WRC
WATER RESOURCES COMMISSIONER
Jim Nash

How Water Works

Water Resources Education for Elected and Appointed Officials

Agenda

- Who We Are and What We Do
- Drain Maintenance History and More
- Drinking Water Operations
- Stormwater Management
- Retention Treatment Basin (RTB) Synopsis
- Guided tour of GWK RTB

Who We Are

- Oversee maintenance, operation and improvement of water, sewer and stormwater infrastructure
- The Michigan Drain Code guides much of our work
- Ensure sustainable, efficient and resilient drainage, water and sewer systems

What We Do

Water Systems

- 168,000 residents served
- 1,220 miles of water mains
- 27 water treatment facilities
- 11 water storage tanks
- 6 booster pump stations

Sewer Systems

- 195,000 residents served
- 1,230 miles of sanitary sewers
- 138 lift stations
- 7 water recovery facilities
- 3 sewage retention facilities

Regional Sewer

- 1,000,000 residents served
- 410 miles of sewer
- 4 retention treatment facilities
- 2 water resource recovery facilities
- 18 lift stations

Storm Drains

- Manage 433 county drains, including 560 miles of enclosed storm drain and 220 miles of open channel storm drain, spanning 900 square miles
- Clean and inspect 6 miles of drains, to improve flow and reduce flooding risks

Dams and Lakes

- Responsible for 41 lake level control and dam structures across Oakland County
- Participates in Lake Level Improvement Boards for 47 lakes
- Inspect managed control structures

How We Do It

380 Employees

19 Departments

24/7 Operations

Community Support

Exceptional Leadership

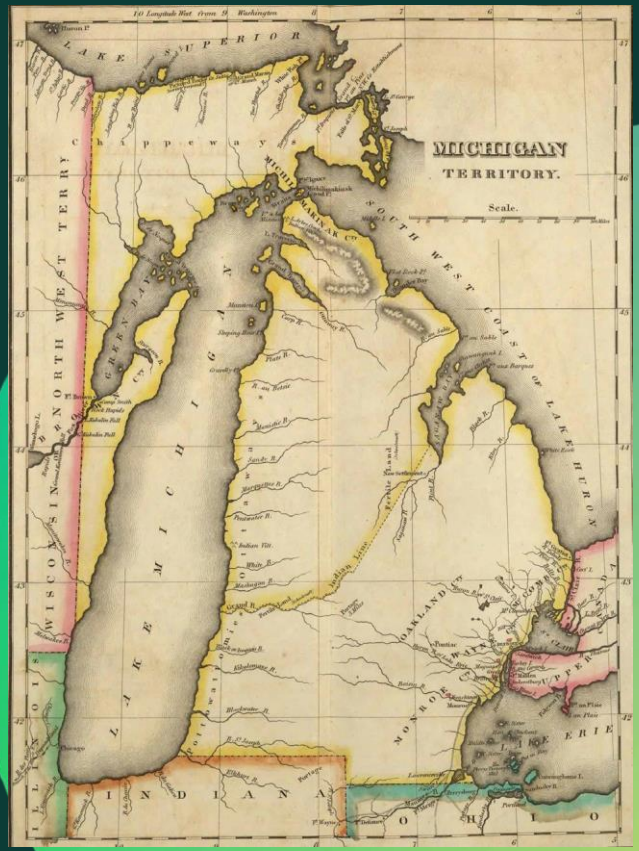
Drain Maintenance

Geoff Wilson, P.E. Chief Engineer

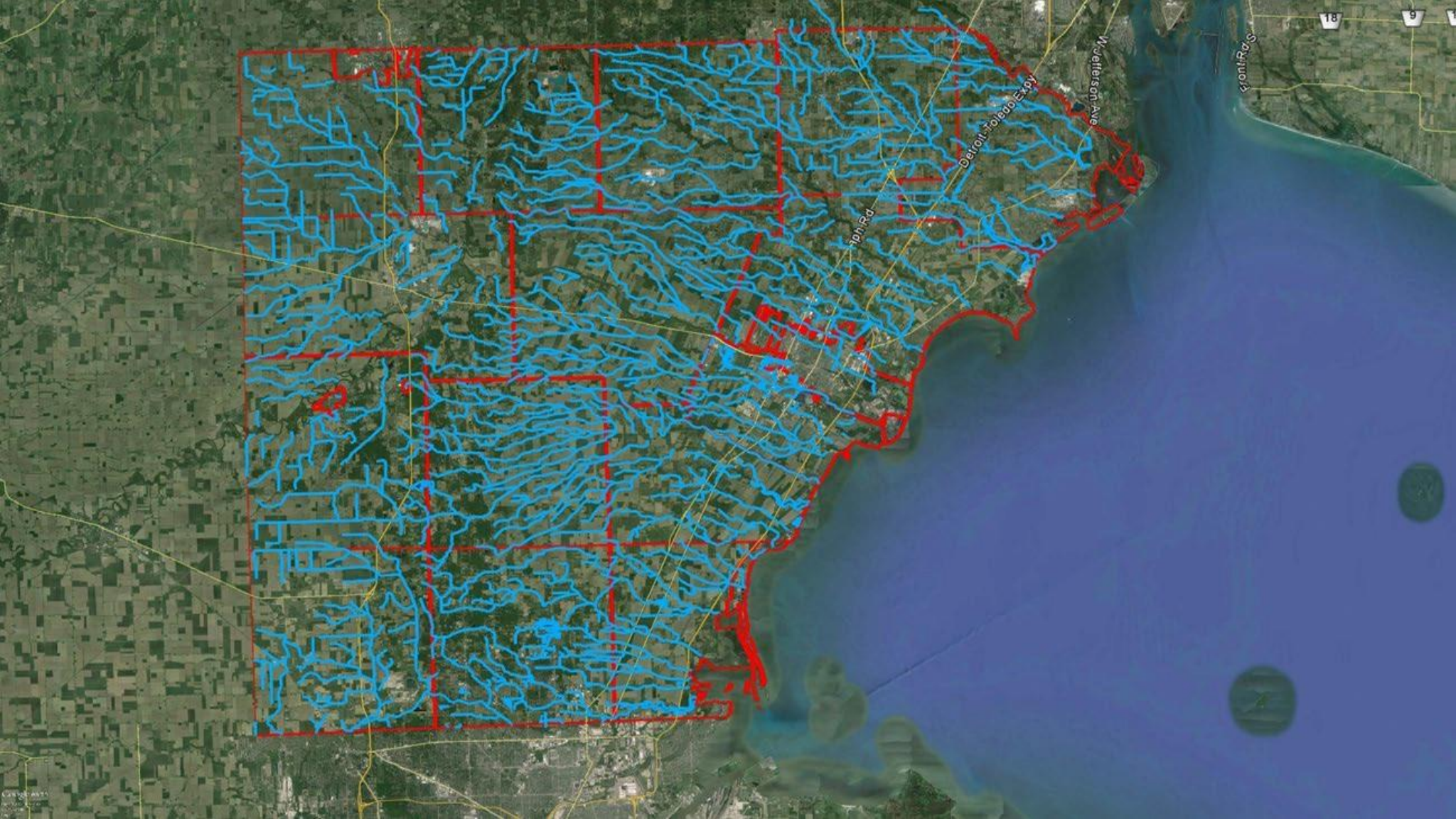
History of the Drain Commissioner

- “Michigan apparently consisted of swamps, lakes, and poor, sandy soil ***not worth the cost of surveying***. Not more than one acre in a hundred, or perhaps a thousand, could be cultivated.” -*Tiffin Report,1816*

- Lansing under “several feet” of water when the first settlers arrived in 1835




W Jefferson Ave
Detroit-Toledo Expy
Pelham Rd
Fort St


W. Jefferson Ave
Detroit-Toledo Expy
Front Rd S

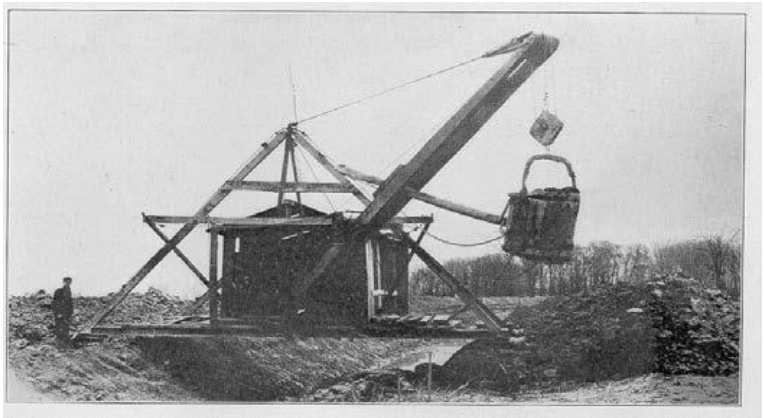
History of Drainage and Drain Statutes

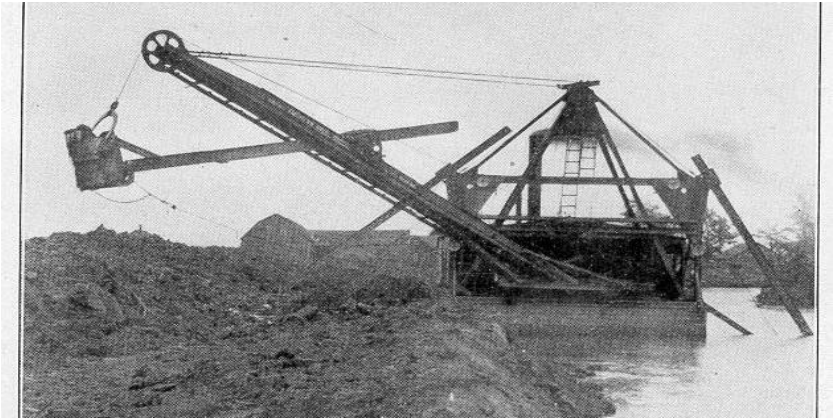
1857
Maintenance of authorized drains introduced

1897
Township drain commissioner shifted to county

1919
Michigan Geological and Biological Study

Early Drainage Techniques





Drain Categories

Chapter 4 or 5

- Old, farm-focused drains
- Costs shared by landowners, road agencies, and local governments
- Annual costs limited to $10,000 per mile of drain

Chapter 18

- Newer drains in subdivisions
- Maintenance funding is limited

Chapter 20 or 21

- Newer drains for modern development
- Costs shared by municipalities and road agencies
- Maintenance dollars not capped

GWK is a Chapter 20 Drain

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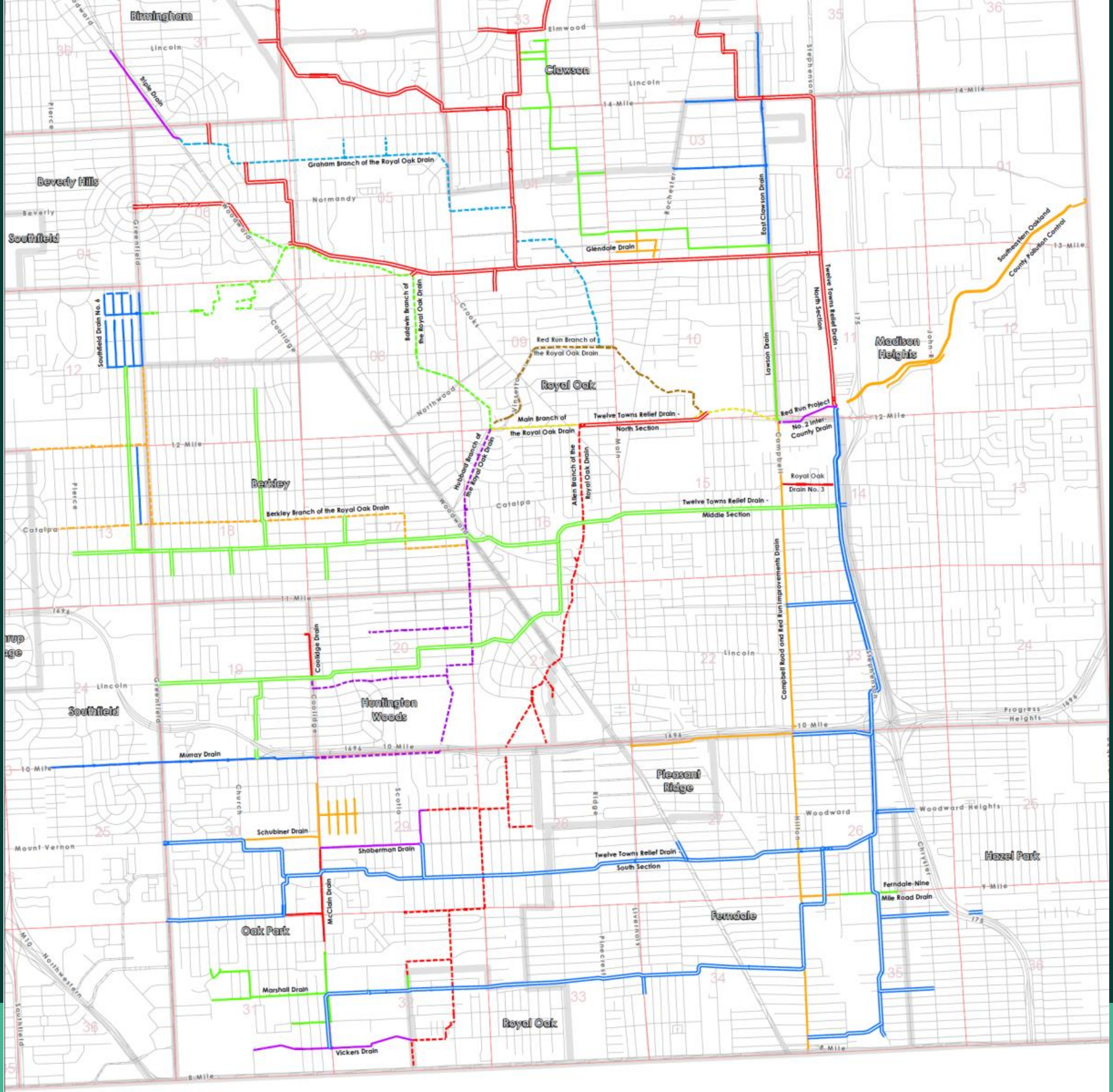
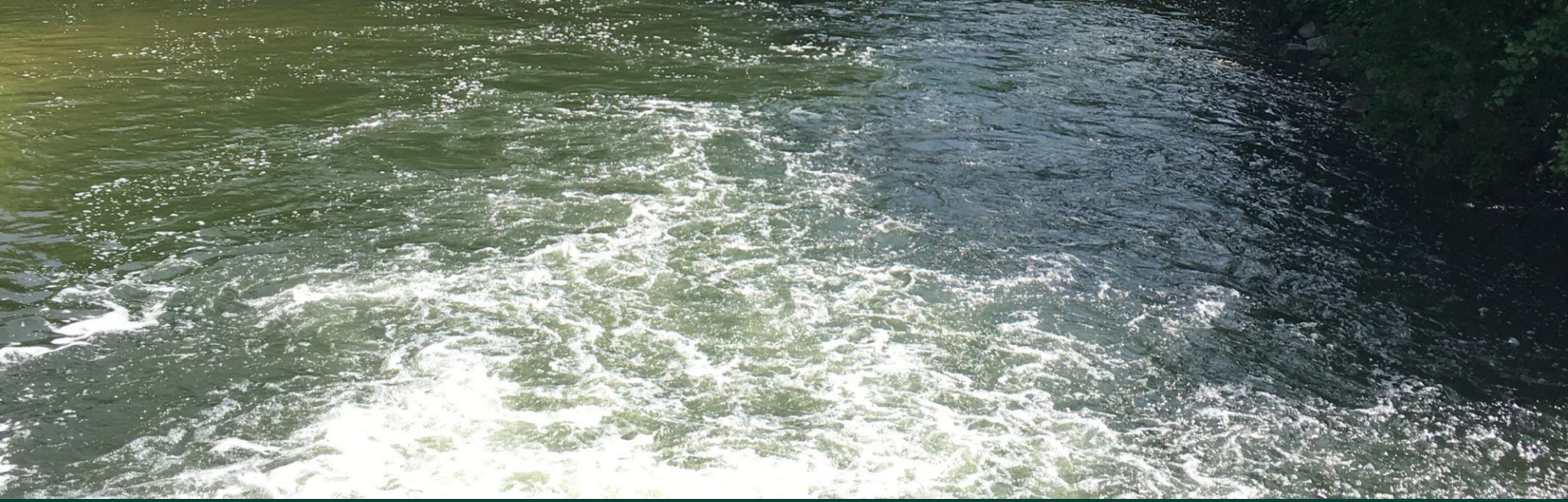
PRE-GEORGE W KUHN CSO
RETENTION TREATMENT BASIN FACILITY
(1949 IMAGERY)

GWK Today



Birmingham
Clawson
Beverly Hills
Southfield
Graham Branch of the Royal Oak Drain
Glendale Drain
East Clawson Drain
Southfield Drain No. 6
Baldwin Branch of the Royal Oak Drain
Red Run Branch of the Royal Oak Drain
Royal Oak
Lawson Drain
Twelve Towns Relief Drain - North Section
Madison Heights
Southeastern Oakland County Pollution Control
Red Run Project
No. 2 Inter-County Drain
Main Branch of the Royal Oak Drain
Hubbard Branch of the Royal Oak Drain
Allen Branch of the Royal Oak Drain
Royal Oak Drain No. 3
Berkley
Berkley Branch of the Royal Oak Drain
Twelve Towns Relief Drain - Middle Section
Campbell Road and Red Run Improvements Drain
Coolidge Drain
Huntington Woods
Murray Drain
Pleasant Ridge
Schubiner Drain
Shoberman Drain
Twelve Towns Relief Drain South Section
Ferndale-Nine Mile Road Drain
Hazel Park
McClain Drain
Oak Park
Ferndale
Marshall Drain
Vickers Drain
Royal Oak



Lake Level Control Structures and Lake Improvement Boards

Public Dam Management

- 41 lake level control structures
- An additional approximately 150 dams and lake level control structures in Oakland County are private

Drinking Water Operations

Zach Earp, Civil Engineer II

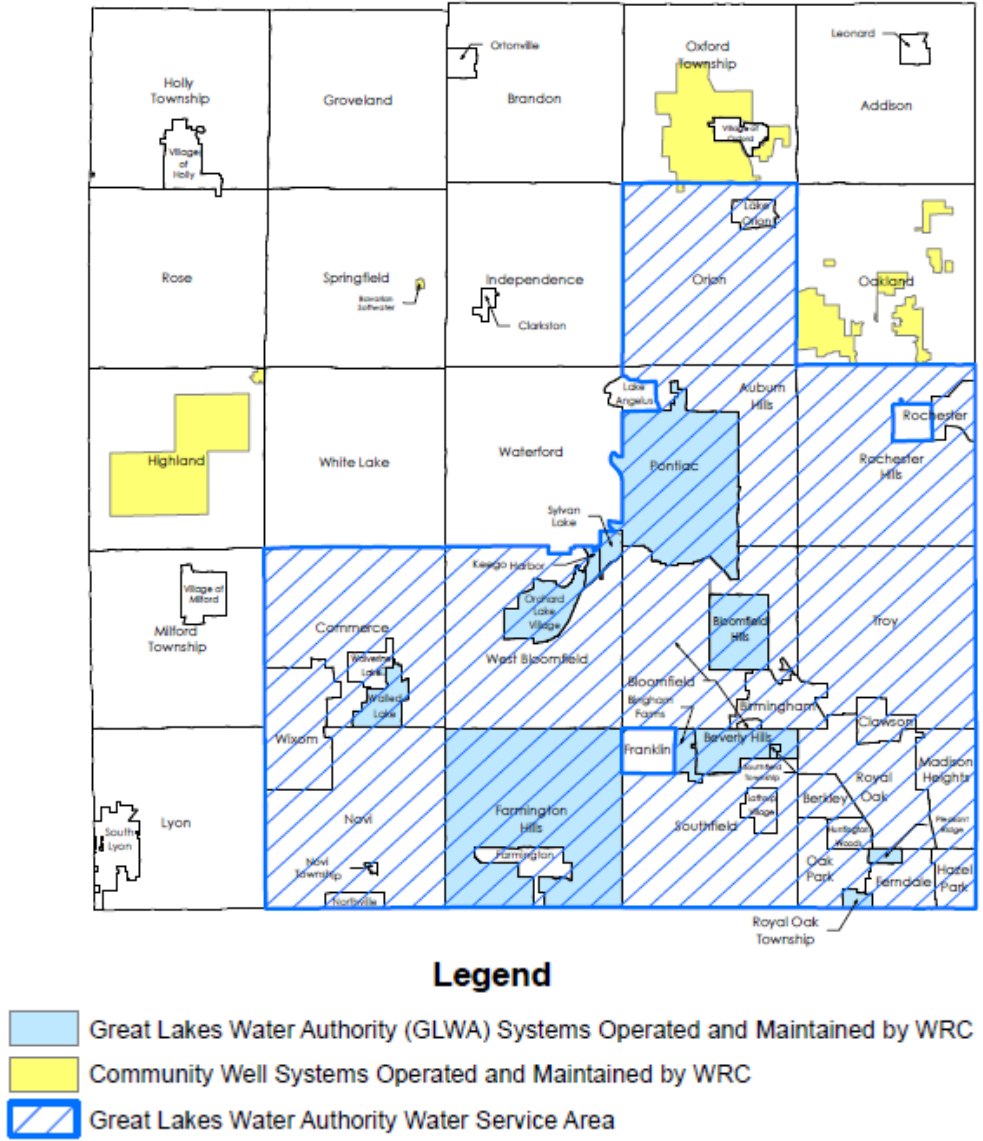
Drinking Water Operations

- Daily operations, emergencies, regulations, and customer support
- 7 Water Systems Engineering
- 49 Water Maintenance
- 12 Cross Connection
- 11 Pump Maintenance

Where We Operate

We provide reliable drinking water for 21 systems in 15 communities, serving nearly 168,000 residents.

- Village of Beverly Hills (as-needed)
- Village of Bingham Farms
- City of Bloomfield Hills
- City of Farmington Hills
- Highland Township
- City of Keego Harbor
- Oakland Township
- City of Orchard Lake Village
- Oxford Township
- City of Pleasant Ridge
- City of Pontiac
- Royal Oak Township
- Springfield Township
- City of Sylvan Lake
- City of Walled Lake



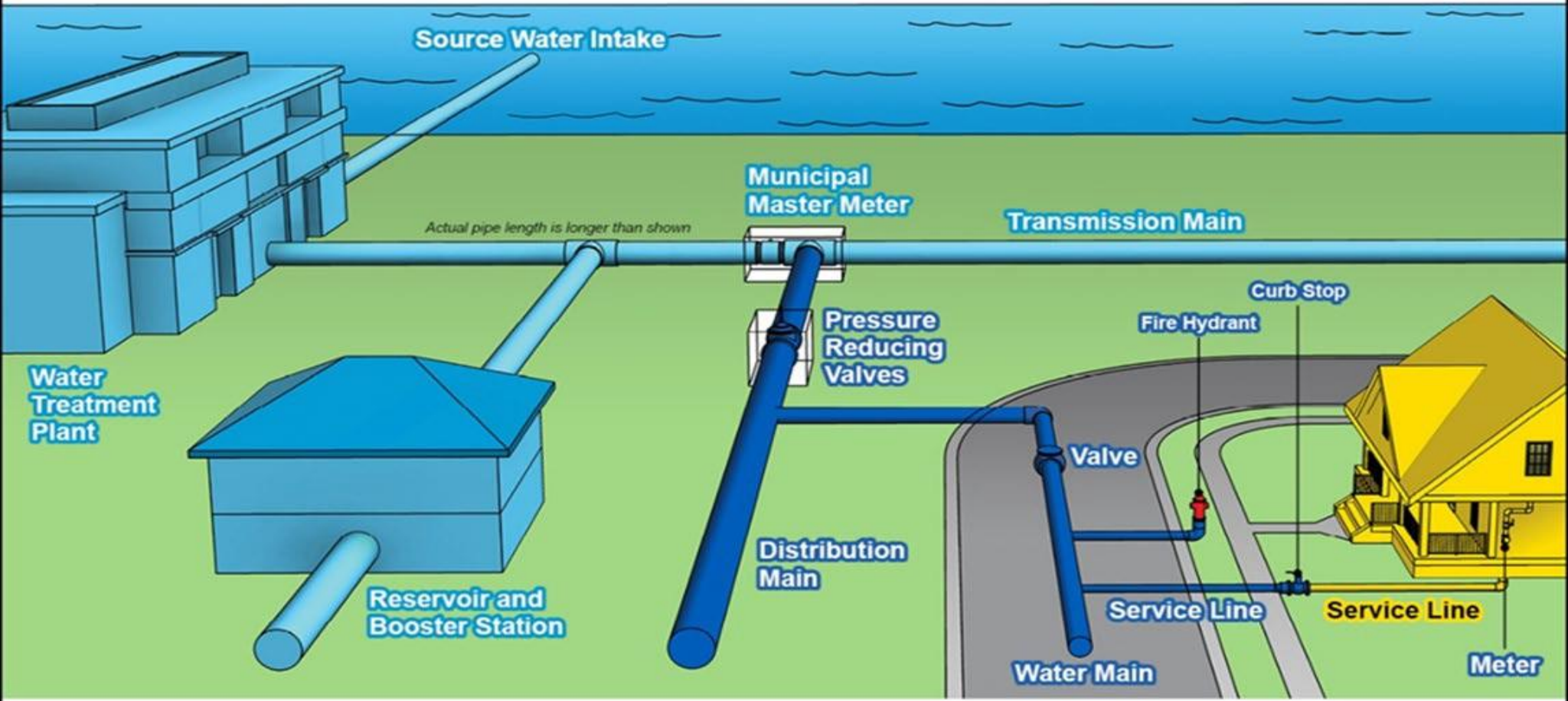
Infrastructure

12,856 fire hydrants
13,614 system valves
1,220 miles of water main
6 booster stations
33 control valves
11 storage tanks
27 well houses

Ensuring Water Quality and Service

- Drinking water that meets or exceeds regulatory requirements
- Routine maintenance, inspections and site visits
- 24/7 emergency response
- Customer support
- Regulatory compliance
- Sampling and reporting
- Safe Drinking Water Act of 1974

Our water system is a shared responsibility.



Public Education

- Flushing
- Clean your aerators every 6 months
- Use cold water for drinking and cooking
- Replace faucets made before 2014
- Annual Consumer Confidence Reports

How to Flush Your Home Plumbing

Frequently Asked Questions

How do I know my water is safe?

Your water is routinely tested to ensure it meets the Safe Drinking Water Act requirements.

How can I get my water tested?

Make an appointment with our office or contact the Oakland County Health Department to order sample bottles.

Break

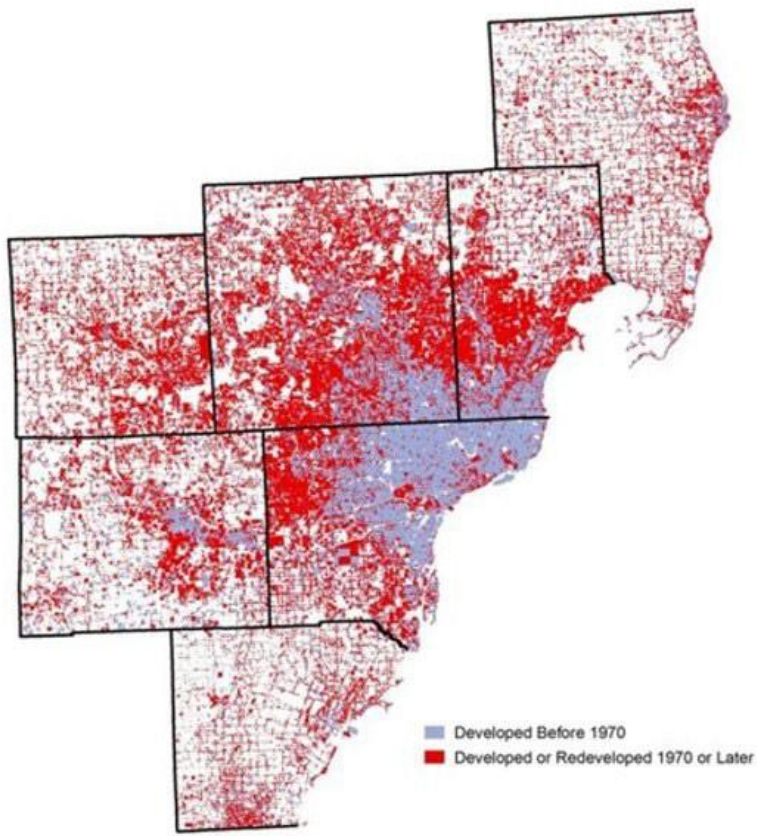
Stormwater Management

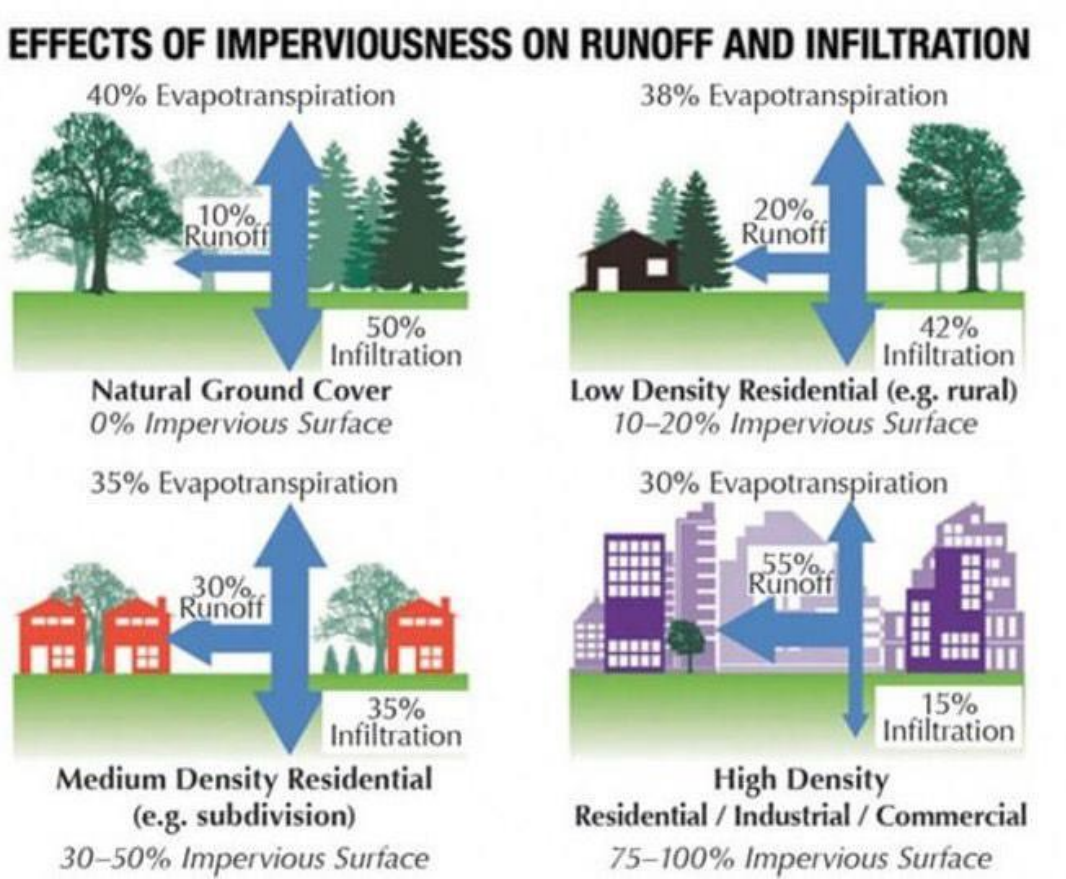
Lynne Seymour, P.E. Chief Engineer

Stormwater Management

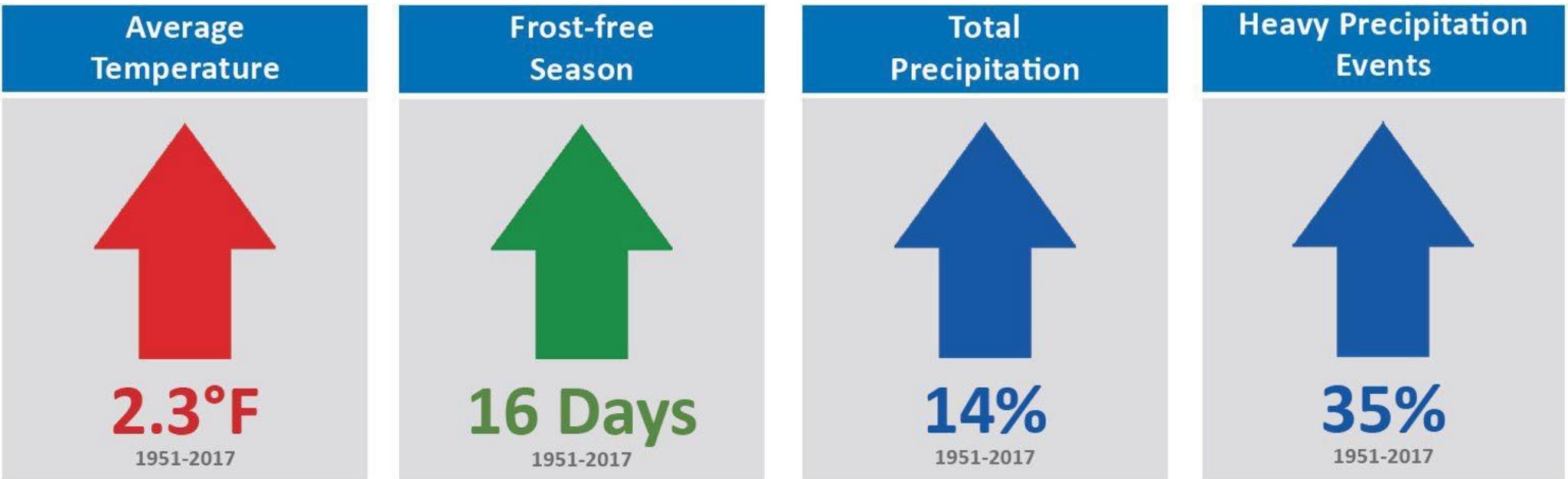
- Why is it important?
- Separated vs. combined systems
- Initiatives
- Partnership opportunities

Importance of Stormwater Management





Importance of Stormwater Management



Great Lakes climate trends (1951–2017)

Stormwater Impacts in the GWKDD

Wet Weather Impacts in GWK Combined Sewer Drainage District:

- Greater than 93% stormwater
- Flow rates 150 times greater than typical dry weather flows

George W. Kuhn RTB Facility Green Infrastructure Project

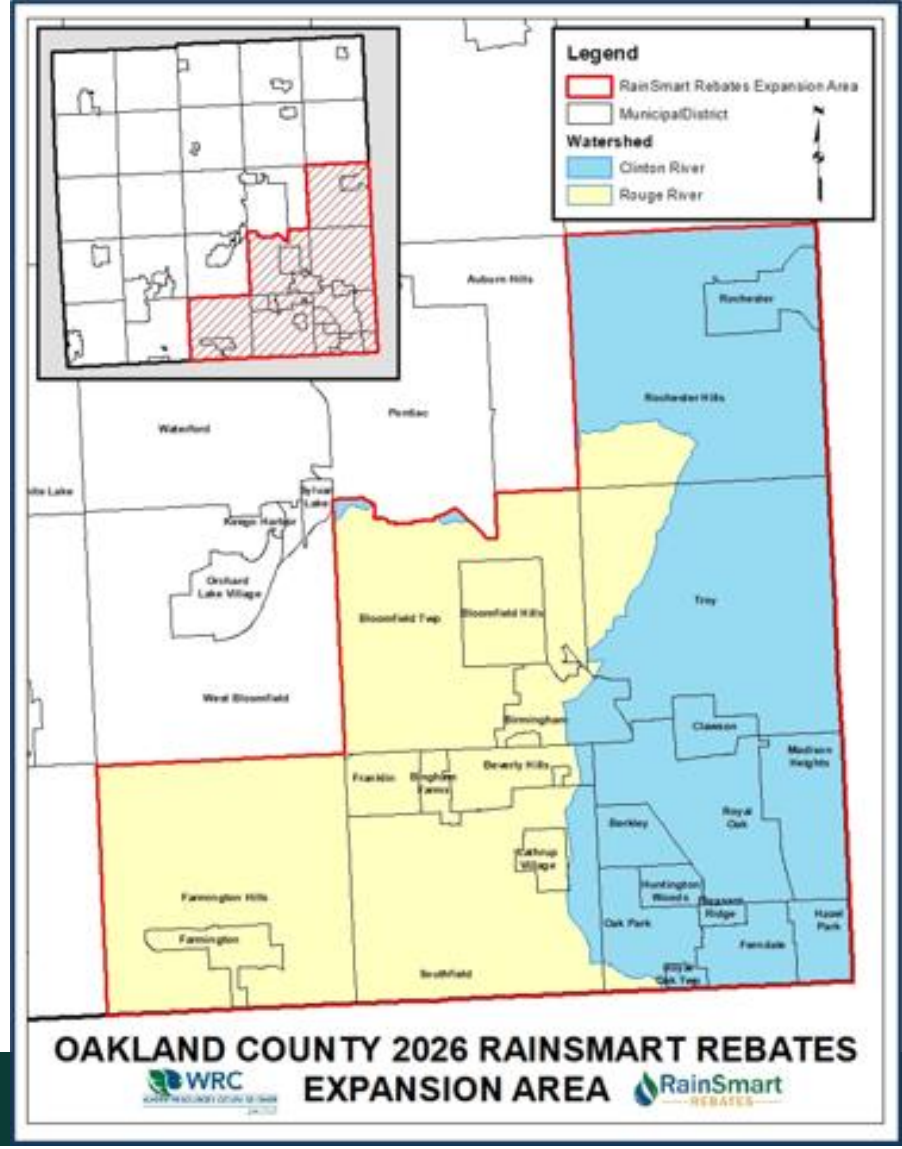
Initiatives

- Green infrastructure
- Sustainable landscaping
- Regional detention

RainSmart REBATES

RainSmart REBATES

- Two-year pilot project was incredibly successful
- Allowed for expansion of program to 24 communities



Norton Street Innovation

- **$1.3 million secured in external funding**
- Reduces stormwater flow
- Manages stormwater naturally
- Improves water quality and reduces pollution
- Enhances urban spaces with native plants and biodiversity
- Engaged with residents from beginning to end

$3M Investment to Manage Stormwater

- Regional Stormwater Detention Credit Program
  - Will initiate a program that allows road projects to meet stormwater storage requirements in a new way
  - Study, plan, and construct improvements to a regional stormwater storage basin in the City of Troy that will store up to 33 million gallons of water during heavy rains

Shared Responsibility

- Public Education
- Pollution Prevention and Good Housekeeping
- Post-Construction Stormwater Runoff Controls

Collaboration Opportunities

- County Drain Petition Projects
  - Green infrastructure
  - Regional detention
  - Improving existing storage
- Grant applications

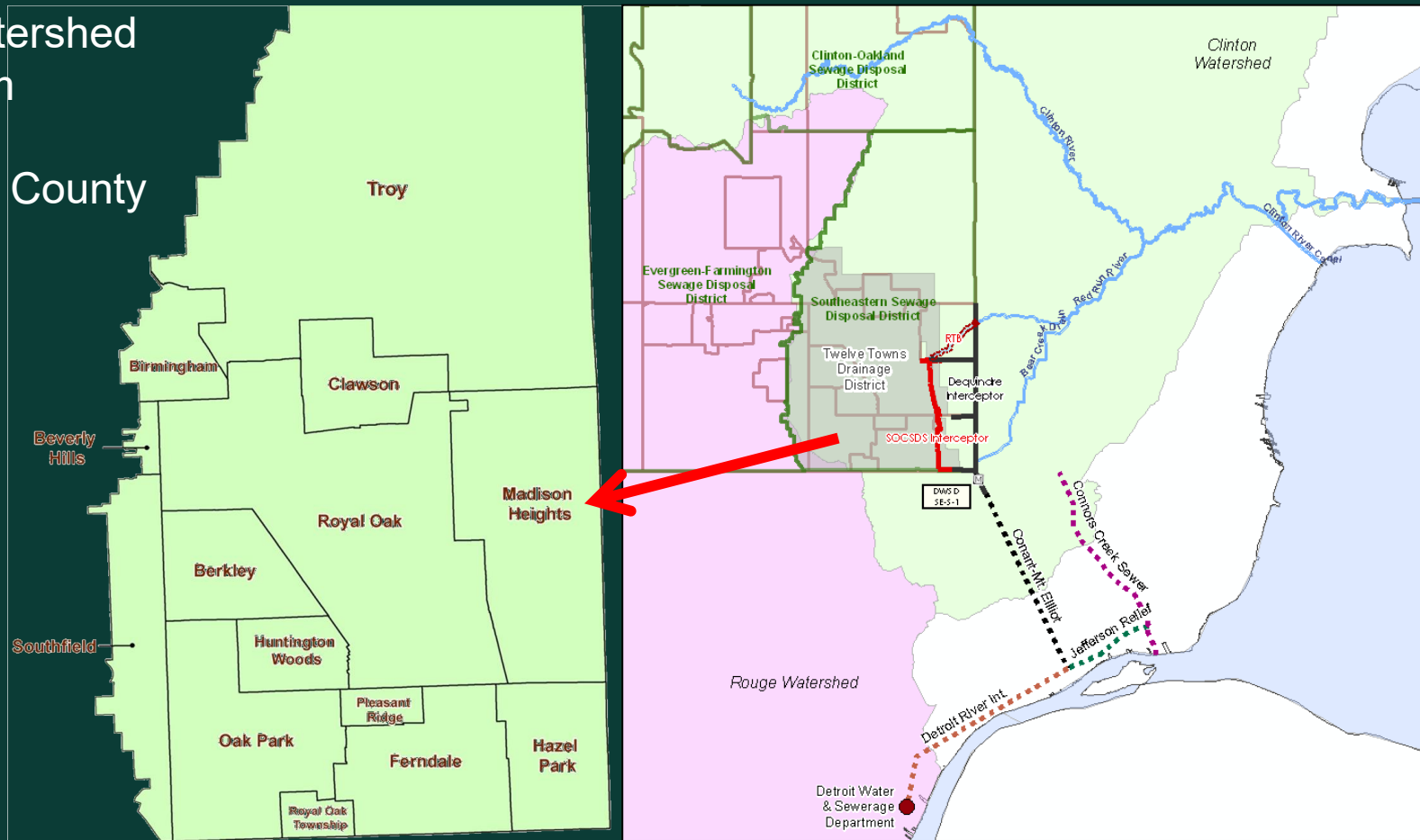
Progress

George W. Kuhn Retention Treatment Basin

Lesli Maes, P.E., Assistant Chief Engineer

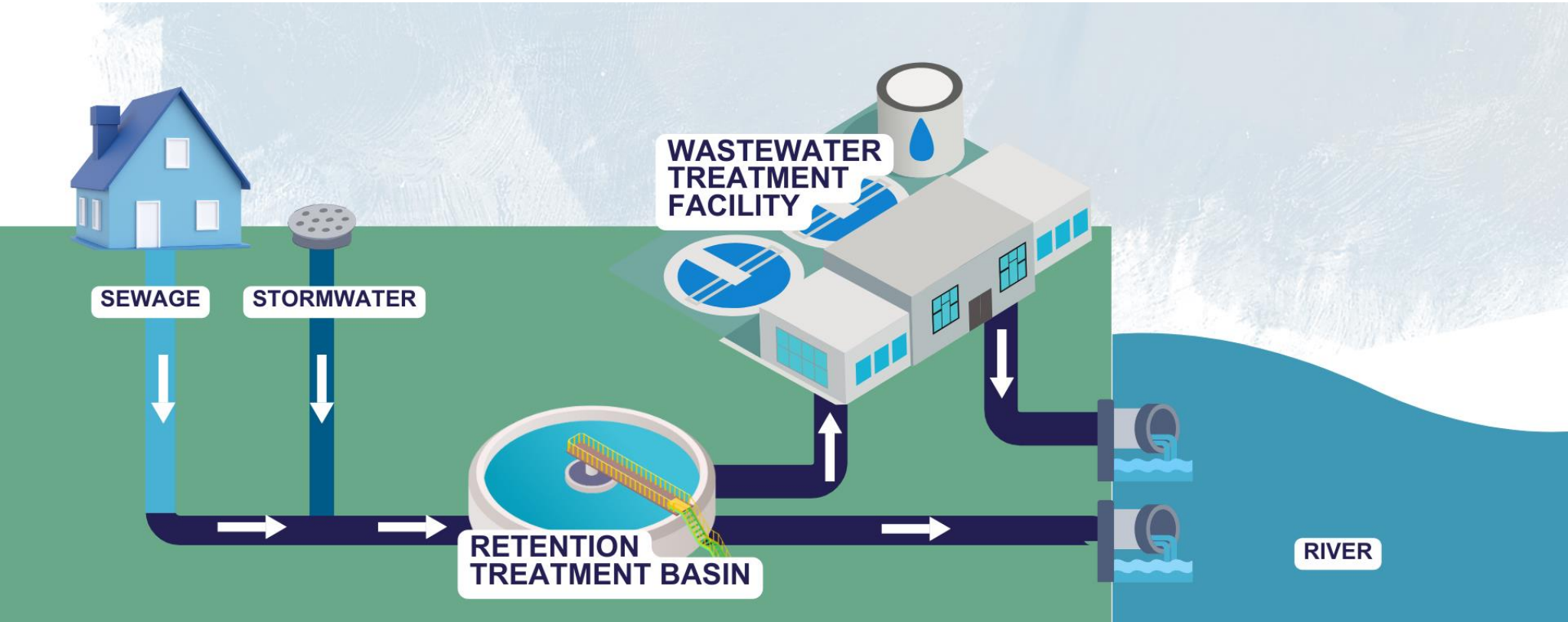
GWK Drainage District

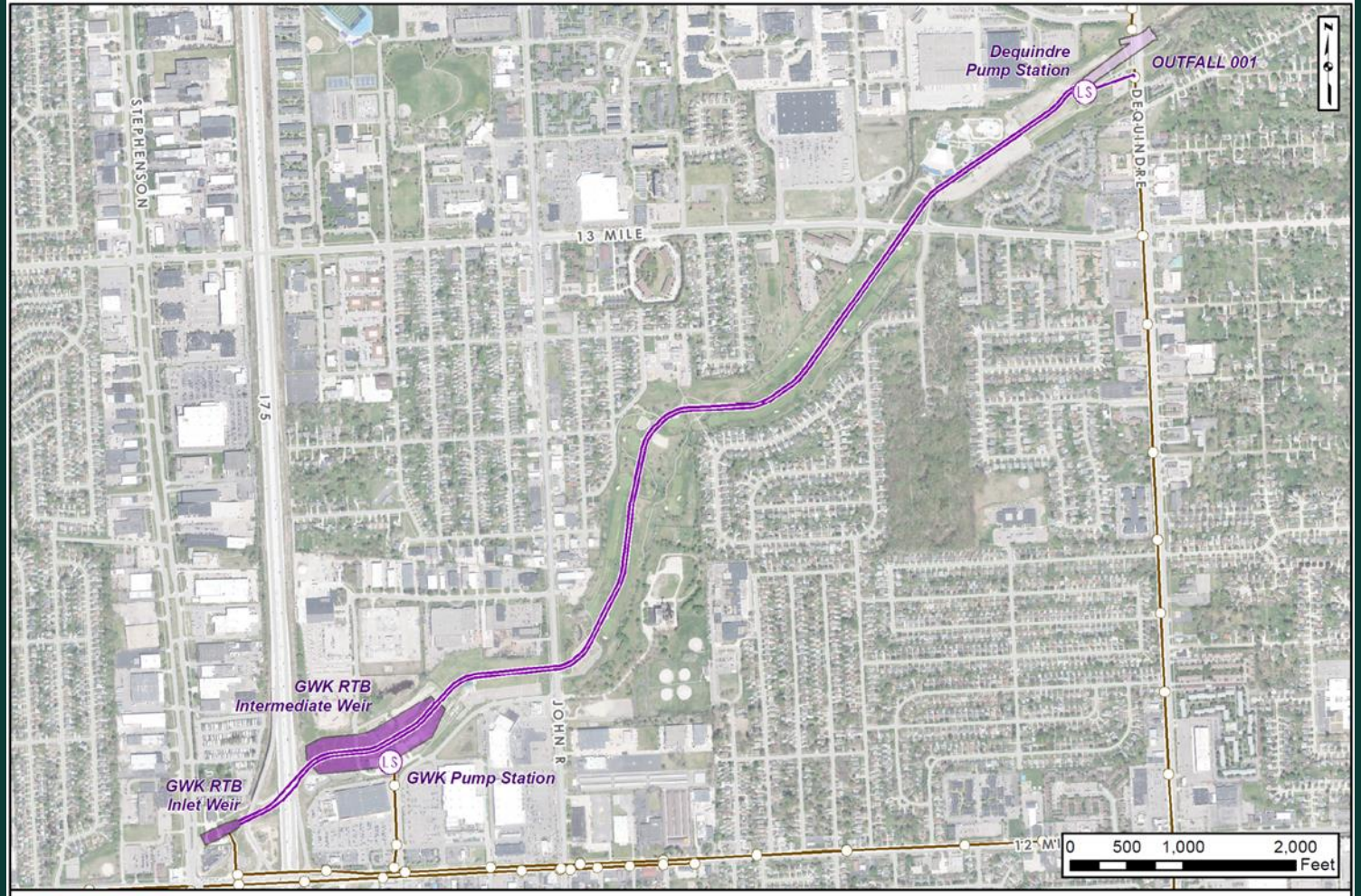
- Clinton River Watershed
- Combined system
- 14 municipalities
- 186,000 Oakland County residents
- 24,500 Acres



Combined Sewer System

During Wet Weather





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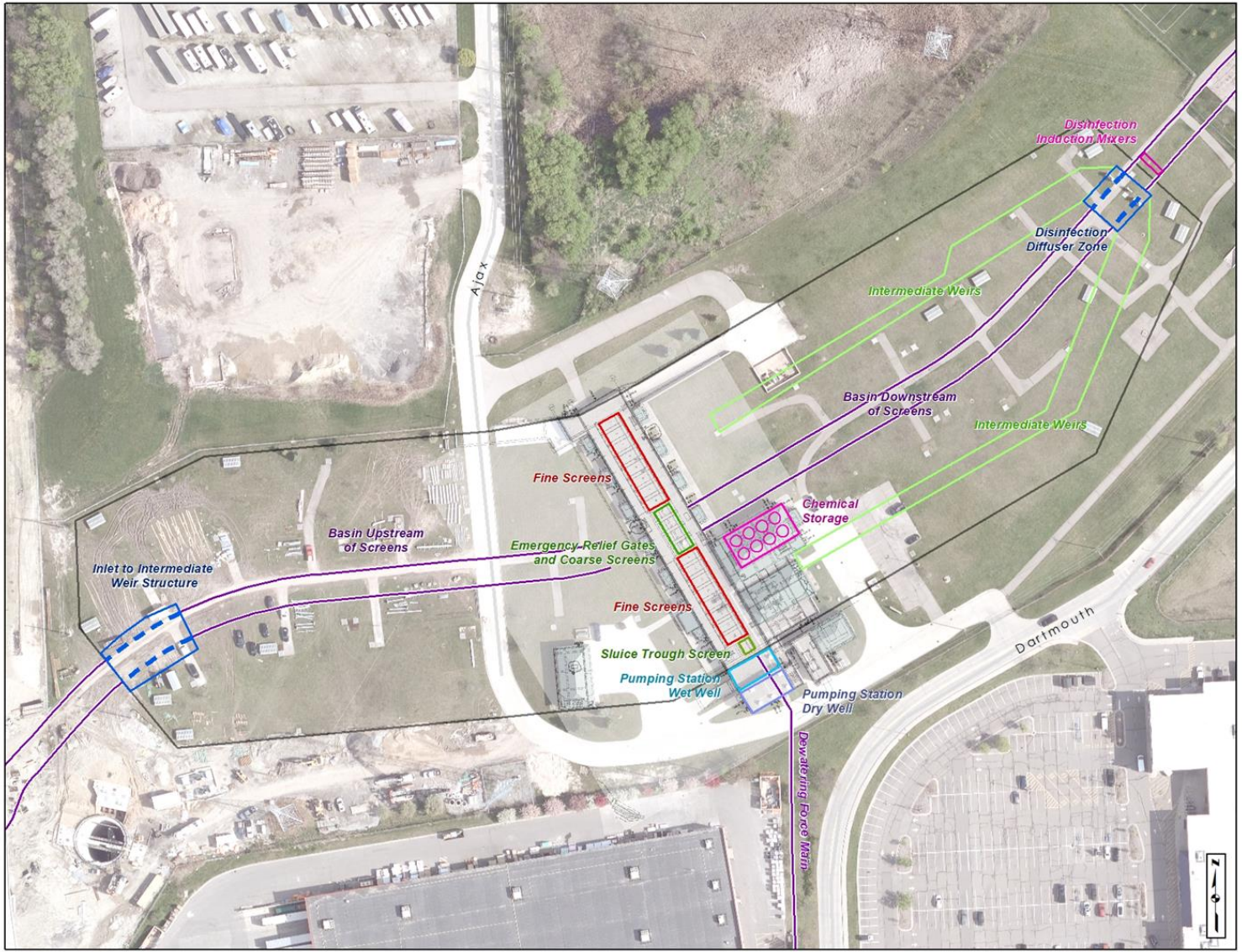
GEORGE W KUHN CSO
RETENTION TREATMENT BASIN FACILITY

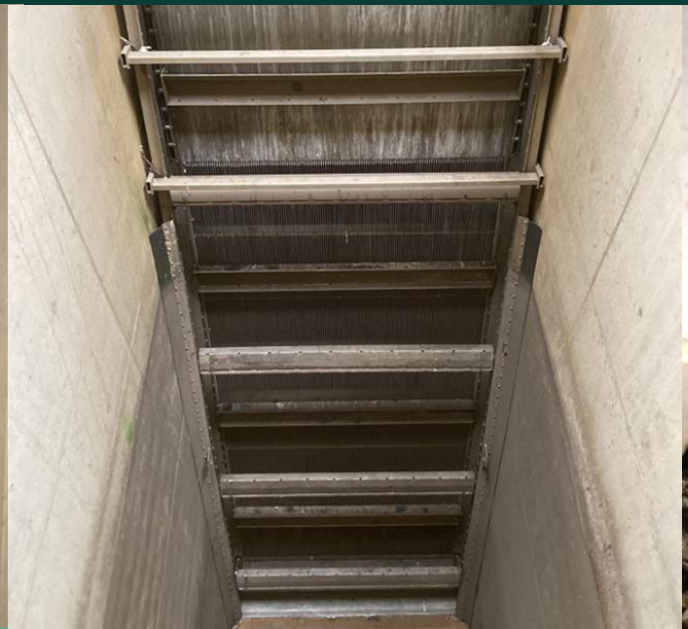
Treated Effluent
GWK Basin Route
Sanitary Interceptor

Intermediate Weir Structure

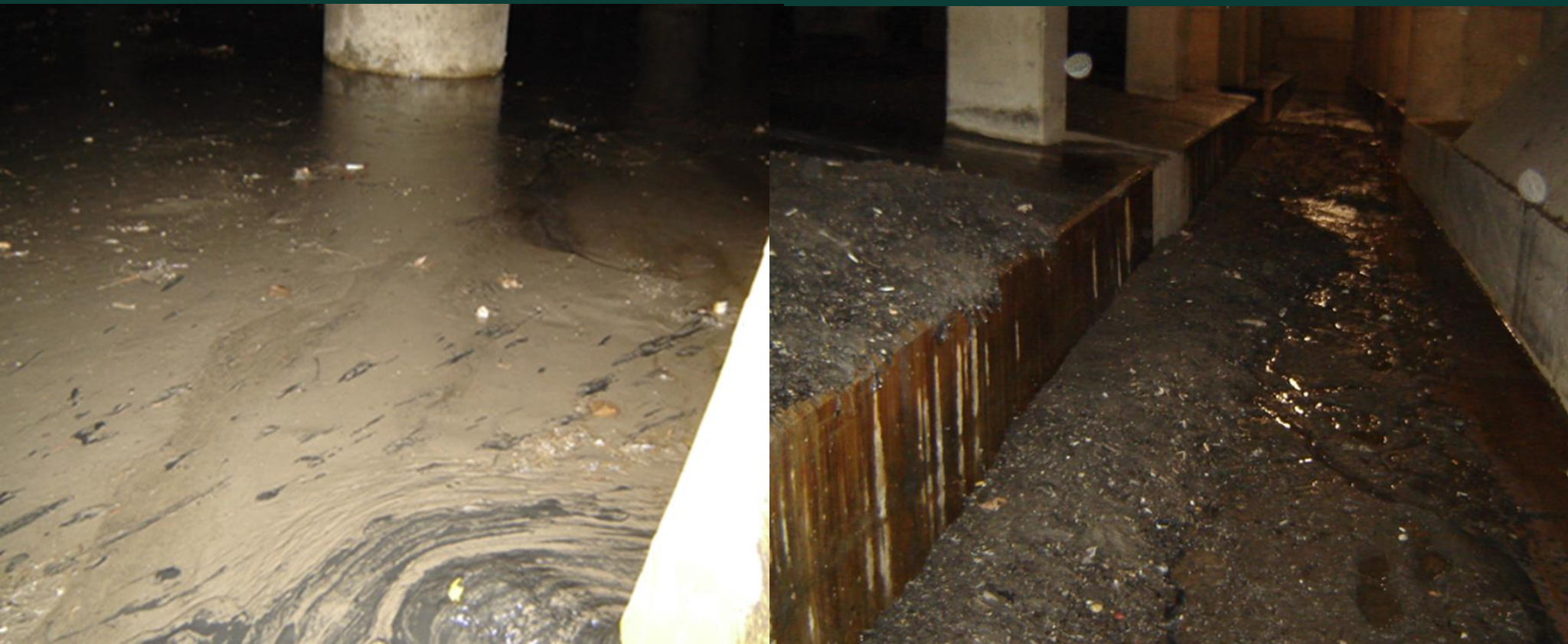
- Fine screens (16)
- Coarse screens (4)
- Sodium Hypochlorite storage and pumps
- 2000-foot-long intermediate weir
- Sodium hypochlorite diffusers and chemical induction mixers (16)



Screening



Settling

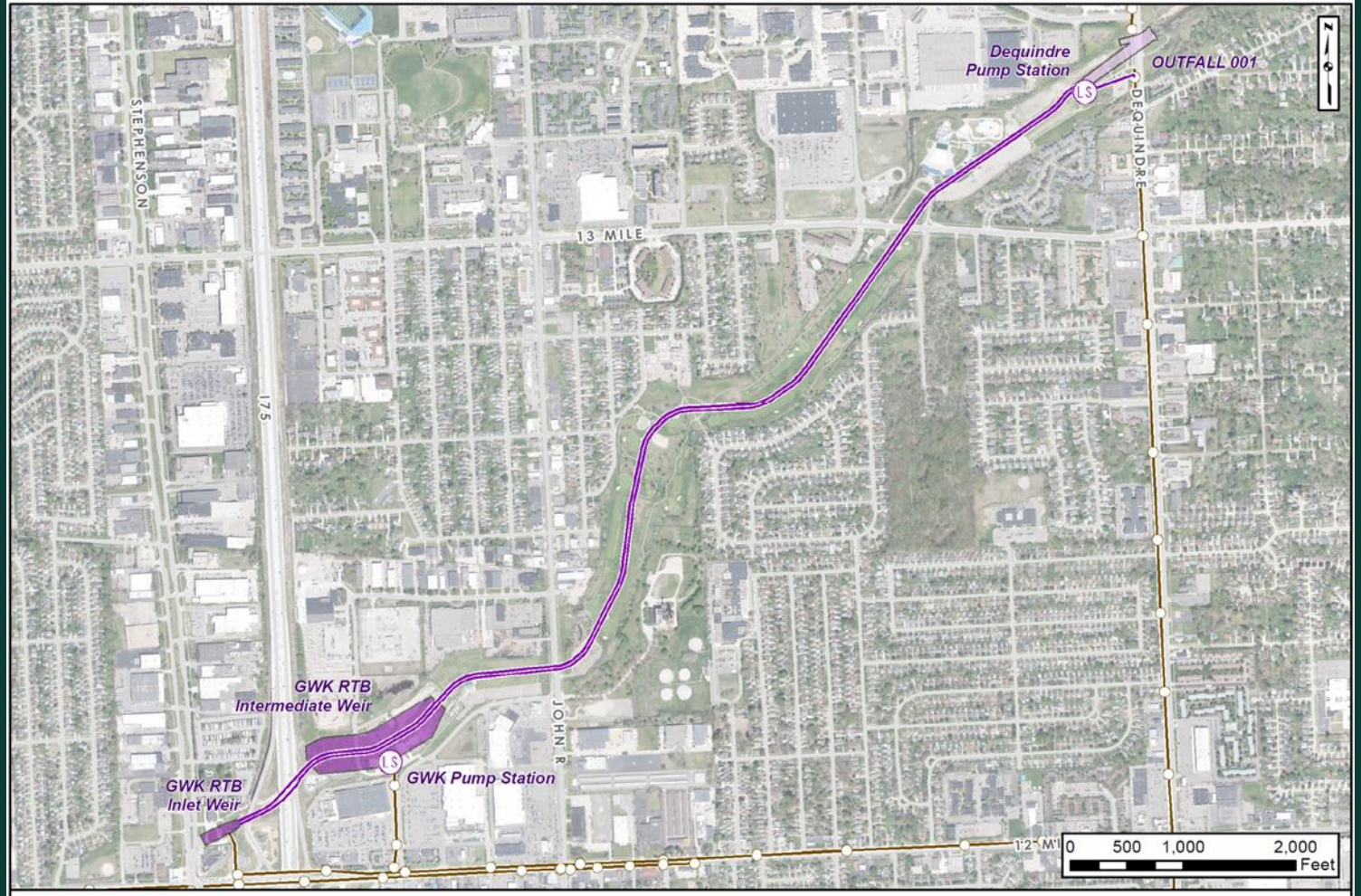


Disinfection

150,000 gallons sodium hypochlorite storage

8 chemical feed pumps

16 chemical induction mixers



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GEORGE W KUHN CSO
RETENTION TREATMENT BASIN FACILITY

Treated Effluent
GWK Basin Route
Sanitary Interceptor

GWK Success Rate

We sample and send permitted treated discharge for testing to ensure we are meeting the standards of our permit.

Our facility maintains a nearly 100% compliance success rate.

During a large rain event, our team works around the clock to protect our rivers, lakes, and communities.

RTBs Are A Solution To Pollution

1950s

No storage

Wet weather flow discharged to the Red Run Drain 55-60 times

1960s

$466 million invested

30 million gallons of storage

Reduced discharges to 25-30 times

1970s

$145 million invested

90 million gallons of storage

Reduced discharges to 12-15 times

2000s

$250 million invested

124 million gallons of storage

Reduced discharges to 7-8 times

2020s

$1.4 billion invested

149 million gallons of storage

Retention Treatment Basin

- GWK RTB is the largest facility of its kind in the United States.
- 93% of flow coming into the GWK RTB is stormwater — 7% is wastewater.
- The GWK RTB can store 124 million gallons of combined flow
- The MDOT tunnel can store an additional 25 million gallons of stormwater
- 97% of the year all flow is sent to a GLWA wastewater treatment plant

Facility Tour