Water Diversion **REPORT**

2024 Report on Water Diversion

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EXECUTIVE SUMMARY

The City of Racine (Racine) is submitting this report to satisfy the requirements in the Wisconsin Department of Natural Resources (DNR)'s approval of its diversion application.

The DNR's approval stipulated that Racine must annually report on the following items for the prior calendar year:

1) The total amount of water sold monthly or quarterly to each category of customer within the approved diversion area.

2) The total monthly sewerage flow to the City of Racine Wastewater Treatment Plant from the diversion area.

3) The total consumptive use as specified by the DNR.

4) A summary of the impact of the implemented conservation and efficiency measures required under Wisconsin Administrative Code NR 852.04 and NR 852.05, including quantifiable impacts to water use intensity, as defined in Wisconsin Administrative Code NR 852.03(29).

5) A description of any additional conservation and efficiency measures implemented.

The amount of water diverted in 2024 totaled about 15.7 million gallons, an average of about 43,000 gallons per day which was an increase to the 2023 total. This amount represents 0.61% of the total permissible diversion of 7.0 million gallons per day. The amount diverted includes water sold, with no water used to flush the mains for system maintenance. The need for system flushing has since been eliminated in favor of system recycling as a 2021 water conservation measure. In 2024, return gallons totaled about 7.5 million gallons through both sanitary wastewater return flow and inflow and infiltration (I/I), an average of about 20,600 gal/day. The total consumptive use was then about 8.2 million gallons, representing a consumptive use coefficient of 52%. Water usage was much higher during the warm summer months, which indicates the majority of water was likely for landscaping purposes. In 2024, Foxconn remained the only water service connected party in the diversion area. Microsoft has announced plans to construct phase 1 of multiple phases. However, the first phase to be completed in 2026 will not be located in the diversion area. Future land purchases for Microsoft are located in the diversion area, but it may be several years before those buildings will be operable. Return flow met all water quality discharge standards.

SECTION 1: TOTAL AMOUNT OF WATER DIVERTED

The Racine Water Utility (RWU) diverted water to the Mississippi River basin, selling water to one industrial customer, Foxconn. The sales were properly coded within RWU's billing system to track the amount of water that was diverted. The total amount of water diverted is the sum of the water sold, which equals 15,702,016 gallons. That represents an average of 43,019 gallons diverted each day (Tables 1,2,3).

The reporting requirements specify the water sold should be segmented into months and/or quarters. RWU uses temporary meters to track water demand associated with the operations and maintenance of the infrastructure, including main flushing. Currently, RWU bills its industrial customers monthly and all others quarterly. These permanent meters will measure the demand to calculate the total amount of water diverted. All water diverted in 2024 was measured by permanent or temporary metering.

Table 1. 2024 Water Diversion Total (gallons)

Water sold-residential	0
Water sold-commercial	0
Water sold-industrial	15,702,016
Water flushed	0
Water Diversion Total (gal)	**15,702,016**

Table 2. 2024 Industrial Water Sold to Foxconn (gallons)

2024	month gal	quarter gal
January	655,996	
February	466,044	
March	548,284	1,670,284
April	666,468	
May	694,892	
June	813,076	2,174,436
July	2,943,380	
August	3,413,872	
September	2,493,832	8,851,084
October	1,916,376	
November	514,624	
December	575,212	3,006,212
TOTAL	15,702,016	15,702,016
AVG Day	43,019	

In addition to the water that was sold, RWU may use water to flush mains to maintain water quality. The flushing is metered to record the correct amounts, but cannot be attributed to any customer and is instead considered a part of the RWU's operations and maintenance. This flushing is discharged to the Mississippi River Basin ditch, but none occurred in 2024. Flushing is defined as water wasted and is not associated with water recycled for use outside of the diversion area (discussed in Section 5 conservation measures).

Table 3. 2024 Water Flushed by Quarter (gallons)

Quarter	Water Flushed (g)
Q1	0
Q2	0
Q3	0
Q4	0
Total	**0**

SECTION 2: TOTAL MONTHLY SEWERAGE FLOW

The return gallons totaled 7,518,377 gallons through both sanitary sewerage return flow, and I/I (Table 4). That represents an average of 20,598 gallons diverted each day. The sanitary sewer infrastructure for the diversion area was completed in March 2020 with all return flow to the Racine Wastewater Utility WWTP. The Foxconn facility began to discharge sanitary wastewater in the fourth quarter of 2020 and continues at this time. All other return flow was attributed to inflow and infiltration (I/I) and cannot be attributed to any customer. There also remains a potential error factor in metering low flows in large 30" pipe. This will be an issue until more customers connect to the diversion area water supply and return wastewater flow. In 2024, Foxconn continues to be the only connected customer discharging wastewater back to the Great Lakes Basin. The Foxconn discharge reflects sanitary use only and no process wastewater.

A permanent wastewater flow laser meter was installed by the Village of Mount Pleasant at the Hwy H metering site on March 1, 2020. The Hwy H site records all wastewater return flow from the diversion area Mississippi River basin back to the Great Lakes basin. The Hwy H meter was checked for recalibration by the manufacturer representative on April 27, 2023. The village and rep are satisfied that the Hwy H meter is working as intended. The village also installed three permanent wastewater flow meters to record discharge out of Foxconn: gate 5 meter installed Nov 19, 2020; meters at gate 6 and gate 7 both installed Jan 10, 2021. Village personnel read the Hwy H and Foxconn meters daily Monday through Friday. All Foxconn wastewater meters were also recalibrated on April 27, 2023. For 2024, the Foxconn meters registered higher total flow than the Hwy H meter. All meters were calibrated in 2023 and believed to be working properly, however, Village personnel believe that the Hwy H meter total is most accurate being larger and should be used for return flow purpose.

Table 4. 2024 Water Returned to Great Lakes Basin (gallons)

2024	month gal	quarter gal
January	741,476	
February	549,943	
March	630,931	1,922,350
April	802,992	
May	731,789	
June	463,391	1,998,172
July	546,643	
August	652,334	
September	518,248	1,717,225
October	556,941	
November	711,937	
December	611,752	1,880,630
TOTAL	7,518,377	7,518,377
AVG Day	20,598	

SECTION 3: TOTAL CONSUMPTIVE USE

The total consumptive water use is the sum of the water sold and the water used for flushing (15,702,016) gallons, also referred to as “water diversion total”, minus the total return gallons (7,518,377 gallons) equals 8,183,639 gallons. This annual water supply and return equates to an average daily consumptive use of 22,421 gallons/day, and a consumptive use coefficient of 52.1% (Table 5).

Table 5. Total Diversion Area Consumptive Use (gallons)

Water Diversion Supply Total (g)	Return Gallons Total (g)	Total Consumptive Use (g)	Average Daily Consumptive Use (g)	Consumptive Use Coefficient
15,702,016	7,518,377	8,183,639	22,421	52.1%

The Foxconn facility’s total consumptive use is calculated by subtracting Foxconn’s sewerage return (10,266,505 gallons) from the total gallons purchased (15,702,016 gallons) for a total consumptive use of 5,435,511 gallons. The average daily consumptive use is 14,892 gallons/day and the consumptive use coefficient is 34.6% (Table 6). As Foxconn is the only water user and wastewater discharger in the diversion area, and the diversion return flow exceeds the Foxconn return flow, it is assumed that the lower diversion consumptive use than the Foxconn consumptive use coefficient is impacted by a combination of return water I/I and the difficulty in accurately metering very low flow in large pipe. However, in 2024 total Foxconn flow exceeded the total return flow at Hwy H, which is not possible and correlates to error in the Foxconn metering. This error will be monitored going forward as the meters were calibrated in 2024.

Table 6. Foxconn Consumptive Use (gallons)

Foxconn Water Sold Total (g)	Foxconn Return Gallons Total (g)	Foxconn Total Consumptive Use (g)	Foxconn Average Daily Consumptive Use (g)	Foxconn Consumptive Use Coefficient
15,702,016	10,266,505	5,435,511	14,892	34.6%

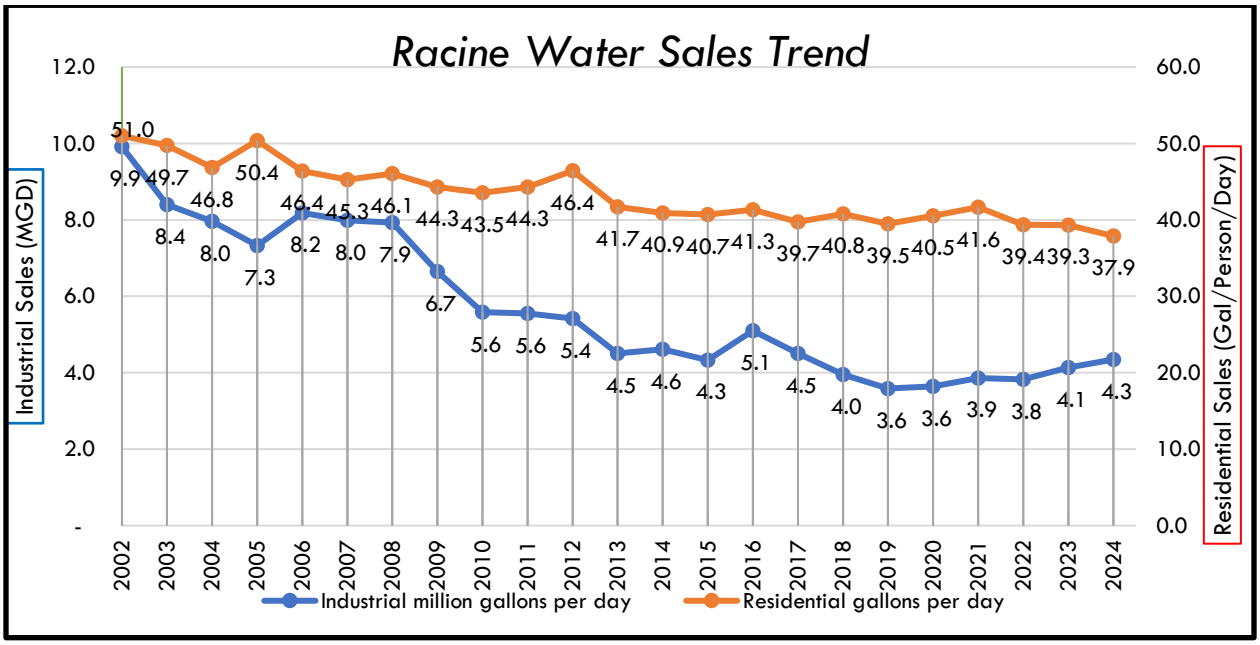
In a letter titled “2020 Documentation of Reporting Requirements for the City of Racine Diversion of Lake Michigan Water“ dated August 28, 2020, the Wisconsin Department of Natural Resources assumed a 10-percent consumptive-use coefficient for Racine’s Diversion Application.

The 2024 overall diversion area consumptive use coefficient of 52.1% (and Foxconn’s consumptive use coefficient of 34.6%) exceed the assumed 10% consumptive use coefficient. There are a number of reasons why this may have occurred in 2024. Foxconn site landscaping water use appears to have increased from the previous year. Foxconn used about as much water in 2024 as 2023 with about 70% of this usage occurring in the warm months of the year. Water used for landscaping at the Foxconn site is not returned to the Racine Wastewater Treatment Plant from the diversion area. Overall diversion area usage remains just a fraction of overall diversion area water use allotment (0.5%). The RWU anticipates the overall consumptive use coefficient to stabilize as normal industrial operations at the facility are finalized and more permanent customer connections are made, but that is not the current situation. Water main flushing by the RWU due to extremely low water supply volumes in the Mt. Pleasant TID #5 area was eliminated through operational controls. A total of 0 gallons were flushed in 2024.

SECTION 4: SUMMARY OF THE IMPACT OF CONSERVATION AND EFFICIENCY MEASURES AND ADDITIONAL MEASURES IMPLEMENTED

The declining water use trends noted in the diversion application for RWU have continued. Per-person demand has fallen from 51 gallons per person per day in 2002 to 38 gallons per person per day in 2024, as residential demand continues to slowly decrease (Figure 1). This has decreased from 2020-2021, which was impacted by the pandemic and the increase in time spent at home. Also, 2021 was a very dry year so more water was very likely used for lawn and garden irrigation purposes. The industrial decline has stabilized with demand falling from 9.9 million gallons per day in 2002 to 3.6 million gallons per day in 2020, and now back to 4.3 million gallons per day in 2024. The expectation is that industrial use will increase with expansion in the Village of Mt Pleasant TID#5 area in the future, but this has not been the reality to date. There has been a recent trend of an increase in large multi-residential projects developing in the overall Racine area.

Figure 1. Racine Water Sales Trend



The ratio of system maximum day pumpage to average day pumpage equaled 1.55 in 2024, which is a increase to the 1.54 in 2023 (Table 7). Tables 8 and 9 provide data and calculations for water use per residential equivalent unit (REU). System REUs total 48,909 in 2024 (Table 8). In 2024, water usage per Residential Equivalent Unit was 264 gpd / REU (Table 9), which is the same as 2023 (264 gpd/REU) and comparable to 2021 (266 gpd/REU). The calculation is found by dividing average day water use by total REUs. Residential demand continues to slowly go down with usage of 38 gal/person/day in 2024 (Table 10).

Table 7. 2024 Water System Pumpage Maximum to Average Day Ratio

Year	Total Year Pumpage (Mgal)	Average Day Pumpage (Mgal)	Max Day Pumpage (Mgal)	Max to Average Day Ratio
2022	5,482.680	15.021	24.924	1.66
2023	5,532.517	15.155	23.344	1.54
2024	5,517.927	15.076	23.361	1.55

Table 8. 2024 Residential Equivalent Units (REUs)

Meter size	Number of Meters	REU Ratio	REUs
5/8	27,030	1	27,030
3/4	5,402	1	5,402
1	1,038	2.5	2,595
1 1/4	0	3.7	0
1 1/2	532	5	2,660
2	553	8	4,424
2 1/2	0	12.5	0
3	122	15	1,830
4	66	25	1,650
6	22	50	1,100
8	10	80	800
10	9	122	1,098
12	2	160	320
Total	34,786		48,909

Table 9. Water System Average Day Water Use Per REU

Year	Total Water Sales (Kgal)	Average Day Water Use (Kgal)	Water Use / REU (gpd / REU)
2022	4,530,279	12,412	254
2023	4,716,245	12,921	264
2024	4,708,643	12,900	264

Table 10. Water System Per Capita Residential Water Usage

Year	Residential Demand (Mgal)	Total Service Area Population	Gal/Per/Day
2015	1,667	112,224	41
2016	1,687	111,865	41
2017	1,625	112,059	40
2018	1,664	111,811	41
2019	1,600	110,986	39
2020	1,674	113,186	41
2021	1,695	111,479	42
2022	1,623	112,951	39
2023	1,615	112,531	39
2024	1,569	113,430	38

The population served is an estimate as an unknown number of residents remain on a private well and not utility municipal water supply. This is particularly the case in Mount Pleasant. Note: The Utility utilized the WI Demographic Services Center (Dept of Administration) as the source of population data.

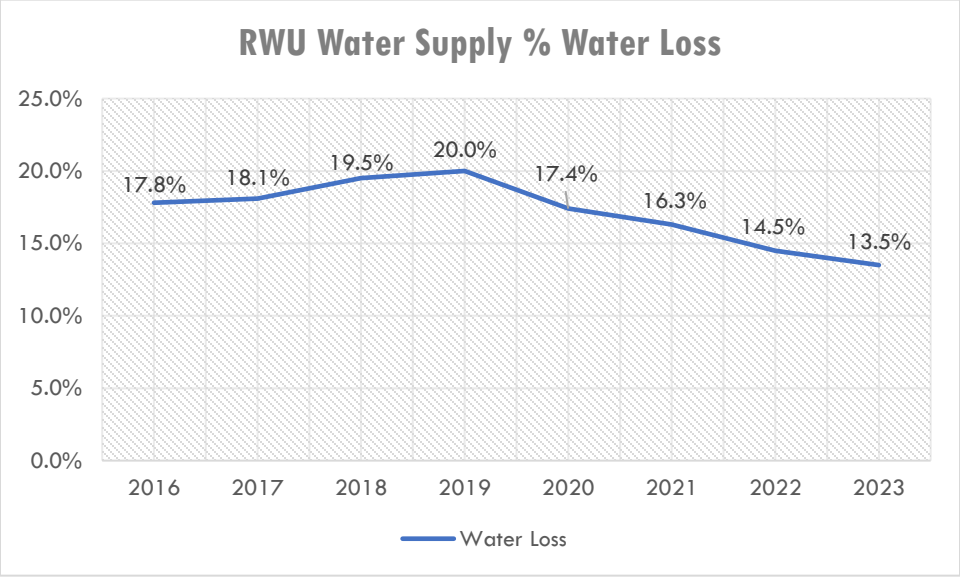
RWU has worked to implement the conservation and efficiency measures it laid out in the diversion application that meet requirements in Wisconsin Administrative Code NR 852.04. Table 11 below summarizes these efforts. It describes additional measures undertaken since the application was submitted.

Table 11. Conservation and Efficiency Measures

Abbreviation	Requirement	Location
PWS-1	Water-use audit	RWU annually submits to the PSC its water production, sales, and nonrevenue water with its annual report as required by Wisconsin Administrative Code PSC 185.85(3). RWU also uses the American Water Works Association water audit software to conduct audits that help quantify losses and identify areas to improve efficiency and recovery.
PWS-2	Leak detection and repair program	RWU prepared a water loss control plan under Wisconsin Administrative Code PSC 185.85(4) and submitted it to the PSC prior to submitting its diversion application. RWU continued its efforts to upgrade water mains by replacing about 3,950 ft of older main in 2024. Note: Totals for uncompleted projects not included. RWU contracted with AECOM in 2020 to perform a leak detection survey on the entire distribution system over a 2-year period. The 2020-2021 surveys combined for estimated detected leakage of 1.4 mgd. RWU continues this effort to survey roughly 20% of the system annually. In 2024, the AECOM survey comprised 104 miles of main (22% of system) and found an estimated 229,000 gpd of leakage. RWU has been proactive to repair all detected leaks Private property leaks take more time to correct, due to access issues but they are being addressed too. See Appendix A for a copy of the 2024 AECOM report. The positive impact of the expanded leak detection program is a main driver to the Utility reduction in system water loss (non-revenue water) as shown in Figure 2 below.
PWS-3	Information and education outreach	RWU includes the information required by Wisconsin Administrative Code PSC 185.33(1) and (1m), e.g. rates and volume unit conversions, in its customer water bills. RWU has posted the conservation and efficiency information required by Wisconsin Administrative Code PSC 185.96 online. See https://www.cityofracine.org/Water/WaterConservation/ and click on the Water Conservation links labeled “Conservation Practices” and “Leak Detection Program” to view the conservation and efficiency information. The City of Racine is working to ensure green building standards are incorporated into city operations and all new private developments and is committed to the US Green Buildings Council Leadership in Energy and Environmental Design (LEED) certification system.

PWS-4	Source measurement	RWU meters water produced and pumped into the distribution system and verifies the accuracy of its station meters in accordance with Wisconsin Administrative Code PSC 185.83 and 185.85(2). RWU documents its compliance with these requirements in its annual report to the PSC on pages W-14, Sources of Water Supply-Statistics, and W-27, Water Conservation Programs.
PWS-R1	Distribution system pressure management	RWU analyzed distribution system pressure management in a 2017 water-system study. It operates the distribution system to meet pressure requirements in Wisconsin Administrative Code NR 811.70(4). The study concluded that pressure does not appear to be a major contributor to main breaks or leaks.
PWS-R2	Residential demand management program	RWU has posted residential water conservation information on its website. See explanation for PWS-3 for the link. RWU continues to notify customers of high-water use through mailings that accompany the water bills and survey residences for leaks on customer request. RWU generally sends mailings if water use has risen for the quarter over 50% of what it had been in the prior year.
PWS-R3	Commercial and industrial demand management program	The City of Racine's largest industrial water user began reducing demand mid-year in 2020 by implementing a geothermal system installation estimated at an annual reduction of approximately 300 million gallons. As of 2024, it appears it has not been successful. Usage has only decreased 1.3% down about 5 mg/yr from 2019. RWU will work with the communities in which it provides service to review their requirements for commercial and industrial landscaping and watering.
PWS-R4	Water reuse	RWU will continue to look for opportunities to work with individual large-volume commercial and industrial water users to explore opportunities for water reuse within their facilities.

Figure 2. Racine Water Utility System % Water Loss (Non-Revenue Water)



SECTION 5: ADDITIONAL CONSERVATION MEASURES

The City of Racine City Development Department recognizes that 14% of the world's potable water is used by buildings, and therefore the Department promotes green building certifications like USGBC's LEED and Wisconsin Green Built Homes, which include water conservation measures related to indoor use, outdoor use, specialized uses, and metering. One component of these certifications is the measurement of all sources of water relative to a building: cooling towers, appliances, fixtures, process water and irrigation. Using an "efficiency first" approach, projects are asked to first pursue water use reduction strategies and then to consider nonpotable and alternative sources of water. Metering at the whole-building level is an important goal ensuring projects can monitor and control water use to identify opportunities for water savings.

The RWU instituted an operational procedure change in the fall of 2020 to recycle water from the system high pressure (933 zone) to and from the intermediate pressure (875 zone). The diversion area in Mt Pleasant resides in the 933 zone. As this new water infrastructure still has only one permanent connection, water becomes stagnant requiring periodic system flushing to maintain water quality. Recycling the water, instead of flushing (wasting), not only saves water but also greatly increases and stabilizes the chlorine residuals throughout the 933 zone.

The Utility has two pump stations, one along Braun Road and the other along STH 20, that boost water from the 875 to 933 zone. The intent of recycling is to create an artificial water demand in the 933 pressure zone to allow water to flow through that zone and maintain water quality without wasting water through flushing. Recycling works by pumping water into the 933 zone with one station while backfeeding water out of the 933 zone with the other station. Backfeeding is accomplished by opening a small bypass line to allow water to flow backward through the pumping station supply lines, which creates the artificial demand. The discharge pumps at the recycling station are off during this time and the rate of flow is recorded by the supply line meter and is controlled via a throttling valve. This pumping is then flipped every 4 weeks or so by pumping from STH 20 and recycling at Braun Rd. This operational change greatly reduces the need for main flushing in the 933 zone and is expected to continue until more permanent

connections are made. There remains a small segment of dead end main in the 933 zone in the diversion area where occasional flushing may still be necessary, but that is minimal. Figure 3, below, depicts recycling water at the STH 20 booster station. No flushing water was utilized in 2022.

While recycle water passes through the diversion area, it is not used in the diversion area. The recycle rate is normally about 225 gpm and approximately one-third of this recycle flows through the diversion area. For 2024, about 39.03 million gallons (average 107,000 gpd) of water was recycled through the diversion and used elsewhere in the RWU system. Recycling water, in lieu of flushing, is estimated to save between 3 million and 4 million gallons per year of wasted water.

Figure 3. Racine Water Utility High Pressure Zone Recycle