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Addendum No. 1 for
City of Whitewater, Wisconsin

2017 Water System Study

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This Addendum No. 1 to the 2017 *Water System Study* report, herein called the 2017 Plan, is issued to modify or explain the original report to incorporate the recently adopted Wisconsin Department of Natural Resources (WDNR) administrative rule, Chapter Natural Resources (NR) 854.

ADD Section 8–NR 854 Addendum as follows:

8.01 ESTABLISHMENT OF A PLANNING PERIOD

The planning was established in the 2017 Plan in Section 3–Historical and Projected Water Demands. The planning period was identified as the end of 2037.

8.02 DELINEATION OF THE AREA

The current water supply distribution system is delineated in Figure 2.01-1 of the 2017 Plan. The projected growth area for the system through 2037 is delineated in Figure 5.05-1 in the 2017 Plan. This plan does not include diversions from the Great Lakes Basin.

8.03 DESCRIPTION OF THE PUBLIC WATER SUPPLY SYSTEM

A. Existing Sources

The existing sources serving the system are described in Section 2–Existing Water System, Subsection 2.02 of the 2017 Plan. Currently, five active wells supply the system. All wells are routed through a sand pressure filter for iron removal and treated with chlorine and fluoride. The City of Whitewater, Wisconsin (City) has indicated that there have been no water quality issues identified with its water sources.

B. Consecutive Water Systems Purchasing Water

Currently, the water utility does not sell water to any consecutive water systems. There are no plans to sell water to any consecutive water systems through 2037.

C. Water System Map

A description of the water treatment facilities, water storage, and water distribution facilities are included in Section 2–Existing Water System of the 2017 Plan. A map of the water distribution system is shown in Figure 2.01-1. Since the 2017 Plan, the City has decommissioned the Starin Park Elevated Tank and replaced it with the Southwest Elevated Tank, a 0.75-million gallon elevated tank located at the southeast corner of Indian Mound Parkway and West Walworth Avenue (County Highway S). The City has also decommissioned the Well No. 7 Reservoir and booster pumps. Well No. 7 now pumps directly to the distribution system. An updated schematic of the water system is shown in Figure 8.03-1, and a map showing the location of the Great Lakes Basin in relation to the City is shown in Figure 8.03-2.

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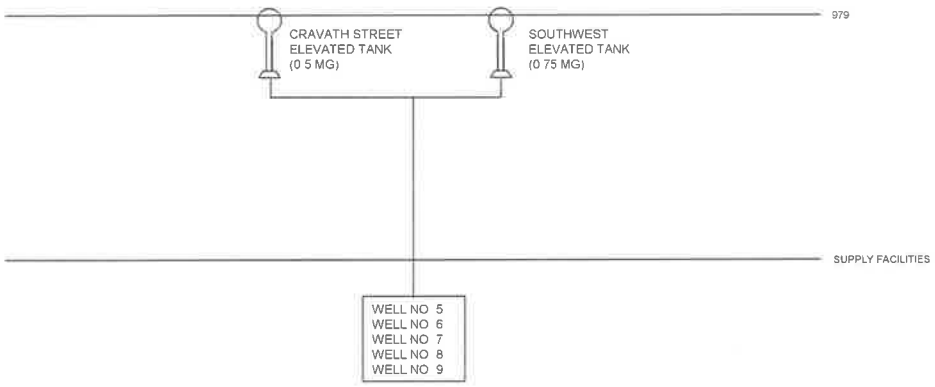

WATER SYSTEM SCHEMATIC

WATER SUPPLY SERVICE AREA PLAN
CITY OF WHITEWATER
WALWORTH AND JEFFERSON COUNTY, WISCONSIN

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FIGURE 8.03-1
1407.155

GREAT LAKES BASIN OVERVIEW MAP
WATER SUPPLY SERVICE AREA PLAN

CITY OF WHITEWATER
WALWORTH AND JEFFERSON COUNTY, WISCONSIN

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FIGURE 8.03-2
1407.155

8.04 DESCRIPTION OF EXISTING SOURCES AND WITHDRAWALS

A. Supply Sources and Withdrawals

The following describes the geologic formation each well pulls from:

1. Well No. 5 pulls from the Eau Claire formation.
2. Well No. 6 pulls from Mount Simon sandstone.
3. Well Nos. 7 and 8 pull from the Quartzite-Precambrian formation.
4. Well No. 9 pulls from hard sandstone.

The well drilling logs for the City wells are included in the Appendix in the 2017 Plan. The drilling logs include the depth of each well and additional geologic information. The average daily withdrawal for each source is listed in Table 8.04-1. The maximum withdrawal capacity of each source is listed in Section 2–Existing Water System, Subsection 2.02 of the 2017 Plan. The average daily and annual supply do not exceed maximum rated withdrawal capacities. The City does not purchase any water for its public water supply.

Table 8.04-1 Average Daily Withdrawal

Average Daily Withdrawal Amount (gallons)												
Well No.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average
5	-	-	-	294,000	310,000	405,000	327,000	286,000	278,000	292,000	240,000	304,000
6	-	-	-	373,000	280,000	484,000	380,000	323,000	281,000	325,000	267,000	339,125
7	-	-	-	336,000	319,000	345,000	231,000	373,000	335,000	384,000	343,000	333,250
8	-	-	-	521,000	432,000	447,000	361,000	403,000	355,000	410,000	363,000	411,500
9	-	-	-	195,000	321,000	361,000	396,000	336,000	321,000	378,000	369,000	334,625

Current water quality treatment processes are described in Section 2–Existing Water System, Subsection 2.02 of the 2017 Plan. The 2017 Plan does not include any diversions.

B. Withdrawal Measurement Methods

Water withdrawal from Well Nos. 5 through 9 is measured using magnetic flow meters. The meters are read daily and documented each month.

Methods to measure nonrevenue water by the City are as follows:

1. Systemwide Flushing–Compare pre- and post-average pumpage to the flushed day usage.

2. Dead-End Flushing–A meter is attached to the flushing hydrant.

3. Fire Protection–Water use is estimated based on loads of water hauled by tanker truck or average flow rate through pumper trucks.

4. Leaking from Water Main and Services–Water use is based on pipe condition, size of water main break or hole, and estimated duration of leak. Water industry tools are used to help estimate leakage.

5. Water Tower Inspections–The volume of water spent during draining and used during filling is calculated by the City, while a hydrant meter is used to measure the amount of water used for cleaning the tower during inspection.

8.05 DESCRIPTION OF EXISTING WATER USE

The population for the 2017 Plan is discussed in Section 3–Historical and Projected Water Demands. As most population density mapping is delineated by zip code, a population density map for the City is not available. The best surrogate for population density is the land use map, which shows the type of zoning and relative density of population based upon housing type.

The number of retail customers purchasing water from the City is listed in Table 8.05-1. The volume of water sold for 10 years preceding the planning period is listed in Table 8.05-2.

Year	Residential	Commercial	Industrial	Public Authority	Multifamily Residential	Irrigation	Total
2007	2,995	447	39	-	-	-	3,481
2008	2,995	447	39	100	-	-	3,581
2009	3,063	456	39	105	-	-	3,663
2010	3,116	382	40	101	-	-	3,639
2011	2,988	383	36	77	-	-	3,484
2012	2,960	399	39	76	-	-	3,474
2013	3,041	385	45	120	0	0	3,591
2014	3,071	290	41	120	100	0	3,622
2015	3,097	290	44	123	100	0	3,654
2016	3,137	293	44	126	102	0	3,702

Table 8.05-1 Number of Retail Customers

	Sales of Water (Kgal)						
Year	Residential	Commercial	Industrial	Public Authority	Multifamily Residential	Irrigation	Total
2007	134,310	91,265	328,678	-	-	-	554,253
2008	132,461	94,046	282,094	87,150	-	-	595,751
2009	130,721	92,773	275,492	65,878	-	-	564,864
2010	125,168	82,621	240,423	81,521	-	-	529,733
2011	142,329	79,303	207,039	86,538	-	-	515,209
2012	135,987	88,808	316,061	107,210	-	-	648,066
2013	125,761	85,591	223,158	77,837	-	-	512,347
2014	104,124	85,567	223,622	75,500	18,375	-	507,188
2015	105,998	85,624	206,050	80,584	18,706	-	496,962
2016	124,673	82,433	234,043	86,720	50,379	-	578,248

Kgal=thousands of gallons

Table 8.05-2 Sales of Water

The top ten largest customers for the City during 10 years before the planning period are listed in Table 8.05-3. It should be noted that data for 2011 and 2012 were unavailable. The top customers have stayed relatively consistent, with LS Power Development, LLC (LS Power) being the top customer from 2008 to 2016.

Table 8.05-3 Largest Customers

	Sales (cf)								
Customers	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
LS Power	260,508,000	259,109,000	259,109,000	-	-	210,188,292	209,946,916	194,640,115	273,652,134
University of Wisconsin-Whitewater	75,790,530	51,640,070	51,640,070	-	-	49,025,981	69,649,804	75,421,502	78,389,649
Twin Oaks Mobile Home Park	14,058,000	12,128,000	12,128,000	-	-	11,246,440	10,720,660	10,847,880	10,012,300
Fairhaven	6,867,300	6,942,800	6,942,800	-	-	6,813,140	7,238,441	6,474,618	7,869,658
Whitewater Unified School District	9,754,390	8,355,200	8,355,200	-	-	6,868,869	4,683,937	5,595,654	6,740,965
Generac Power Systems, Inc.	4,086,900	4,966,700	4,966,700	-	-	5,522,792	4,772,964	3,723,935	3,478,475
Indian Village Apartments	4,947,200	2,516,200	2,516,200	-	-	2,406,067	2,098,426	2,599,011	2,276,085
Bieck Management, Inc. Apartment Building	3,936,600	2,213,000	2,213,000	-	-	-	-	-	-
Harmony Inn Apartments	3,395,100	3,409,400	3,409,400	-	-	1,847,090	4,358,936	4,594,409	4,141,573
Regent Apartments	1,597,000	1,742,000	1,742,000	-	-	2,072,613	-	-	-
Husco International	-	-	-	-	-	-	-	-	-
Seville Apartments	-	-	-	-	-	-	3,091,880	2,783,870	3,092,130
Golden State Foods, LLC	-	-	-	-	-	-	2,742,003	2,091,866	2,162,351

cf=cubic feet

8.06 PROJECTED WATER DEMAND

A. Projected Water Demands and Growth

The projected water demands from 2017 through 2037 are discussed in Section 3–Historical and Projected Water Demands of the 2017 Plan. A description of the methods used to derive projected water demands is discussed in Section 3–Historical and Projected Water Demands, Subsections 3.04 and 3.05 of the 2017 Plan. The projected growth area during the planning period is shown in Figure 5.05-1 of the 2017 Plan. There are no projected sales to consecutive water systems through the planning period. Table 8.06-1 shows the projected water demand during the planning period. A review of the projected demand was conducted to determine the accuracy of the projection as time has passed in the planning period. The review determined that the projected demand completed in 2017 is still applicable to demands the City has been seeing.

	Total Population	Demand (MGD)
2017	15,135	1.96
2022	15,708	2.03
2027	16,303	2.11
2032	16,921	2.19
2035	17,562	2.27

MGD=million gallons per day

Table 8.06-1 Projected Water Demand

B. Population Projection

The projected population through 2037 is shown in Figure 3.02-1 of the 2017 Plan. A description of the methods used to derive the projected population is listed in Section 3–Historical and Projected Water Demands, Subsections 3.02 of the 2017 Plan.

8.07 INVENTORY AND IDENTIFICATION OF THE SOURCES AND QUANTITIES OF WATER SUPPLIES IN THE REGION

A. Inventory of Alternative Water Sources

1. Groundwater Alternatives

The City currently operates five deep wells (Well Nos. 5 through 9). Typically, deep wells support larger capacities, but often iron and radium treatment are required. Some radium treatment options may also have reject water or backwash waste and increase the system's nonrevenue water. Shallow wells typically support less capacity than deep wells and are more prone to contamination such as volatile organic compounds and per- and polyfluoroalkyl substances. Iron and manganese treatment are often required as well. Because the system currently operates to treat groundwater, additional deep wells are deemed the most viable alternative source option.

2. Surface Water Alternatives

Lake Koshkonong is located west of the City and would require approximately 15 miles of transmission main to deliver water to the City. Surface water treatment at a centralized location (either near the lake, along the transmission main, or in the City) would be required. Operation of surface water treatment is generally more expensive, requires elevated operator skill sets and licensing, and creates larger waste streams. Given the relative abundance and generally high quality of the local groundwater, a surface water source from Lake Koshkonong is deemed not viable.

8.08 PLAN RECOMMENDATIONS

Section 7–Conclusions and Recommendations of the 2017 Plan discusses that the enlargement of existing sources, development of new sources, or purchase of a new water supply is not needed to meet demands through 2037. Therefore, there does not need to be an analysis of increasing water supply.

The 2017 Plan demonstrates that the existing water system effectively uses its existing infrastructure to meet anticipated demands scenarios. Section 3–Historical and Projected Water Demands of the 2017 Plan reviews average day, maximum day, and maximum day plus fire projected demand scenarios and compares those with existing capacities, which shows that additional water supply is not needed.

8.09 ANALYSIS AND CONSISTENCY WITH OTHER PLANS AND AGREEMENTS

A. Approved Comprehensive Plans

Comprehensive plans that include the City are the *City of Whitewater Comprehensive Plan* (Updated 2017) prepared by Vandewalle & Associates, Inc., *Southeastern Wisconsin Regional Planning Commission Multi-Jurisdictional Comprehensive Plan for Walworth County* (Updated 2019) prepared by the Southeastern Wisconsin Regional Planning Commission (SEWRPC), and *Jefferson County Comprehensive Plan* (2021) prepared by SRF Consulting Group, Inc. The future land use outlined in the *City of Whitewater Comprehensive Plan* is consistent with the future service area shown in the 2017 Plan. The historical census data in the *Southeastern Wisconsin Regional Planning Commission Multi-Jurisdictional Comprehensive Plan for Walworth County* and the *Jefferson County Comprehensive Plan* are the same as the 2017 Plan.

B. Approved Areawide Water Quality Management Plans

The City is included in SEWRPC's Regional Water Quality Management Plan. The amended *Regional Water Quality Management Plan Update for the Greater Milwaukee Watersheds* (2013) completed by SEWRPC can be found on the City's Web site.

C. Existing Land Use Agreements

The City does not have any current land use agreements. Section 5–Computer Modeling of the 2017 Plan shows areas of future development; however, these boundaries could change depending on growth extents.

D. Existing Wholesale or Retail Customer Sales Agreements

There are no known wholesale or retail customer sales agreements between the City and another entity.

E. Other Existing Agreements

There are no other known agreements between the City and another entity.

8.10 PUBLIC PARTICIPATION

This addendum to the 2017 Plan that is based on requirements needed by WDNR NR 854 will be included in the City's Public Works Committee agenda. Comments will be requested by e-mail or public comment at the Public Works Committee Meeting. Public comments will be added to this addendum as an Appendix and will be reviewed and acknowledged by the Public Works Committee.

8.11 SUBMISSION OF PLAN TO LOCAL GOVERNMENT

A submission of the plan to local governments will take place after public participation. Any comments from local governments will be added to this addendum as an Appendix.

8.12 PROCEDURE FOR IMPLEMENTING AND UPDATING THE PLAN

The City will continue to monitor water demands, population changes, and the resulting impact on the 2017 Plan. As changes are deemed necessary, the City will work with the WDNR and Public Service Commission to revise and update the 2017 Plan through the end of the planning period.