

Tour of Waukesha and Surrounding Areas

Associated with the Waukesha Great Lakes Diversion Application

February 17 8:30 am—12:00 pm



Material provided by:



WELCOME

Location, 8:30 a.m. : STOP A Carroll Campus Center Parking Lot (115 Wright St. Waukesha, WI).

Speaker: Introduction from Mayor Reilly, City of Waukesha and Cathy Stepp, WDNR Secretary

The purpose of this tour is to provide an overview of important landmarks associated with the city of Waukesha's Great Lakes Diversion Application. This packet contains information about each landmark as it relates to the Waukesha Application.

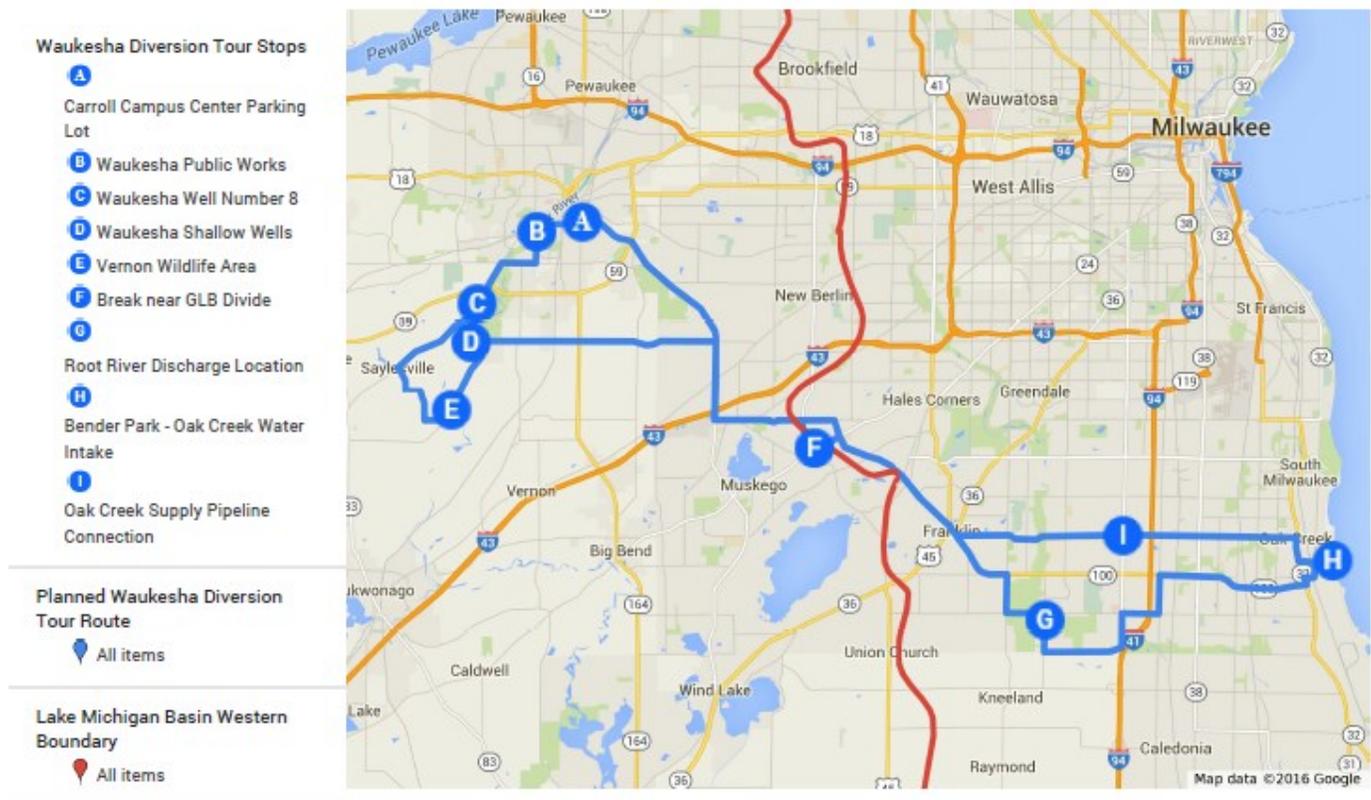
The city of Waukesha (Applicant) seeks to divert an annual average of 10.1 million gallons per day (GPD) of Lake Michigan water for its public water supply. The Applicant proposes to obtain water from the Oak Creek Water Utility and return treated wastewater to the Root River.

General information on the Application can be found on the Wisconsin Department of Natural Resources (WDNR) website: dnr.wi.gov ; Search "Waukesha Application" and

The Regional Body and Compact Council Website: www.waukeshadiversion.org and

The City of Waukesha Website: www.waukeshaapplication.com

Waukesha Diversion Tour Route



This map is available at:

<https://www.google.com/maps/d/viewer?mid=z-iLpzt2n6BM.kD9ePbSru3Os>

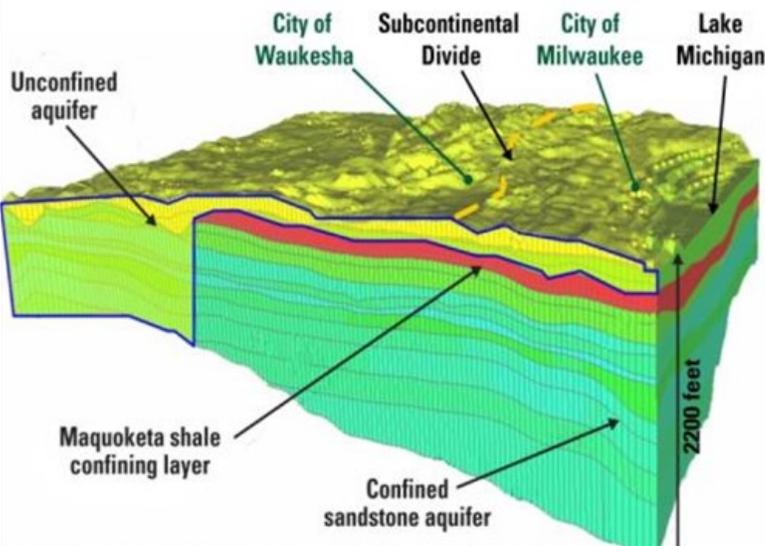
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In-Route Information on the City of Waukesha, WI



Statistic	2000	2010
Population	64,825	70,718
Demographics		
White	91%	88%
Non-white	9%	12%
Waukesha Median Income	\$50,085	\$57,001
Wisconsin Median Income	\$51,467	\$52,413
Population below poverty level	5.9%	10.6%



Source: Adapted from Ken Bradbury, Wisconsin Geological and Natural History Survey WGLA 100

General City Facts

- ◆ City since 1896
- ◆ Urban hub of Waukesha County
- ◆ 2014 population: 70850
- ◆ Houses county services
- ◆ Owns/operates a public transit system
- ◆ 6 of the 10 largest employers are manufacturers

Application Related Details

- ◆ The City is located 1.5 miles west of the Great Lakes surface water divide, 17 miles west of Lake Michigan.
- ◆ Deep groundwater quality continues to worsen (high radium, salts).
- ◆ Several wells no longer usable because of water quality issues.
- ◆ Deep groundwater drawdown of approximately 350 feet below pre-development groundwater water levels and limits the availability of potable water supply from the deep aquifer.
- ◆ Pumping shallow wells would adversely impact wetlands.
- ◆ Even with conservation, there is not an adequate long-term supply of water in the Mississippi River Basin (MRB).

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Water Supply Treatment Plant and Wastewater Treatment Plant

Locations: **STOP B Waukesha Public Works & Wastewater Treatment Plant: 300 to 600 Sentry Dr., Waukesha, WI**

Existing Water Supply

- ◆ The current water system is comprised of 10 wells (7 deep, 3 shallow), 3 water treatment plants for radium and iron/manganese removal, 12 storage tanks, 9 booster pump stations and ~ 326 miles of transmissions and distribution water mains.
- ◆ Wisconsin Department of Justice court order allows blending water within the distribution system until June 30, 2018 as long as the blended water meets the radium standard (12 mo-annual average).

Wastewater Treatment Plant (WWTP)

- ◆ The City of Waukesha owns and operates the WWTP.
- ◆ The WWTP is an advanced facility with settling and biological treatment systems, dual media sand filters, and UV disinfection designed to meet WPDES requirements.
- ◆ Current wastewater flows average 10 MGD (greater than withdrawals because of infiltration and inflow).
- ◆ The return flow would be treated and contained within the WWTP before being discharged to the Root River.
- ◆ Any additional flow will be sent to the Fox River to minimize Mississippi Basin River (MRB) water to the Great Lakes Basin and protect the integrity of both basins.

Sewer Service

- ◆ The City of Waukesha has separate stormwater and sanitary sewerage systems.
- ◆ WWTP receives some MRB water from infiltration and inflow and a few septage haulers within the sewer service area.
- ◆ In a diversion scenario, water from both the Great Lakes and MRB would be mixed in the wastewater system and treated at the WWTP.

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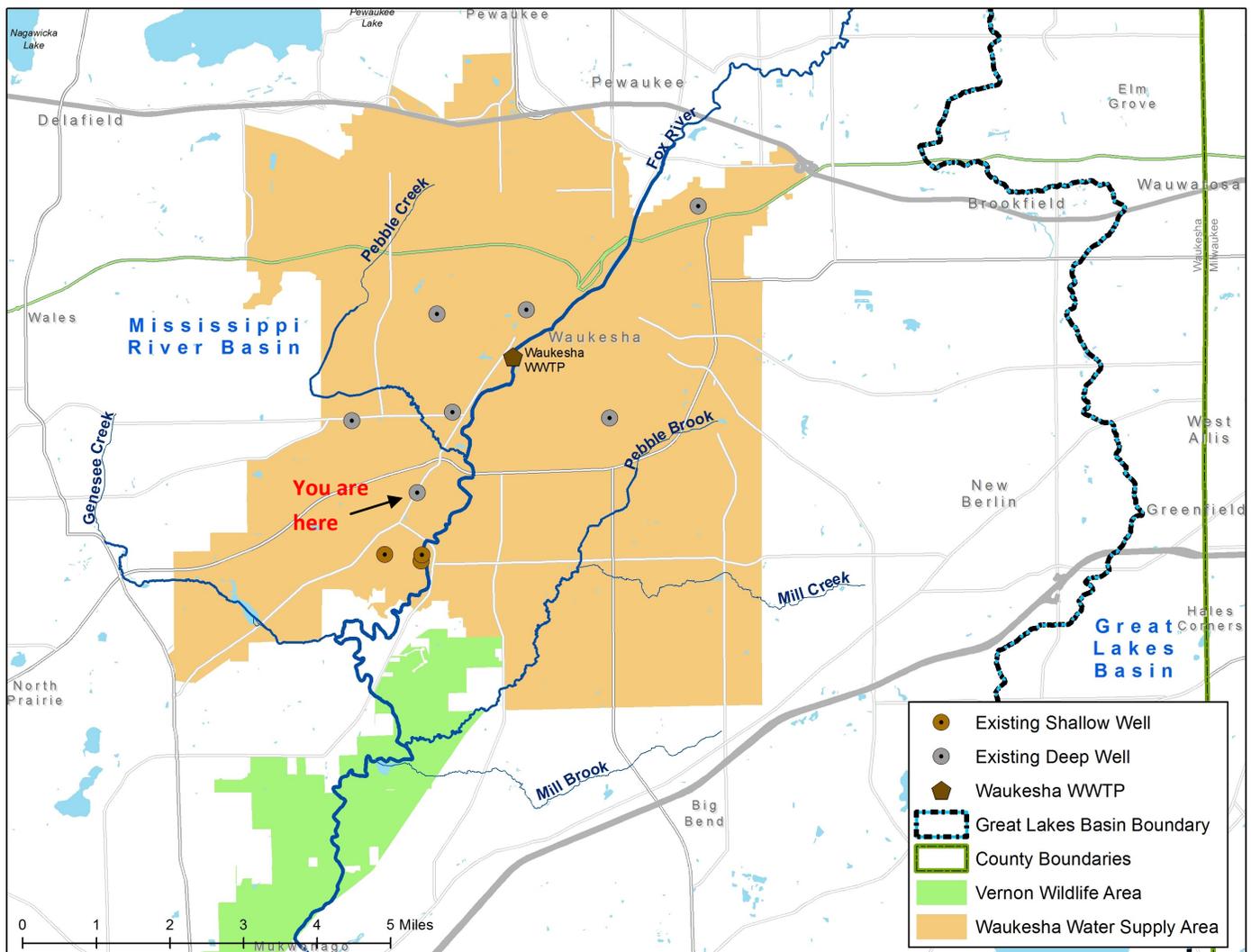


Deep Well #8

Locations: **STOP C** Deep Well #8: 3103 Saylesville Rd., Waukesha, WI

Existing Water Supply

- ◆ Three of the deep wells withdraw water that are either treated to remove radium or blended with water from shallow wells to produce water at the entry point to the distribution system that meets radium drinking water standards.
- ◆ The remaining 4 deep wells have no treatment and regularly exceed radium standards at entry points to the water distribution system.
- ◆ 2014 daily average withdrawal was 6.6 MG (85% of that water was from the seven deep aquifer wells, 15% from the three shallow aquifer wells).



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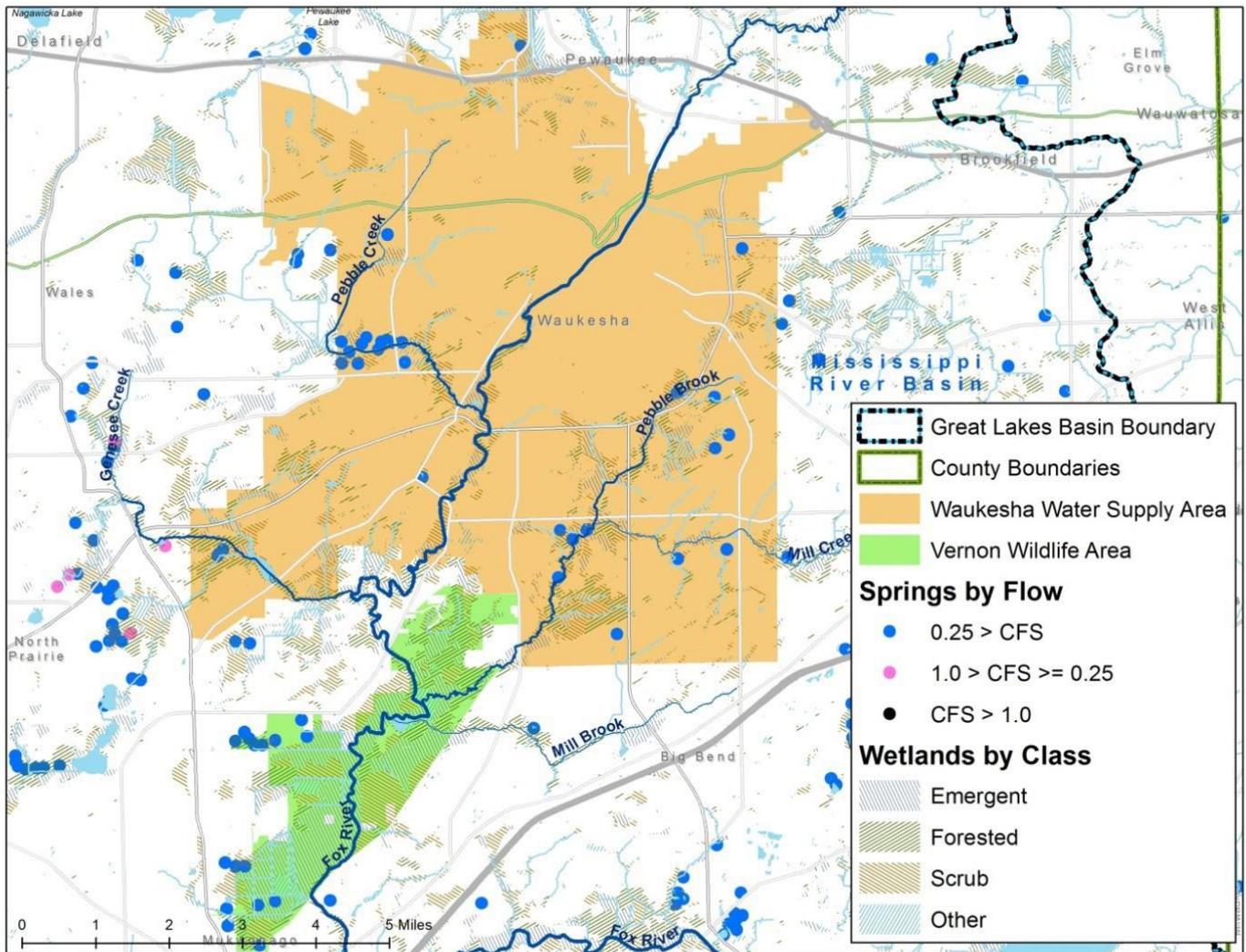


Shallow Wells along Fox River Corridor

Location: **STOP D**, Shallow Wells: 3700 Rivers Crossing Dr., Waukesha, WI

Shallow Wells

- ◆ Three shallow wells – produced a daily average of 1 MGD in 2014. Capacity from the shallow wells is limited due to high chloride concentrations.
- ◆ Two of the wells are less than 250 feet from the Fox River, the third is approximately a half mile from the Fox River.
- ◆ Shallow wells at this stop are blended with water from deep wells at the water supply treatment plant.
- ◆ Other surface water features in the area include wetlands, Genesee Creek and Pebble Creek (See preliminary final EIS Section 3.4 for descriptions of nearby surface waters).



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Fox (Illinois) River and Vernon Wildlife Area

Location: STOP E, River Rd (County Rd I) @ Fox River Bridge Crossing, Waukesha, WI

Fox River Background

- ◆ The headwaters originate about 15 miles north of the City of Waukesha and the river flows about 200 miles to the Illinois River in Ottawa, Illinois.
- ◆ The Fox River is a warm water sport fishery and supports fish such as bass, pike, bluegill, etc.
- ◆ Average annual stream flow is 113 cfs at the City of Waukesha gage (1963-2013).
- ◆ The Applicant currently discharges all wastewater to the Fox River.

Water Supply Alternatives Application Details

The six water supply alternatives analyzed in depth include:

1. Deep (confined) and shallow aquifers
 2. Shallow aquifer (including river bank inducement)
 3. Unconfined deep aquifer
 4. Multiple source alternative
 - * Deep (confined) aquifer;
 - * Shallow aquifer
 - * Unconfined deep aquifer;
 - * Quarries;
 - * Silurian dolomite;
 5. Lake Michigan and shallow aquifer
 6. Lake Michigan
-
- ◆ The WDNR's technical review concludes that there is no reasonable water supply alternative in the Mississippi River Basin (MRB) based on projected impacts to lakes and wetlands.
 - ◆ If the current water supply does not change, impacts to surface waters from existing shallow wells could impact 430-484 acres of wetlands (within a 1-foot drawdown of the water table, 20-year projection).
 - ◆ Alternatives 1, 2, 4 and 5 all include different configurations of shallow wells near this stop. This also includes wells directly along the Fox River, Pebble Brook and Mill Creek.
 - ◆ Shallow aquifer alternatives, south of the City, are projected to impact 700 to 2300 acres of wetlands (within a 1-foot drawdown) - depending on well locations and volume.
 - ◆ Analysis of the unconfined deep aquifer in western Waukesha Co. estimated 6 – 12" of drawdown and a decrease >10% of baseflow to several seepage lakes, indicating likely adverse impacts to these lakes and associated wetlands.

**STOP F: Break near Great Lakes Basin subcontinental divide:
S69 W15742 Janesville Rd, Muskego, WI**

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Proposed Return Flow Outfall: Root River

Location— STOP G: bridge crossing near 10400 S. 60th St., Franklin, WI

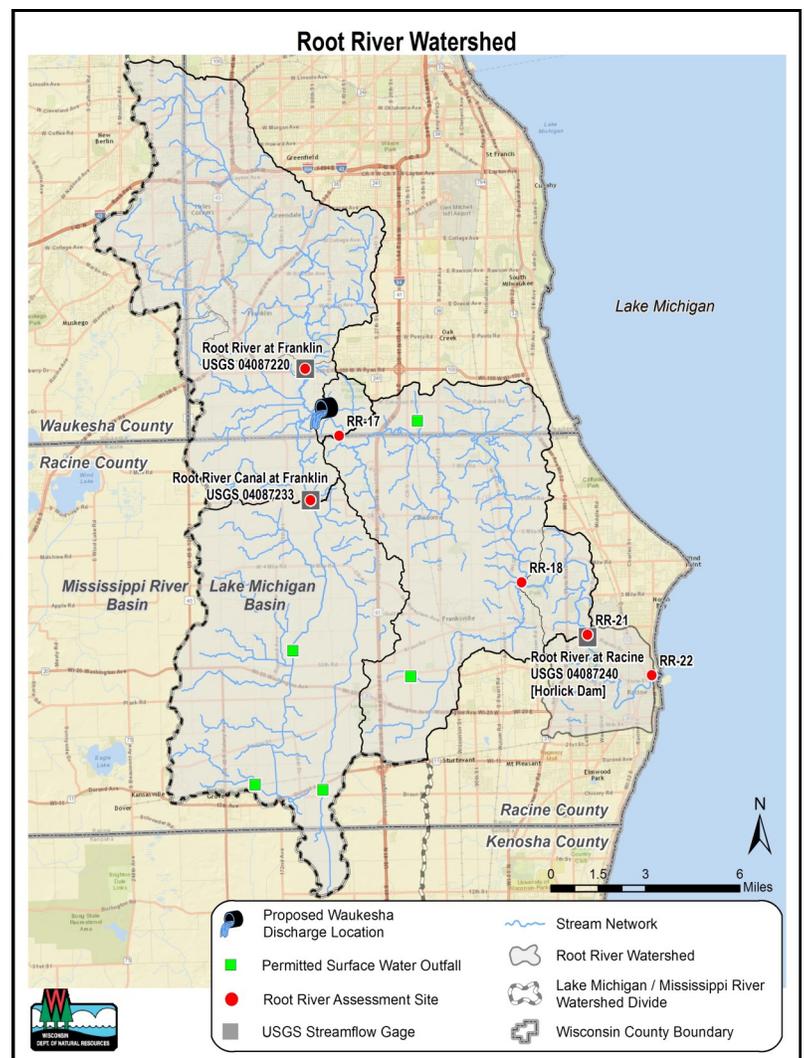
Root River Background

- ◆ Watershed encompasses Waukesha, Milwaukee, Kenosha and Racine Counties (about 200 sq. miles) and is made up of mixed urban and rural land use.
- ◆ The Root River drains to Lake Michigan at the City of Racine
- ◆ A Root River Restoration Plan developed in 2014 by the Southeastern WI Regional Planning Commission identified four primary concerns for watershed health: water quality, recreational access and use, habitat conditions and flooding.

ROOT RIVER FLOWS	Root River at Franklin	Root River Canal	Root River at Racine
February Ave. Discharge ('64-'14)	46.9 cfs	62.2 cfs	171.6 cfs
August Ave. Discharge ('64-'14)	25.9 cfs	21.9 cfs	67.7 cfs
Flow on 02/15/2016	Ice	Ice	70 cfs

Root River Application Details

- ◆ The Applicant would pump treated wastewater 20.2 miles to the Root River.
- ◆ The Applicant does not have a combined sewer system.
- ◆ Wastewater discharge and design of outfall will be required to meet water quality standards.
- ◆ Return would equal previous year's average annual withdrawal (ex: 6.6 MGD, 10 cfs in 2015).
- ◆ Maximum return flow would be 10.1 MGD (15.6 cfs) at full build-out.
- ◆ Benefits include: improvement in local water quality and increased flow to the river to provide habitat for fish spawning and flow at the Steelhead fish egg collection facility downstream.
- ◆ The maximum return flow would be <2% of the river flow during a 2-year frequency storm and an even smaller fraction during a 100-year flood.



Lake Michigan

Location: STOP H Oak Creek Water Intake near Bender Park, 4503 E Ryan Rd., Oak Creek, WI

- ◆ The department found no significant, adverse individual or cumulative impacts to Lake Michigan as a result of the proposed diversion.
- ◆ With the proposed return flow management scenario, there is a miniscule-to-no net loss to Lake Michigan (nearly 100% will be returned on an average annual basis).

The Waukesha diversion can be compared to taking one spoon out of an Olympic swimming pool every day and putting it back the next.

Quantity Impacts	Total volume (Million Gallons)	Maximum annual withdrawal (MG) and approximate return	Maximum annual withdrawal (% of total volume)
Lake Michigan	1,299,318,237	3,687	0.000284%
Great Lakes	6,056,144,311	3,687	0.000061%

Oak Creek Booster Station to Hillcrest Reservoir

Location: STOP I Intersection of 27th Street and W. Puetz Road, Oak Creek WI

- ◆ The City of Oak Creek would provide Lake Michigan water from its current distribution system to the Applicant at this location.
- ◆ A booster pump station would be needed to increase water pressure.
- ◆ A 30-inch, 19.4 mile-long pipeline would be constructed, following transportation and utility corridors to minimize environmental impacts.
- ◆ The supply pipeline would terminate at the Hillcrest reservoir in the City of Waukesha - a 5 million gallon underground water reservoir.

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