



Great Lakes Project: Where We Stand Now

Program Overview and Update

Kelly Zylstra, PE, WWU Operations Manager

KZYLSTRA@WAUKESHA-WATER.COM



Timeline – a Look Back

- December 2000:
 - EPA issues final ruling retaining the 1976 standard for radium
- December 2003:
 - City of Waukesha and County Circuit Court enter into consent decree with DOJ to achieve phased-in compliance with new radium standard
- March 2009:
 - DOJ sets 2018 deadline for meeting new standard
- July 2011:
 - Informational meetings, public hearings held



Timeline – a Look Back

- October 2013:
 - Revised Application filed
- 2013-2015:
 - WDNR prepared technical review, draft decision and draft EIS
- August 2015:
 - Public meetings held
- December 2015:
 - WDNR prepared revised technical review and updated EIS
- January 7, 2016:
 - WDNR forwarded application to Regional Body and Compact Council

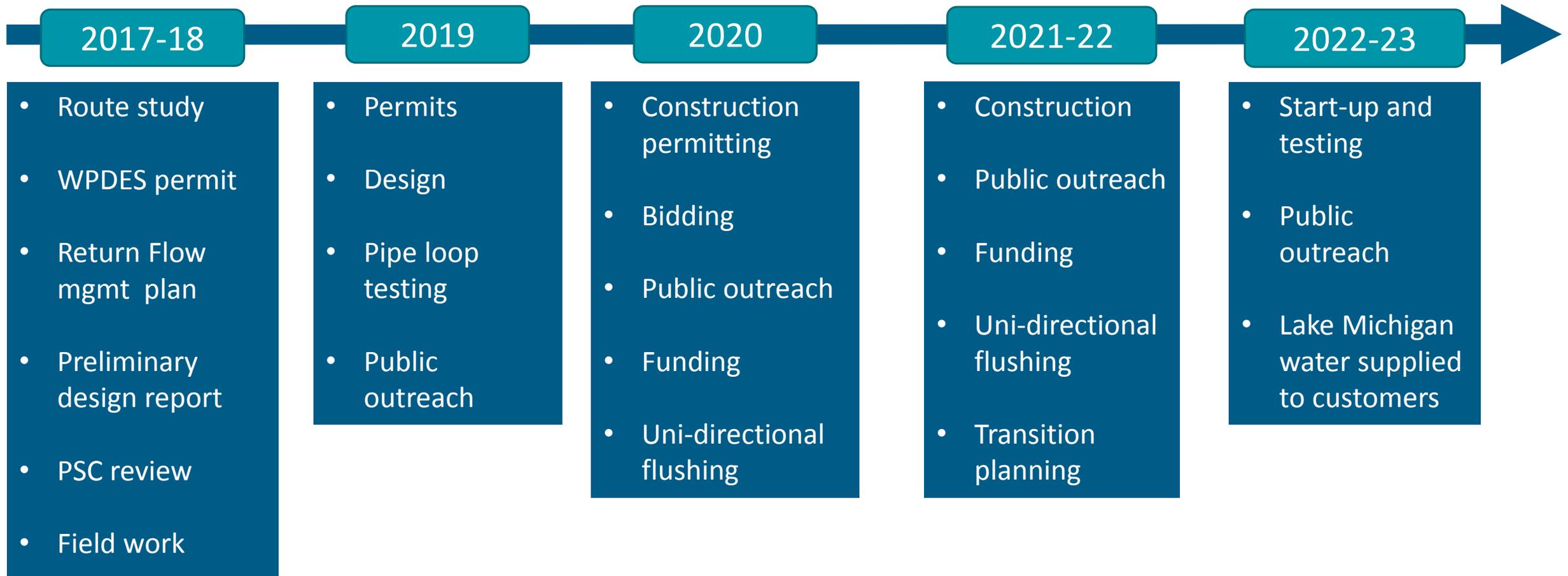


Timeline – a Look Back

- June 2016:
 - Compact Council Grants Approval
- October 2016:
 - WWU hires the Greeley and Hansen team to assist with Program Management and the path ahead
- July 2017:
 - DOJ extends compliance deadline to 2023
 - Recognizing City's effort to develop new water supply
 - Extension granted with conditions:
 - Requires backup equipment for City's radium compliance wells
 - Additional layer of redundancy if project slips beyond September 2023
 - If project not 50% complete by May 2022, Waukesha must install temporary treatment system

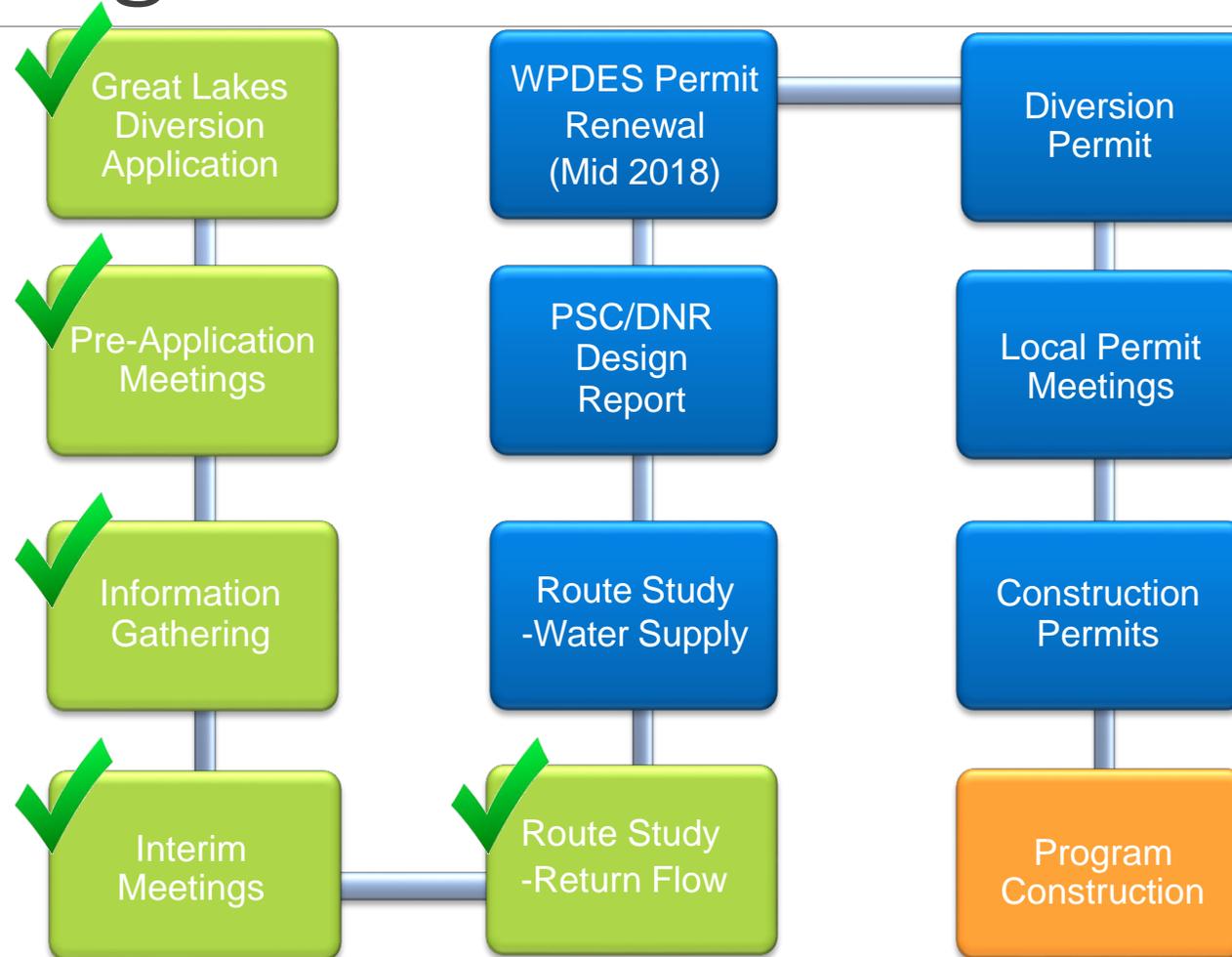


The Path Ahead – the Timeline





Permitting Schedule



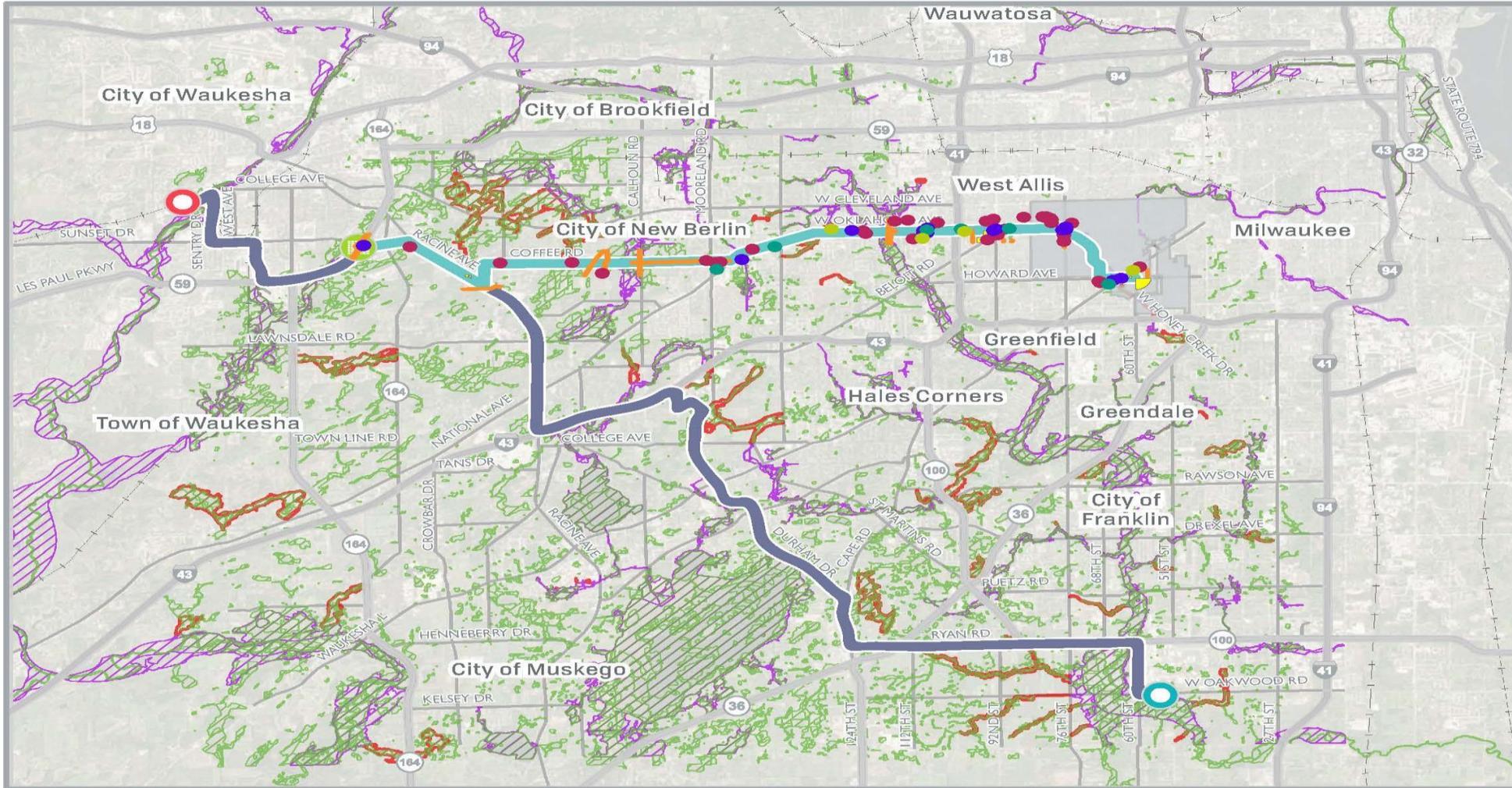


Permitting and Pathways

- Holding open houses in community along potential routes
 - Working with Milwaukee on pump station
 - Working with CWP on return flow pump station
 - 30% design report for entire Program
 - Survey and field work
 - Soil borings and environmental data base review
- Goal is to have the preferred route selected by the end of April and the design report submitted in June.

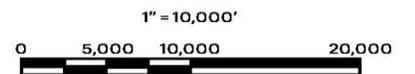


Route 1



- ROUTE ALTERNATIVE 1
- RETURN FLOW
- RETURN FLOW PUMPING STATION
- OUTFALL
- WAUKESHA DISTRIBUTION SYSTEM
- NEW WATER SUPPLY PUMPING STATION EVALUATION AREA
- FEMA SFHA-A
- FEMA SFHA-AE
- GROUNDWATER & SOIL CONTAMINATION
- GROUNDWATER CONTAMINATION
- SOIL CONTAMINATION
- ARCHITECTURE & HISTORY INVENTORY
- ARCHAEOLOGICAL REPORT INVENTORY
- ARCHAEOLOGICAL SITES INVENTORY
- WETLANDS

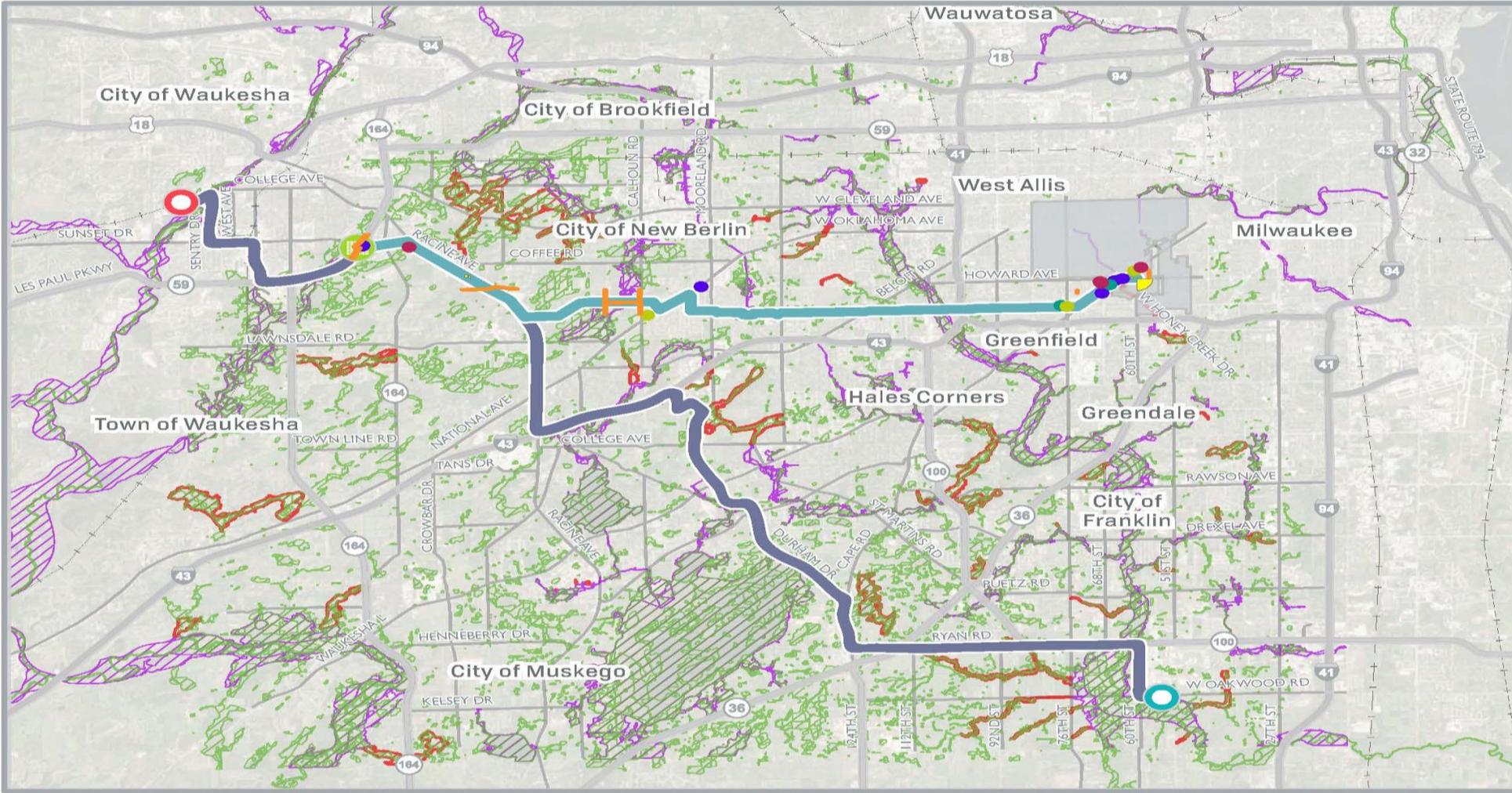
ENVIRONMENTAL CONSIDERATIONS
Great Lakes Water Supply Program
 Waukesha, Wisconsin



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

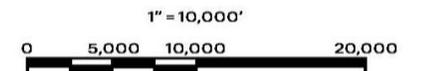


Route 2



-  ROUTE ALTERNATIVE 2
-  RETURN FLOW
-  RETURN FLOW PUMPING STATION
-  OUTFALL
-  WAUKESHA DISTRIBUTION SYSTEM
-  NEW WATER SUPPLY PUMPING STATION EVALUATION AREA
-  FEMA SFHA-A
-  FEMA SFHA-AE
-  GROUNDWATER & SOIL CONTAMINATION
-  GROUNDWATER CONTAMINATION
-  SOIL CONTAMINATION
-  ARCHITECTURE & HISTORY INVENTORY
-  ARCHAEOLOGICAL REPORT INVENTORY
-  ARCHAEOLOGICAL SITES INVENTORY
-  WETLANDS

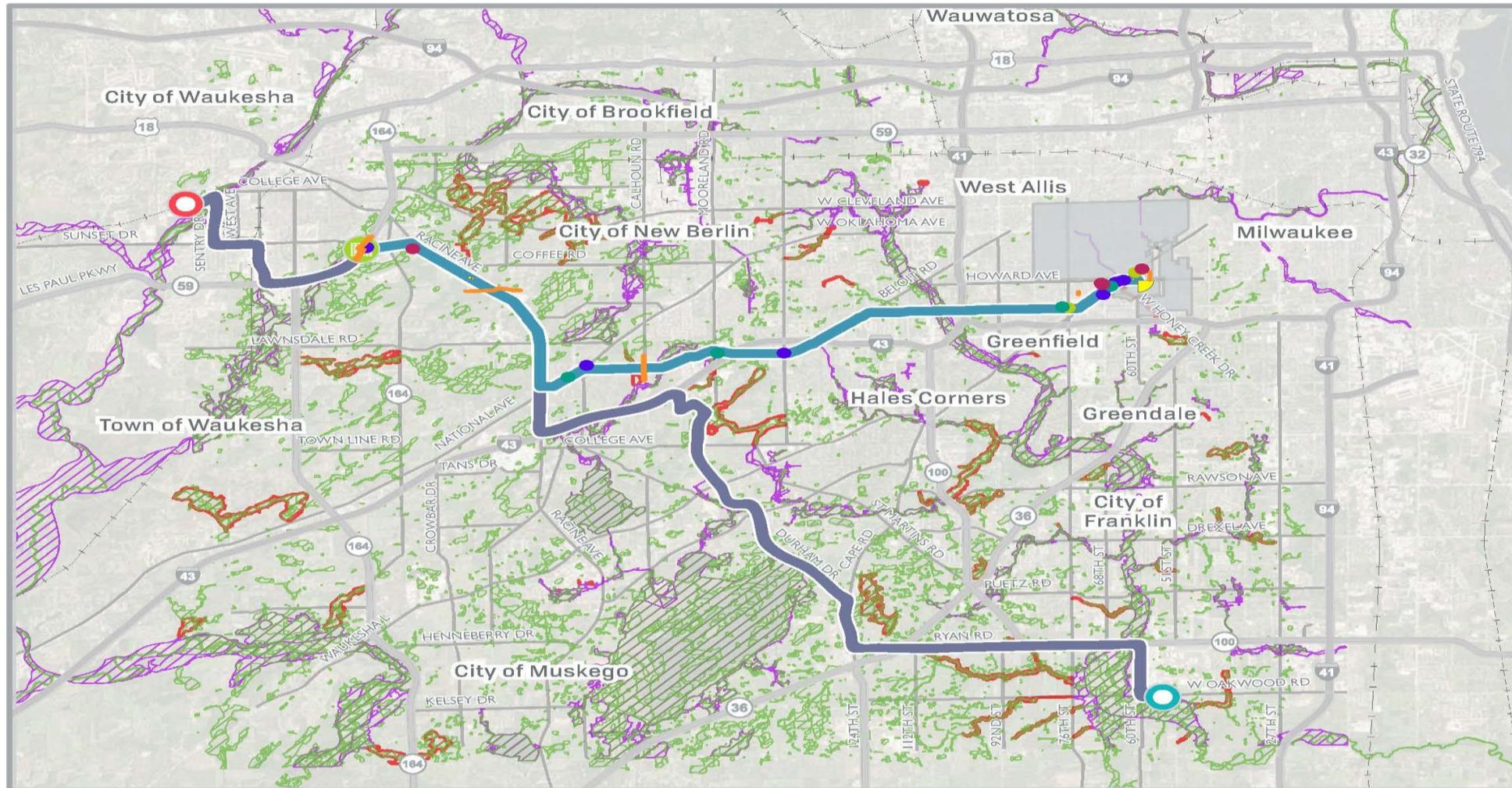
ENVIRONMENTAL CONSIDERATIONS
Great Lakes Water Supply Program
 Waukesha, Wisconsin



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

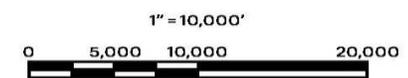


Route 3



- ROUTE ALTERNATIVE 3
- RETURN FLOW
- RETURN FLOW PUMPING STATION
- OUTFALL
- WAUKESHA DISTRIBUTION SYSTEM
- NEW WATER SUPPLY PUMPING STATION EVALUATION AREA
- FEMA SFHA-A
- FEMA SFHA-AE
- GROUNDWATER & SOIL CONTAMINATION
- GROUNDWATER CONTAMINATION
- SOIL CONTAMINATION
- ARCHITECTURE & HISTORY INVENTORY
- ARCHAEOLOGICAL REPORT INVENTORY
- ARCHAEOLOGICAL SITES INVENTORY
- WETLANDS

ENVIRONMENTAL CONSIDERATIONS
 Great Lakes Water Supply Program
 Waukesha, Wisconsin



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

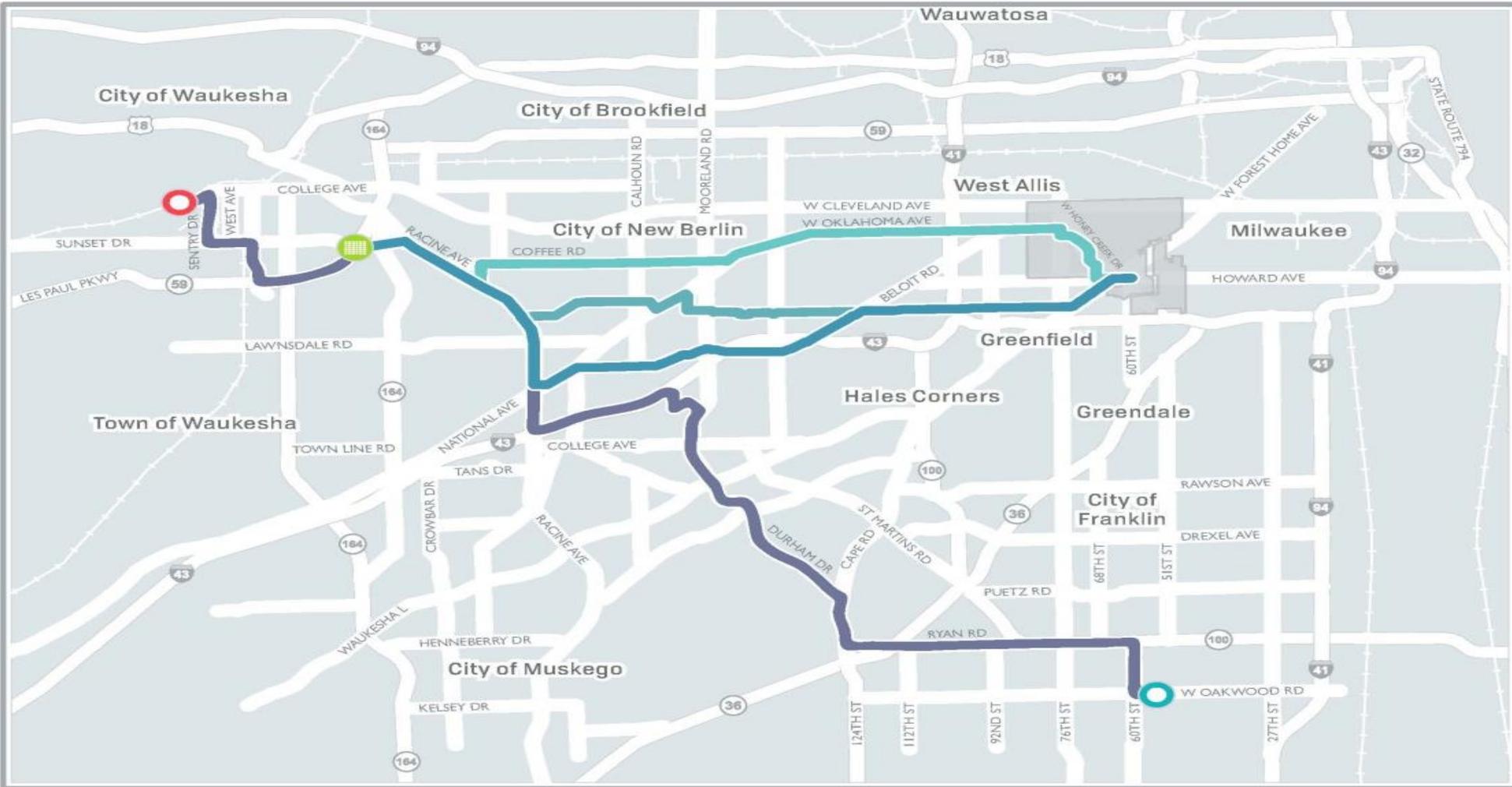


Non-Economic Analysis

Evaluation Item	Route Alternatives		
	M1	M2	M3
Pipeline Length	Fair	Less	More
Special Crossings	Fair	Less	More
Depth to Bedrock	Less	Fair	More
Dense Soils	Less	Fair	More
Organic Soils	Comparable		
Depth to Groundwater	More	Fair	Less
Corrosive Soils	Less	More	Fair
Contaminated Materials	More	Less	Fair
Wetlands	Comparable		
Waterways	Comparable		
Endangered Resources	Less	More	Less
Cultural Resources	Less	Fair	More
Agricultural Resources	Comparable		
Transportation (i.e., Maintenance of Traffic)	Less	More	Most
Planned Regional Transportation Projects	Less	Less	More
Energy Consumption	Less	Less	More
Stakeholder Feedback Challenges	For discussion		
Real Property and Easement Requirements	Less	More	Fair



Overview of All Routes



- ROUTE ALTERNATIVE 1
- ROUTE ALTERNATIVE 2
- ROUTE ALTERNATIVE 3
- RETURN FLOW
- RETURN FLOW PUMPING STATION
- OUTFALL
- WAUKESHA DISTRIBUTION SYSTEM
- NEW WATER SUPPLY PUMPING STATION EVALUATION AREA



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

ROUTE ALTERNATIVES
Great Lakes Water Supply Program
Waukesha, Wisconsin





Return Flow

THE DIVERSION PERMIT REQUIRES THAT THE AMOUNT BORROWED IS RETURNED TO THE GREAT LAKES BASIN.

THE CLEAN WATER PLANT PRODUCES HIGHLY TREATED EFFLUENT THAT WILL BE RETURNED TO THE ROOT RIVER.



Root River comparison (quantity and quality)

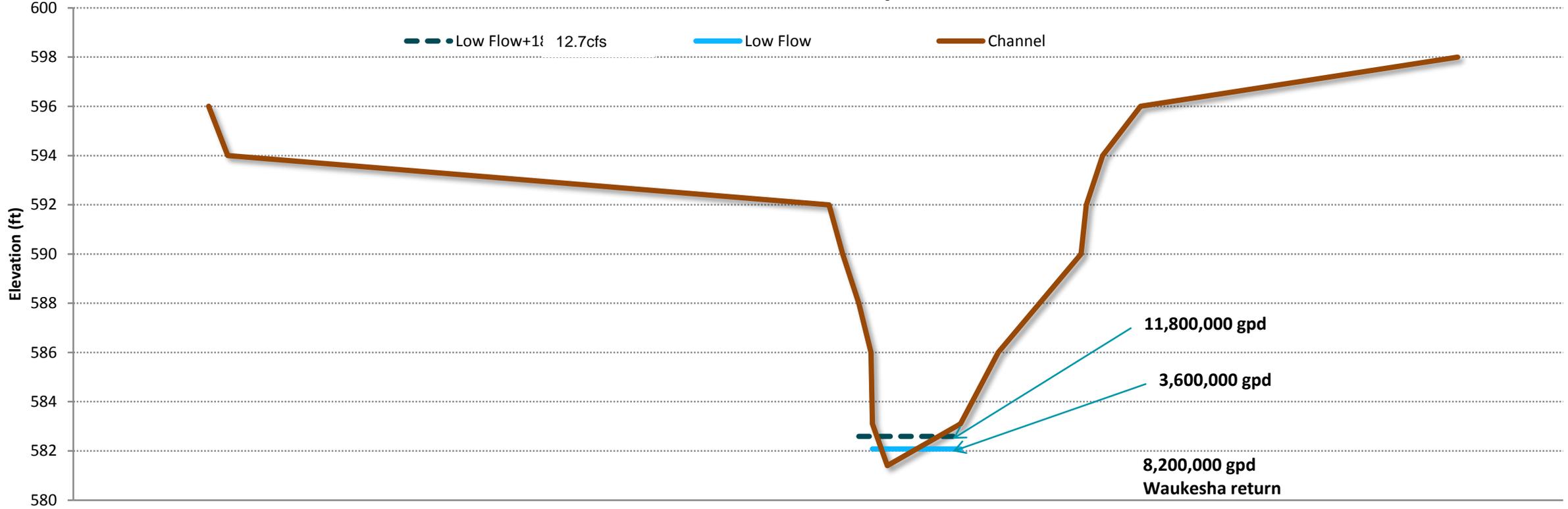


Parameter	Return Flow Water Quality ^a	Projected Permit Required Discharge Quality	Average Root River Water Quality
Biological Oxygen Demand (mg/L)	1.8	≤5.7 to ≤10.0	Approx. 2.4
Total Suspended Solids (mg/L)	1.2	≤10.0	Approx. 10 to 27
Dissolved Oxygen (mg/L) [more oxygen is better]	9.2	≥7.0	Approx. 5.5 to 9.9
Total Phosphorus (mg/L)	<0.075	≤0.075	Approx. 0.13
Fecal Coliform (Counts/100mL)	12	≤400	Approx. 500 to 3,000

^a Average Historical Waukesha Operation or Permit Limit

Low River Flow with Average Return Flow

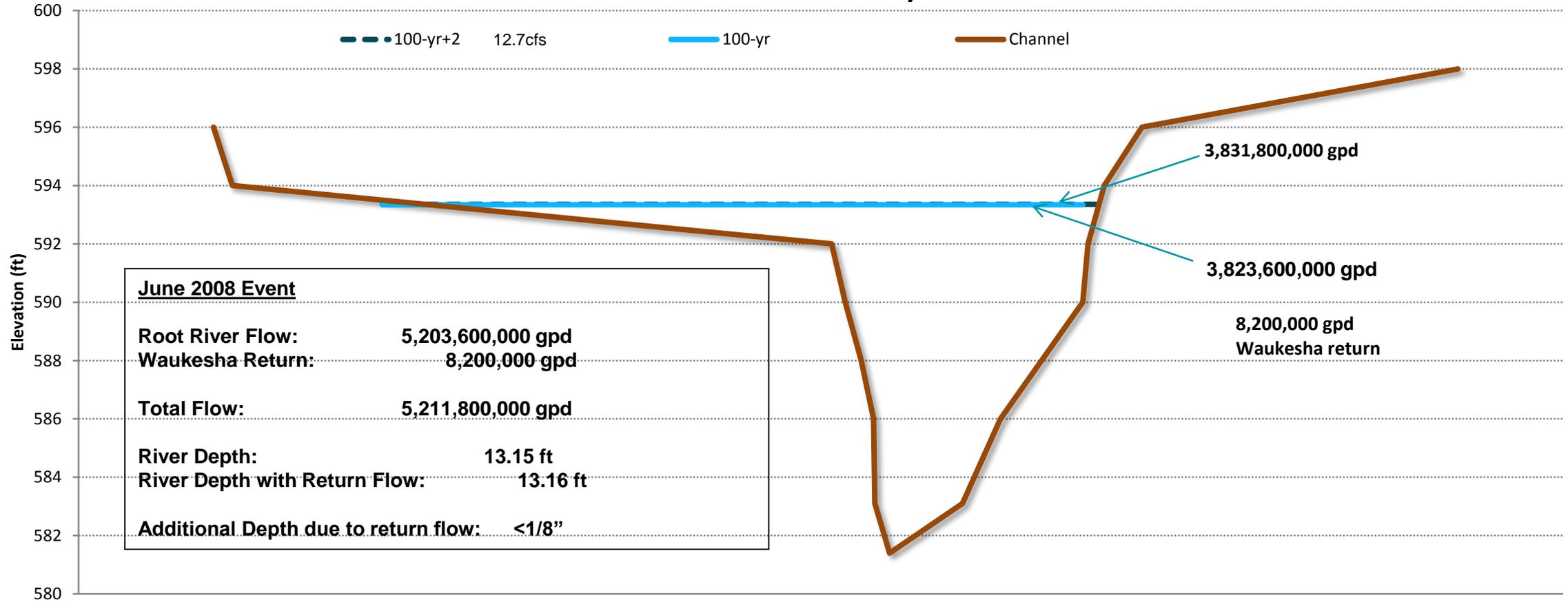
Root River Downstream of Steelhead Facility



Root River Flow Scenario	River Flow Rate (mgd)	Return Flow Rate (mgd)	River Flow Rate with Return Flow (mgd)	% Increase in River Flow Rate (%)	Increase in water depth (in)	River Avg Velocity (fps)	River Avg Velocity with Return Flow (fps)
Low Flow	3.6	8.2	11.8	227%	4.8	0.63	0.82

100 year River Flow with Maximum Return Flow

Root River Downstream of Steelhead Facility



Root River Flow Scenario	River Flow Rate (mgd)	Return Flow Rate (mgd)	River Flow Rate with Return Flow (mgd)	% Increase in River Flow Rate (%)	Increase in water depth (in)	River Avg Velocity (fps)	River Avg Velocity with Return Flow (fps)
100 Year Flow	3823.6	8.2	3831.8	0.21%	0.12 (~1/8")	5.04	5.05



Benefits to Root River and its fisheries

Low river flows in summer and fall negatively impact recreational fishing and egg harvesting.

Increasing low flows improves angling and provides functional habitat during critical spawning periods.

~25 miles of river downstream of potential return flow location.



Sources:

1. WDNR Lake Michigan Weir Assessments for the Root River Steelhead Facility. Assessments provided by WDNR and from <http://dnr.wi.gov/topic/fishing/hatcheries/spawning.html>.
2. Flow data from USGS gage 04087240 Root River at Racine. Data accessed July 18, 2013.



Transition Plan

THE TRANSITION TO SURFACE WATER WITH THE DIFFERENCES IN WATER QUALITY AND WATER TREATMENT REQUIRES A COORDINATED TRANSITION TO MINIMIZE LOCAL IMPACTS.



Transition Plan

Pipe Loop Testing

Distribution System Water Quality Sampling

Distribution System Water Quality Monitoring

Unidirectional Flushing

Water Transition Plan



Pipe Loop Testing

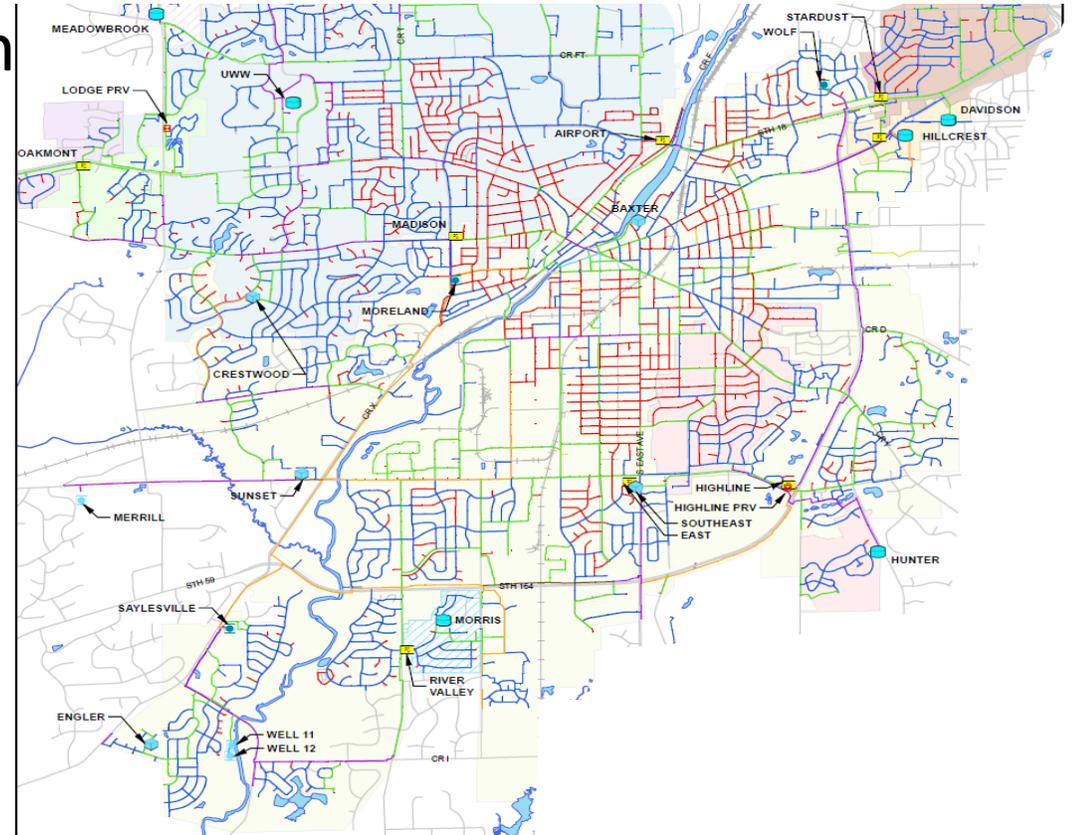
- ✓ Design, Build, Operate Pipe Loop Apparatus
- ✓ Collect Data
- ✓ Determine Chemicals Needed
- ✓ Write Report





Distribution System Water Sampling

- ✓ Initial Distribution System Evaluation
- ✓ Hydraulic Modeling (Water Age)
- ✓ DBP Sample Locations
- ✓ Total Coliform Sample Locations
- ✓ Lead/Copper Sample Locations





Distribution System Water Monitoring

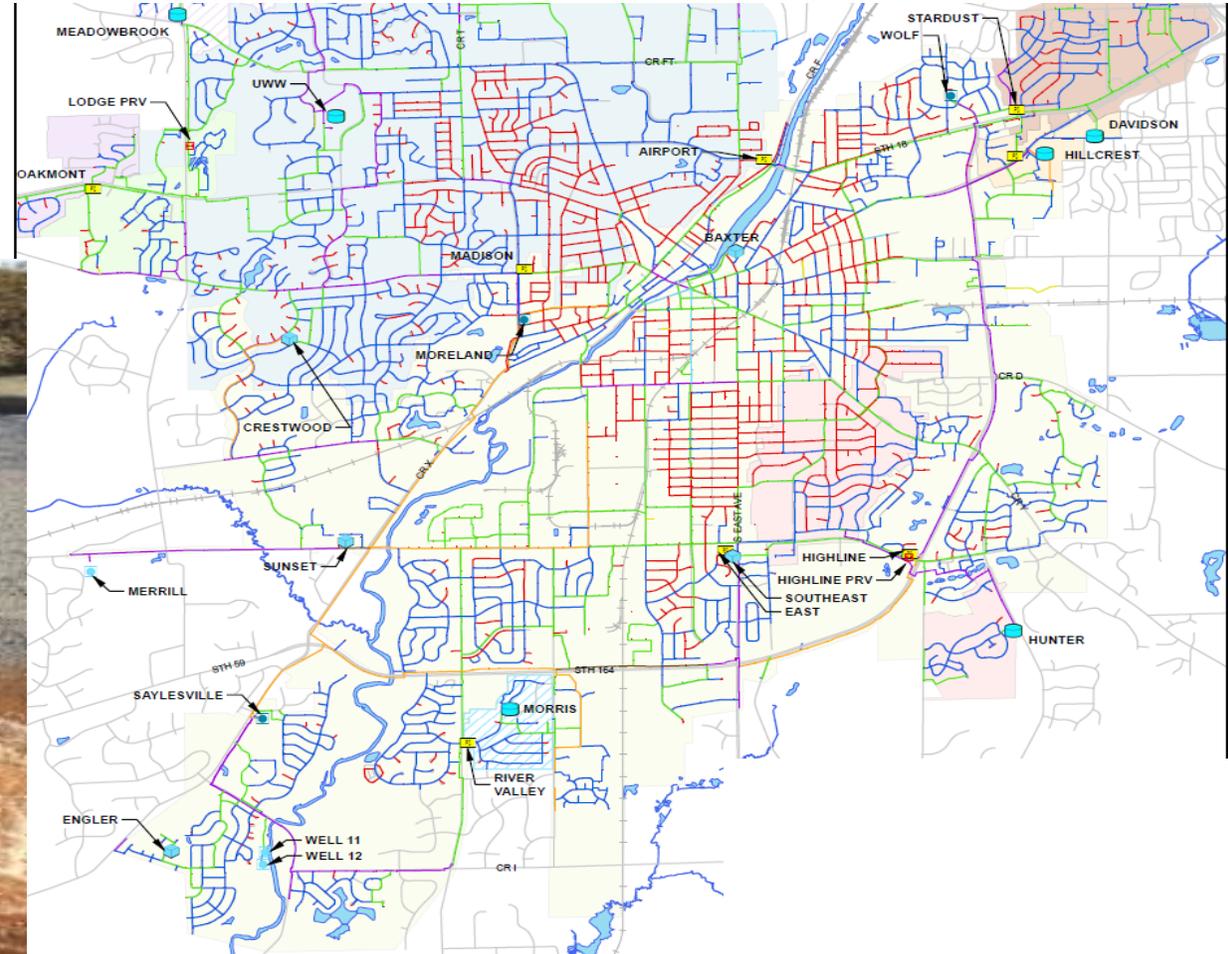
- ✓ Determine parameters to monitor in distribution system
- ✓ Determine where to monitor
- ✓ Determine how to monitor





Unidirectional Flushing Program

- ✓ Develop UDF Plan
- ✓ Develop UDF Procedures





We'd like to hear from you.

CALL OUR HOTLINE

262.409.4444

VISIT OUR WEBSITE

greatwateralliance.com

FOLLOW US

f @GWASocial **t** @GWA_Social



GREAT WATER
ALLIANCE™