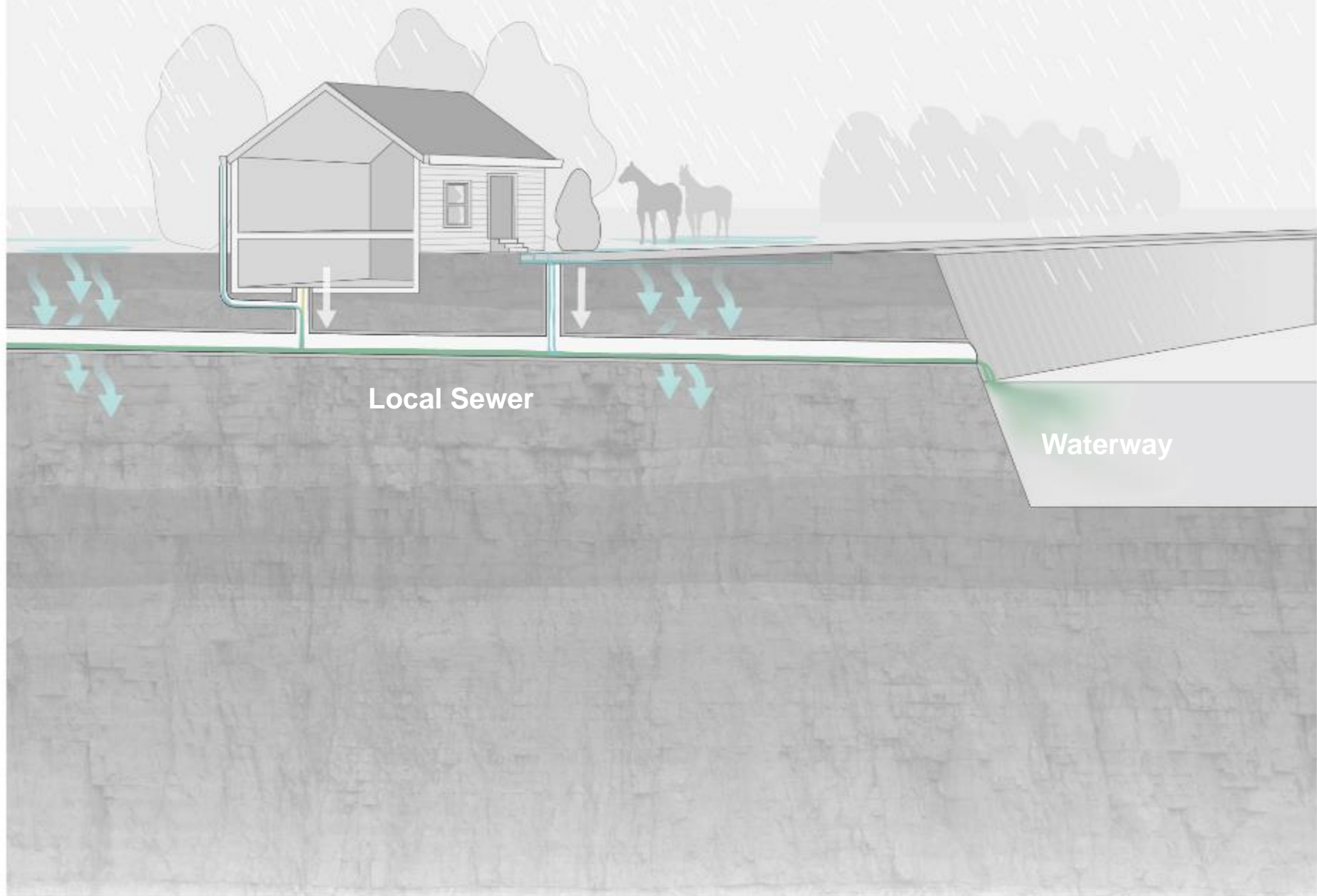


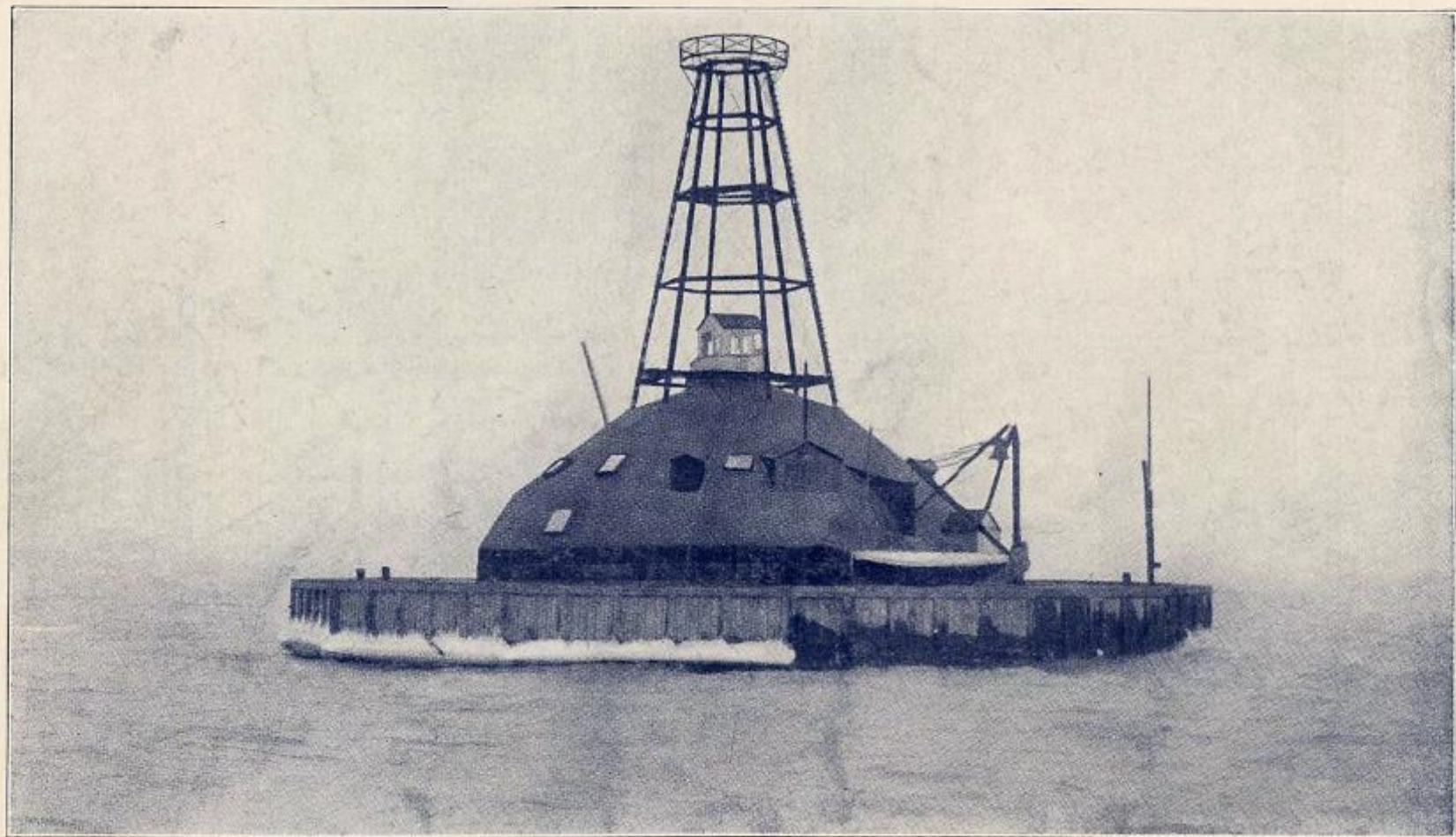
CHICAGO IN 1820.





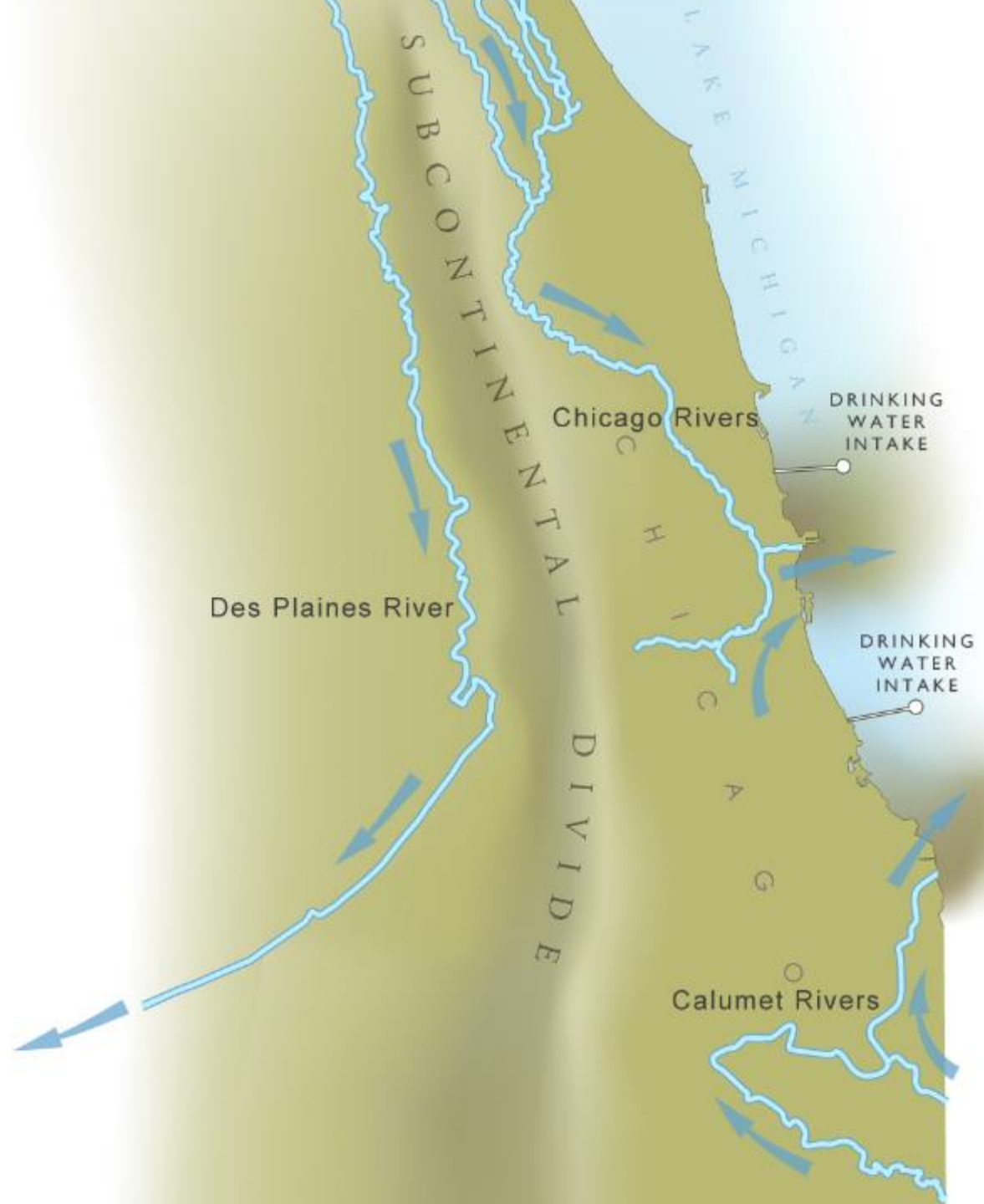
CHICAGO.





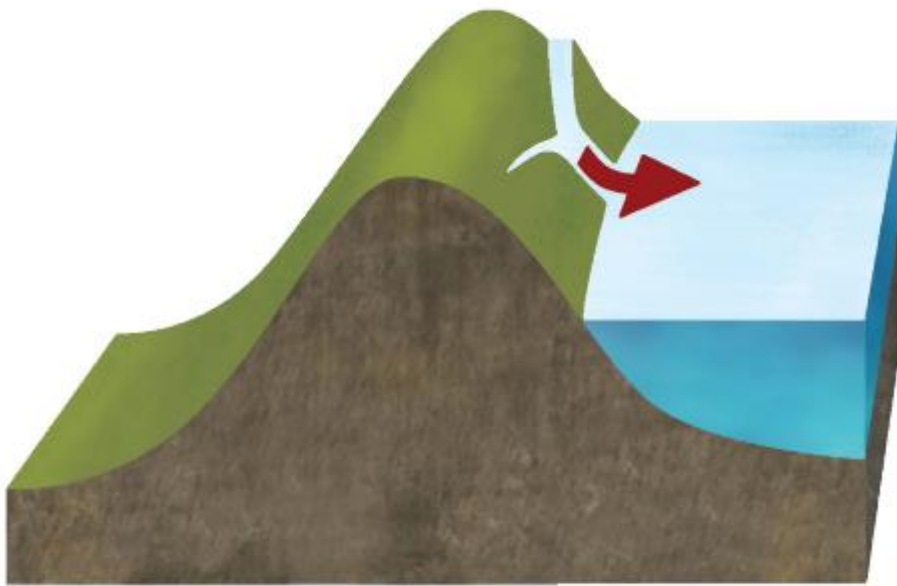
ORIGINAL TWO MILE CRIB BUILT 1867

Prior to 1900

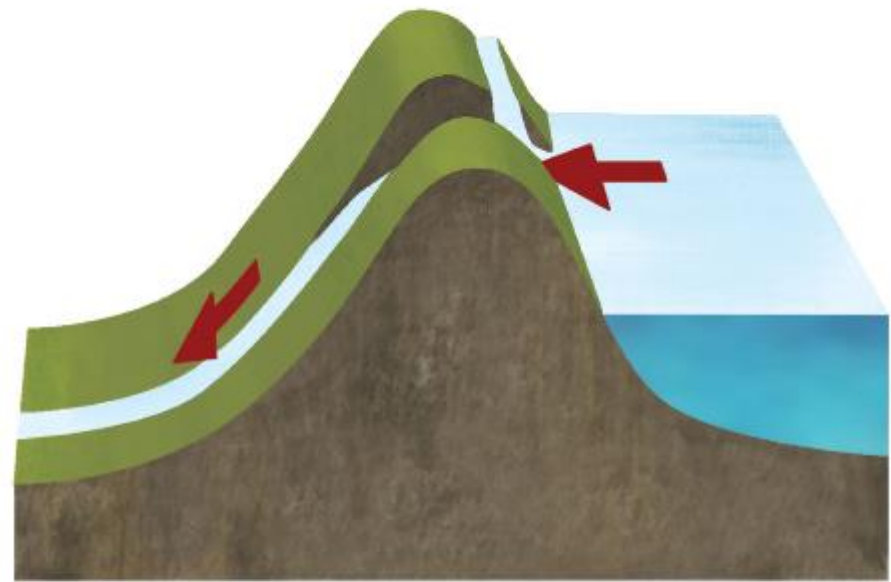


How the Chicago River was Reversed

Before Canal Excavation



After Canal Excavation



(diagram not to scale)

The Chicago River was reversed following the completion of the Chicago Sanitary and Ship Canal in 1900



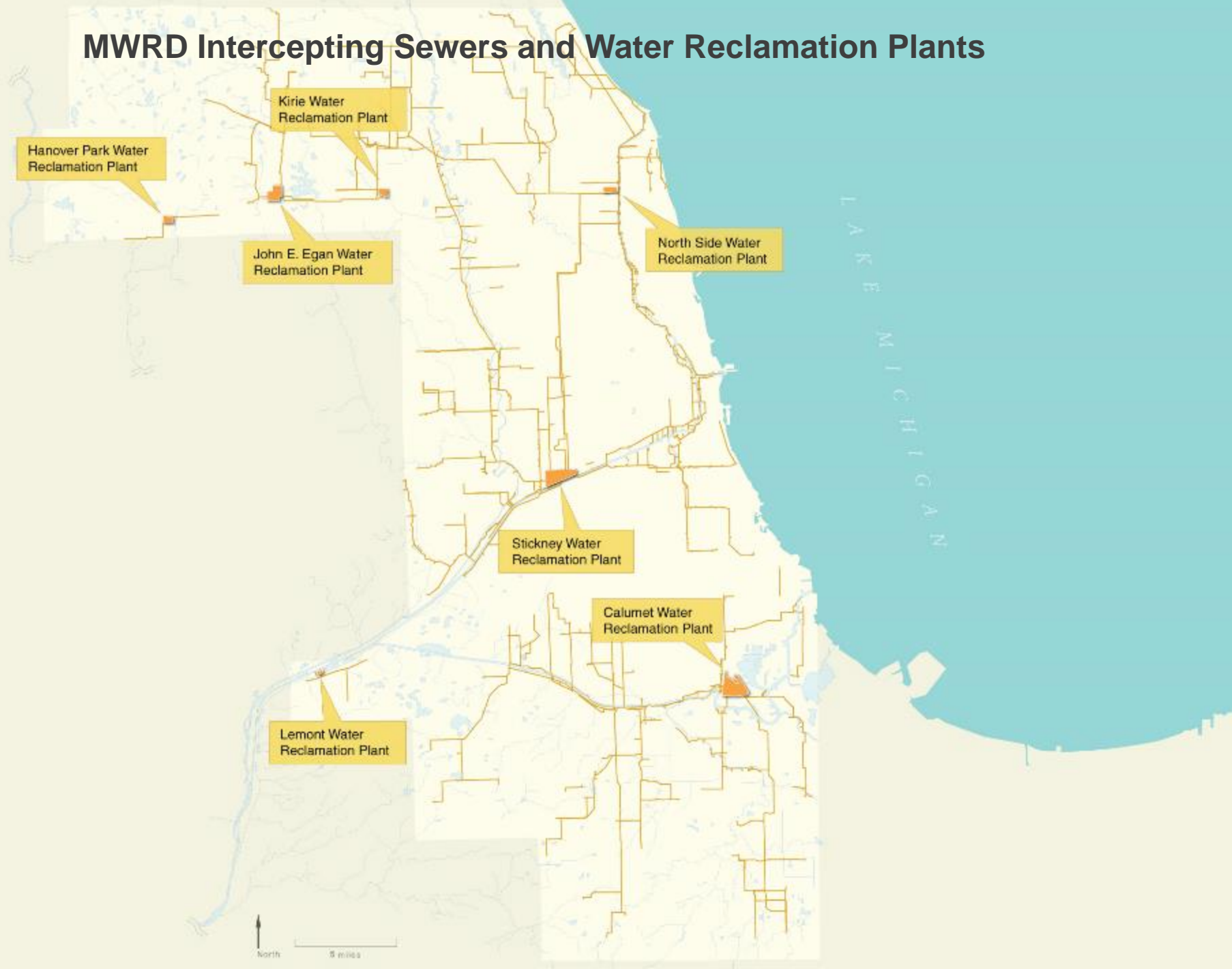


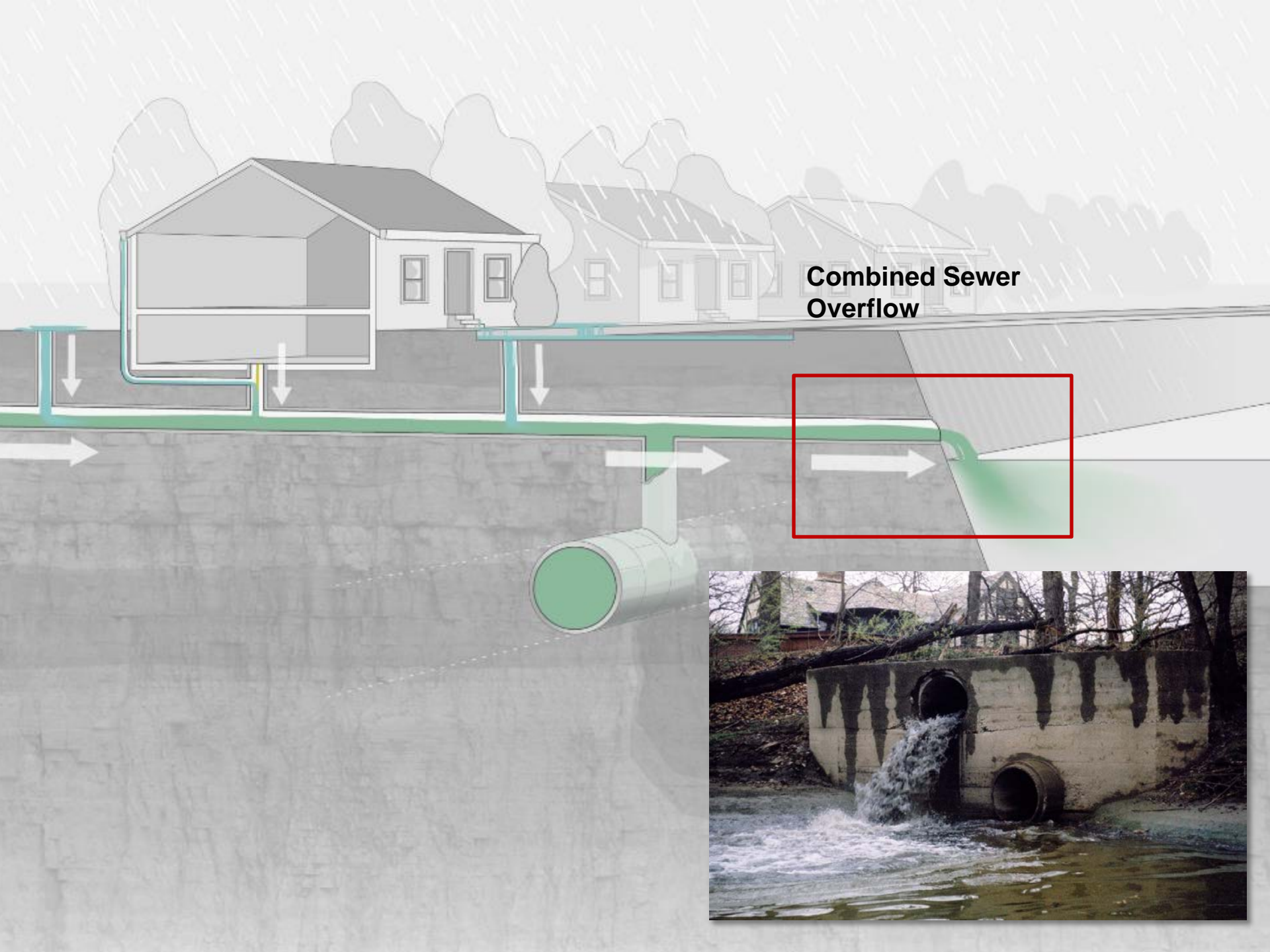


North Branch of the Chicago River

Main Stem of the Chicago River

MWRD Intercepting Sewers and Water Reclamation Plants

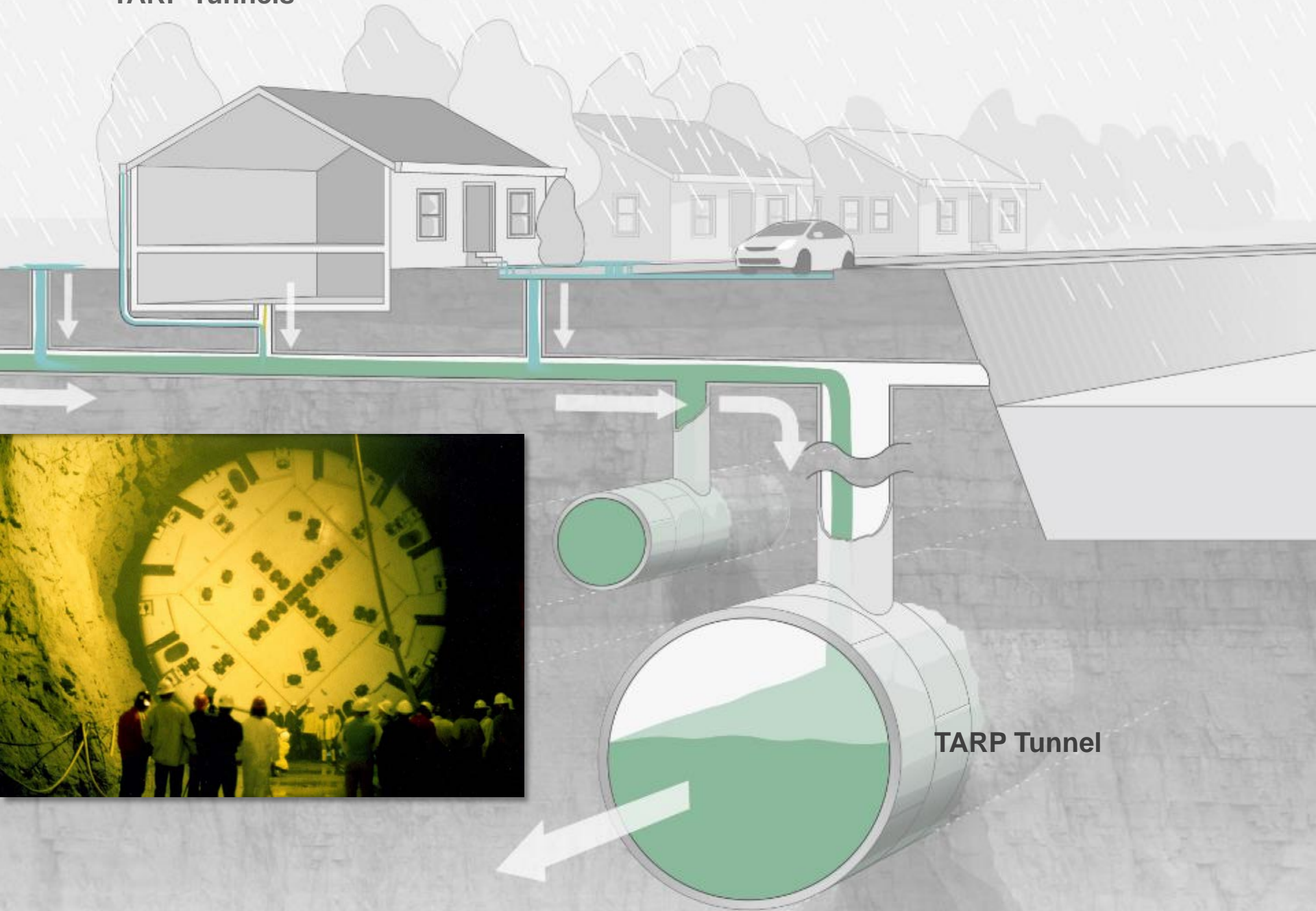




**Combined Sewer
Overflow**

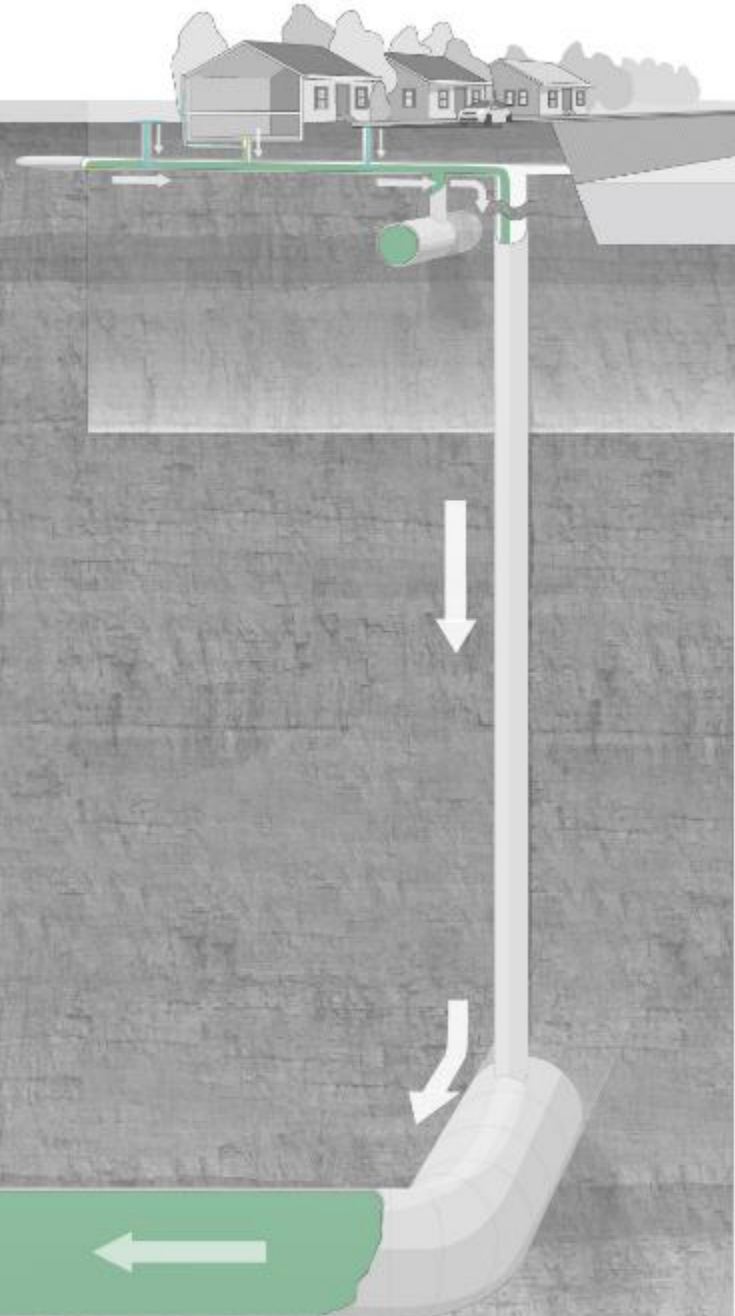


TARP Tunnels





TARP Reservoir





McCook Reservoir



Thornton Reservoir

McCook Reservoir

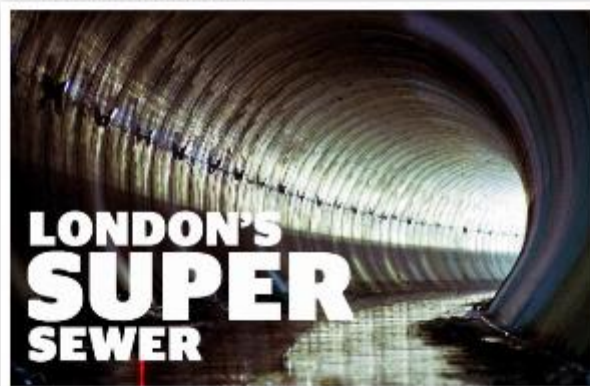
Melbourne, Australia



Seattle, Washington



London, England



Vienna, Austria



Milwaukee, Wisconsin

MMSD Deep Tunnel



Portland, Oregon



Singapore





Metropolitan Water Reclamation
District of Greater Chicago

Stormwater Management, Green Infrastructure, Tunnel and Reservoir Plan and Flood Control Projects and Facilities





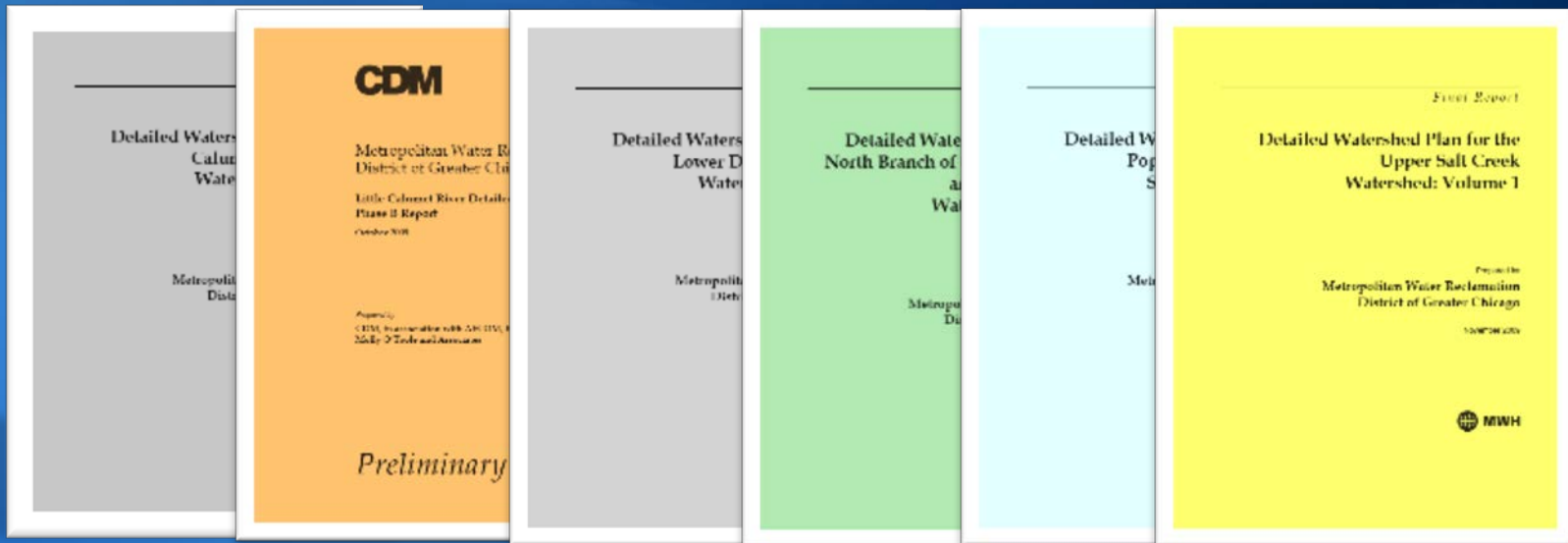
Stormwater Management Program

- MWRD conveyed authority in November 2004 to plan, manage, implement, and finance activities relating to stormwater management in Cook County
- Cook County Stormwater Management Plan (CCSMP) adopted in 2007 establishing program framework
- Primary Stormwater Management Activities:
 - Develop Capital Improvement Program (CIP) to address *REGIONAL* stormwater problems
 - Comprehensive uniform stormwater regulations to ensure future development and redevelopment does not exacerbate flooding



Regional Flood Control Projects

- Regional Flooding or Streambank Stabilization Projects recommended in Detailed Watershed Plans

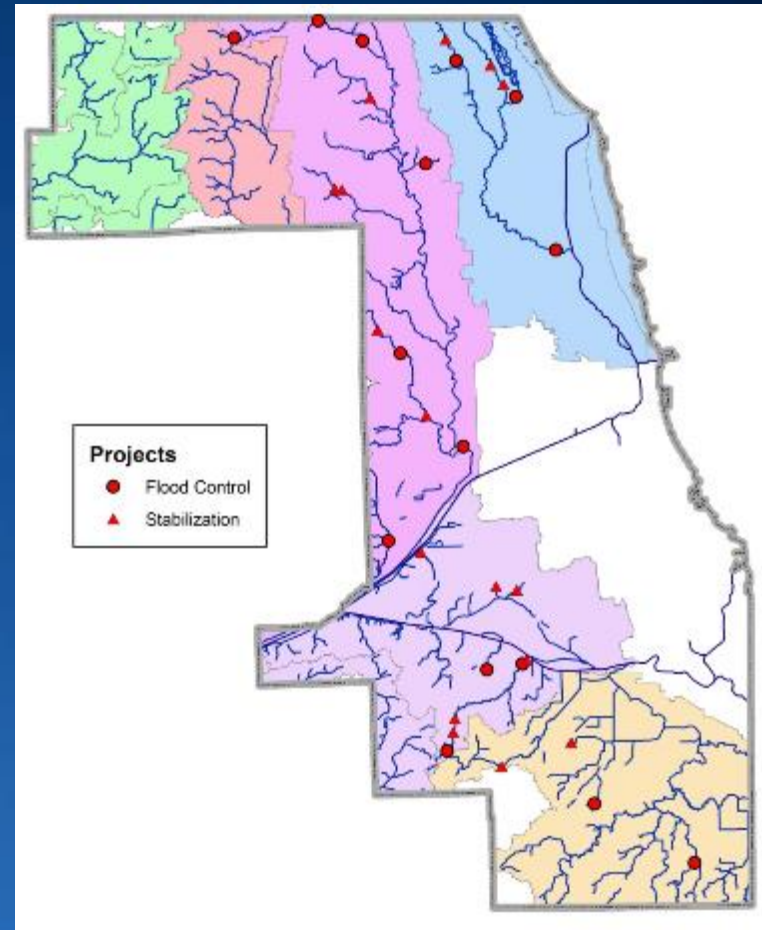


- Projects previously approved by Federal or State Agencies



Recommended DWP Projects

- 15 Flood Control Projects to address overbank flooding
- 12 Streambank Stabilization Projects to address critical erosion
- Prioritized based on Benefit-to-Cost Ratio and Distributed across Cook County





Regional Flood Control Projects

Example: Heritage Park Flood Control Facility

- 150 Acre-feet of New Stormwater Storage
- Flood Control improvements integrated into Park District master plan
- Provides Compensatory Floodplain Storage for Levee 37 which protects 600 homes and businesses from flooding
- Tri-party IGA with MWRD, Wheeling and Park District





Regional Flood Control Projects

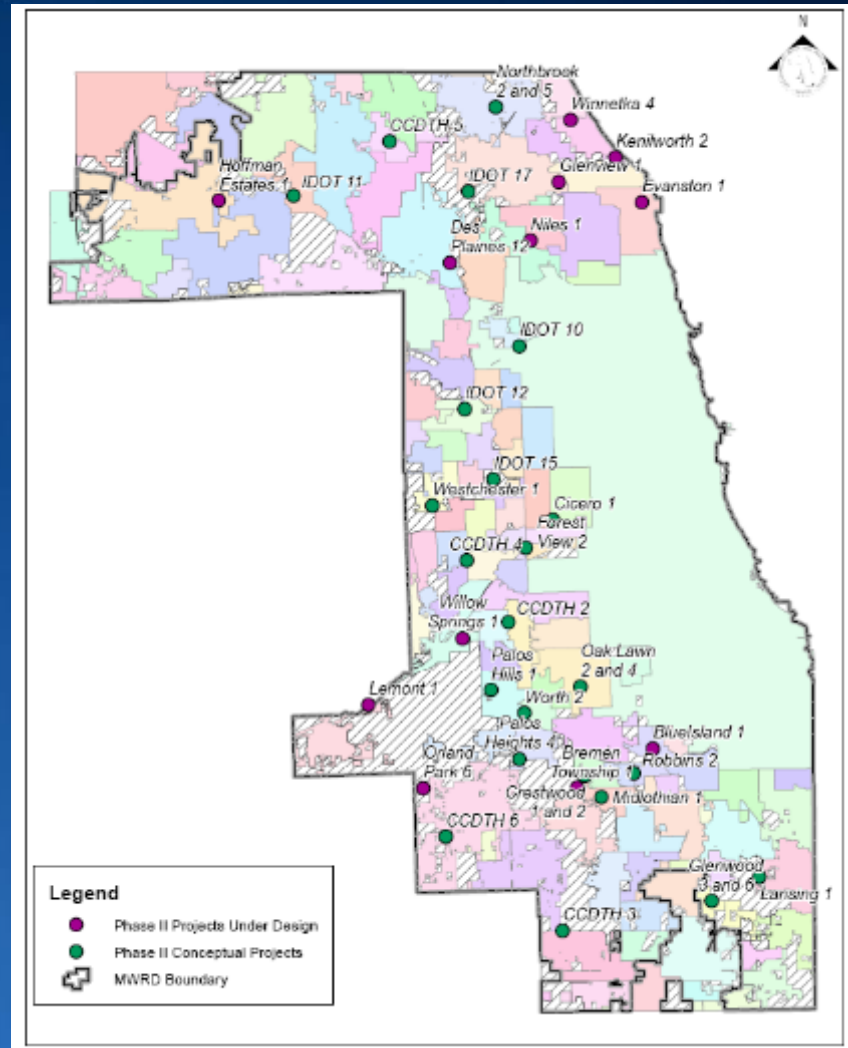


Flood Control and Streambank Stabilization Project on Tinley Creek in Crestwood



Phase II Projects

- Shovel-ready and Conceptual projects
- Distributed throughout Cook County
- Types of Projects include:
 - Green infrastructure
 - Localized detention
 - Upsizing critical storm sewers/culverts
 - Pump stations
 - Establishing drainage ways





Local Stormwater Projects

Shovel-Ready Example: Mayfair Reservoir Expansion

- 27 Acre-feet of New Stormwater Storage in Village of Westchester
- 60 Structures Protected
- Village responsible for design, construction, maintenance
- MWRD provided \$2,121,000 for construction
- Project completed 2015





Flood-Prone Property Acquisition Program

- Policy adopted by Board of Commissioners on August 7, 2014
- Three Distinct Components
 1. Local Sponsor Assistance Program
 2. District Initiated Program
 3. Local Government Application



Photo Source: MWRD



Green Infrastructure

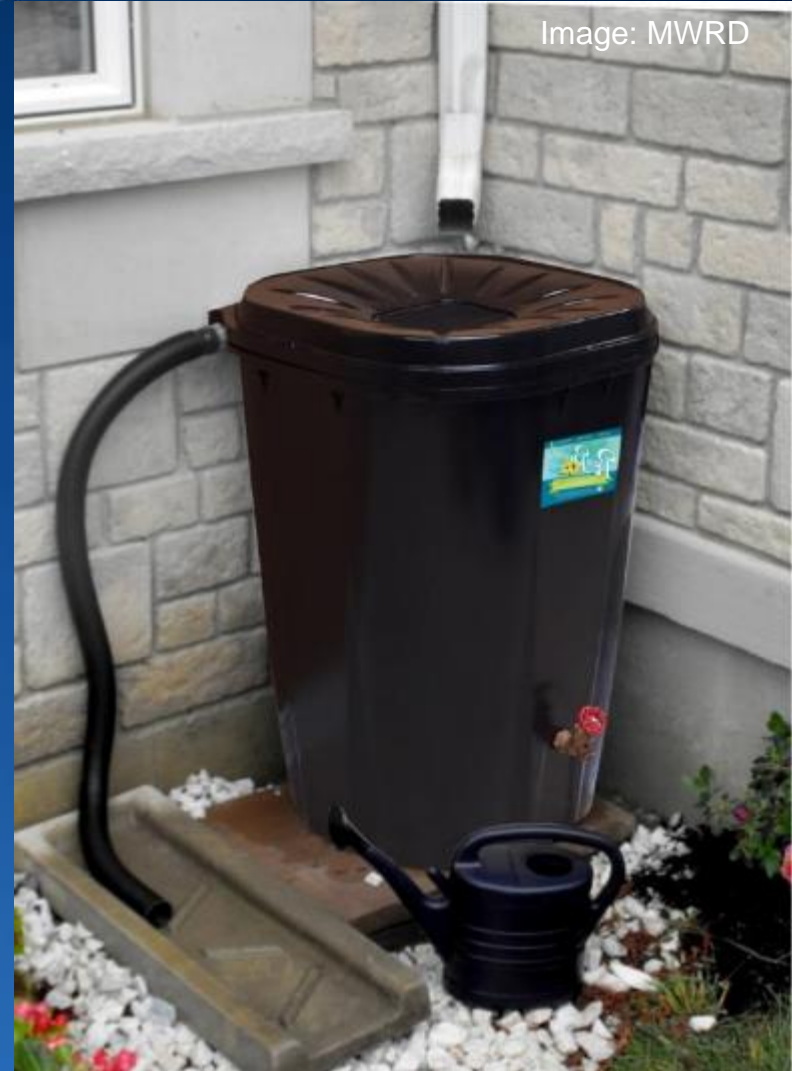
Program Components

- Rain Barrel Program
- Comprehensive Land Use Policy
- Community Assistance and Public Outreach
- Projects and Design Retention Capacity



Rain Barrels

- The District's Rain Barrel Program utilized three distribution networks
 - Municipalities
 - non-government planning organizations and community groups
 - campus-type facilities
- Through Sept. 2016, nearly 110,000 MWRD rain barrels have been distributed in 108 communities across Cook County





Land Use Policy: **Green Infrastructure Requirements**

- MWRD's Comprehensive Land Use Policy requires public entities leasing MWRD property to provide GI based on the size of the leasehold and the desired use
- Private developers are required to comply with the terms of the Watershed Management Ordinance.
 - Capture 1-inch of runoff from impervious surfaces using Green Infrastructure
 - In 2014 and 2015 15, 119 permits issued requiring a total of 7,795,627 Gallons of GI retention volume



Green Infrastructure Community Assistance and Public Outreach

- Committed to providing administrative and technical assistance to communities
- Worked with stakeholders to share and gain knowledge on the:
 - Design
 - Installation
 - Maintenance of GI
- The District prioritizes GI projects that achieve MWRD's goals:
 - Reducing flooding
 - Reducing basement backups
 - Reducing CSO discharges





Green Infrastructure Partnerships

- Space to Grow
 - Managed by Healthy Schools Campaign and Openlands
 - Funding and technical assistance from
 - *Chicago Public Schools*
 - *Chicago Dept. of Water Management*
 - *MWRDGC*
- Chicago Housing Authority
 - Dearborn Homes Rainwater Harvesting
- Local Municipalities
 - Evanston, Blue Island, Kenilworth, Wilmette, Northbrook (complete)
 - Niles, Berwyn (under construction)
 - Skokie (design completed and will be constructed this Fall)



Green Infrastructure Projects at MWRD

| Project | Design Retention Capacity (MG) |
|---------------------------------|--------------------------------|
| Chicago Public Schools, Phase I | 1.08 |
| Blue Island | 0.15 |
| Wilmette Green Alleys | 0.07 |
| Kenilworth | 1.32 |
| Evanston Civic Center | 0.17 |
| Northbrook: Wescott Park | 0.16 |
| Totals | 2.95 |



Projects in Progress

| Project | DRC (MG) | Status |
|--|----------|---|
| Niles | 0.28 | Complete |
| Skokie GI (Permeable Parking and Rain Gardens) | 0.17 | Design complete, construct late 2017 |
| Dearborn Homes | 0.29 | Construct late 2017, early 2018 |
| CPD & Parjana | TBD | Complete |
| Berwyn Green Alleys | 0.62 | Complete |
| Chicago Public Schools, Phase II | 6.00 | 2 constructed per year |



Chicago Public Schools

Before



After





Chicago Public Schools

- Rebuilding schoolyards in a sustainable way, including stormwater storage
- MWRD and DWM each dedicate up to \$500,000 per school towards GI measures (basically splitting the projects in even thirds, overages to CPS)
- Elementary schools prioritized based on flood risk, site suitability, and socioeconomic factors
- The objective is to reduce local flooding and the amount of rainwater entering the local combined sewer system
- Just over 1 million gallons of stormwater retention

Design Criteria (for CPS projects)



- Maximize Stormwater Retention Volume
- Stormwater elements to be visible
 - for public education
- Exceed Chicago and MWRD Ordinance Requirements
 - City of Chicago Flow Vortex
 - Bulletin 70 Rainfall Data
- Any stormwater released to be of high water quality
- 4 schools constructed in 2014, 2 schools in 2015
- Projects have positively impacted thousands of local residents by providing:
 - A safe place for their children to play
 - Educating all to the benefits of GI
 - Providing much needed relief to localized flooding



Types of GI used

- Downspout Disconnection



Source:
Storm Water Alliance
for the Bay

- Rain Garden



Rainwater Harvesting



Source:
Aditya Rainwater Harvesters

Source: Washington State
University Extension

Types of GI used



- Bioswales



Source: *Geosyntech, Aaron Volkening*

Permeable Pavements



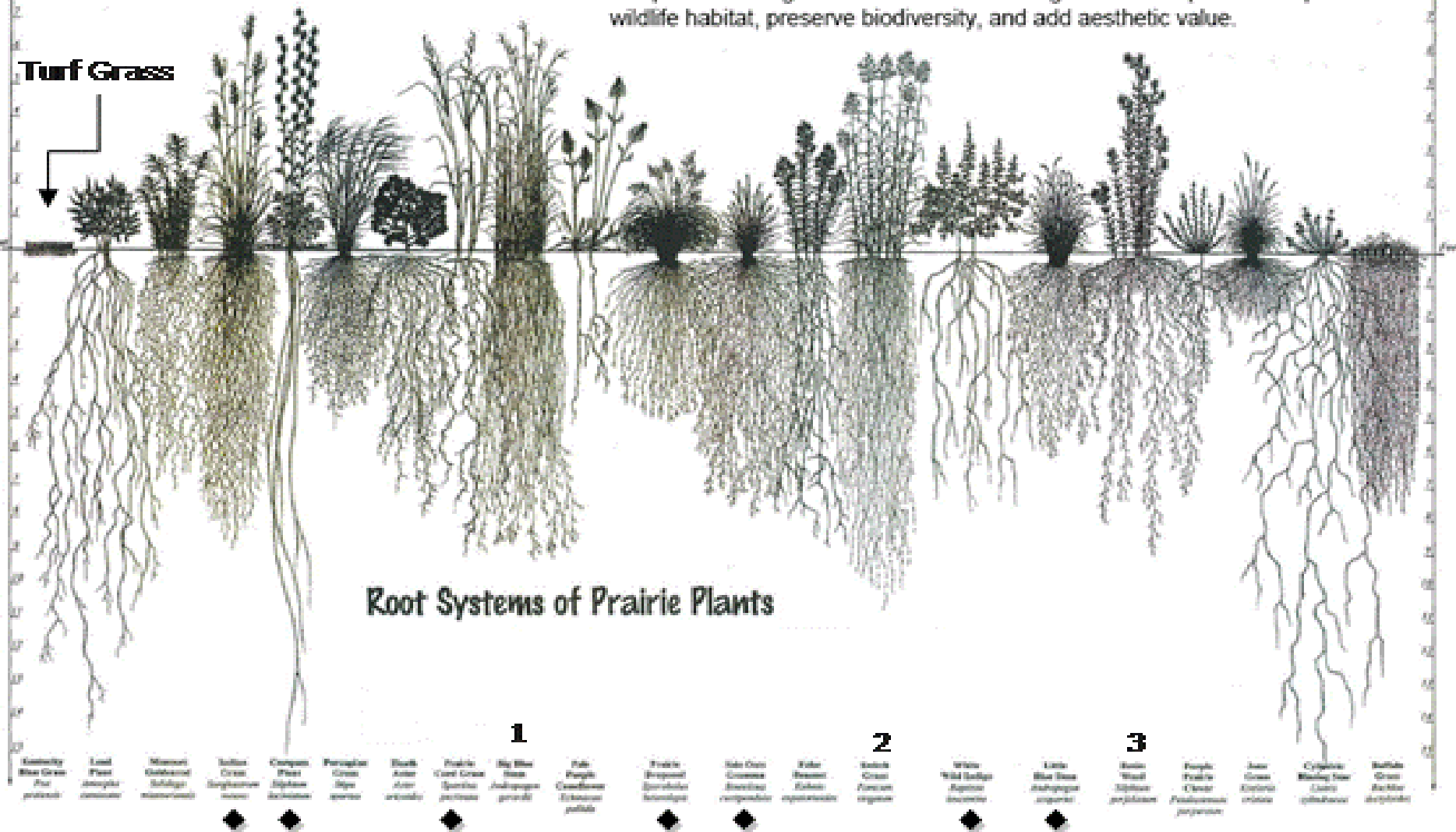
Source: *MWRD, JRW*

- Green Roofs




Source: *City of Chicago*

Turf Grass



Root Systems: Turf Grass to Native Plants

Source: *NRCS, City of Elgin*

An aerial photograph of a brick-paved walkway. The bricks are arranged in a herringbone pattern. Three rectangular plaques are embedded in the pavement, each containing a different inscription. The plaques are made of a lighter-colored material than the surrounding bricks.

Laugh, Live, Love

ACHIEVE3000
BELIEVES IN
SUCCESS 4 ALL

To My Aiberto
Who Helped Me
See The World

Source: MWRD, JRW



Source: MWRD, JRW



Community Planting / Ribbon Cutting



Source: MWRD, PA



Source: MWRD, PA



Wadsworth Elementary



Video removed



Contact Information

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