2020 ANNUAL REPORT OF WATER USE, WATER DIVERSION AND RETURN FLOW FOR THE CITY OF NEW BERLIN, WISCONSIN

CITY OF NEW BERLIN
WAUKESHA COUNTY, WISCONSIN

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Prepared By: City of New Berlin Utility
3805 S Casper Drive
New Berlin, Wisconsin 53151

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2015 ANNUAL REPORT OF WATER USE, WATER DIVERSION AND RETURN FLOW FOR THE CITY OF NEW BERLIN, WISCONSIN

INTRODUCTION

The information contained in this document provides the needed data and related explanations of the data required to satisfy the conditions of the WATER SUPPLY SERVICE AREA PLAN AND DIVERSION APPROVAL issued by the Wisconsin Department of Natural Resources (DNR) dated May 21, 2009. In particular, the data and explanations report the following information for calendar year 2020 for the City of New Berlin (CITY):

1. The total amount of water purchased from Milwaukee on a monthly basis. Note: All water used by New Berlin Utility customers is purchased from the City of Milwaukee. **ALL City of New Berlin Wells are out of service.**
2. The amount of water sold to each category and the subcategory of customer on a quarterly basis within the City limits.
3. The amount of water sold to each category and the subcategory of customer on a quarterly basis within the approved diversion area.
4. Average residential per capita use.
5. There is currently NO water pumped from City of New Berlin wells. All wells are out of service.
6. Average residential per capita use.
7. A description of the efforts made by the City to improve water conservation and efficiency and minimize the infiltration and inflow into the sanitary system.
8. Estimates of the total monthly sewerage flow within the City.
9. Estimates of the monthly sewerage return flow from within the approved water supply service area and approved diversion area.

The information is presented in 9 sections with titles identical to those above. Data is presented in a tabular format preceded by explanation of each table, how the data was obtained and how the data was interpreted using estimating techniques, engineering judgment and data analysis. Table titles first contain the section number they refer to then the number of the table.

SECTION 1 - THE TOTAL AMOUNT OF WATER PURCHASED FROM THE CITY OF MILWAUKEE

The City of Milwaukee provides all of the water used by the CITY. In 2009, the CITY still used groundwater until July for some of their water needs. In July 2009, the improvements needed to allow the entire CITY to be served with Lake Michigan water via the City of Milwaukee were completed, thus allowing for discontinuance of groundwater supplies. These projects were completed following the Diversion Approval. All City of New Berlin groundwater wells are abandoned. (Appendix E)

Table 1-1 provides the "Total Amount of Water Purchased from the City of Milwaukee" as measured by Milwaukee and billed to the CITY. Table 1-1 contains 4 columns, the

first listing the month, the second representing the cubic feet of water purchased and the third the number of gallons purchased from the City of Milwaukee and the average daily use. All of these totals are determined by the amount of water purchased (and measured) from the City of Milwaukee Water Works. Note: Milwaukee water had an inaccurate meter in 2014.

SECTION 2 - THE AMOUNT OF WATER SOLD TO EACH CATEGORY AND SUBCATEGORY OF CUSTOMER ON A QUARTERLY BASIS WITHIN THE CITY LIMITS

The CITY records and reports all water sold in a report to the Wisconsin Public Service Commission (PSC) by customer class each year. The four customer classes are Residential, Commercial, Industrial and Public. The CITY can further break these water sales records down by geographic location east and west of the sub continental divide and by residential units comprised of condominiums and apartments that are tracked as commercial establishments. Table 2-1 provides a breakdown of these water sales on a quarterly basis for the entire City and by the standard PSC customer classes and the subcategories tracked by the CITY.

SECTION 3 - THE AMOUNT OF WATER SOLD TO EACH CATEGORY AND SUBCATEGORY OF CUSTOMER ON A QUARTERLY BASIS WITHIN THE APPROVED DIVERSION AREA

Table 3-1 reports only water used in the Mississippi river basin on a quarterly basis and also provides a breakdown of residential use by condominiums and apartments in the Mississippi Basin.

SECTION 4 - THE AMOUNT OF WATER DIVERTED TO THE APPROVED DIVERSION AREA ON A MONTHLY BASIS (TO BE ESTIMATED BY THE CITY)

Table 4-1 provides the estimates of the diversion amounts. The estimates are based upon actual percentages of total water use determined by applying an average factor of 57.3 percent groundwater pumpage and 42.7 percent Lake Michigan water usage in 2009. This approximates the water use patterns where the groundwater pumpage was Mississippi River basin pumpage and the Lake Michigan pumping stations was Great Lakes basin pumpage. For the year, the total usage was multiplied by .573 to estimate the diverted amount. The CITY previously maximized the area where Lake Michigan Water was provided to customers so this method provides a reliable estimate of diverted water pumpage.

SECTION 5 - THE AMOUNT OF WATER PUMPED FROM EACH MUNICIPAL WELL WITHIN THE CITY LIMITS ON A QUARTERLY BASIS, NOTING THE BASIN IN WHICH EACH WELL IS LOCATED

Table 5-1 provides a list of all City of New Berlin wells were disconnected in 2009 per the DNR after the diversion request was approved. All City of New Berlin groundwater wells have been abandoned. (Appendix E)

SECTION 6 – AVERAGE RESIDENTIAL PER CAPITA USE

Table 6-1 provides a calculation of average residential per capita use. That calculation shows residential per capita use to be 55.21 gallons per capita per day City wide. The calculation takes into account single family residential, condominium residential, and apartment residential and also breaks the information down by basin. The per capita residency occupation rate of 2.62 in 2020 is from the MMSD Operating Manual. The calculation method used in Table 6-1 to determine the population served by the water system has been added at the bottom of the page. Information from the MMSD Cost Recovery Manual is found in Appendix E.

SECTION 7 – A DESCRIPTION OF THE EFFORTS MADE BY THE CITY TO IMPROVE WATER CONSERVATION AND EFFICIENCY AND MINIMIZE INFILTRATION AND INFLOW TO THE SANITARY SEWER SYSTEM

Water Conservation

The CITY adopted a Water Conservation Plan on December 8, 2009. A copy of the plan is attached to this document in appendix A and includes the revisions made in 2013. The Plan has six distinct goals to promote water conservation.

- Reduce per capita residential water consumption from January 1, 2008 by not less than ten (10) percent by the year 2020 for utility customers as per an agreement between the City of New Berlin and the Wisconsin Department of Natural resources (WDNR).
- Enable the City to meet future needs of our growing population.
- Protect Ground and Surface water supplies from unsustainable depletion. Since acquiring Milwaukee water, the Utility was able to reduce hydrant flushing to once per year. This practice alone has saved substantial water each year (Appendix E).
- Eliminate unnecessary waste in water use practices. The Water Conservation Plan provides the necessary authority to limit lawn sprinkling on an odd/even day and time of day schedule. The dry conditions during summer in 2012 prompted a Press Release limiting water sprinkling (Appendix E). The summer of 2015 provided adequate rainfall to assist our water conservation efforts. The Utility posts information on the website, newsletter and Utility bill in an effort to educate customers in water conservation measures (Appendix E)
- Reduce wastewater treatment volume and associated municipal expenditures.

- Promote the increased use of harvested and recycled water for irrigation needs through the use of cisterns where appropriate for commercial and industrial development. The City has had a Rain Garden display at the recycling center for several years. This display includes a working rain barrel. Information on the various native plants, where to obtain rain barrels and lists of classes are included on the City's website (http://www.newberlin.org/index.aspx?nid=422). The Water Resources Management Utility has also used rain gardens and bioretention in several of their projects (Appendix E)

In 2017, the City of New Berlin has eliminated the Third Quarter Sewer Credit to residential customers.

Specific accomplishments include the preparation of the plan near the end of the reporting year. That plan includes a savings projected of 9.4 million gallons of water per year by not using water softeners in the diversion area and a savings of 8.7 million gallons by reducing hydrant flushing from twice per year to once per year for a total estimated annual savings of 18.1 million gallons. Hydrant flushing is performed in spring and fall. Every other hydrant is flushed in spring and the remaining ones in the fall. This ensures that each hydrant is flushed annually on a scheduled basis for maximum efficiency. The CITY also adopted sprinkling restrictions for residents to follow year round. Per capita residential water use decreased city wide from 68.03 in 2007 down to 55.21 in 2020. Adequate rainfall this summer assisted water conservation efforts. (Appendix E)

Beginning in April of 2010, the CITY has a toilet rebate program designed to provide incentives for utility customers to abandon 5 gallon per use toilets and install a water sense 1.3 gallon per flush toilets. The amount of the rebate is $100 per toilet.

Toilet Replacements By Year

2010	78	2013	6	2016	7	2019	3
2011	45	2014	7	2017	9	2020	4
2012	12	2015	10	2018	6		

The PSC approved the program to continue in 2020. (For Examples of reduced water consumption after low flow toilet installation, Appendix E)The Utility also performed 35 leak detection tests in 2020 and provides this service free of charge to utility customers. In addition, the Badger Meter RTR/Neptune meter system that we now use can verify whether a customer has a leak. This allows us to notify the customer to set up an appointment to perform a free leak inspection to help reduce the amount of water that is wasted. (Appendix E) Our numbers are down as to follow the COVID-19 guidelines.

In 2013 the Utility began offering customers free toilet leak dye tablets available at City Hall and the Library. This continued in 2020 and will be offered in 2021. The City's website advertised the EPA's WaterSense "Fix A Leak Week" which gives tips on checking for and fixing leaks.(Appendix D)

The Utility has implemented the cross connection inspection program that was mandated by the DNR for commercial and industrial customers and has been inspecting residential customers since 2012 when meters are replaced or when answering a customer service call. In 2020 there were 184 residential inspections were conducted. (Appendix E) The Utility began documenting if customers are operating water softeners or have removed or disconnected the unit. Since March 2012 Utility personnel that perform meter pulls have documented whether softeners have been disconnected or removed from residences. They have found over 90% of softeners were not in use. (Appendix E) In 2005 and also in 2009 when Milwaukee water was delivered to Utility customers on various sides of the continental divide, letters were sent to customers that provided information regarding the changes in water, including water hardness data and encouraged customers to disconnect their softeners. (Appendix E) Based on estimates and an average softener regeneration of once a week, the average residential customer would save over 2,600 gallons per year. (Appendix E). Because of variables such as weather, occupancy rates, economic conditions and the fact that meters are read quarterly in thousand gallon increments, it is difficult to provide an actual water savings realized in 2011 through disconnection of water softeners. Hydrant flushing water usage has reduced since we began this program. (Appendix E). A 5 Year Water Use Analysis is also listed (see Appendix E).

The City of New Berlin began a member of the Alliance for Water Efficiency in 2013 and began using the AWE Tracking tool to monitor conservation efforts. The Utility teamed with the Energy Efficiency Program's Focus on Energy, sponsored by WE Energies to provide residential citizens with a no-cost energy savings program that provided high efficiency faucet aerators, showerheads, kitchen flip aerators, insulation of hot and cold water heater pipes and water heater temperature setback assistance. The results were impressive with 943 homes responding to the program for a total water savings of 5,772,429 gallons.

In 2015 Kaempfer and Associates conducted a new water study of the entire Utility area. The Utility has a 20 year project schedule to improve reliability and conservation.

The Utility repaired 4 water main breaks, repaired 5 leaking service lines, performed 2 valve replacement and repairs and replaced 2 hydrants.

With the completion of the conservation plan and use of the CITY web site to provide public education on the need for water conservation, New Berlin is committed to continuing to educate the public. Along with the Water Conservation Plan, Utility personnel use a "Residential Demand Management Program" to monitor high consumption, show customers the amount of water caused by leaks, and provide informational material on water conservation. (Appendix E) Many studies have shown the value of public education is an important component of water conservation efforts. The City's website contains educational information with kid's pages for water conservation activities and links to a drip calculator and other resources to provide

helpful information to utility customers. The Utility also provides classes to schools and businesses and hands out coloring books and water usage wheels to promote water conservation and information on Water Smart Landscape Designs on the website (see Appendix D)

Infiltration and Inflow (I/I)

The City has an annual I/I program that has been in place since 1997. The City spent $156,094.00 in 2020 on I/I reduction. Table 7-1 lists the I/I reduction projects from 2015. The Utility has invested an average of $764,012 per year from 2000-2013 in I & I reduction. (Appendix B) Private I & I investigation and implementation began in 2013.

Infiltration and Inflow (I/I) occurs in all sanitary sewerage systems. Infiltration refers to rainwater and groundwater that seeps into the system through defective pipes and joints. Inflow refers to storm water and surface water that enters the sewer directly. Both cause "clear water" to enter the system and increase treatment costs, cause sewer backups, bypassing and overflows.

Wastewater systems all have differing designs, construction, ages and are located in varying climates. With this in mind, there are not national standards for allowable I/I. Rather, EPA has required through the NPDES permit program that all wastewater overflows be eliminated. This requirement has prompted many sewerage systems to take active measures to reduce I/I. The MMSD is one of these.

MMSD addresses I/I reduction by placing limits on peak hourly flow rates. If a metered area exceeds the limits, I/I reduction is required. The requirements for these metered areas, also called "meter sheds" as listed in the MMSD 2035 Facility Plan are:

Sanitary Meter Shed Area (acres)	Maximum Allowable Peak Hourly Flow Rate (gallons per acre per day)
Less than 250	18,400
250 to 499	17,700
500 to 999	16,400
1,000 to 2,499	13,700
2,500 to 4,999	9,400
Greater than 5,000	4,000

Based upon the MMSD Facility Plan sewer flows for New Berlin, all areas of the City are currently in compliance with the above limits.

The City of New Berlin annually contracts with a consultant to monitor sewer flows during wet periods and prepare a report quantifying I/I. Preliminary results of the 2009

flow monitoring plan and analysis of flows by the city's consultant and 2010-2020 results are provided in Appendix C.

Precise quantification of I/I is impossible with today's technology. Area and velocity flow meters are used annually by the City to derive estimates of I/I by basin and sub-basin. These meters replace older style "level only" meters and are considered to be more accurate. Still, the environment in which they are placed has flooding, toxic gases, high levels of solids and other impairments which readily affect the meters performance. Data that is collected must be collated and suspect data discarded. The remaining reliable data is then professionally analyzed and reasonable professional estimates of I/I can then be made. This is the program used by New Berlin.

The most current estimates of I/I by the City's consultant indicate that total average daily sewer flows are 5.71 MGD. The attached email correspondence from the City and R.A. Smith indicates how they arrived at this figure. Using basin monitors this flow can be divided into flow east and west of the sub continental divide. This was determined by using all of the flow from basins 5 and 6 (Meter 5A) and 50 percent of the flow from basin 7 (Meter 7B). Based upon 2015 metered water use and estimates of sewerage flow the following average daily flows and I/I estimates can be derived:

These are the most current and accurate estimates of I/I available for the City of New Berlin. These volumes change regularly and there will be differing estimates each year depending on a number of factors including groundwater levels and precipitation amounts and severity of precipitation events.

The City has spent over $20 million since 1997 on I/I reduction efforts. This includes all capital projects for manhole rehabilitation, studies and sanitary sewer replacement or relining. They received only 1 of 2 awards given by MMSD for their I/I reduction efforts in 2003. Listings of past projects are attached. Future projects will focus on higher I/I areas as identified by annual studies.

New Berlin ranks 5th out of 29 communities in expenditures for I/I reduction. This places them well ahead of many larger and older communities with more I/I.

It is important to realize that the I/I will occur and transmit some quantity of water across the basin divide. It is more important to realize that approval of the diversion has eliminated about 2.0 MGD of pumped water from outside the basin flowing into the basin on a daily basis. This, coupled with the strong commitment to reducing I/I by New Berlin, as evidenced above, absolutely minimizes the amount of water entering the basin from outside the basin.

Going forward, New Berlin proposes to monitor the amount of water used inside and outside the basin by customer water meter. Further, they propose to continue with the annual I/I quantification studies and will use the results of those studies to estimate I/I on both sides of the divide. This information will be available on an annual basis for the previous year.

SECTION 8 – ESTIMATES OF TOTAL MONTHLY SEWERAGE FLOW WITHIN THE CITY

Appendix C contains excerpts from an email provided by R.A. Smith to the City on Sewerage flows. These estimates were developed based upon metering performed by that firm and by MMSD during 2011-2020

SECTION 9 – ESTIMATES OF THE MONTHLY SEWERAGE RETURN FLOW FROM WITHIN THE APPROVED WATER SUPPLY SERVICE AREA AND DIVERSION AREA

Table 9-1 provided by R.A. Smith estimated flows both in the Great Lakes basin and Mississippi basin. The estimates assume all of basin 5 and 6 and 50 percent of basin 7 provide sewerage flows from the Mississippi Basin, and the remaining flow is from the Great Lakes Basin.

Table 1-1

Total Amount of Water Purchased From the City of Milwaukee
Annual Report of Water Use, Water Diversion and Return Flow - 2020
City of New Berlin, Wisconsin

Month	Cubic Feet	Monthly Total Amount of Water Purchased From The City of Milwaukee	**Average Daily Usage (SCADA)**
January	100,088	74,871,029	2,415,194
February	87,242	65,261,553	2,250,398
March	102,672	76,803,995	2,477,548
April	95,613	71,523,496	2,384,117
May	100,428	75,125,366	2,423,399
June	125,930	94,202,188	3,140,073
July	124,977	93,489,295	3,015,784
August	126,774	94,833,544	3,059,147
September	107,064	80,089,439	2,669,648
October	96,256	72,004,493	2,322,726
November	97,800	73,159,486	2,438,650
December	96,522	72,203,475	2,329,144
Total Annual Pumpage	**1,261,366**	**943,567,359**	**30,925,828**

Source: City of Milwaukee, Wisconsin Public Service Commission, and SCADA

Note: **ALL of water used by the City of New Berlin Utility customers was purchased from the City of Milwaukee. New Berlin wells are no longer in service**

Average:	2.578	million gallons per day
	78,630,613	gallons per month
Highest Day:	August 20, 2020	4,838,000 gallons per day
Lowest Day:	November 11, 2020	2,134,000 gallons per day

Table 2-1

Amount of Water Sold to Each Category and Subcategory of Customer on a Quarterly Basis Within the City Limits 2020
Annual Report of Water Use, Water Diversion and Return Flow - 2020
City of New Berlin, Wisconsin

	Major Category (Gallons Sold in Thousands)				
	Residential	Commercial	Industrial	Public	Total
1st Quarter 2020	94,410	75,232	17,732	1,915	189,289
2nd Quarter 2020	95,859	67,968	16,253	1,004	181,084
3rd Quarter 2020	139,314	79,665	18,351	2,221	239,551
4th Quarter 2020	112,265	76,372	19,096	1,933	209,666
Total	**441,848**	**299,237**	**71,432**	**7,073**	**819,590**

	Residential Subcategory (Gallons Sold in Thousands)		
	Great Lakes Basin	Mississippi Basin	Totals
1st Quarter 2020	62,642	31,768	94,410
2nd Quarter 2020	63,355	32,504	95,859
3rd Quarter 2020	95,124	44,190	139,314
4th Quarter 2020	75,803	36,462	112,265
Total	**296,924**	**144,924**	**441,848**

	Condominium and Apartment Subcategory of Commercial Category (Gallons Sold in Thousands)		
	Great Lakes Basin	Mississippi Basin	Totals
1st Quarter 2020	16,131	20,683	36,814
2nd Quarter 2020	15,948	20,723	36,671
3rd Quarter 2020	17,097	23,361	40,458
4th Quarter 2020	16,441	22,070	38,511
Total	**65,617**	**86,837**	**152,454**

Source: City of New Berlin, Wisconsin

Table 3-1

Amount of Water Sold to Each Category and Subcategory of Customer on a Quarterly Basis Within the Approved Diversion Area 2020

Annual Report of Water Use, Water Diversion and Return Flow - 2020

City of New Berlin, Wisconsin

	Major Category Mississippi Basin (Gallons Sold in Thousands)				
	Residential	Commercial	Industrial	Public	Total
1st Quarter 2020	31,768	50,977	15,679	1,278	99,702
2nd Quarter 2020	32,504	45,061	14,260	732	92,557
3rd Quarter 2020	44,190	53,481	15,176	1,871	114,718
4th Quarter 2020	36,462	51,623	16,072	1,472	105,629
Total	**144,924**	**201,142**	**61,187**	**5,353**	**412,606**

Condominium and Apartment Subcategory of Commercial (Gallons Sold in Thousands)	
	Mississippi Basin
1st Quarter 2020	20,683
2nd Quarter 2020	20,723
3rd Quarter 2020	23,361
4th Quarter 2020	22,070
Total	**86,837**

Source: City of New Berlin, Wisconsin

Table 4-1

Amount of Water Diverted to the Approved Diversion Area on a Monthly Basis

Annual Report of Water Use, Water Diversion and Return Flow - 2020

City of New Berlin, Wisconsin

Month	Estimated Amount Diverted in Gallons
January	42,901,099
February	37,394,870
March	44,008,689
April	40,982,963
May	43,046,835
June	53,977,854
July	52,996,366
August	54,339,621
September	45,891,249
October	41,258,574
November	41,920,385
December	41,372,591
Total	**540,091,096**

Source: City of New Berlin, Wisconsin and Ruekert & Mielke, inc.

Table 5-1

All water provided to City of New Berlin Utility customers are serviced by City of Milwaukee water.

There are NO New Berlin ground water wells in service.

We have abandoned wells 1, 2, 3, 4, 5, 7, 8, 9, 10 and 11

All wells were disconnected when we received permission for our diversion request and all water is provided by Milwaukee Water.

Table 6-1

Average Residential Per Capita Use
Annual Report of Water Use, Water Diversion and Return Flow - 2020
City of New Berlin, Wisconsin

		2020 Quarter (Use in Thousands)						Average Residential Per capita Use in Gallons per Day
		1st	2nd	3rd	4th	Total	Population	
Basin	**Cust Class**	**Cons**	**Cons**	**Cons**	**Cons**			
Great Lakes	C-CONDO/APT	16,131	15,948	17,097	17,097	66,273	3,511	
Great Lakes	R Residential	62,642	63,355	95,124	75,803	296,924	13,594	
	TOTALS					363,197	17,104	**58.18**
Mississippi	C-CONDO/APT	20,683	20,723	23,361	22,070	86,837	4,797	
Mississippi	R Residential	31,768	32,504	44,190	36,462	144,924	7,623	
	TOTALS					231,761	12,420	**51.12**
	Combined City Wide Residential Per Capita Water Use					594,958	29,524	**55.21**

Source: City of New Berlin, Milwaukee Metropolitan Sewerage District

Calculations: We took the average number of residential connections and multiplied it by the occupancy factor. Then, we broke down the number of bedrooms and multiplied that by the appropriate occupancy factor and finally added the number of condos multiplied by their occupancy factors. We took the occupancy factors out of MMSD's Cost Recovery Manual. The calculation is complicated by two factors; 1) a significant portion of the city is not served by municipal water and 2) the PSC & DNR have different classification methods for residential customers specific to condo and apartment units. (See Table 6-1, P.2)

Table 6-1, P.2

2020 Connections

		Q1	Q2	Q3	Q4			
Basin	Customer Class	Count	Count	Count	Count	Average	Occupancy Factor	Population
MILW	C-CONDO/APT	173	173	173	173			
MILW	R Residential	5203	5207	5209	5214	5,208	2.62	13,646
MISB	C-CONDO/APT	817	817	819	819			
MISB	R Residential	2910	2919	2924	2930	2,921	2.62	7,652

2020 Condo/Apartment Population Calculation

Basin		Bedroom	Units	Factor	Population	**Total**
MILW	Apartment	1	458	1.50	687	
MILW	Apartment	2	937	2.50	2,343	
MILW	Apartment	3	79	2.61	206	
MILW	Condo		110	2.50	275	**3,511**
MISB	Apartment	1	398	1.50	597	
MISB	Apartment	2	897	2.50	2,243	
MISB	Apartment	3	21	2.61	55	
MISB	Condo		761	2.50	1,903	**4,797**
						29,605

Factors are from MMSD Cost Recovery Manual

Table 7-1

Water Conservation Efforts and I/I Reduction Efforts
Annual Report of Water Use, Water Diversion and Return Flow - 2020
City of New Berlin, Wisconsin

Year	Project Title	Work Involved	Project Expenditures
2009	Glendale Road	Sewer Rehabilitation, Relining and Manhole Repairs to Reduce I/I	$711,000.00
2009	Deer Creek Interceptor	Sewer Rehabilitation, Relining and Manhole Repairs to Reduce I/I	$247,945.00
2010	Various Areas	Sewer Rehabilitation, Relining and Manhole Repairs to Reduce I/I	$352,785.00
2011	Greenridge/various	Sewer Rehabilitation, Relining and Manhole Repairs to Reduce I/I	$283,000.00
2012	124th & Greenfield	Relay Section of sewer main, Relining and Manhole Repairs to Reduce I/I	$73,000.00
2013	Various Areas	Dye Testing/Leak Inspection for PPI/I	$460,000.00
2013	Citywide	Manhole Grouting (areas identified from dye testing results)	$2,400.00
2013	Citywide	Manhole Grouting (areas identified from dye testing results)	$36,056.00
2014	Citywide	Grant Work	$5,000.00
2015	Citywide	Manhole Grouting	$15,212.00
2015	Calhoun Road	Boot Installation	$846.00
2015	Various Areas	Dye Testing/Leak inspection for PPI/I	$233,258.00
2016	Citywide	Manhole & Lateral Grouting	$13,740.00
2016	Citywide	Boot Installation	$24,586.00
2016	Citywide	Manhole Lid Replacement	$10,287.00
2017	Hearthridge Drive	Sewer Relining	$24,890.00
2017	124th & Cleveland	Sewer Obstruction Removal & Lining	$22,523.00
2018	Citywide	Manhole Grouting	$4,000.00
2018	Rogers Drive	Sectional Relining	$21,400.00
2018	124th & Howard	Sanitary Frame Replacement	$7,500.00
2018	Linnie Lac Lift Station	MH Deck Replacement	$7,500.00
2018		PPI/I Program Lateral Lining	$937,419.35
2019	Moorland Rd	Sewer Relining	$78,979.00
2019	124th Cleveland	Sewer Relining	$16,165.00
2019	Citywide	Manhole Grouting	$48,500.00
2019	Citywide	Grant Work	$32,301.00
2020	Citywide	Recoat Manholes (36 total)	$126,469.00
2020	Karrington	Mid City Repair Annular Space in Manholes	$29,625.00
	Total		**$3,826,386.35**

Source: City of New Berlin Utility Department

Table 8- 1 & 9-1

Estimates of the Monthly sewerage return Flow From Within the Approved Water Supply Service Area and approved Diversion Area
Annual Report of Water Use, Water Diversion and Return Flow - 2020
City of New Berlin, Wisconsin

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	3.33	99,900,000	1,198,800,000
Mississippi River Basin	2.38	71,400,000	856,800,000
Total	**5.710**	**171,300,000**	**2,055,600,000**

Source: R.A. Smith and Milwaukee Metropolitan Sewerage District

RA Smith 2020 Report

See below for the flows across the divide. The 2020 flow for the Mississippi River Basin is similar to the reading we calculated for the basin in 2019 (2.34 MGD). The 2020 flow for the Great Lakes Basin is about a 22% decrease from the reading we calculated for the basin in 2019 (4.29 MGD). The table is what needs to be submitted, but feel free to review the rest of the information, which we've always just used to justify the data we present.

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email.

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	3.33	99,900,000	1,198,800,000
Mississippi River Basin	2.38	71,400,000	856,800,000
Total	5.71	171,300,000	2,055,600,000

Here is the formula and information for first calculating the total sewer flows and then once again across the divide...

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. The information below gives a conservative estimate of the flows from the City to MMSD in 2020.

Because MMSD has only two meters monitoring flows from the City, we needed to rely more heavily on Utility-Owned meters to estimate the flows below. The following are the average flows for the City during 2020.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2020 through October 2020.)
(New Berlin Basins 1, 4, 5, and 6) = 2.18 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011, 2.292 in 2012, 2.479 in 2013, 2.00 in 2014, 1.66 in 2015, 2.05 in 2016, 2.21 in 2017, 2.06 in 2018 and 2.47 in 2019)

MMSD Meter MS0213 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2020 through October 2020.)
(New Berlin Basin 9) = 0.994 MGD (0.403 MGD in 2009, 0.452 in 2010, 0.369 in 2011, 0.65 in 2012, 0.982 in 2013, 0.474 in 2014, 0.967 in 2015, 1.17 in 2016, 1.04 in 2017, 1.07 in 2018 and 1.23 in 2019)

(New Berlin Basin 2, utility owned meter 2002-A) = 0.123 MGD (0.084 MGD in 2013, .095 in 2014, 0.141 in 2015, .075 in 2016, 0.146 in 2017, 0.14 in 2018, and 0.158 in 2019)

(New Berlin Basin 3, utility owned meters 2003-A and 2003-E) = 0.517 MGD (0.503 in 2009, 0.551 in 2014, 0.327 in 2015 .41 in 2016, 0.45 in 2017, 0.49 in 2018, and 0.749 in 2019)

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(New Berlin Basins 7 and 10, utility owned meters 2007-B and 2010-A) = 1.87 MGD (2.292 MGD in 2009, 2.530 in 2010, 2.083 in 2011, 1.420 in 2012, 2.527 in 2013, 1.834 in 2014, 1.55 in 2016, 1.88 in 2017, 1.89 in 2018, and 2.01 in 2019)

(New Berlin Basin 8, utility owned meter 2008-C and lift station 6) = 0.026 MGD (0.041 MGD in 2015, 0.058 in 2016, 0.026 in 2017, 0.02 in 2018, and 0.016 in 2019)

Total 2020 Average Daily Flow = 5.71 MGD à * 365 = 2.08 Billion Gallons
(about a 14.0% decrease from 2019 numbers and about a .48% increase from 2018 numbers)

Total 2019 Average Daily Flow = 6.63 MGD à * 365 = 2.42 Billion Gallons
(about a 16.9% increase from 2018 numbers and about a 15.2% increase from 2017 numbers)

Total 2018 Average Daily Flow = 5.67 MGD à * 365 = 2.07 Billion Gallons
(about a 1.4% decrease from 2017 numbers and about a 6.78% increase from 2016 numbers)

Total 2017 Average Daily Flow = 5.75 MGD à * 365 = 2.10 Billion Gallons
(about a 8% increase from 2016 numbers and about a 16.2% increase from 2015 numbers)

Total 2016 Average Daily Flow = 5.31 MGD à * 365 = 1.94 Billion Gallons
(about a 8.6% increase from 2015 numbers and about a 6.9% increase from 2014 numbers)

Total 2015 Average Daily Flow = 4.89 MGD à * 365 = 1.785 Billion Gallons
(about a 1.5% decrease from 2014 numbers and about a 25.75% decrease from 2013 numbers)

Total 2014 Average Daily Flow = 4.966 MGD à * 365 = 1.813 Billion Gallons
(about a 25% decrease from 2013 numbers and about a 2% increase from 2012 numbers)

Total 2013 Average Daily Flow = 6.586 MGD à * 365 = 2.404 Billion Gallons
(about a 35% increase from 2012 numbers)

Total 2012 Average Daily Flow = 4.874 MGD à * 365 = 1.780 Billion Gallons
(about a 10% decrease from 2011 numbers)

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Total 2011 Average Daily Flow = 5.397 MGD à * 365 = 1.970 Billion Gallons
(about a 10% decrease from 2010 numbers)

Total 2010 Average Daily Flow = 5.979 MGD à 5.979 * 365 = 2.182 Billion Gallons
(about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD à 6.025 * 365 = 2.199 Billion Gallons
(about a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide… here is how we do it…

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD Meter DC0306 = 2.18 MGD
    - New Berlin Flow Meter Basin 1 (utility meter 3001-G, 0.57 MGD) and Basin 4 (utility meter 3001-A, 0.191 MGD)
    - Resultant Basin 5 and 6 flows = 1.419 MGD

Assuming that half of flow from Basin 7 and 10 is pumped over the sub-divide line we get:

- New Berlin Basins 7 and 10 (utility owned meters 2007-B and 2010-A) = 1.87 MGD/2 = .935 MGD

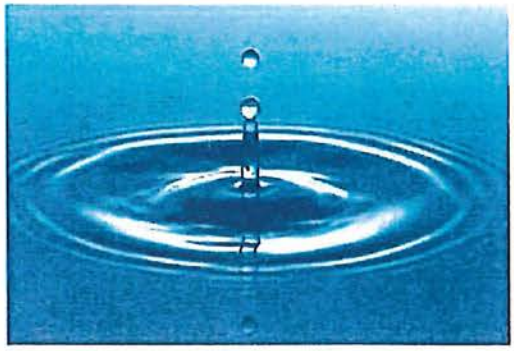
Add Basin 8 (utility owned meter 2008-C and lift station 6), and the above two together and we get our number à 1.419 + 0.935 + 0.026 = 2.38 MGD

Thanks and let me know if you have any questions.

Ben G. High, P.E.
Project Manager
16745 West Bluemound Road, Brookfield, WI 53005-5938
direct: 262-317-3273
Ben.High@raSmith.com

Appendix A
Water Conservation Plan

City of New Berlin
Water Conservation Plan



City of New Berlin
city living with a touch of country

Adopted by the New Berlin Common Council on 12/8/09

Updated February 2019

WATER CONSERVATION PLAN MISSION STATEMENT

To promote water conservation and protection measures throughout the City of New Berlin to ensure a viable and healthy water supply for future generations.

Goals:

- Reduce overall water consumption.
- Enact water protection / conservation ordinances and codes.
- Protect wellhead recharge areas.
- Provide incentives for water conservation.
- Promote 3-Dimensional (groundwater, stormwater and surface-water) water management.
- Implement good stormwater Best Management Practices ("BMPs") that enhance recharge areas.

INTRODUCTION

This document presents the City of New Berlin's ("City") Water Conservation Plan. Over the years, the City, as well as the Southeastern Wisconsin Regional Planning Commission (SEWRPC) have conducted a number of water supply studies. All of these studies are referenced in one form or another throughout this document.

New Berlin is uniquely positioned within southeast Wisconsin as it straddles the "Sub-Continental Divide", which runs north-south through the eastern part of the City. Nearly 27 square miles in the western part of the City, or about 73 percent of the City's total land area, is located in the Fox River Watershed. This portion is west of the Sub-Continental Divide and part of the Mississippi River Watershed. The remaining City land area is tributary to the Great Lakes / St. Lawrence River drainage basin.

The Utility Service Area is supplied with water from Lake Michigan which is purchased from the Milwaukee Water Works. In this portion of the City wastewater is returned to Lake Michigan via the Milwaukee Metropolitan Sewerage District sewer system. The western portions of the City, outside of the Utility Service Area, use groundwater / private wells as their water supply source.

New Berlin is located within Waukesha County, one of the fastest growing counties within the southeast Wisconsin region. The County's population in 2005 was 377,348. New Berlin is the sixth largest city in terms of land area in the state and the third most populated municipality in the County with a 2005 population of 38,969. Population trends for New Berlin indicate an approximate two to three percent increase in five year increments out to 2020. At that point in time, the estimated New Berlin population is expected to be 42,228. The City has experienced steady, moderate growth over the past 20 years.

There are three City entities that are involved with water conservation and water resource protection; they include the Water Utility, Department of Community Development (DCD) and the Water Resources Management Utility (a division of DCD).

The Mission of the Water Utility is to be the responsible custodian for and to provide a good quality, potable water supply at adequate pressures and in sufficient quantity for consumption and fire protection purposes, to all current and future Utility customers consistent with State/Federal Regulations and water industry practices and standards, in the most cost effective manner possible, and to educate the public about the benefits of being a good water use steward.

The Department of Community Development promotes and maintains the careful development of land, and preservation of the natural resources in the City of New Berlin. To accomplish this, the Department is involved in both current and long-range land use planning, engineering, building and capital improvement planning. This Department regulates every aspect of the development/construction process. DCD reviews, documents, permits, regulates and inspects all development/construction activity in the city. These efforts include reviewing and documenting development, economic development, geographic information systems (GIS)/land information systems (LIS), zoning enforcement, building inspection, construction/field inspections for new development, capital planning, mapping and in-house capital project design. It also includes the dissemination of this information to the public, working and coordinating with county, regional, state, and federal officials.

The long-term vision of the Water Resources Management Utility is to "promote a three-dimensional approach to efficiently and effectively manage storm water and to protect the water resource needs of the City of New Berlin". The Utility's Mission is dedicated to the management, construction, maintenance, protections, control, regulation, use, and enhancement of storm & surface water systems, flood protection, water quality, and groundwater recharge through education, coordination, development, maintenance and management of projects & programs in concert with other community development programming in an efficient and cost effective manner that considers the needs for protection of public health, private property, the natural environment, and economic development.

PURPOSE OF THE PLAN

The City has developed a Water Conservation Plan in order to be good stewards of a finite resource. Its loss can impact the quality of life for residents and dramatically affect policy decisions. In order to maintain quality of life and economic activity, a sustainable water supply is needed. To be good stewards, the City should conserve water by working closely with all residents and businesses to promote water conservation, and work with other governmental jurisdictions in the region to effectively manage water resources.

To this end, the City views water resource management three-dimensionally. That is the protection & management of our groundwater, surface water and storm water through various means and methods. The City has set the following Plan goals to promote water conservation:

- ⇒ Reduce per capita residential water consumption from January 1, 2008 by not less than ten (10) percent by the Year 2020 for Utility customers as per an agreement between the City of New Berlin and the Wisconsin Department of Natural Resources (WDNR)
- ⇒ Enable the City to meet future needs of our growing population
- ⇒ Protect ground and surface water supplies from unsustainable depletion
- ⇒ Eliminate unnecessary waste in water use practices
- ⇒ Reduce wastewater treatment volume and associated municipal expenditures
- ⇒ Promote the increased use of harvested and recycled water for irrigation needs through the use of cisterns where appropriate for commercial and industrial development

Much of this Plan was developed by referencing the numerous water studies and current, relevant industry materials that are available. According to our Department's records, twenty-two (22) studies at a cost of over $500,000 have been conducted analyzing and studying water issues in New Berlin. This does not include the current ongoing work related to the redevelopment of the New Valley Sand & Gravel quarry site (Mill Valley Business Park). There will be a geo-technical component to that report. A comprehensive list of recent water studies conducted for New Berlin can be found in Appendix A.

WATER UTILITY ACCOMPLISHMENTS

The Water Utility has worked hard to reduce water usage to help conserve a very valuable resource. We have in place an odd-even sprinkling schedule citywide to reduce water usage to lawns and gardens. In addition, we have a program in place whereby we change out water meters on a 10-year cycle instead of the 20-year program that the Public Service Commission requires. Changing the meters on a 10-year cycle ensures more accurate water consumption usage totals. Now that water utility customers are supplied with Milwaukee Water throughout the entire service area, the Water Utility will see reductions in water usage as follows:

1. 90% of all customers will NOT USE water softeners
   - ⇒ 180 gallons of water passes through every time the softener runs
   - ⇒ 9.4 million gallons of water will be saved by not using softeners

2. 8.7 million gallons will be saved annually due to the reduction of hydrant flushing from twice per year to once per year.

A total of 18.1 million gallons of water will be saved annually with just these two changes. Since 2006, the Utility has seen a decrease in the total water usage by approximately 21%.

CURRENT REGULATIONS AND ACTIVITIES

Current development standards, regulations and activities are already being implemented within in the City. The goal of this plan is to expand on the current City actions and implement additional water conservation strategies. Below is a list of current City initiatives:

- ⇒ Codes/ordinances – numerous City regulations are in place to protect water quality and quantity. These ordinances follow DNR requirements for storm water management.
- ⇒ Sprinkling restrictions – the Utility Department has enacted sprinkling restrictions for residents to follow year-round. The restrictions are as follows: even numbered addresses water on even days of each month and odd numbered addresses water on odd days of each month.
- ⇒ Utility activities – the Utility Department utilizes the City webpage to provide information to residents. The webpage includes information on water conservation, kids activities to learn more about water, a water drip calculator and sprinkling restrictions. The Utility Department has also placed informational articles in the City's "Leaflet" quarterly newsletter, and has included conservation techniques in the City's Annual Water Quality Report. The department also offers free "leak test" for customers to have their toilets or water softeners tested for leaks. New meters that are currently being installed have a "leak detection" feature on them for residential and industrial usages.
- ⇒ Development/land use regulations – The Department of Community Development encourages Low Impact Development (LID) techniques when reviewing projects. The Zoning Code has minimum open space requirements to limit the amount of impervious surface on development sites. Alternative stormwater Best Management Practices ("BMPs") that use vegetation to naturally infiltrate the ground is also encouraged.
- ⇒ Wellhead protection – the City also has a Wellhead Protection Area in the southeast portion of the City. This area is important to groundwater recharge and regulations are in place to protect the groundwater in this area.
- ⇒ 3-D Storm water regulations (groundwater, surface water and storm water) – the City's ordinances and codes are in place to protect the City's water resources. The regulations work to promote protection of groundwater, surface water and storm water. The DNR regulates many activities surrounding these resources and the City's regulations adhere to the DNR requirements. Currently the City has a storm water management ordinance (Ord. #2193) to set storm water management requirements, an erosion control ordinance (Ord. #2268) to prevent erosion from construction sites and a post-construction storm water management ordinance (Ord. #2267) to prevent erosion for the long-term after construction.

The City also has an illicit discharge ordinance to prevent and remedy any illegal discharges to the storm drain system.

⇒ Public awareness/education – Aside from the Utility Department's activities, the City utilizes the website, "Leaflet" newsletter and mailing inserts to promote water conservation and protection. The Water Resources Management Utility (WRM) has partnered with a number of other communities from Kenosha, Racine, Milwaukee and Waukesha counties (known as the Root-Pike Watershed Initiative Network) to conduct programming to work to protect, restore, and sustain the ecosystems of the Root River and Pike River. The City recently hosted a Rain Garden Workshop that educated participants on ways of keeping storm water runoff from polluting streams, rivers and lakes by learning how to build and maintain a rain garden. The WRM is also involved in a number of other educational initiatives in relation to the City's Wisconsin Pollutant Discharge Elimination System Permit (WPDES) ranging from neighborhood meetings, development reviews to discussing local water resources issues to newsletter articles.

WISCONSIN'S GREAT LAKES COMPACT

The Great Lakes Basin is comprised of Lake Erie, Lake Huron, Lake Michigan, Lake Ontario, Lake Superior and the St. Lawrence River – represented by eight (8) Great Lakes states and two (2) Canadian Provinces (Minnesota, Wisconsin, Illinois, Indiana, Ohio, Michigan, Pennsylvania, New York, Quebec and Ontario). The Compact, in and of itself is significant as it encompasses ten (10) jurisdictions across international boundaries that have collectively agreed to manage the largest surface freshwater resource in the world. This is the first multi-jurisdictional agreement of this type in the world.

Each state and/or province adopted statutes further implementing the Compact within their respective jurisdictions. The Wisconsin Legislature adopted Act 227 in early 2008. Governor Doyle signed the law into effect on May 27, 2008. Wisconsin Act 227 adopts text of the Compact into state statute and provides implementation provisions for both pre and post Compact. In summary, Act 227 now regulates:

⇒ "Interbasin Transfers"
⇒ New Statewide Water Supply Planning for Public Water Supply Systems
⇒ New Statewide Water Use Regulations & Reporting System
⇒ New In-basin Water Use Permitting System; and
⇒ New Water Conservation and Efficiency Program

As a complimentary document to Wisconsin Act 227, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) has prepared a draft Regional Water Supply Study. The complete study can be referenced on the SEWRPC website via the following link http://www.sewrpc.org/water/watersupplystudy. The scope of this study is as follows:

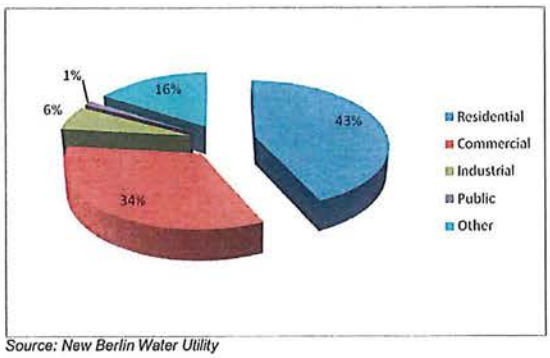
- ⇒ Forecast future water use demand in the Region
- ⇒ Consider potential of water conservation to reduce future demand
- ⇒ Identify groundwater recharge areas which should be protected from development
- ⇒ Assess potential for shallow groundwater recharge through infiltration of storm water runoff
- ⇒ Consider potential alternative sources of supply
  - o Shallow groundwater
  - o Lake Michigan water replacing groundwater east of the sub-continental divide
  - o Lake Michigan water replacing groundwater in "straddling communities" which already have "return flow"
  - o Lake Michigan water replacing groundwater in "straddling communities" and "communities in straddling counties" and providing for "return flow"
- ⇒ Estimate costs and impacts of alternatives
  - o Groundwater-Surface Water Interdependence and Impacts
- ⇒ Identify any development constraints necessary to assure water supply sustainability
- ⇒ Amend regional land use plan if necessary.

The Regional Water Supply Study has identified and evaluated seven (7) different scenarios for providing adequate and clean water supplies to the region. It is important that this Plan be used as a guide as future water resource planning and conservation policy decisions are made.

EVALUATION OF HISTORICAL WATER USAGE AND PAST & CURRENT CONSERVATION MEASURES

In 2015, the breakdown, by use, for City Water Utility customers is as follows:

⇒ Residential	43%	
⇒ Commercial	34%	
⇒ Industrial	6%	
⇒ Public	1%	
⇒ Other	16%	*(Hydrant flushing, equipment malfunction, lost water, meter inaccuracies)*



Source: New Berlin Water Utility

According to numbers provided by the City's Water Utility Department, the total yearly usage was as follows:

2016	1,004,682,932
2017	940,313,792
2018	959,770,020
2019	897,864,383
2020	943,567,359

The maximum usage (in gallons – highest day) for the last four years were:

2017	4,247,000	12/14/2017
2018	5,919,000	05/28/2018
2019	4,432,000	07/15/2019
2020	4,838,000	08/20/2020

Source: New Berlin Water Utility

Water usage is tracked by quarterly billing to show high consumption with a high/low report for residential and industrial usage. The average residential water use per residential customer in New Berlin for 2007 was 70 gallons per customer per day (gpcd). The 2020 average is 50.21 gallons per customer per day.

New Berlin has moved ahead with its water conservation measures whether it be through promoting and/or limiting water usage and loss or through land use planning, storm water management and development review. Utility activities implemented to date include:

- Sprinkling restriction in effect year around
- Notices of sprinkling restrictions on the City's website, quarterly leaflet, utility billings and on the local access cable channel

- ⇒ Leaflets available on the City website and references in the annual consumer confidence report
- ⇒ Rain barrels
- ⇒ Fixture replacement rebate program
- ⇒ Conduct annual water audits assessing utility system water losses
- ⇒ Leak detection program
- ⇒ Flag significant quarterly changes in water meter readings
- ⇒ Meter individual multi-family and residential condominium units
- ⇒ Replace water meters on a 10 year cycle
- ⇒ A water rate service charge that includes certain fixed charges but no water use, encouraging even those with lower water use to conserve
- ⇒ Adoption of the Storm water Management Ordinances
- ⇒ Water rate requests to the Public Service Commission reflecting full cost pricing
- ⇒ There are no bulk water sales within the Water Utility service area.

LAND USE PLANNING, STORMWATER MANAGEMENT AND DEVELOPMENT REVIEW MEASURES

The following is a summary of several ways that the Department of Community Development (DCD) furthers water conservation efforts here in New Berlin through the regulation of land use, storm water management and construction activities. Many of these items described below are not directly related to water conservation "per se" but, they do reflect our efforts surrounding water preservation and improving water quality.

The Department of Community Development (DCD) literally aids in the coordination and regulation of all construction activity within the city. The DCD also establishes and coordinates compliance with all storm water regulations. The DCD practices what we call *"three-dimensional water resource planning"*. Focusing efforts on protection of groundwater, surface water and storm water resources.

Many of the water studies listed in Appendix A of this report have been utilized over the years in refining the City's Comprehensive Plan and utility needs. This was especially true during the preparation of the Growth and Development Master Plan update to the City's 1987 Comprehensive Plan. Since that time, DCD has been involved in the following initiatives and/or ways of promoting Low Impact Development (LID) in order to preserve our water resources.

- ⇒ The Department promotes the use of alternative "Best Management Practices" ("BMPs") for handling storm water. The encouragement of "green-roofs", bio-retention swales, rain gardens, rain barrels and "prairie restorations", all promote habitat restoration and groundwater recharge. The Department has effectively promoted these ideals over the past two or more years. For example, the Settler's Ridge Subdivision located off of Wehr Road is 15 lots on 75 acres. Our Department required the developer to restore and enhance the open space into a "prairie habitat" that will be forever preserved offering not only visual benefits but

functional as well, for overland flow of storm water allowing for groundwater recharge.

⇒ The Department has over the past several years, developed a number of ordinances and policies to assist in our efforts to promote *"Three-Dimensional Water Resource Planning"*. This is the protection of groundwater, surface water and managing storm water conveyance. With assistance from Mr. Randall Arendt (one of the nation's foremost experts in conservation subdivision design & development), the City developed a conservation subdivision ordinance requiring that 75% of lands in any given conservation subdivision be set aside for permanent open space preservation for those without public utilities. For those conservation subdivisions with public utilities, our ordinance requires that 65% of the land be set-aside for permanent preservation. To the best of our knowledge, this is one of, if not the strictest conservation requirements within the State in terms of minimum open space requirements. Our ordinance also allows a transfer of density option in order to preserve additional open lands while allowing compensation to the parcels giving away their development rights. In the past, the Department has proposed a purchase of development rights program. However, that program was not funded.

⇒ Another example of how "BMPs" have been incorporated into a new development is the recent Living Word Church project. They are installing bio-infiltration swales that will contain engineered soils. These swales will be planted to follow DNR Technical Standards. They will also have temporary diversion swales during construction, which will protect the bio-infiltration swales.

⇒ The recently approved Crossroads Community Church is an additional example of the incorporation of "BMPs". This project will include bio-infiltration swales with engineered soils. A portion of the parking that will be used for larger church services will be grass covered with geo-blocks. This will help treat runoff as it comes off the parking lot before it enters the storm water ponds.

⇒ A recent project in the New Berlin Industrial Park was a Dog Day Care. This was a new use to the City. In working with the applicant, Staff had some concerns about the amount of animal waste and runoff from chemicals that this site would generate. Working collectively, DCD staff, DNR staff and the applicant worked on incorporating a rain garden and the proper use of environmentally friendly chemicals that do not degrade water quality and do not negatively impact the drainage ways and watershed.

⇒ Through continuing education, the Department is beginning to learn more about applying the standards found under the Leadership in Energy Efficient Design (LEED) program. With the recently approved Willowtree Development, an approximately 350,000 square foot building, the developer coordinated with our Department and was able to incorporate storm water "BMPs" into the site design and also various LEED design criteria. Besides incorporating energy efficient elements into the building's construction, the property will also be water efficient in terms of watering its landscaping. Irrigation water will be used from the site's retention pond to reduce water usage by 50% or more. In addition, a portion of the parking lot used for overflow parking will be grass covered with geo-blocks, further allowing infiltration and treating runoff prior to reaching the retention pond.

- ⇒ Another project that is promoting groundwater recharge, enhancing aquatic habitat, and helping to protect our water resource assets is the Underwood Creek "Prospect Parkway" project being managed by the City's Water Resources Management Utility. Depending upon funding availability, this project is incorporating rain gardens, bio-retention swales, infiltration basins & trenches, native / prairie plantings and providing for additional wetland plantings that will help absorb additional water & pollutants and detaining additional water from entering the creek causing flooding problems downstream.
- ⇒ The current study underway for the redevelopment of the New Valley Sand & Gravel Quarry (Mill Valley Business Center) is being site designed to support 100% groundwater recharge of all storm water. In addition, LEED standards will also be recommended for new development.
- ⇒ The City's upcoming Comprehensive Plan update will focus on neighborhood planning efforts and identification of significant environmental features in the city and ways to preserve their integrity and further our three-dimensional water resource planning ideals.
- ⇒ In 2001, the Department conducted and prepared an Urban Ecological Analysis report. The project used the CITYgreen software that American Forests utilizes to examine the environmental and economic benefits of trees and green spaces within the City. This information is currently used on various maps within the City including the Map of Potential Conservation Lands and the Departments front counter maps to help staff and others quickly see areas of the City and their associated tree canopy.
- ⇒ The Department promotes water quality management measures to meet the City's WPDES Permit requirements by administering and enforcing the provisions of the City's Storm Water Ordinance No. 2193, the Illicit Discharge Ordinance No. 2269, the Erosion Control Ordinance No. 2268 and the Post Construction Ordinance No. 2267. The intent of this enforcement is to reduce the amount of sediment and other pollutants reaching the waters of the State. Our Department, through the Water Resources Management Utility have implemented a strong code compliance program to monitor all on-site construction activities related to erosion control and storm water management to ensure that all construction sites are in compliance with federal, state and local laws regulating water quality and storm water. All of which ultimately protects our water resources.
- ⇒ In addition, our Department is responsible for inspecting all plumbing devices pursuant to Comm 84.20 regarding flow control and flow restricting devices. Members of our Department also serve on various statewide or regional boards or commissions that focus on improving land use planning and / or improving watershed & water resource management.

Due to increasing and complicated legislation & regulations relating to water resource protection, there needs to be a change in community development programming at all levels of government. Managing water resources is critical in high-quality land use planning and the overall health & integrity of these vital resources.

CONSERVATION MEASURES

Programs or activities to achieve water conservation can be classified into three categories: 1) program actions, 2) voluntary, and 3) mandatory. Program actions are those activities that can be directly taken up by the City. Voluntary activities are those that use education or incentives to promote water conservation. Mandatory activities are those that use regulations and ordinances. These measures can be combined or phased in over time.

Suggested/Recommended "Program" Actions:

- ⇒ Install more rain gardens at public buildings
- ⇒ Install low flow fixtures at City Hall or other City buildings and monitor decrease in water usage
- ⇒ Install a rain barrel at City Hall
- ⇒ Remove obstacles in the zoning and building code to allow for rain harvesting tanks in all zoning districts. Encourage new subdivisions through homeowner association declarations of restrictions to allow them as well.
- ⇒ Encourage all new subdivisions to plant trees and use water harvesting for landscape irrigation.
- ⇒ Reduce hydrant flushing from two times to one time per year
- ⇒ Detect and reduce leakage in the New Berlin water system. Leakage from the water system provides an opportunity to reduce the amount of water that is being used by utility customers. The New Berlin Water Utility should institute a more detailed water audit for the system to identify priority areas for water main replacement. Reducing leaks increases water pressure within the system and reduces energy costs for water pumping.

Suggested/Recommended "Voluntary" Actions:

- ⇒ When brushing your teeth, do not let the water run
- ⇒ Use water conserving shower heads and replace them as necessary
- ⇒ Check every faucet in your home for leaks (just a slow drip can waste 15-20 gallons per day).
- ⇒ Install rain barrels
- ⇒ Use native plantings in landscaping
- ⇒ Install a rain garden
- ⇒ Install low-flow fixtures with rebate assistance from the Utility for installation of water efficient fixtures
- ⇒ Bypass water softener system
- ⇒ Do not water lawns, gardens and landscaping between the hours of 9:00 a.m. and 9:00 p.m.

- ⇒ Cleaning of sidepaths, driveways, parking areas, tennis courts, patios, decks or other hard-surface areas should be accomplished with brooms – the use of water should be avoided
- ⇒ Limit the outdoor use of any water-play apparatus connected to a water source to one hour per day
- ⇒ The operation of outdoor misting systems used to cool people or areas should be avoided unless their use is necessary to alleviate an immediate threat to a person's health or safety
- ⇒ Water obtained by means of a fire hydrant shall not be used for cleaning equipment of any kind
- ⇒ Pools larger than 500 cubic feet should be supplied with water *obtained* from a source on that property's side of the sub-continental divide
- ⇒ The watering of gardens, trees and landscaping (except invasive species) through the use of a hand-held watering can or other hand-held container or hose is encouraged, provided any such watering device is utilized manually and in conjunction with an automatic hand-held shut-off valve
- ⇒ The watering or irrigation of new landscaping would also be allowed
- ⇒ Avoid showering, doing laundry, or running a dishwasher during a rain storm

Suggested/Recommended "Mandatory" Actions:

- ⇒ Sprinkling Ordinance – impose fines when not followed (odd/even days)
- ⇒ Sprinkling Ordinance – prohibit sprinkling during a significant portion of the mid-day hours when evaporation rates are high
- ⇒ Require an automatic hand-held shut-off valve for all outdoor domestic water hose use
- ⇒ Require rain and moisture sensors on all new lawn irrigation systems
- ⇒ Require low flow fixtures

The simplest application to minimize impact on City residents is to require conservation measures for all new development, so that it is incorporated from the outset. As new technology becomes available, its implementation into our codes and wide spread use should be encouraged.

PROGRAM IMPLEMENTATION

The City designates the Water Utility and the Department of Community Development (including the WRM) as the responsible departments for implementing this Water Conservation Plan. Each department would work cooperatively in administering, educating and implementing the programs and policies identified herein. To further the Plans' implementation, the City should set city-wide and household conservation goals and publicize them.

New Berlin should act as a role model for water conservation. Some of the areas where the City can lead by example are as follows:

⇒ Continue to promote three-dimensional water resource planning
⇒ Implement best management practices ("BMPs") for conservation and utilize public lands as pilot projects
⇒ Actively coordinate all land use planning elements thru sound community development; and
⇒ Provide water resource utility fee credits to property owners who utilize "BMPs" on their property (ie. pervious paving, rain gardens, bio-swales, etc.).

REDUCING WATER USE

Reduce per capita residential water consumption from January 1, 2008 by not less than (10) percent by the Year 2020 for Utility customers as per an agreement between the City of New Berlin and the Wisconsin Department of Natural Resources (WDNR). This goal is based on prior experience with other municipal water conservation programs. New Berlin is also seeking to reduce peak water demand by 1 MGD through controls in water sprinkling. The city will develop a program that provides monetary and other incentives to water users to reduce water use. Many water utilities use incentive-based programs to encourage water use reductions. This is usually done in tandem with a change in the rate structure that discourages increases in water usage.

INCENTIVE PROGRAM FOR RESIDENTS (Toilet and Fixture Replacements)

Toilet Replacements

The City of New Berlin Water Utility will develop a program to offer rebates of up to $100 for residential customers who replace their high water using toilets with EPA WaterSense-rated High Efficiency Toilet (HET) models. The program is part of the utility's Water Conservation Plan to reduce per capita residential water usage ten (10) percent by the year 2020.

Toilets eligible for rebate must be HETs (which use an average of 1.28 gallons per flush) and must be on the Environmental Protection Agency's (EPA) WaterSense list. Any toilet that meets the criteria and is purchased after January 1, 2010, will be eligible. Rebates will be in the form of checks sent to the customer's residence of record; the check amount will not exceed the purchase price of the toilet.

To apply for the rebate, an applicant must submit two items: the original, dated sales receipt for the toilet showing the manufacturer's model name and number and the completed application form. These items would be submitted to the City's Water Utility Office.

Eligibility

Participants in the program must be residential customers of the New Berlin Water Utility, and the installation address must be in the customer service area of the utility. Qualified customers are those who live in single-family homes, condos, or apartments in buildings no larger than two units. Rebates are for replacement of existing larger-capacity toilets, and are not for new construction. Rebates are first-come, first-served, until funding is exhausted. The program is for only two toilet rebates per household. Eligible replacement toilets must be HETs listed on the EPA WaterSense website (http://epa.gov/watersense/pp/find_het.htm).

Installation

Homeowners may install the toilets themselves, or they may hire a plumber or contractor to do the job. Owners are responsible for proper installation and associated costs. All applicable building and/or plumbing permits shall be obtained from the Department of Community Development – Inspection Services Division and pass all inspections. Installation may also be subject to verification by water utility personnel. Toilets may be purchased at any supplier as long as they are on the WaterSense list of HETs. Where applicable, permit fees will be waived for these installations.

Rebates

Rebate checks of up to $100/toilet (not to exceed actual purchase price) will be sent to the customer's address four to six weeks after applications are processed and the Utility has received notification that the installation has passed inspection. Rebates are not available for the costs of installation. The program will be based upon a "first come-first served" basis and will be limited to the amount budgeted within a given year.

Fixture Replacement

Greater water savings are achieved when ALL fixtures are replaced with High Efficiency ones. In addition to offering rebates for the installation of HETs, the Water Utility will also offer rebates for the installation of high efficiency showerheads and faucets.

For High Efficiency Showerheads (HES), participants will receive a $10.00 rebate (not to exceed the purchase price) when they purchase and install 1.5 gallon per minute (gpm) showerheads (maximum of two (2). Or, participants may exchange their old showerheads for free (maximum of two (2)) for new high efficiency ones at either the City's Utility Office or the Department of Community Development – Permit Application Center. Where applicable, permit fees will be waived for these installations.

Regarding, High Efficiency Faucets (HEF), participants may receive a $25.00 rebate (not to exceed the purchase price) when they purchase and install 1.5 gallon per minute (gpm) kitchen/bathroom faucet (maximum of two (2)). Faucets must be EPA WaterSense certified.

All rebates shall be granted on a first-come, first-served basis until program funds are exhausted. This program is subject to available funds and the City of New Berlin Utility Committee would reserve the right to alter program funding or program requirements at any time without notice. The Water Utility would not guarantee that program funding would be sufficient nor that all persons submitting applications shall receive a rebate.

Only High-Efficiency Toilets labeled as EPA's WaterSense and 1.5 gallons per minute showerheads and/or faucets qualify for a rebate. Proof of WaterSense labeled High Efficiency Faucet and/or proof of 1.5 gpm Showerhead is required to be submitted with application. No substitutions will be accepted under this Program. Original dated sales receipt for new showerhead or faucet must be submitted with the rebate application. New construction is not covered by this rebate. Rebate amount applies to purchase of approved toilets/faucets/showerheads only.

IMPLEMENT CONSERVATION PLAN and CONDUCT PUBLIC OUTREACH & EDUCATION

The New Berlin Water Utility and Department of Community Development will implement the final conservation plan encompassing the information gathered. The City will circulate the plan to local stakeholders, government officials, and utility staff to generate support for and comment on the plan. The Department's will implement the plan's measures and track progress.

The City will actively promote implementation of the conservation plan through public education and outreach in the New Berlin schools and the press. The City will utilize existing educational and outreach materials available through: the California Urban Water Conservation Council – www.h2ouse.org; www.everydrop.org; www.waterwiser.org; and the American Water Works Association at www.awwa.org.

The Utility will also conduct an ongoing monitoring program to assess the effectiveness of water use reduction activities through actual water use savings, customer participation, and costs of device maintenance.
The Water Utility will regularly report on the program effectiveness to the Utility Committee and through annual reports to the public.

APPENDIX A – RECENT NEW BERLIN WATER STUDIES

⇒ City of New Berlin Application for Water Diversion	2006
⇒ Radium Compliance Study	2002
⇒ Lake Michigan Water Study	2001
⇒ Report on the Geophysical Logging Study on Well 8	2001
⇒ Sand and Gravel Test Boring Results	2001
⇒ New Berlin Energy Park Studies & Groundwater Monitoring	2000
⇒ Report on the Geologic Reconnaissance Study for the Siting of Shallow Sand and Gravel Wells	2000

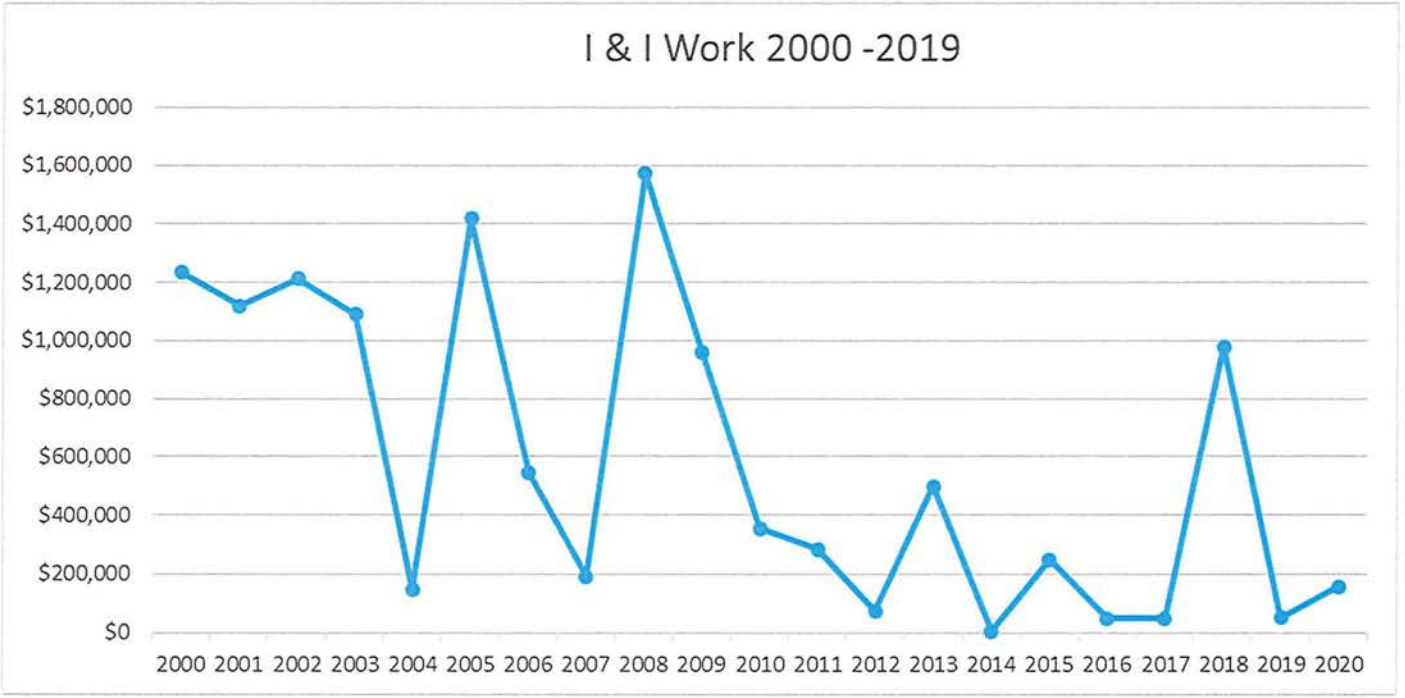
⇒ Water System Study Update for Impact Fees	1998
⇒ Westbrook Water Service Study	1998
⇒ Update Supply and Storage Analysis	1994
⇒ Geothermal Survey for Dolomite Well Site – Valley View Park	1992
⇒ Geothermal Survey for Locating a Dolomite Well Site – Westridge Subdivision	1992
⇒ Shallow Geothermal Survey for Valley View Park Test Well Site	1992
⇒ Report on the Phase II, Sand and Gravel Well Exploration Studies at the High Pointe and Woodfield Sites in the East Half of the City of New Berlin	1991
⇒ Report on the Phase II, Dolomite Well Exploration Study at the Westridge and Valley View Park Sites in the East Half of the City of New Berlin	1991
⇒ Report on the Phase I Study of the Groundwater Exploration Program for the East Half of the City of New Berlin	1991
⇒ Water System Facilities Study	1989-'91
⇒ Westbrook Water Service Study	1998
⇒ Update Supply and Storage Analysis	1994
⇒ Water System Facilities Study	1989-'91
⇒ Radium Compliance Study	1986
⇒ Section 25 Water Study	1985

Appendix B
I/I Reduction
Efforts

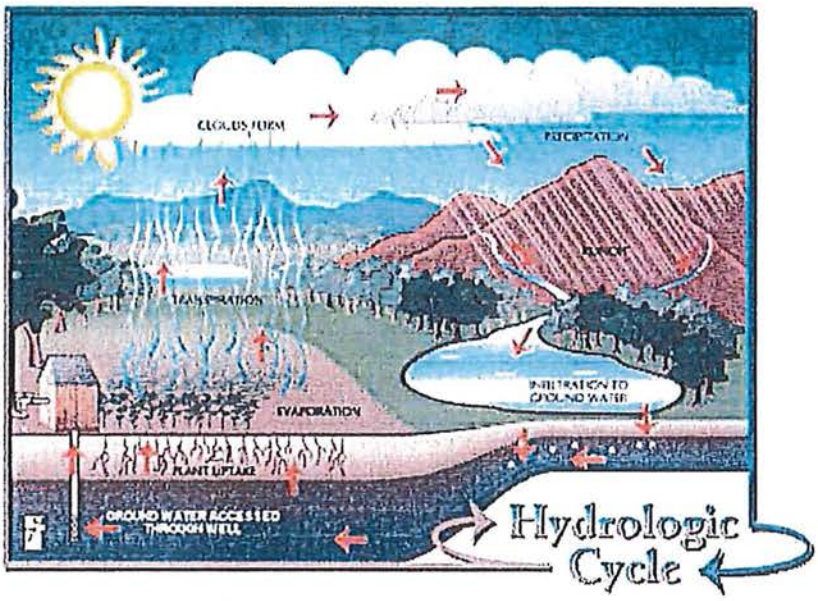
City of New Berlin

I & I WORK

Year	Amount
2000	$1,234,824
2001	$1,118,524
2002	$1,212,340
2003	$1,089,713
2004	$148,310
2005	$1,418,395
2006	$544,788
2007	$192,847
2008	$1,570,444
2009	$958,745
2010	$352,785
2011	$283,000
2012	$73,000
2013	$498,456
2014	$5,000
2015	$249,317
2016	$48,613
2017	$47,413
2018	$977,819
2019	$50,000
2020	$156,094
Total	**$12,230,427**



APPENDIX B – GROUNDWATER CYCLE



Source: Illustrations depicting the world water supply and hydrologic cycle were developed by Stephen ADDucci, studio d'aDDuci, for original use in the Purdue Pesticide Programs Pesticide and Water Quality *publication PPP-35 (1995). Reuse in this program is by express agreement with the illustrator. Developed in the Agricultural & Biological Engineering Department, Purdue University, 1997. Funded jointly by Purdue and U.S. EPA Region 5.*

Illustrations depicting the world water supply and hydrologic cycle were developed by Stephen ADDucci, studio d'aDDuci, for original use in the Purdue Pesticide Programs Pesticide and Water Quality *publication PPP-35 (1995). Reuse in this program is by express agreement with the illustrator.*

Appendix C

Sewage Flow Estimates

RA Smith 2020 Report

See below for the flows across the divide. The 2020 flow for the Mississippi River Basin is similar to the reading we calculated for the basin in 2019 (2.34 MGD). The 2020 flow for the Great Lakes Basin is about a 22% decrease from the reading we calculated for the basin in 2019 (4.29 MGD). The table is what needs to be submitted, but feel free to review the rest of the information, which we've always just used to justify the data we present.

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email.

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	3.33	99,900,000	1,198,800,000
Mississippi River Basin	2.38	71,400,000	856,800,000
Total	5.71	171,300,000	2,055,600,000

Here is the formula and information for first calculating the total sewer flows and then once again across the divide...

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. The information below gives a conservative estimate of the flows from the City to MMSD in 2020.

Because MMSD has only two meters monitoring flows from the City, we needed to rely more heavily on Utility-Owned meters to estimate the flows below. The following are the average flows for the City during 2020.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2020 through October 2020.)
(New Berlin Basins 1, 4, 5, and 6) = 2.18 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011, 2.292 in 2012, 2.479 in 2013, 2.00 in 2014, 1.66 in 2015, 2.05 in 2016, 2.21 in 2017, 2.06 in 2018 and 2.47 in 2019)

MMSD Meter MS0213 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2020 through October 2020.)
(New Berlin Basin 9) = 0.994 MGD (0.403 MGD in 2009, 0.452 in 2010, 0.369 in 2011, 0.65 in 2012, 0.982 in 2013, 0.474 in 2014, 0.967 in 2015, 1.17 in 2016, 1.04 in 2017, 1.07 in 2018 and 1.23 in 2019)

(New Berlin Basin 2, utility owned meter 2002-A) = 0.123 MGD (0.084 MGD in 2013, .095 in 2014, 0.141 in 2015, .075 in 2016, 0.146 in 2017, 0.14 in 2018, and 0.158 in 2019)

(New Berlin Basin 3, utility owned meters 2003-A and 2003-E) = 0.517 MGD (0.503 in 2009, 0.551 in 2014, 0.327 in 2015 .41 in 2016, 0.45 in 2017, 0.49 in 2018, and 0.749 in 2019)

(New Berlin Basins 7 and 10, utility owned meters 2007-B and 2010-A) = 1.87 MGD (2.292 MGD in 2009, 2.530 in 2010, 2.083 in 2011, 1.420 in 2012, 2.527 in 2013, 1.834 in 2014, 1.55 in 2016, 1.88 in 2017, 1.89 in 2018, and 2.01 in 2019)

(New Berlin Basin 8, utility owned meter 2008-C and lift station 6) = 0.026 MGD (0.041 MGD in 2015, 0.058 in 2016, 0.026 in 2017, 0.02 in 2018, and 0.016 in 2019)

Total 2020 Average Daily Flow = 5.71 MGD à * 365 = 2.08 Billion Gallons
(about a 14.0% decrease from 2019 numbers and about a .48% increase from 2018 numbers)

Total 2019 Average Daily Flow = 6.63 MGD à * 365 = 2.42 Billion Gallons
(about a 16.9% increase from 2018 numbers and about a 15.2% increase from 2017 numbers)

Total 2018 Average Daily Flow = 5.67 MGD à * 365 = 2.07 Billion Gallons
(about a 1.4% decrease from 2017 numbers and about a 6.78% increase from 2016 numbers)

Total 2017 Average Daily Flow = 5.75 MGD à * 365 = 2.10 Billion Gallons
(about a 8% increase from 2016 numbers and about a 16.2% increase from 2015 numbers)

Total 2016 Average Daily Flow = 5.31 MGD à * 365 = 1.94 Billion Gallons
(about a 8.6% increase from 2015 numbers and about a 6.9% increase from 2014 numbers)

Total 2015 Average Daily Flow = 4.89 MGD à * 365 = 1.785 Billion Gallons
(about a 1.5% decrease from 2014 numbers and about a 25.75% decrease from 2013 numbers)

Total 2014 Average Daily Flow = 4.966 MGD à * 365 = 1.813 Billion Gallons
(about a 25% decrease from 2013 numbers and about a 2% increase from 2012 numbers)

Total 2013 Average Daily Flow = 6.586 MGD à * 365 = 2.404 Billion Gallons
(about a 35% increase from 2012 numbers)

Total 2012 Average Daily Flow = 4.874 MGD à * 365 = 1.780 Billion Gallons
(about a 10% decrease from 2011 numbers)

RA Smith 2020 Report

Total 2011 Average Daily Flow = 5.397 MGD à * 365 = 1.970 Billion Gallons
(about a 10% decrease from 2010 numbers)

Total 2010 Average Daily Flow = 5.979 MGD à 5.979 * 365 = 2.182 Billion Gallons
(about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD à 6.025 * 365 = 2.199 Billion Gallons
(about a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide... here is how we do it...

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD Meter DC0306 = 2.18 MGD
    - New Berlin Flow Meter Basin 1 (utility meter 3001-G, 0.57 MGD) and Basin 4 (utility meter 3001-A, 0.191 MGD)
    - Resultant Basin 5 and 6 flows = 1.419 MGD

Assuming that half of flow from Basin 7 and 10 is pumped over the sub-divide line we get:

- New Berlin Basins 7 and 10 (utility owned meters 2007-B and 2010-A) = 1.87 MGD/2 = .935 MGD

Add Basin 8 (utility owned meter 2008-C and lift station 6), and the above two together and we get our number à 1.419 + 0.935 + 0.026 = 2.38 MGD

Thanks and let me know if you have any questions.

Ben G. High, P.E.
Project Manager
16745 West Bluemound Road, Brookfield, WI 53005-5938
direct: 262-317-3273
Ben.High@raSmith.com

2019 RA Smith Report

See below for the flows across the divide. The average daily flow for the Great Lakes Basin has increased by about 24% from the 2018 value (3.24 MGD). The average daily flow for the Mississippi River Basin has decreased by about 4% from the 2018 value (2.43 MGD) . The table is what needs to be submitted, but feel free to review the rest of the information, which we've always just used to justify the data we present.

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email.

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	4.29	128,700,000	1,565,850,000
Mississippi River Basin	2.34	70,200,000	854,100,000
Total	6.63	198,900,000	2,419,950,000

Here is the formula and information for first calculating the total sewer flows and then once again across the divide...

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. The information below gives a conservative estimate of the flows from the City to MMSD in 2019.

Because MMSD has only two meters monitoring flows from the City, we needed to rely more heavily on Utility-Owned meters to estimate the flows below. The following are the average flows for the City during 2019.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from March 2019 through October 2019.)
(New Berlin Basins 1, 4, 5, and 6) = 2.47 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011, 2.292 in 2012, 2.479 in 2013, 2.00 in 2014, 1.66 in 2015, 2.05 in 2016, 2.21 in 2017 and 2.06 in 2018)

MMSD Meter MS0213 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from March 2019 through November 2019.)
(New Berlin Basin 9) = 1.23 MGD (0.403 MGD in 2009, 0.452 in 2010, 0.369 in 2011, 0.65 in 2012, 0.982 in 2013, 0.474 in 2014, 0.967 in 2015, 1.17 in 2016, 1.04 in 2017 and 1.07 in 2018)

(New Berlin Basin 2, utility owned meter 2002-A) = 0.158 MGD (0.084 MGD in 2013, .095 in 2014, 0.141 in 2015, .075 in 2016, 0.146 in 2017 and 0.14 in 2018)

(New Berlin Basin 3, utility owned meters 2003-B and 2003-C) = 0.749 MGD (0.503 in 2009, 0.551 in 2014, 0.327 in 2015 .41 in 2016, 0.45 in 2017 and 0.49 in 2018)

2019 RA Smith Report

(New Berlin Basins 7 and 10, utility owned meters 2007-B and 2010-A) = 2.01 MGD (2.292 MGD in 2009, 2.530 in 2010, 2.083 in 2011, 1.420 in 2012, 2.527 in 2013, 1.834 in 2014, 1.55 in 2016, 1.88 in 2017 and 1.89 in 2018)

(New Berlin Basin 8, utility owned meter 2008-C and lift station 6) = 0.016 MGD (0.041 MGD in 2015, 0.058 in 2016, 0.026 in 2017 and 0.02 in 2018)

Total 2019 Average Daily Flow = 6.63 MGD → * 365 = 2.42 Billion Gallons (about a 16.9% increase from 2018 numbers and about a 15.2% increase from 2017 numbers)

Total 2018 Average Daily Flow = 5.67 MGD → * 365 = 2.07 Billion Gallons (about a 1.4% decrease from 2017 numbers and about a 6.78% increase from 2016 numbers)

Total 2017 Average Daily Flow = 5.75 MGD → * 365 = 2.10 Billion Gallons (about a 8% increase from 2016 numbers and about a 16.2% increase from 2015 numbers)

Total 2016 Average Daily Flow = 5.31 MGD → * 365 = 1.94 Billion Gallons (about a 8.6% increase from 2015 numbers and about a 6.9% increase from 2014 numbers)

Total 2015 Average Daily Flow = 4.89 MGD → * 365 = 1.785 Billion Gallons (about a 1.5% decrease from 2014 numbers and about a 25.75% decrease from 2013 numbers)

Total 2014 Average Daily Flow = 4.966 MGD → * 365 = 1.813 Billion Gallons (about a 25% decrease from 2013 numbers and about a 2% increase from 2012 numbers)

Total 2013 Average Daily Flow = 6.586 MGD → * 365 = 2.404 Billion Gallons (about a 35% increase from 2012 numbers)

Total 2012 Average Daily Flow = 4.874 MGD → * 365 = 1.780 Billion Gallons (about a 10% decrease from 2011 numbers)

Total 2011 Average Daily Flow = 5.397 MGD → * 365 = 1.970 Billion Gallons (about a 10% decrease from 2010 numbers)

2019 RA Smith Report

Total 2010 Average Daily Flow = 5.979 MGD → 5.979 * 365 = 2.182 Billion Gallons (about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD → 6.025 * 365 = 2.199 Billion Gallons (about a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide... here is how we do it...

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD Meter DC0306 = 2.47 MGD
    - New Berlin Flow Meter Basin 1 (utility meter 3001-G, 0.77 MGD) and Basin 4 (utility meter 3001-A, 0.336 MGD)
    - Resultant Basin 5 and 6 flows = 1.364 MGD

Assuming that half of flow from Basin 7 and 10 is pumped over the sub-divide line we get:

- New Berlin Basins 7 and 10 (utility owned meters 2007-B and 2010-A) = 2.01 MGD/2 = 1.005 MGD

Add Basin 8 (utility owned meter 2008-C and lift station 6), and the above two together and we get our number → 1.364 + 1.005 + 0.016 = 2.34 MGD

Thanks and let me know if you have any questions.

Ben G. High, P.E.
Project Manager

raSmith
16745 West Bluemound Road, Brookfield, WI 53005-5938
direct: 262-317-3273
Ben.High@raSmith.com

Hart, Jim

From: High, Ben <ben.high@raSmith.com>
Sent: Tuesday, January 29, 2019 8:19 AM
To: Hart, Jim
Cc: Stamborski, Chris
Subject: RE: Diversion Report

Hi Jim,

See below for the flows across the divide. The figures for 2018 are similar to the readings we calculated for 2017 for both the Great Lakes Basin (3.19 MGD) and Mississippi River Basin (2.56 MGD). The table is what needs to be submitted, but feel free to review the rest of the information, which we've always just used to justify the data we present.

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email.

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	3.24	97,200,000	1,182,600,000
Mississippi River Basin	2.43	72,900,000	886,950,000
Total	5.67	170,100,000	2,069,550,000

Here is the formula and information for first calculating the total sewer flows and then once again across the divide...

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. The information below gives a conservative estimate of the flows from the City to MMSD in 2018.

Because MMSD has only two meters monitoring flows from the City, we needed to rely more heavily on Utility-Owned meters to estimate the flows below. The following are the average flows for the City during 2018.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from March 2018 through October 2018.)
(New Berlin Basins 1, 4, 5, and 6) = 2.06 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011, 2.292 in 2012, 2.479 in 2013, 2.00 in 2014, 1.66 in 2015, 2.05 in 2016 and 2.21 in 2017)

MMSD Meter MS0213 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from March 2018 through November 2018.)
(New Berlin Basin 9) = 1.07 MGD (0.403 MGD in 2009, 0.452 in 2010, 0.369 in 2011, 0.65 in 2012, 0.982 in 2013, 0.474 in 2014, 0.967 in 2015, 1.17 in 2016 and 1.04 in 2017)

(New Berlin Basin 2, utility owned meter 2002-A) = .14 MGD (0.084 MGD in 2013, .095 in 2014, 0.141 in 2015, .075 in 2016 and .146 in 2017)

(New Berlin Basin 3, utility owned meters 2003-B and 2003-C) = .49 MGD (.503 in 2009, .551 in 2014, 0.327 in 2015 .41 in 2016 and .45 in 2017)

(New Berlin Basins 7 and 10, utility owned meters 2007-B and 2010-A) = 1.89 MGD (2.292 MGD in 2009, 2.530 in 2010, 2.083 in 2011, 1.420 in 2012, 2.527 in 2013, 1.834 in 2014, 1.55 in 2016 and 1.88 in 2017)

(New Berlin Basin 8, utility owned meter 2008-C and lift station 6) = .02 MGD (.041 MGD in 2015, .058 in 2016 and .026 in 2017)

Total 2018 Average Daily Flow = 5.67 MGD → * 365 = 2.07 Billion Gallons
(about a 1.4% decrease from 2017 numbers and about a 6.78% increase from 2016 numbers)

Total 2017 Average Daily Flow = 5.75 MGD → * 365 = 2.10 Billion Gallons
(about a 8% increase from 2016 numbers and about a 16.2% increase from 2015 numbers)

Total 2016 Average Daily Flow = 5.31 MGD → 5.31 * 365 = 1.94 Billion Gallons
(about a 8.6% increase from 2015 numbers and about a 6.9% increase from 2014 numbers)

Total 2015 Average Daily Flow = 4.89 MGD → 4.89 * 365 = 1.785 Billion Gallons
(about a 1.5% decrease from 2014 numbers and about a 25.75% decrease from 2013 numbers)

Total 2014 Average Daily Flow = 4.966 MGD → 4.966 * 365 = 1.813 Billion Gallons
(about a 25% decrease from 2013 numbers and about a 2% increase from 2012 numbers)

Total 2013 Average Daily Flow = 6.586 MGD → 6.586 * 365 = 2.404 Billion Gallons
(about a 35% increase from 2012 numbers)

Total 2012 Average Daily Flow = 4.874 MGD → 4.874 * 365 = 1.780 Billion Gallons
(about a 10% decrease from 2011 numbers)

Total 2011 Average Daily Flow = 5.397 MGD → 5.397 * 365 = 1.970 Billion Gallons
(about a 10% decrease from 2010 numbers)

Total 2010 Average Daily Flow = 5.979 MGD → 5.979 * 365 = 2.182 Billion Gallons
(about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD → 6.025 * 365 = 2.199 Billion Gallons
(about a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide... here is how we do it...

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD Meter DC0306 = 2.06 MGD
    - New Berlin Flow Meter Basin 1(utility meter 3001-G, 0.43 MGD) and Basin 4 (utility meter 3001-A, 0.17 MGD)
    - Resultant Basin 5 and 6 flows = 1.46 MGD

Assuming that half of flow from Basin 7 and 10 is pumped over the sub-divide line we get:

- New Berlin Basins 7 and 10, (utility owned meters 2007-B and 2010-A) = 1.89 MGD/2 = .95 MGD

Add Basin 8 (utility owned meter 2008-C and lift station 6), and the above two together and we get our number → 1.46 + .95 + .02 = 2.43 MGD

Thanks and let me know if you have any questions.

Project Engineer

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direct: 262-317-3273

From: Hart, Jim <jhart@newberlin.org>
Sent: Monday, January 28, 2019 2:06 PM
To: High, Ben <ben.high@raSmith.com>
Subject: RE: Diversion Report

Thank you!

From: High, Ben <ben.high@raSmith.com>
Sent: Monday, January 28, 2019 1:43 PM
To: Hart, Jim <jhart@newberlin.org>
Subject: RE: Diversion Report

Jim,

I will get right on that.

Thanks.

From: "High, Ben" <ben.high@raSmith.com>
Date: January 15, 2018 at 12:13:30 PM CST
To: "jhart@newberlin.org" <jhart@newberlin.org>
Cc: "Stamborski, Chris" <Chris.Stamborski@raSmith.com>
Subject: 2017 New Berlin Sanitary Sewer Flows - East/West of Divide

Hi Jim,

See below for the flows across the divide. The figures for 2017 are higher for the Mississippi Basin but lower for the Great Lakes Basin. Looking back at historical data, the overall flow from New Berlin for 2017 (5.75 MGD) seems to relate the best with the total flow data from 2016 (5.31 MGD) & 2011 (5.397 MGD). Since we depend on a combination of our meters, lift stations and MMSD meters, this is all that we have to go on. So, review if you'd like, but the table is what needs to be submitted, not the rest of the information, which we've always just used to justify the data we present.

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email. Compared to 2016, 2017 was a rainier year which contributes to the higher total flows.

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	3.19	95,700,000	1,164,350,000
Mississippi River Basin	2.56	76,800,000	934,400,000
Total	5.75	159,300,000	2,098,750,000

Here is the formula and information for first calculating the total sewer flows and then once again across the divide...

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. The information below gives a conservative estimate of the flows from the City to MMSD in 2017.

Because MMSD has only two meters monitoring flows from the City, we needed to rely more heavily on Utility-Owned meters to estimate the flows below. The following are the average flows for the City during 2017.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2017 through October 2017.)
(New Berlin Basins 1, 4, 5, and 6) = 2.21 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011, 2.292 in 2012, 2.479 in 2013, 2.00 in 2014, 1.66 in 2015 and 2.05 in 2016)

MMSD Meter MS0213 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2017 through October 2017.)
(New Berlin Basin 9) = 1.04 MGD (0.403 MGD in 2009, 0.452 in 2010, 0.369 in 2011, 0.65 in 2012, 0.982 in 2013, 0.474 in 2014, 0.967 in 2015 and 1.17 in 2016)

(New Berlin Basin 2, utility owned meter 2002-A) = .146 MGD (0.084 MGD in 2013, .095 in 2014, 0.141 in 2015 and .075 in 2016)

(New Berlin Basin 3, utility owned meters 2003-B and 2003-C) = .45 MGD (.503 in 2009, .551 in 2014, 0.327 in 2015 and .41 in 2016)

(New Berlin Basins 7 and 10, utility owned meters 2007-B and 2010-A) = 1.88 MGD (2.292 MGD in 2009, 2.530 in 2010, 2.083 in 2011, 1.420 in 2012, 2.527 in 2013, 1.834 in 2014 and 1.55 in 2016)

(New Berlin Basin 8, utility owned meter 2008-C and lift station 6) = .026 MGD (.041 MGD in 2015 and .058 in 2016)

Total 2017 Average Daily Flow = 5.75 MGD → * 365 = 2.10 Billion Gallons (about a 8% increase from 2016 numbers and about a 16.2% increase from 2015 numbers)

Total 2016 Average Daily Flow = 5.31 MGD → 5.31 * 365 = 1.94 Billion Gallons (about a 8.6% increase from 2015 numbers and about a 6.9% increase from 2014 numbers)

Total 2015 Average Daily Flow = 4.89 MGD → 4.89 * 365 = 1.785 Billion Gallons (about a 1.5% decrease from 2014 numbers and about a 25.75% decrease from 2013 numbers)

Total 2014 Average Daily Flow = 4.966 MGD → 4.966 * 365 = 1.813 Billion Gallons (about a 25% decrease from 2013 numbers and about a 2% increase from 2012 numbers)

Total 2013 Average Daily Flow = 6.586 MGD → 6.586 * 365 = 2.404 Billion Gallons (about a 35% increase from 2012 numbers)

Total 2012 Average Daily Flow = 4.874 MGD → 4.874 * 365 = 1.780 Billion Gallons (about a 10% decrease from 2011 numbers)

Total 2011 Average Daily Flow = 5.397 MGD → 5.397 * 365 = 1.970 Billion Gallons (about a 10% decrease from 2010 numbers)

Total 2010 Average Daily Flow = 5.979 MGD → 5.979 * 365 = 2.182 Billion Gallons (about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD → 6.025 * 365 = 2.199 Billion Gallons (about a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide... here is how we do it...

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD Meter DC0306 = 2.21 MGD
    - New Berlin Flow Meter Basin 1(utility meter 3001-G, 0.37 MGD) and Basin 4 (utility meter 3001-A, 0.25 MGD)
    - Resultant Basin 5 and 6 flows = 1.59 MGD

Assuming that half of flow from Basin 7 and 10 is pumped over the sub-divide line we get:

- New Berlin Basins 7 and 10, (utility owned meters 2007-B and 2010-A) = 1.878 MGD / 2 = .939 MGD

Add Basin 8 (utility owned meter 2008-C and lift station 6), and the above two together and we get our number → 1.59 + .939 + .0026 = 2.56 MGD

Thanks and let me know if you have any questions.

Project Engineer

16745 West Bluemound Road, Brookfield, WI 53005-5938
direct: 262-317-3273
Ben.High@rasmith.com
LinkedIn
raSmith.com

From: High, Ben [mailto:Ben.High@rasmithnational.com]
Sent: Wednesday, January 11, 2017 10:48 AM
To: Hart, Jim
Cc: Stamborski, Chris
Subject: 2016 New Berlin Sanitary Sewer Flows - East/West of Divide

Hi Jim,

See below for the flows across the divide. The figures for 2016 are higher for the Mississippi Basin but lower for the Great Lakes Basin. Looking back at historical data, the overall flow from New Berlin for 2016 (5.31 MGD) seems to relate the best with the total flow data from 2013 (6.586 MGD) & 2011 (5.397 MGD). Since we depend on a combination of our meters, lift stations and MMSD meters, this is all that we have to go on. So, review if you'd like, but the table is what needs to be submitted, not the rest of the information, which we've always just used to justify the data we present.

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email. Compared to 2015, 2016 was a rainier year which contributes to the higher total flows.

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	2.897	86,910,000	1,057,405,000
Mississippi River Basin	2.413	72,390,000	880,745,000
Total	5.31	159,300,000	1,938,150,000

Here is the formula and information for first calculating the total sewer flows and then once again across the divide...

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. The information below gives a conservative estimate of the flows from the City to MMSD in 2016.

Because MMSD has only two meters monitoring flows from the City, we needed to rely more heavily on Utility-Owned meters to estimate the flows below. The following are the average flows for the City during 2016.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2016 through October 2016.)
(New Berlin Basins 1, 4, 5, and 6) = 2.05 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011, 2.292 in 2012, 2.479 in 2013, 2.00 in 2014, and 1.66 in 2015)

MMSD Meter MS0213 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2016 through October 2016.)
(New Berlin Basin 9) = 1.17 MGD (0.403 MGD in 2009, 0.452 in 2010, 0.369 in 2011, 0.65 in 2012, 0.982 in 2013, 0.474 in 2014, and 0.967 in 2015)

(New Berlin Basin 2, utility owned meter 2002-A) = .075 MGD (0.084 MGD in 2013, .095 in 2014, and 0.141 in 2015)

(New Berlin Basin 3, utility owned meters 2003-B and 2003-C) = .41 MGD (.503 in 2009, .551 in 2014, and 0.327 in 2015)

(New Berlin Basins 7 and 10, utility owned meters 2007-B and 2010-A) = 1.55 MGD (2.292 MGD in 2009, 2.530 in 2010, 2.083 in 2011, 1.420 in 2012, 2.527 in 2013, and 1.834 in 2014)

(New Berlin Basin 8, utility owned meter 2008-C and lift station 6) = .058 MGD (.041 MGD in 2015)

Total 2016 Average Daily Flow = 5.31 MGD → * 365 = 1.94 Billion Gallons
(about a 8.6% increase from 2015 numbers and about a 6.9% increase from 2014 numbers)

Total 2015 Average Daily Flow = 4.89 MGD → 4.89 * 365 = 1.785 Billion Gallons
(about a 1.5% decrease from 2014 numbers and about a 25.75% decrease from 2013 numbers)

Total 2014 Average Daily Flow = 4.966 MGD → 4.966 * 365 = 1.813 Billion Gallons
(about a 25% decrease from 2013 numbers and about a 2% increase from 2012 numbers)

Total 2013 Average Daily Flow = 6.586 MGD → 6.586 * 365 = 2.404 Billion Gallons
(about a 35% increase from 2012 numbers)

Total 2012 Average Daily Flow = 4.874 MGD → 4.874 * 365 = 1.780 Billion Gallons
(about a 10% decrease from 2011 numbers)

Total 2011 Average Daily Flow = 5.397 MGD → 5.397 * 365 = 1.970 Billion Gallons
(about a 10% decrease from 2010 numbers)

Total 2010 Average Daily Flow = 5.979 MGD → 5.979 * 365 = 2.182 Billion Gallons
(about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD → 6.025 * 365 = 2.199 Billion Gallons
(about a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide... here is how we do it...

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD Meter DC0306 = 2.05 MGD
    - New Berlin Flow Meter Basin 1(utility meter 3001-G, 0.33 MGD) and Basin 4 (utility meter 3001-A, 0.14 MGD)
    - Resultant Basin 5 and 6 flows = 1.58 MGD

Assuming that half of flow from Basin 7 and 10 is pumped over the sub-divide line we get:

- New Berlin Basins 7 and 10, (utility owned meters 2007-B and 2010-A) = 1.55 MGD / 2 = .775 MGD

Add Basin 8 (utility owned meter 2008-C and lift station 6), and the above two together and we get our number → 1.58 + .775 + .058 = 2.413 MGD

Thanks and let me know if you have any questions.

Ben G. High, P.E.
R.A. Smith National, Inc.
262-317-3273

2015

Hanley, Sue

From: Hart, Jim
Sent: Thursday, February 04, 2016 1:05 PM
To: Hanley, Sue
Subject: FW: 2015 New Berlin Sanitary Sewer Flows - East/West of Divide

From: High, Ben [mailto:Ben.High@rasmithnational.com]
Sent: Monday, January 25, 2016 8:33 AM
To: Hart, Jim
Cc: Stamborski, Chris
Subject: 2015 New Berlin Sanitary Sewer Flows - East/West of Divide

Jim,

See below for the flows across the divide. The figures for 2015 are higher for the Great Lakes Basin but lower for the Mississippi Basin. Looking back at historical data, the overall flow from New Berlin for 2015 (4.89 MGD) seems to relate the best with the total flow data from 2014 (4.97 MGD) & 2012 (4.87 MGD). Since we depend on a combination of our meters, lift stations and MMSD meters, this is all that we have to go on. So, review if you'd like, but the table is what needs to be submitted, no the rest of the information, which we've always just used to justify the data we present.

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email. Compared to 2013, 2014 was a much drier year which contributes to significantly lower total flows.

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	3.012	90,360,000	1,084,320,000
Mississippi River Basin	1.878	56,340,000	676,080,000
Total	4.89	146,700,000	1,760,400,000

Here is the formula and information for first calculating the total sewer flows and then once again across the divide...

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. The information below gives a conservative estimate of the flows from the City to MMSD in 2015.

Because MMSD has only two meters monitoring flows from the City, we needed to rely more heavily on Utility-Owned meters to estimate the flows below. The following are the average flows for the City during the above time period.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2015 through October 2015.)
(New Berlin Basins 1, 4, 5, and 6) = 1.66 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011, 2.292 in 2012, 2.479 in 2013, and 2.00 in 2014)

MMSD Meter MS0213 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2015 through October 2015.)

(New Berlin Basin 9) = 0.967 MGD (0.403 MGD in 2009, 0.452 in 2010, 0.369 in 2011, 0.65 in 2012, 0.982 in 2013, and 0.474 in 2014)

(New Berlin Basin 2) = 0.141 MGD (0.084 MGD in 2013 and .095 in 2014)

(New Berlin Basin 3, utility owned meters 2003-B and 2003-C) = 0.327 MGD (.503 in 2009 and .551 in 2014)

New Berlin Meters 2007-B and 2010-A

-We installed a meter in basin 10A in 2014 to measure flows from Sections 35 and 36. This meter had been in place in prior programs. We have always had a meter at 7B (Cortez and LaSalle Drives) that gives us good data. Adding these two Utility meters together gives us a good approximation of what is coming from these areas.
(New Berlin Basins 7 and 10) = 1.75 MGD (2.292 MGD in 2009, 2.530 in 2010, 2.083 in 2011, 1.420 in 2012, 2.527 in 2013, and 1.834 in 2014)

The flow data for Basin 8 has been predominately taken from lift station 5 & 6, but in 2015 we installed a flow meter to meter all of basin 2008-C and some of basin 2008-A.

New Berlin Flow Meter 2008-C = .016 MGD

New Berlin Lift Station 6 = 0.025 MGD (0.003 MGD in 2009, 0.007 in 2010, 0.007 in 2011, 0.005 in 2012, 0.006 in 2013, and .007 in 2014)

Total 2015 Average Daily Flow = 4.89 MGD → 4.89 * 365 = 1.785 Billion Gallons
(about a 1.5% decrease from 2014 numbers, and about a 25.75% decrease from 2013 numbers)

Total 2014 Average Daily Flow = 4.966 MGD → 4.966 * 365 = 1.813 Billion Gallons
(about a 25% decrease from 2013 numbers, and about a 2% increase from 2012 numbers)

Total 2013 Average Daily Flow = 6.586 MGD → 6.586 * 365 = 2.404 Billion Gallons
(about a 35% increase from 2012 numbers)

Total 2012 Average Daily Flow = 4.874 MGD → 4.874 * 365 = 1.780 Billion Gallons
(about a 10% decrease from 2011 numbers)

Total 2011 Average Daily Flow = 5.397 MGD → 5.397 * 365 = 1.970 Billion Gallons
(about a 10% decrease from 2010 numbers)

Total 2010 Average Daily Flow = 5.979 MGD → 5.979 * 365 = 2.182 Billion Gallons
(about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD → 6.025 * 365 = 2.199 Billion Gallons
(about a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide... here is home we do it...

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD 1, 4, 5, and 6 Meter = 1.664 MGD
    - New Berlin Flow Meter Basin 1 (0.44 MGD) and Basin 4 (0.262 MGD)
    - Resultant Basin 5 and 6 flows = .962 MGD

Another MMSD meter measures flows from all of New Berlin Basins 7 and 10. Assuming that half of this flow is pumped over the sub-divide line we get:

- New Berlin 7B and 10A Meter = 1.75 → 1.75/2 = .875 MGD

Add Basin 8, and the above two together and we get our number → 0.875 + .962 + .041 = 1.878 MGD

Thanks and let me know if you have any questions.

Ben G. High, P.E.
Civil Engineer
262-317-3273
262-781-8466 fax

R.A. Smith National, Inc.
16745 West Bluemound Road, Suite 200, Brookfield, WI 53005-5938

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2014

Hanley, Sue

From: Hart, Jim
Sent: Thursday, February 05, 2015 11:38 AM
To: Hanley, Sue
Subject: FW: 2014 New Berlin Sanitary Sewer Flows - East/West of Divide

Hi,

FYI

Thanks,

Jim

From: Stamborski, Chris M. [mailto:Chris.Stamborski@rasmithnational.com]
Sent: Thursday, February 05, 2015 7:53 AM
To: Hart, Jim
Cc: High, Ben; Pichler, Lucas
Subject: 2014 New Berlin Sanitary Sewer Flows - East/West of Divide

Jim-

See below for the flows across the divide. The figures for 2014 were lower than 2013, but looking closer at the historical data that we've collected on this, 2013 looked like it was artificially high. Since we depend on a combination of our meters, lift stations and MMSD meters, this is all that we have to go on. So, review if you'd like, but the table is what needs to be submitted, not the rest of the information, which we've always just used to justify the data we present.

Thanks.

Chris

Chris M. Stamborski, P.E.
R.A. Smith National, Inc.
262-317-3337

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email. Compared to 2013, 2014 was a much drier year which contributes to significantly lower total flows.

Basin	Average Daily Flow (MGD)	Monthly (30 Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	2.728	81,840,000	995,720,000
Mississippi River Basin	2.238	67,140,000	816,870,000
Total	4.966	148,980,000	1,812,590,000

Here is the formula and information for first calculating the total sewer flows and then once again across the divide...

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. The information below gives a conservative estimate of the flows from the City to MMSD in 2014.

Because MMSD has only two meters monitoring flows from the City, we needed to rely more heavily on Utility-Owned meters to estimate the flows below. The following are the average flows for the City during the above time period.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from April 2014 through November 2014.)
(New Berlin Basins 1, 4, 5, and 6) = 2.00 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011, 2.292 in 2012, and 2.479 in 2013)

MMSD Meter MS0213 (This is an area-velocity meter similar to what the utility uses. I trust the accuracy of this data. The average flow below is from January 2014 through November 2014.)
(New Berlin Basin 9) = 0.474 MGD (0.403 MGD in 2009, 0.452 in 2010, 0.369 in 2011, 0.65 in 2012, and 0.982 in 2013)

(New Berlin Basin 2) = 0.095 MGD (0.084 MGD in 2013)

(New Berlin Basin 3, utility owned meters 2003-B and 2003-C) = 0.551 MGD (.503 in 2009)

New Berlin Meters 2007-B and 2010-A

-We installed a meter in basin 10A in 2014 to measure flows from Sections 35 and 36. This meter had been in place in prior programs. We have always had a meter at 7B (Cortez and LaSalle Drives) that gives us good data. Adding these two Utility meters together gives us a good approximation of what is coming from these areas.
(New Berlin Basins 7 and 10) = 1.834 MGD (2.292 MGD in 2009, 2.530 in 2010, 2.083 in 2011, 1.420 in 2012 and 2.527 in 2013)

The flow from New Berlin Basin 8 (Lift Station 5 and 6 predominantly) flow unmetered through Muskego.

New Berlin Lift Station 5 = 0.005 MGD (0.012 MGD in 2009, 0.009 in 2010, 0.005 in 2011, 0.004 in 2012, and 0.005 in 2013)

New Berlin Lift Station 6 = 0.007 MGD (0.003 MGD in 2009, 0.007 in 2010, 0.007 in 2011, 0.005 in 2012, and 0.006 in 2013)

Total 2014 Average Daily Flow = 4.966 MGD → 4.966 * 365 = 1.813 Billion Gallons
(about a 25% decrease from 2013 numbers, and about a 2% increase from 2012 numbers)

Total 2013 Average Daily Flow = 6.586 MGD → 6.586 * 365 = 2.404 Billion Gallons
(about a 35% increase from 2012 numbers)

Total 2012 Average Daily Flow = 4.874 MGD → 4.874 * 365 = 1.780 Billion Gallons
(about a 10% decrease from 2011 numbers)

Total 2011 Average Daily Flow = 5.397 MGD → 5.397 * 365 = 1.970 Billion Gallons
(about a 10% decrease from 2010 numbers)

2014

Total 2010 Average Daily Flow = 5.979 MGD → 5.979 * 365 = 2.182 Billion Gallons
(about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD → 6.025 * 365 = 2.199 Billion Gallons
(about a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide... here is home we do it...

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD 1, 4, 5, and 6 Meter = 2.000 MGD
    - New Berlin Flow Meter Basin 1 (0.498 MGD) and Basin 4 (0.193 MGD)
    - Resultant Basin 5 and 6 flows = 1.309 MGD

Another MMSD meter measures flows from all of New Berlin Basins 7 and 10. Assuming that half of this flow is pumped over the sub-divide line we get:

- New Berlin 7B and 10A Meter = 1.834 → 1.834/2 = 0.917 MGD

Add Basin 8, and the above two together and we get our number → 0.917 + 1.309 + .0.12 = 2.238 MGD

Lucas Pichler
Civil Engineer I
(262) 317-3218

R.A. Smith National, Inc.
16745 West Bluemound Road, Suite 200, Brookfield, WI 53005-5938

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Hanley, Sue 2013

From: Hart, Jim
Sent: Tuesday, January 28, 2014 2:54 PM
To: Hanley, Sue
Subject: FW: 2013 Sanitary Sewer Flows - East/West of Divide

Susie,

For the Diversion Report from Chris.

Thanks,

Jim

From: Stamborski, Chris M. [mailto:Christopher.Stamborski@rasmithnational.com]
Sent: Tuesday, January 28, 2014 2:43 PM
To: Hart, Jim
Subject: 2013 Sanitary Sewer Flows - East/West of Divide

Jim-

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email. Because 2013 experience a more normal rainfall pattern than in past years, the amount of sewage generated in much higher than in recent years. The only difference is the reliance on Utility-owned meters for data, as the MMSD meters installed were not in service for most, or all, of 2013 as they are being replaced with newer, more accurate models. What we've seen is that the MMSD meters may have been 'underreporting' data with these older meters, which also contributes to the increase seen in the numbers below, as the Utility-owned meters appear to be much more accurate with what is actually happening at each site.

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	3.457	103,710,000	1,261,805,000
Mississippi River Basin	3.129	93,870,000	1,142,085,000
Total	6.586	197,580,000	2,403,890,000

Please let me know if you have any questions.

Chris

Chris M. Stamborski, P.E.
R.A. Smith National, Inc.
262-317-3337

Here is the formula and information for first calculating the total sewer flows and then once again across the divide....

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. The information below gives a conservative estimate of flows from the City to MMSD in 2013.

Because MMSD was servicing its main metering locations in the City, we needed to rely more heavily on Utility-Owned meters to estimate the flows below. In some cases we needed to use historical data to predict flows due to the lack of metered information available in 2013. You will notice that there was no data provided for the meters that monitor basins 2 or 3 in the City. For the purposes of this summary, I used the 2009 average flows for basin 3, assuming that they would remain similar in 2012, as that basin has probably not changed much since then. There is no data for basin 2 in the City, as the District has not had a meter in place in this basin in quite some time. The following are the average flows for the City during the above time period.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the Utility uses. I trust the accuracy of this data. The average flow below is from January 2013 through November 2013.)
(New Berlin Basins 1, 4, 5, and 6) = 2.479 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011, 2.292 in 2012)

(New Berlin Basin 2) = 0.084 MGD (location metered in 2013 with Utility-owned meter, no previous data available)

MMSD Meter 027C = no data available (0.160 MGD in 2009)
(New Berlin Basins 3A and 3B)

MMSD Meter 027D = no data available (0.343 MGD in 2009)
(New Berlin Basins 3C, 3D, and 3E)

New Berlin Meters 9A and 9B (formerly taken from an MMSD meter, which was not in service in 2013)

- I believe that the MMSD meter at this location has always 'under' reported data. In this case, we used Utility-owned meters (one upstream, and another downstream of the MMSD monitoring location) to develop the total flow from this basin. In 2012 we used the MMSD data because it was a smaller number. In 2013 we are using the Utility meter data, which should be more accurate, but higher.

(New Berlin Basin 9) = 0.982 MGD (0.403 MGD in 2009, 0.452 MGD in 2010, 0.369 in 2011, 0.65 MGD in 2012)

New Berlin Meters 7B and 10A (formerly taken from an MMSD, which was not in service in 2013

- We installed a meter in basin 10A in 2012 to measure flows from Sections 35 and 36. This meter had been in place in prior programs, but was removed due to the lack of I/I witnessed at that location. We will be using the 2012 average to help predict what was coming from this area in 2013. We have always had a meter at 7B (Cortez and LaSalle Drives) that gives us good data. Adding these two Utility meters together gives us a good approximation of what is coming from these areas.

(New Berlin Basins 7 and 10) = 2.527 MGD (2.292 MGD in 2009, 2.530 MGD in 2010, 2.083 in 2011, 1.420 in 2012)

The flow from New Berlin Basin 8 (Lift Station 5 and 6 predominantly) flow unmetered through Muskego.

New Berlin Lift Station 5 = 0.005 MGD (0.012 MGD in 2009, 0.009 MGD in 2010, 0.005 in 2011, 0.004 in 2012)
(New Berlin Basin 8C)

New Berlin Lift Station 6 = 0.006 MGD (0.003 MGD in 2009, 0.007 MGD in 2010, 0.007 in 2011, 0.005 in 2012)

Total 2013 Average Daily Flow = 6.586 MGD → 6.586 * 365 = 2.404 Billion Gallons
(about a 35% increase from 2012 numbers, but only 9% from 2009 numbers)

Total 2012 Average Daily Flow = 4.874 MGD → 4.874 * 365 = 1.780 Billion Gallons
(about a 10% decrease from 2011 numbers)

Total 2011 Average Daily Flow = 5.397 MGD → 5.397 * 365 = 1.970 Billion Gallons
(about a 10% decrease from 2010 numbers)

Total 2010 Average Daily Flow = 5.979 MGD → 5.979 * 365 = 2.182 Billion Gallons
(about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD → 6.025 * 365 = 2.199 Billion Gallons
(approximately a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide.....here is how we do it.....

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD 1, 4, 5, and 6 Meter = 2.479 MGD
  - New Berlin Flow Meter Basin 1 (0.36 MGD) and Basin 4 (0.25 MGD)
  - Resultant Basin 5 and 6 flows = 1.869 MGD

Another MMSD meter measures flows from all of New Berlin Basins 7 and 10. Assuming that half of this flow is pumped over the sub-divide line we get:

- New Berlin 7B and 10A Meter = 2.527 MGD →2.527/2 = 1.26 MGD

Add the above together and we get our number →1.869 + 1.26 = 3.129 MGD

From: Stamborski, Chris M. [mailto:Christopher.Stamborski@rasmithnational.com]
Sent: Wednesday, January 30, 2013 1:53 PM
To: Hart, Jim
Subject: Sanitary Sewer Flows - East/West of Divide

Jim-

Below is Table 9-1, which has been used in past reporting by the City, which estimates the monthly sewage return flow across the divide. As in past years, I've also included the methodology used to arrive at the numbers below for your reference later in this email. The slight change in this year's calculation is the reliance more on the New Berlin metering data than that collected by MMSD. MMSD did provide us information from their sites as they have in the past, but for whatever reason, their meters did not record data for the entire year, leaving their average numbers higher than they actually are.

Basin	Average Daily Flow (MGD)	Monthly (30 Day Flow (Gallons)	Annual Flow (Gallons)
Great Lakes Basin	2.632	78,960,000	960,680,000
Mississippi River Basin	2.242	67,260,000	818,330,000
Total	4.874	146,220,000	1,779,010,000

Please let me know if you have any questions.

Chris

Chris M. Stamborski, P.E.
R.A. Smith National, Inc.
262-317-3337

Here is the formula and information for first calculating the total sewer flows and then once again across the divide....

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. In order to compare all figures "apples to apples", we only included the average flows at each location from January through October, as that is when we have common data from all three data sources. The information below gives a conservative estimate of flows from the City to MMSD in 2012.

You will notice that there was no data provided for the meters that monitor basins 2 or 3 in the City. For the purposes of this summary, I used the 2009 average flows for basin 3, assuming that they would remain similar in 2012, as that basin has probably not changed much since then. There is no data for basin 2 in the City, as the District has not had a meter in place in this basin in quite some time. The following are the average flows for the City during the above time period.

MMSD Meter DC0306 (This is an area-velocity meter similar to what the Utility uses. I trust the accuracy of this data.)
(New Berlin Basins 1, 4, 5, and 6) = 2.292 MGD (2.812 MGD in 2009, 2.766 in 2010, 2.430 in 2011)

(New Berlin Basin 2) = no data available

MMSD Meter 027C = no data available (0.160 MGD in 2009)
(New Berlin Basins 3A and 3B)

MMSD Meter 027D = no data available (0.343 MGD in 2009)
(New Berlin Basins 3C, 3D, and 3E)

New Berlin Meters 9A and 9B (formerly taken from an MMSD meter, but I don't trust the accuracy of that meter, and it was out of service for half of the year, resulting in poor data collection.)

- I believe that the MMSD meter at this location has always 'under' reported data. In this case, their meter is 'over' reporting the data at 1.235 MGD, so I took the lower number measured by our meters located one manhole upstream from the MMSD monitoring point.

(New Berlin Basin 9) = 0.65 MGD (0.409 MGD in 2009, 0.452 MGD in 2010, 0.369 in 2011)

New Berlin Meters 7B and 10A (formerly taken from an MMSD, but I don't trust the accuracy of that meter now that we have comparable results from the Utility meters)

- We installed a meter in basin 10A to measure flows from Sections 35 and 36. This meter had been in place in prior programs, but was removed due to the lack of I/I witnessed at that location. I wanted to re-install the meter this year to give us an idea of how the new sewer in Section 35 will perform, and also to help determine what the actual flows are in this area. We have always had a meter at 7B (Cortez and LaSalle Drives) that gives us good data. Adding these two Utility meters together gives us a good approximation of what is coming from these areas.

(New Berlin Basins 7 and 10) = 1.420 MGD (2.292 MGD in 2009, 2.530 MGD in 2010, 2.083 in 2011)

The flow from New Berlin Basin 8 (Lift Station 5 and 6 predominantly) flow unmetered through Muskego.

New Berlin Lift Station 5 = 0.004 MGD (0.012 MGD in 2009, 0.009 MGD in 2010, 0.005 in 2011)
(New Berlin Basin 8C)

New Berlin Lift Station 6 = 0.005 MGD (0.003 MGD in 2009, 0.007 MGD in 2010, 0.007 in 2011)

Total 2012 Average Daily Flow = 4.874 MGD → 4.874 * 365 = 1.780 Billion Gallons Per Year

(about a 10% decrease from 2011 numbers)

Total 2011 Average Daily Flow = 5.397 MGD → 5.397 * 365 = 1.970 Billion Gallons Per Year

(about a 10% decrease from 2010 numbers)

Total 2010 Average Daily Flow = 5.979 MGD → 5.979 * 365 = 2.182 Billion Gallons Per Year

(about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD → 6.025 * 365 = 2.199 Billion Gallons Per Year

(approximately a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide.....here is how we do it.....

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD 1, 4, 5, and 6 Meter = 2.292 MGD
  - New Berlin Flow Meter Basin 1 (0.24 MGD) and Basin 4 (0.13 MGD)
  - Resultant Basin 5 and 6 flows = 1.922 MGD

Another MMSD meter measures flows from all of New Berlin Basins 7 and 10. Assuming that half of this flow is pumped over the sub-divide line we get:

- New Berlin 7B and 10A Meter = 1.420 MGD → 1.420/2 = 0.71 MGD

Add the above together and we get our number → 1.922 + 0.710 = 2.632 MGD

Hanley, Sue

From: Hanley, Sue
Sent: Thursday, February 02, 2012 9:26 AM
To: Hanley, Sue
Subject: FW: Sanitary Sewer Flows – East/West of Divide

From: Hart, Jim
Sent: Wednesday, January 25, 2012 1:57 PM
To: Hanley, Sue
Subject: FW: Sanitary Sewer Flows – East/West of Divide

Susie,

Here is Table 9 – 1. I'm on the phone with Chris so I'll call you in a minute.

Jim Hart
Utility Supervisor

From: Stamborski, Chris M. [mailto:Chris.Stamborski@rasmithnational.com]
Sent: Wednesday, January 25, 2012 1:19 PM
To: Hart, Jim
Subject: Sanitary Sewer Flows – East/West of Divide

Jim-

As we discussed briefly last night, below is Table 9-1 used in last year's report by the City to estimate the monthly sewage return flow across the divide. I also included the background information used to arrive at the numbers below for your reference later in this email.

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (
Great Lakes Basin	2.912	87,360,000	1,062,88(
Mississippi River Basin	2.485	74,550,000	907,025,

Total	5.397	161,910,000	1,969,905,000

The important thing to note here is that we used New Berlin flow monitoring data to arrive at the numbers below, which means it will be important to continue monitoring this year (as we've discussed). I also believe, based on last night, that we could be using the flow monitoring data more for the planning of future I/I work in the City. I envision a graphic that shows age of sewer, rehabilitation year, flow monitoring priority locations, etc. that stresses which areas are important for public rehab only, but also which will need to be considered for private rehab as well. Hopefully we can talk more on this.

Please let me know if you have any questions.

Chris

Chris M. Stamborski, P.E.
R.A. Smith National, Inc.
262-317-3327

Here is the formula and information for first calculating the total sewer flows and then once again across the divide.

The following information is a summary of metered information from the MMSD, City-wide flow monitoring, and lift station pumping data. In order to compare all figures "apples to apples", we only included the average flows at each location from March through October, as that is when we have common data from all three data sources. The information below essentially give a conservatively high estimate of flows from the City to MMSD in 2011.

You will notice that there was no data provided for the meters that monitor basins 2 or 3 in the City. For the purposes of this summary, I used the 2009 average flows for basin 3, assuming that they would remain similar in 2011. There is no data for basin 2 in the City, as the District has not had a meter in place in this basin in quite some time. The following are the average flows for the City during the above time period.

MMSD Meter DC0306
(New Berlin Basins 1, 4, 5, and 6) = 2.430 MGD (2.812 MGD in 2009, 2.756 in 2010)

(New Berlin Basin 2) = no data available

MMSD Meter 027C = no data available (0.160 MGD in 2009)
(New Berlin Basins 3A and 3B)

MMSD Meter 027D = no data available (0.343 MGD in 2009)
(New Berlin Basins 3C, 3D, and 3E)

2/2/2012

2011

MMSD Meter MS0213
(New Berlin Basin 9) = 0.369 MGD (0.403 MGD in 2009, 0.452 MGD in 2010)

MMSD Meter MS0210 = 2.083 MGD (2.292 MGD in 2009, 2.530 MGD in 2010)
(New Berlin Basins 7 and 10)

The flow from New Berlin Basin 8 (Lift Station 5 and 6 predominantly) flow unmetered through Muskego. The following is total flow data from lift station 5 and 6 recorded between February 2010 and September 2010 to get an estimate of the total flows produced by these areas, even though there are gravity areas that are not included in these numbers.

New Berlin Lift Station 5 = 0.005 MGD (0.012 MGD in 2009, 0.009 MGD in 2010)
(New Berlin Basin 8C)

New Berlin Lift Station 6 = 0.007 MGD (0.003 MGD in 2009, 0.007 MGD in 2010)

Total 2011 Average Daily Flow = 5.397 MGD à 5.397 * 365 = 1.970 Billion Gallons Per Year
(about a 10% decrease from 2010 numbers)

Total 2010 Average Daily Flow = 5.979 MGD à 5.979 * 365 = 2.182 Billion Gallons Per Year
(about a 1% decrease from 2009 numbers)

Total 2009 Average Daily Flow = 6.025 MGD à 6.025 * 365 = 2.199 Billion Gallons Per Year
(approximately a 10% increase from 2006 numbers)

Since the above indicates total flow from the City, we need to estimate what it is on each side of the divide….here is how we do it….

One MMSD meter measured flows from all of New Berlin Basins 1, 4, 5, and 6. Since we only wanted the flows from 5 and 6, I subtracted the flows recorded for 1 and 4 from the flow monitoring data that we have been collecting for the City every year. The result should give us a good idea of what flows basins 5 and 6 are contributing.

- MMSD 1, 4, 5, and 6 Meter = 2.430 MGD (average flow from 3/1/11 through 10/31/11)
  - New Berlin Flow Meter Basin 1 (0.55 MGD) and Basin 4 (0.21 MGD) (average flow from 3/1/11 through 10/31/11)
  - Resultant Basin 5 and 6 flows = 1.670 MGD

Another MMSD meter measures flows from all of New Berlin Basins 7 and 10. Assuming that half of this flow is pumped over the sub-divide line we get

2011

Appendix D

Education Efforts
Kids Pages &
Teacher Resources

Before You Dig

Digger's Hotline

Please contact the Digger's Hotline at 800-242-8511 or 8-1-1 at least three days before you dig.

Utility Locations and Coordination Council Uniform Color Code

- **Blue** - Water, irrigation, and slurry lines
- **Green** - Sewers and drain lines
- **Orange** - Communication, cable television, alarm or signal lines, cables, or conduits
- **Pink** - Temporary survey markings
- **Red** - Electric and power lines, cables, conduits and lighting cables
- **White** - Proposed excavation
- **Yellow** - Gas, oil, steam, petroleum, or gaseous materials

Regulations

Anyone considering an excavation must call the area hotline. In the event you, as a property owner, call the Digger's Hotline, the utility / contractor must mark your property with flags or painted surfaces. If you recognize flags or painted markings in your yard and are not certain why they are there, call the utility office at 262-786-7086 with your questions. If the department is not responsible for flagging this location, we will attempt to help you determine who called in the locate.

Contact Us

Jim Hart

Utility Manager

Email Jim Hart

Wastewater / Water

Physical Address
4000 S Casper Drive
New Berlin, WI 53151

Mailing Address
3805 S Casper Drive
New Berlin, WI 53151

Phone: (262) 786-7086
Fax: (262) 786-0792

After Hours Phone: (262) 446-5070

Hours

Monday - Friday
7 a.m. - 3:30 p.m.

Summer Hours

Monday - Friday
6 a.m. - 2:30 p.m.

Summer hours are from May 14th through September 17th

Directory

Wastewater

Mission The mission of the wastewater utility is to be the responsible custodian of wastewater collection for all current and future utility customers consistent with local / state regulations and wastewater industry practices and standards in the most cost-effective manner possible, and to educate the public about the benefits of being good water use stewards.

Utility Committee

View information about New Berlin's Utility Committee.

Current Budgets

- Sewer Budget (PDF)

Additional Information

- Wastewater Utility Rates and Regulations

Water

Mission

The mission of the water utility is to be the responsible custodian and provide a good quality, potable water supply at adequate pressures and in sufficient quantities for consumption and fire protection purposes to all current and future utility customers; to be consistent with state / federal regulations and water industry practices and standards in the most cost-effective manner possible; and to educate the public about the benefits of being good water use stewards.

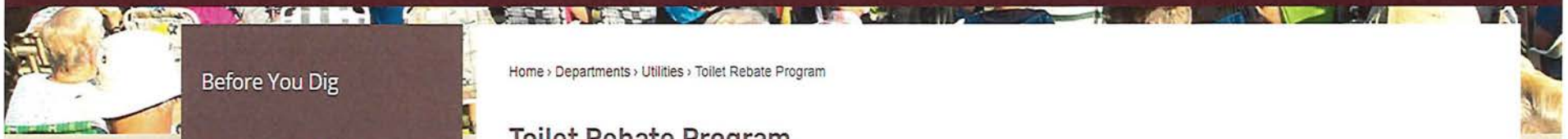
Sprinkling Policy: The City of New Berlin's Water Conservation Policy has an Odd/Even Sprinkling Schedule. Please remember to water your lawn only on odd days if your address is odd numbered and even days if your address is even numbered (i.e. Water on June 12th if your address is 5078). This is extremely important during hot dry summers and ensures that there is sufficient water to allow fire fighters to do their jobs when needed. Light hand watering of plants and flowers is permitted at any time. Your help is greatly appreciated. If you have any questions, please contact the Utility office at 786-7086. Thank you.

Survey Stakes:

To help speed up the process of installing the blacktop, the surveying company started to stake the centerline of the road (The pink flags on the roadway). Please do not drive over the flags.

All of the above work is dependent on the weather, so hopefully it will cooperate with our schedule.

Public Notice of Non-Compliance (PDF)



Before You Dig

Payment and Billing Information

Toilet Rebate Program

Wastewater

Water

Toilet Rebate Program

2020 Toilet Rebate Program

High Efficiency Toilet Rebate Program beginning April 1, 2010

The City of New Berlin Water and Sewer Utilities are sponsoring a toilet rebate program to encourage customers to replace their old toilets with high efficiency water-wise low-flow toilets. This program has been extended to 2020. There are a limit amount of rebates available so please inquire prior to your application. Please note that the gallon per flush rate of the new toilet must be LESS than the old toilet to qualify for the toilet rebate.

How much can you save?

If you currently have a 5 gallon per flush toilet and replace it with a 1.2 gallon toilet, based on 10 flushes per day, the savings are 13,505 gallons per year. At current water and sewer rates, that means an average annual reduction of $57.40 on your water bill and $30.51 on your sewer bill for a total savings of $87.91.

There is a limited number of rebates for toilet replacements and is on a first come first serve basis. Toilets must be purchased between January 1 and December 31, 2020. Amount of each rebate is $100. To qualify:

- You must be a current New Berlin Water or Sewer Utility customer.
- A Permit Fee of $25 and a Tech Fee of $3 must be applied for and paid prior to installation. Upon installation an inspection must be made by the City of New Berlin to ensure that the toilet was replaced with an approved model. Only 1 permit & tech fee is needed per customer.
- Make and model of toilet purchased needs to be from the Water Sense approved list.
- Limit of 2 toilet rebates per customer.
- Original receipts (dated between January 1 and December 31, 2020) must be presented along with the Completed Toilet

- Make and model of toilet purchased needs to be from the Water Sense approved list.
- Limit of 2 toilet rebates per customer.
- Original receipts (dated between January 1 and December 31, 2020) must be presented along with the Completed Toilet Rebate Form (PDF).
- Toilet installation is not included.
- An inspector must verify a qualifying Water Sense Toilet was installed prior to your rebate being approved. Call the Inspection Department for further details 262-786-8610, ext. 2300.
- The check amount will not exceed the purchase price of toilet.
- You are responsible for disposal of your old toilet.*
- Please allow 4 to 6 weeks for your rebate check to be mailed.
- Toilet installation is not included.
- Toilet gallon per flush must be **less** than original toilet that is being replaced to qualify for the rebate.

Toilets can be purchased at many local home improvement and hardware stores or through a plumbing contractor.

*Check with your installer for toilet disposal options or contact your garbage disposal contractor.

For further information, please contact the Inspection Department 262-786-8610, ext. 2300

Automatic Payment Plan

Billing Schedule & Rates

Payment Information

This site is for Water/Sewer Utility Payments ONLY!

Acceptable Payment Methods

New: City of New Berlin Citizen Self Service Portal

View and pay your Taxes and Utility bills online

In order to view and pay your bills online, it is necessary to first create an account.

- Open detailed instructions here to ensure a successful account set up.
- Please have your tax and/or your utility bill ready, you will need your utility account number and customer ID from your Utility bill (Tax Key/Parcel ID from Tax bill to link your accounts).

Once your create a login and link your account to your login, you will be able to:

- View your bill summary and detail
- Sign up for automatic payments
- Make one-time payments by e-check for a flat $1.00 fee

****Please note: The e-check payment option is currently not working. We are aware of this issue and are working to resolve as soon as possible. At this time, please use a different payment method to ensure a timely payment. *Thank you*!****

Due to the cost to the City of New Berlin, we do not accept debit or credit cards at City Hall.

In Person or by Mail

Due to the cost to the City of New Berlin, we do not accept debit or credit cards at City Hall.

In Person or by Mail

The Finance Department accepts checks, money orders, cashier's checks, traveler's checks, and cash as payment. Please bring your remittance slip for ease of processing.

City of New Berlin
3805 S Casper Drive
New Berlin, WI 53151

Payment Drop-Box

For your convenience, there is a 24-hour drop box in the lower parking lot of City Hall available for payments of your utility and tax bills.

- Please include your payment stub, along with a check in a sealed envelope before depositing.
- Payment deposited in the drop box on the due date (collected at 8:00 a.m. the following business morning) will be considered paid on time. (For example, for bills that are due on a Friday - all payments collected from the drop box at 8:00 a.m. the following Monday will be considered on time.)

Please do not place cash in the drop box.

Credit Card Payments

Phone or online

Taxes and utility bills can be paid by credit card; however, this must be done online or by phone. Due to the cost to the city it would be prohibitive and result in an increase to your taxes, we do not accept credit / debit card payments at City Hall.

Official Payments makes credit card payments available to you online or by phone at (888) 2PAY-TAX or 888-272-9829. Official Payments is not affiliated with the City of New Berlin. At their payment screen, be prepared to enter:

- Payment type (either tax or utility)
- Wisconsin, New Berlin

Official Payments makes credit card payments available to you online or by phone at (888) 2PAY-TAX or 888-272-9829. Official Payments is not affiliated with the City of New Berlin. At their payment screen, be prepared to enter:

- Payment type (either tax or utility)
- Wisconsin, New Berlin
- Your jurisdiction code (5801)

Be sure to remain online, or on the phone until you are given a confirmation code. This will be needed for tracking purposes in the event of an error. Official Payments charges a fee based on the amount you charge. The fee is:

- Utility bills - $7.45 per transaction

Automatic Payment Plan

The City of New Berlin also offers an automatic payment plan for your water, sewer, and stormwater bill. To sign up, please complete the agreement form (PDF) authorizing your financial institution to automatically deduct the amount of your bill from your account. Send the form and a voided check to us at:

City of New Berlin
Finance Department
3805 S Casper Dr.
New Berlin, WI 53151

To discontinue, please complete the termination form (PDF) and send to the address above.

For more information, please view frequently asked questions about the automatic payment plan.

Current Water Quality Reports

- 2019 Consumer Confidence Report

Utility Committee

View information about the New Berlin Utility Committee.

Awards

The City of New Berlin Lake Michigan Water Diversion was selected for the American Council of Engineering Companies Best of State Award (PDF).

Hydrant Flushing

All city owned water hydrants are flushed once each year, either in the spring or the fall depending on location. Water Utility Crews will be performing maintenance within the water system and will be flushing hydrants. The Water Main Flushing program is designed to remove natural minerals that sometimes collect in the bottom of water mains and make sure that hydrants are operating correctly. This operation may cause a temporary discoloration in your water supply. By allowing your water to run for a short period of time, the problem should clear itself. Please be assured, although the water may be discolored, it is safe for human use. If you have any questions in regard to this matter, please contact the Utility Office Monday through Friday from 7 a.m. through 3:30 p.m. at 262-786-7086. Thank you for your patience.

Hydrant Flushing dates for 2020:

- April 27th to May 29th
- September 14th to October 9th

The City of New Berlin Utility was selected to receive a Significant Program Award from CVMIC (Cities and Villages Mutual Insurance Company) for their Reflect a Hydrant Program

- Water Budget (PDF)
- Water and Wastewater Rates

Utility Associations

The Utility is a proud member of the Alliance for Energy Efficiency.

Alliance for Water Efficiency MEMBER

Summer hours are from May 11th through September 11th, 2020.

Directory

Paul Farrow
County Executive

Dale R. Shaver
Director

Waukesha
COUNTY
DEPARTMENT OF
PARKS AND LAND USE

Press Release

Contact: Jayne Jenks
Phone: 262-896-8305

FOR IMMEDIATE RELEASE
Date: February 1, 2016

FREE Programs to Learn about Water Resources

Waukesha, WI – Waukesha County Department of Parks and Land Use - Land Conservation staff are offering free public programs in February.

Thursday, February 11: **Understanding Your Water Resources** will be held at the New Berlin Public Library from 6-7 p.m. Find out where your water comes from as well as where it goes. Learn the difference between storm sewers and sanitary sewer. Understand the geology of the area that contributes to the problems in the deep aquifer. Discover the impacts that you have on your watershed – for better or worse and learn how you can become a positive influence on your waters! Call 262-785-4980 to register.

Thursday, February 25: **Get the Groundwater Picture** will be held at the New Berlin Public Library from 6-7 p.m. Learn how a well works and what goes on above ground that affects our drinking water supply. See how groundwater moves and functions using a groundwater model. This model helps take the guesswork out of groundwater. Call 262-785-4980 to register.

For more information, visit waukeshacounty.gov/cleanwater or call 262-896-8300.

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Land Resources Division
515 W. Moreland Blvd.
Waukesha, WI 53188
Phone (262) 896-8300

The WaterPage.com

Water Conservation for Kids

Did you know that kids can make a very important difference towards water conservation? But first off, why do we even need to know about conserving water? Water is a natural resource that we derive from the Earth. Without it, we would not be able to live! Imagine a world with no water at all. You wouldn't be able to drink it, bathe, swim and so on. Without clean water, other creatures, such as plants, animals, birds and ocean life would also get sick and die after drinking polluted water. Although kids don't work at large companies or the government, they can still make a huge impact simply by starting at home and changing the way their families, friends and classmates use water. To get an idea of how much water we could all save if we all made a small effort, think about this: If every person across the nation flushed their toilets one time less every day, together they could all save enough water to fill a lake as large as a mile wide and long and four feet in depth! Now that you know how easy it can be to help save water, try some of the ideas below and start doing your part to change our world.

20 Ways Kids Can Help to Save Water:

- Whenever you wash your hands, don't leave the water running. Wet your hands and turn the water off. Use soap and lather your hands well, then turn the water on to rinse. Turn off the water and make sure it is off completely. Then dry your hands.
- Do the same when you brush your teeth. Turn the faucet on to get your toothbrush and toothpaste wet, and then again to rinse your mouth and toothbrush. Don't leave the water running while you're brushing.
- Tell your friends what you're doing and why and encourage them to do the same.
- Tell adults when faucets are dripping.
- Since baths use a lot of water (about 37 gallons on average), take short showers instead and use only about 20 gallons of water, instead.
- Use a wastebasket for used tissues, or things like gum wrappers, paper towels, or even dead bugs or goldfish. Don't flush them – the average flush uses as much as 5 gallons of water! Even if the toilets in your house are "low-flow" toilets, using them for trash still uses 1.5 gallons of water unnecessarily.
- A regular shower head uses as much as 7 gallons of water every minute. Let adults know they could get a free low-flow shower head at the local water district. Or, suggest that they look for a low flow shower head that has a cut-off valve that shuts off the water flow while lathering your hair or shaving legs. You can then turn the water back on, without it starting off cold again. This will help to conserve even more water while showering.

- Do you have plants in your house? When meals are prepared and vegetables or other fresh produce are washed, collect that water and use it to water the plants.
- In the tank part of the toilets in your house, put several drops of food coloring into the water. If you see the coloring seeping into the bowl, there's a leak. Fixing it can save about 600 gallons of water each month!
- Do you like a drink of cold water now and then? Rather than running the kitchen faucet for several minutes to get cold water, keep a pitcher of water in the refrigerator.
- Put a barrel outdoors to catch rain water, then use that water for things like watering plants or flushing toilets and save hundreds of gallons of water a year!
- In the summertime, it's fun to play under the lawn sprinkler. When you do, make sure it's when the lawn is being watered at the same time.
- Do you have other summer water toys that require a running hose? These might be fun, but they also waste gallons and gallons of water.
- Is there a garbage disposal in your kitchen sink? Then, you know the water has to run into it when you turn on the switch. Instead of doing that and wasting water, why not start composting food waste instead? Collect things like fruit skins and peels, vegetable leaves and stems, and even dead plants and flowers. In a ceramic container, keep them moist and toss them for air once a week. The compost can then be added to a garden like a vitamin for your outdoor plants!
- Encourage the others in your home, and your friends, not to leave any faucet running. Only use what is truly needed!
- If there is a dishwasher in your house, encourage everyone to scrape their plates rather than rinse them before loading them into the machine. It should always be full before turning it on.
- Do you notice that your toilet handle "sticks" and has to be "jiggled" for the toilet to stop flushing? If this is happening, water is continuously running through the toilet and needs to be fixed. Let the adults in your home know.
- Is there a leaky faucet or toilet in the bathroom at school? Be sure to let someone know so that it can be repaired.
- If there is a pool or a hot tub at your house, encourage those who use it to cover it afterwards. This prevents evaporation and having to keep refilling.
- If the adults in your home occasionally water the lawn, encourage them to water in the cooler parts of the day (early morning, or at or after sunset), and never on windy days. This keeps in the soil all the water being sprayed instead of most of the water being lost to evaporation.

Even if you do just one thing each day to contribute to your home's water conservation, you're doing the right thing!

Use these resources to find out more!

- Tips for Kids to Start Saving Water Indoors and Outdoors
- Water Conservation Projects and Tips for Kids

- Play Tip Tank and Other Water Games!
- Learn to Reduce Water Usage at Home
- Can Your Class Win at the Water Conservation Challenge?
- Where Does Water Come From and How Does it Get Dirty?
- Play the "Test Your Water Sense" Game Quiz
- Check Out More Than a Hundred Water-Saving Ideas
- How Old is The Water You Used Today?
- Water Experiments, Activities, Printable and More!
- Help Phil Dumpster Reduce His Water Bills
- Download the Water Conservation Activity Book

- Print the Water Usage Worksheet and Calculate Your Daily Water Usage (PDF)
- Plenty of Water Activity Sheets for Kids
- Water Games and Activities to Try Out
- How Much Water Does Your Toilet Use?
- Create a Virtual Water Family and Help Them Conserve Water Wisely!
- Learn About Water Conservation with Pete the Beak

- tankless water tank
- et water
- best alkaline water
- basement water damage
- water tanks storage
- what is deionized water
- heater review
- types of water pollution
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- water softeners review
- water heater leaking
- cooler dispenser
- scuba diving basics
- carbon block

Menu

Search EPA.gov

WaterSense®
An EPA Partnership Program

Site Navigation

WaterSense / Our Water / What You Can Do / Start Saving

Start Saving

Everyone can play their part in preserving our nation's water resources. With the simple steps and informational tools below, you'll find that it's easier than ever.

Savings Tips | Commit to Save Water! | Calculate Your Savings | For Everything, There is a Season

Indoors

You've purchased some WaterSense labeled products and started down the road to savings, but don't stop there. There are lots of things you can do in your own home to reduce water use and get more from less. Just follow our simple tips below to get started!

Here, there, and everywhere:

- Fix a Leak: Small household leaks can add up to gallons of water lost every day. That's why WaterSense reminds Americans to check their plumbing fixtures and irrigation systems each year in March during Fix a Leak Week.

In the bathroom—where over half of all water use inside a home takes place:

- Turn off the tap while shaving or brushing teeth.
- Showers use less water than baths, as long as you keep an eye on how long you've been

lathering up!

*Average U.S. family per year

- Learn tips on how to Shower Better here!

In the kitchen- whip up a batch of big water savings:

- Plug up the sink or use a wash basin if washing dishes by hand.
- Use a dishwasher; and when you do, make sure it's fully loaded!
- While you're at it, scrape that plate instead of rinsing before loading it into the dishwasher.
- Keep a pitcher of drinking water in the refrigerator instead of letting the faucet run until the water is cool.
- Thaw in the refrigerator overnight rather than using a running tap of hot water.
- Add food wastes to your compost pile instead of using the garbage disposal.

In the laundry room—where you can be clean AND green:

- Wash only full loads of laundry or use the appropriate water level or load size selection on the washing machine.

Outdoors

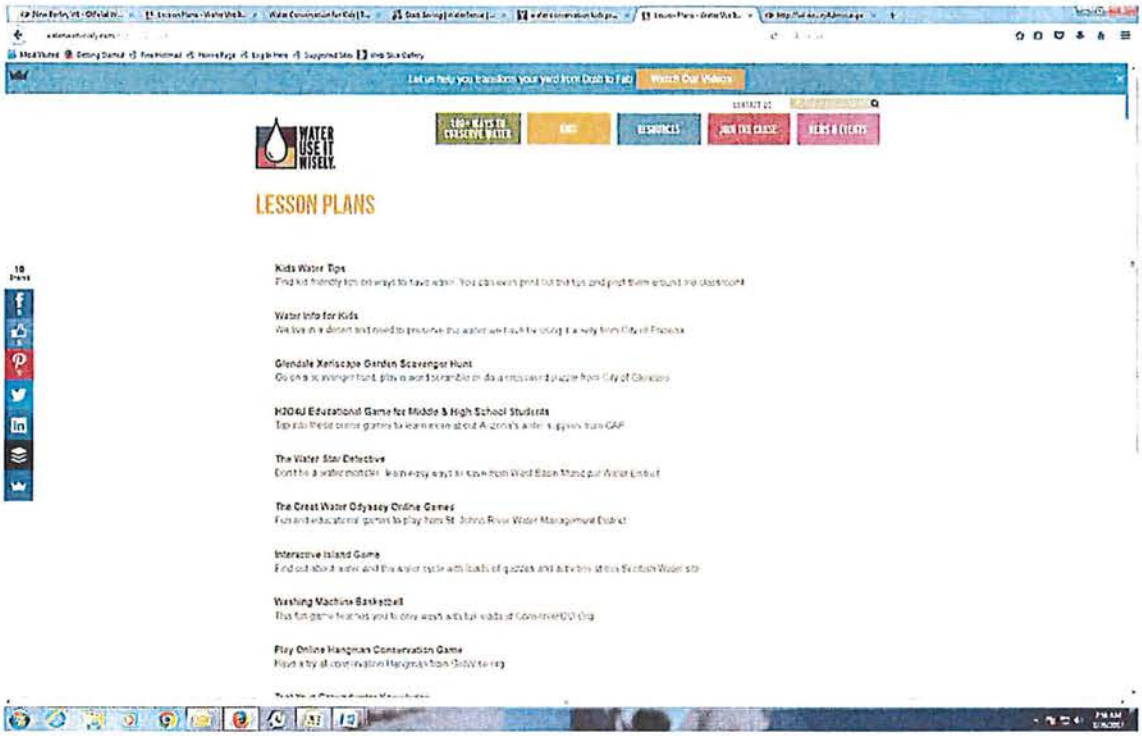
Of the estimated 29 billion gallons of water used daily by households in the United States, nearly 9 billion gallons, or 30 percent, is devoted to outdoor water use. In the hot summer months, or in dry climates, a household's outdoor water use can be as high as 70 percent.

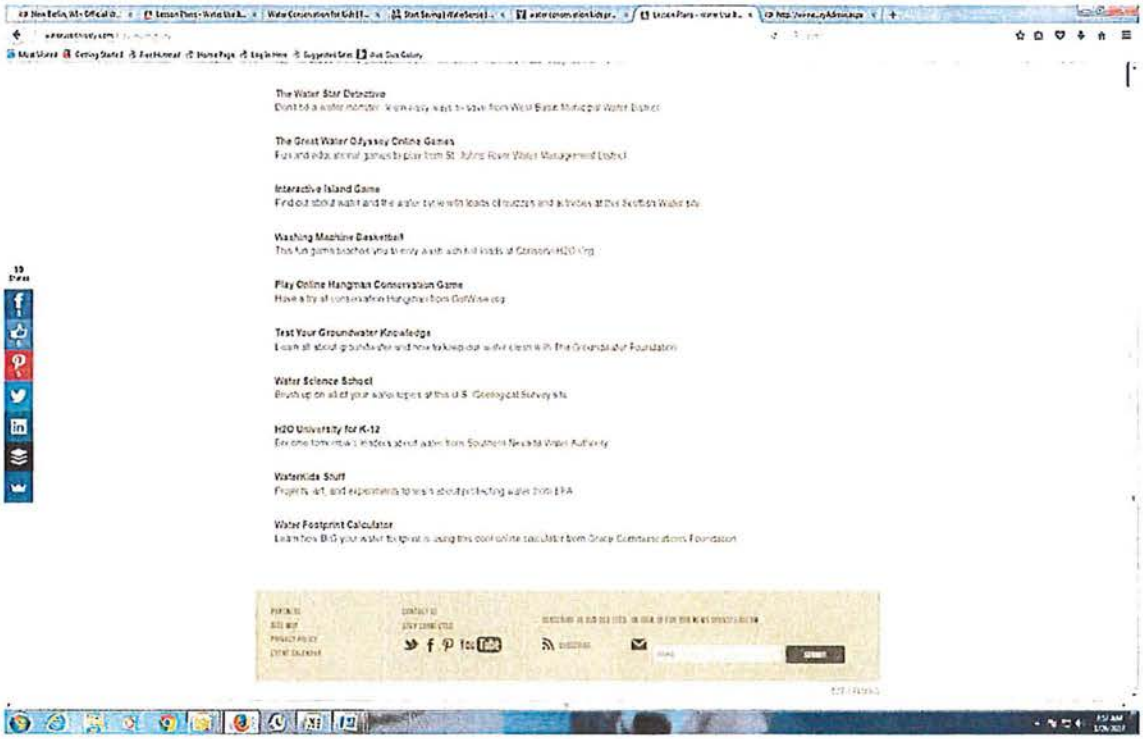
In the yard—be beautiful and efficient:

- Create a water-smart landscape that is both beautiful and efficient to give your home the curb appeal you desire.
- Timing is everything! Knowing when and how much to water allows you to keep a healthy landscape.
- Upgrade to a WaterSense labeled controller if you have an in-ground irrigation system.
- Find a certified irrigation professional to install, maintain, or audit your irrigation system to ensure it is watering at peak efficiency.
- Take a look at the Landscape Photo Gallery for inspirational examples of beautiful, water-smart landscapes from across the country.

Other outdoor uses—drop that hose and keep it covered:

- Sweep driveways, sidewalks, and steps rather than hosing off.
- Wash the car with water from a bucket, or consider using a commercial car wash that recycles water.
- If you have a pool, use a cover to reduce evaporation when pool is not being used.


LESSON PLANS
Kids Water Tips
Water Info for Kids
Glendale Xeriscape Garden Scavenger Hunt
H2O4U Educational Game for Middle & High School Students
The Water Star Detective
The Great Water Odyssey Online Games
Interactive Island Game
Washing Machine Basketball
Play Online Hangman Conservation Game


The Water Star Detective
The Great Water Odyssey Online Games
Interactive Island Game
Washing Machine Basketball
Play Online Hangman Conservation Game
Test Your Groundwater Knowledge
Water Science School
H2O University for K-12
WaterKids Stuff
Water Footprint Calculator

homewaterworks

Calculator Water Conservation Tips Indoor Water Use Landscape & Irrigation Water & Energy About Us

Home

Water Conservation and Saving Tips

- Water Calculator
- Water Conservation Tips
  - Water tips for Home
  - Water tips for Work
- Indoor Water Use
- Landscape & Irrigation
- Water & Energy
- About Us
- Blog

Save Water Now

Looking for quick and easy ways to save water? Look no further. The Alliance fc simple water saving tips for home and business. Remember, when you conse conserve energy.

homewaterworks

Calculator Water Conservation Tips Indoor Water Use Landscape & Irrigation Water & Energy About Us

Home

Water Calculator

How much water do I use? How do I compare? How can I conserve?

Home water conservation is easy once you understand how and where you can use less. The quick and easy Water Calculator shows you which water uses in your home are efficient and which are not and offers simple conservation tips that save water and energy.

Now we have enough info to measure your carbon footprint. Click here to learn more and then get your final results.

Percent Complete

The Water Calculator compares your water use to a similar average and efficient house in your region. The Water Calculator estimates the energy savings and carbon footprint of your hot water usage, and helps identify specific areas for improving overall household water efficiency. Water conservation is easy and the Water Calculator gets you started right away.

About the Water Calculator

homewaterworks
CALCULATOR

The Water Calculator is a collaborative project of the Alliance for Water Efficiency and The Field Museum and was made possible by a grant from the Home Depot Foundation.

Learn more about how the Water Calculator works here.

The Water Calculator is designed to be compatible with the most modern browsers; However, if you are using Internet Explorer 7 or older we recommend that you update your browser software to take full advantage of the

http://www3.epa.gov/watersense/outdoor/landscaping_tips.html

Water-Smart Landscape Design Tips

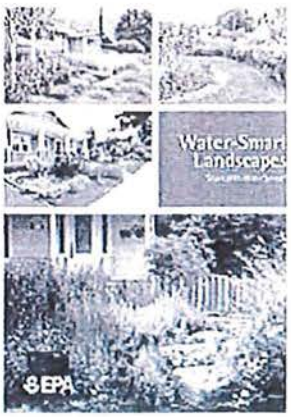
Interested in developing a water-smart landscape for your home or property? Consider the following suggestions to create and maintain a landscape you can be proud of. Explore the What to Plant page for ideas on the best plants for your region, and browse our Water-Smart Landscape Photo Gallery for examples of beautiful, water-smart landscapes from around the country. You can even submit your own photo!

Plants | Soil | Maintenance

Plants

Plan ahead for a water-smart landscape.
If you're designing a new landscape or rethinking your current one, the WaterSense Water Budget Tool can help you plan your landscape for water-efficiency. With two simple inputs, such as zip code and yard size, the water budget tool can tell you if you have designed a landscape that will use an appropriate amount of water for your climate.

Use regionally appropriate, low water-using and native plants.
Once established, these plants require little water beyond normal rainfall. Also, because native plants are adapted to local soils and climatic conditions, they rarely require the addition of fertilizer and are more resistant to pests and diseases than are other species. Be careful when selecting exotic species, as some may be invasive, which may require more water and could displace native plants. For more information on appropriate plant choice, visit these listings of native or regionally-appropriate plants.



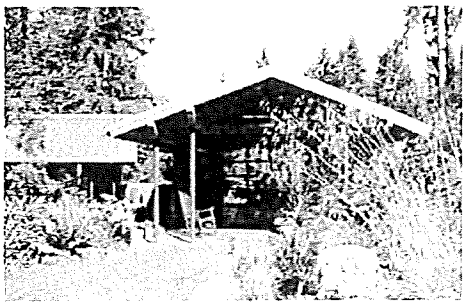
Water-Smart Landscaping

Group plants according to their water needs.
Grouping vegetation with similar watering needs into specific "hydrozones" reduces water use and protects the plants from both underwatering and overwatering by allowing you to water to each zone's specific needs. For example, turf areas and shrub areas should always be separated into

different hydrozones because of their differing water needs. (14 pp, 13.9M, About PDF)

Recognize site conditions and plant appropriately.
Areas of the same site may vary significantly in soil type or exposure to sun and wind, as well as evaporation rates and moisture levels. Be mindful of a site's exposure to the elements and choose plants that will thrive in the site's conditions.

Place turfgrass strategically.



Turfgrass receives the highest percentage of irrigation water in traditional landscaping. The most common used varieties of turfgrass require more water than many landscape plants, such as groundcovers, shrubs, and trees. In addition, homeowners tend to overwater turfgrass. As a result, landscapes with large expanses of turfgrass generally use more water than those with a mixture of other plants. To reduce outdoor water use, plant turfgrass only where it has a practical function, such as a play area. Choose turfgrass types that don't use a lot of water, such as low water-using or native grasses and those that can withstand drought. For more information on turfgrass and water use, see EPA's Research Report c Turfgrass Allowance (PDF) (12 pp, 104K, About PDF)

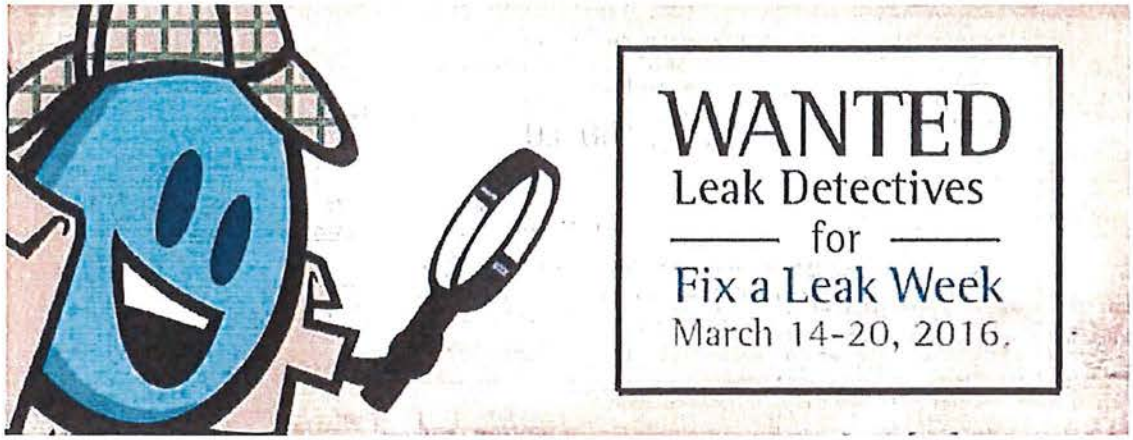
Minimize steep slopes.
Slopes can be challenging because of the potential for erosion and runoff. If slopes cannot be avoided in your landscape design, install plantings with deeper root zones such as native ground covers and shrubs tc provide stabilization and prevent erosion.

Irrigating your landscape? Learn how to make your sprinkler system water smart tool

Share

Landscaping Tips
What to Plant
Watering Wisely Tips
Technology
Go With a Pro
Professional Certification
WaterSense Labeled Certification Programs
Professionals in Action

http://www3.epa.gov/watersense/our_water/fix_a_leak.html



Leaks Can Run, but They Can't Hide

Are you ready to chase down leaks? Household leaks can waste more than 1 trillion gallons of water annually nationwide, so each year we hunt down the drips during Fix a Leak Week. Mark your calendars fo Fix a Leak Week 2016, March 14–20, 2016, but remember that you can race over to your plumbing fixture and irrigation systems, fix the leaks, and save valuable water and money all year long.

From family fun runs to leak detection contests to WaterSense demonstrations, Fix a Leak Week events happen from coast to coast and are all geared to teach you how to find and fix household leaks. See our Fi a Leak Week 2015 Event Map EXIT Disclaimer to find out what went on near you!

Learn how to find and fix leaks during Fix a Leak Week. It's as easy as 1-2-3

More Information

- How to fix a leak | En Español
- Facts and figures
- Educational resources
- Fix a Leak Week video podcast | En Español

Learning Center

Welcome to The Learning Center!

Here you'll find lots of information and interesting facts about water and the water industry.

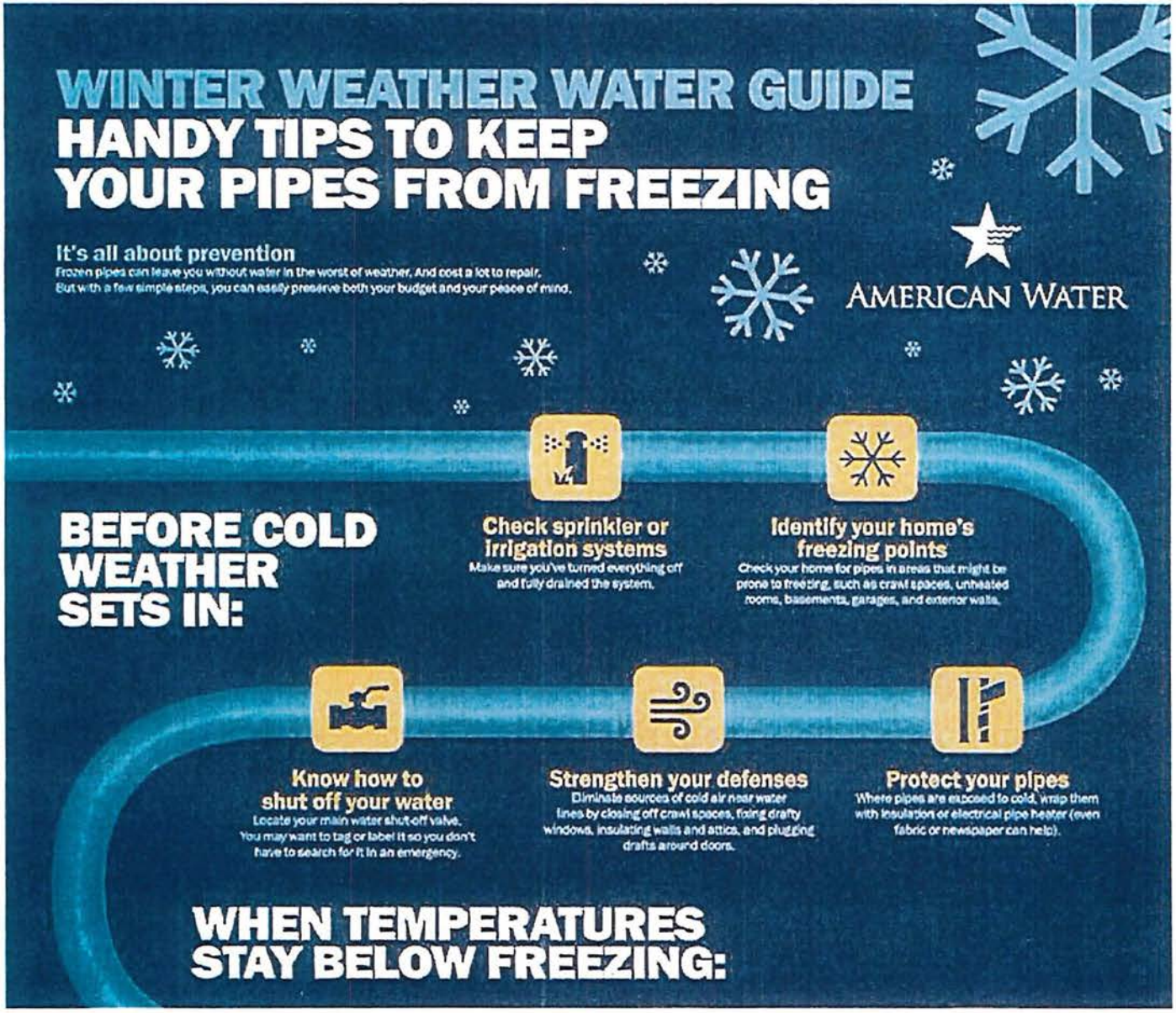
Find out things about water that you never knew - like how many gallons it takes to make a hamburger or a tire!

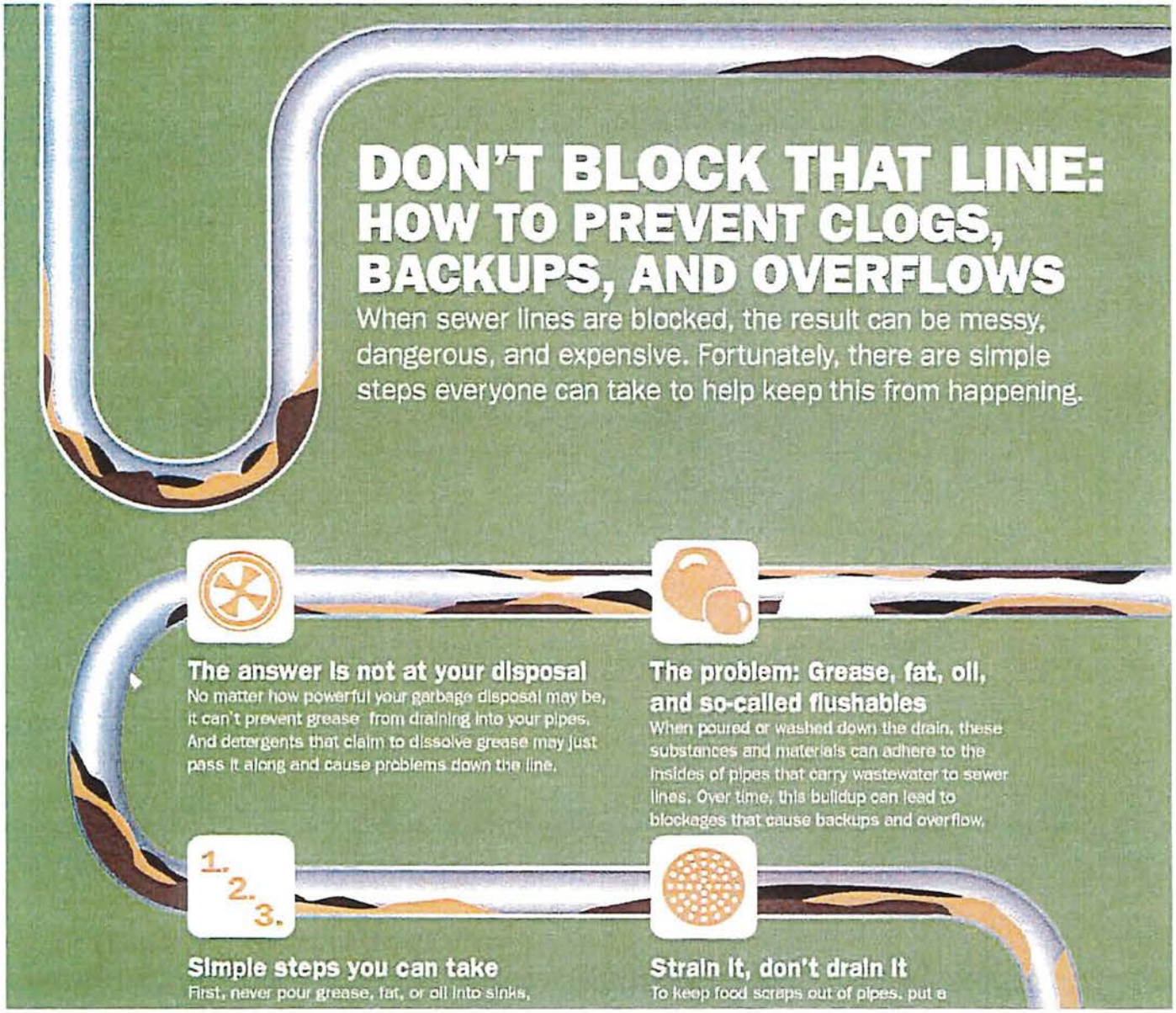
Read about new technologies that can turn seawater into drinking water.

These are just a few of the topics you'll find here.

Water 101
The Value of Water
Industry Leadership
Green Solutions
Wise Water Use
Education Toolkit
Infographics

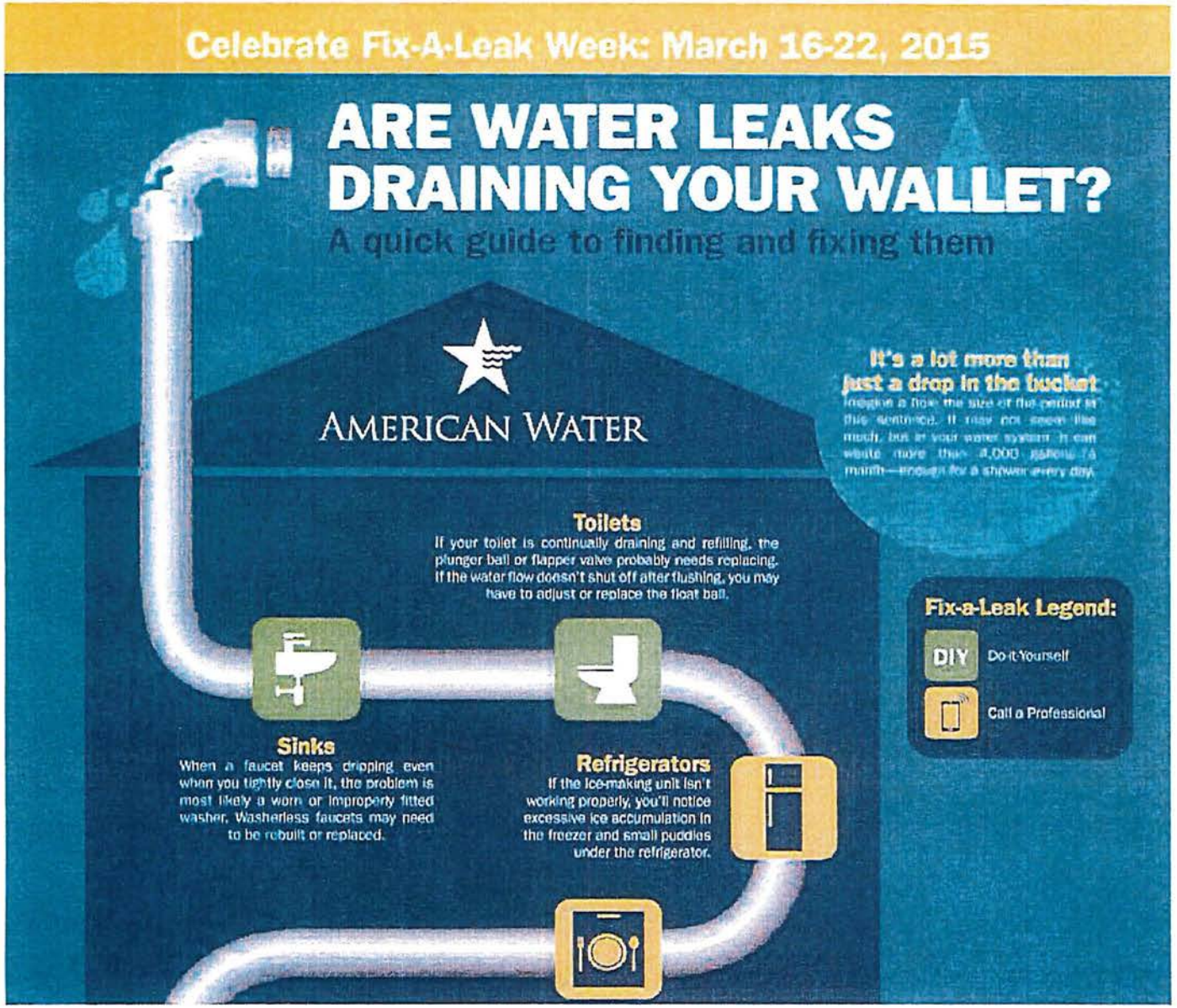
Show your resolve to save water in 2016.
Learn more...


WINTER WEATHER WATER GUIDE
HANDY TIPS TO KEEP YOUR PIPES FROM FREEZING
It's all about prevention
Frozen pipes can leave you without water in the worst of weather. And cost a lot to repair. But with a few simple steps, you can easily preserve both your budget and your peace of mind.
AMERICAN WATER
BEFORE COLD WEATHER SETS IN:
Check sprinkler or irrigation systems
Make sure you've turned everything off and fully drained the system.
Identify your home's freezing points
Check your home for pipes in areas that might be prone to freezing, such as crawl spaces, unheated rooms, basements, garages, and exterior walls.
Know how to shut off your water
Locate your main water shut-off valve. You may want to tag or label it so you don't have to search for it in an emergency.
Strengthen your defenses
Eliminate sources of cold air near water lines by closing off crawl spaces, fixing drafty windows, insulating walls and attics, and plugging drafts around doors.
Protect your pipes
Where pipes are exposed to cold, wrap them with insulation or electrical pipe heater (even fabric or newspaper can help).
WHEN TEMPERATURES STAY BELOW FREEZING:


DON'T BLOCK THAT LINE:
HOW TO PREVENT CLOGS, BACKUPS, AND OVERFLOWS
When sewer lines are blocked, the result can be messy, dangerous, and expensive. Fortunately, there are simple steps everyone can take to help keep this from happening.
The answer is not at your disposal
No matter how powerful your garbage disposal may be, it can't prevent grease from draining into your pipes. And detergents that claim to dissolve grease may just pass it along and cause problems down the line.
The problem: Grease, fat, oil, and so-called flushables
When poured or washed down the drain, these substances and materials can adhere to the insides of pipes that carry wastewater to sewer lines. Over time, this buildup can lead to blockages that cause backups and overflow.
1. 2. 3.
Simple steps you can take
First, never pour grease, fat, or oil into sinks,
Strain it, don't drain it
To keep food scraps out of pipes, put a

Outdoor Water and Money-Saving Tips for Summer

Click to enlarge.


Celebrate Fix-A-Leak Week: March 16-22, 2015
ARE WATER LEAKS DRAINING YOUR WALLET?
A quick guide to finding and fixing them
AMERICAN WATER
It's a lot more than just a drop in the bucket
Toilets
If your toilet is continually draining and refilling, the plunger ball or flapper valve probably needs replacing. If the water flow doesn't shut off after flushing, you may have to adjust or replace the float ball.
Fix-a-Leak Legend:
DIY Do-it-Yourself
Call a Professional
Sinks
When a faucet keeps dripping even when you tightly close it, the problem is most likely a worn or improperly fitted washer. Washerless faucets may need to be rebuilt or replaced.
Refrigerators
If the ice-making unit isn't working properly, you'll notice excessive ice accumulation in the freezer and small puddles under the refrigerator.

American Water is constantly looking to ensure water is available for future generations. Part of our commitment includes helping our customers understand what they can help. We communicate with our customers in a variety of ways, through information in customer bills, in our newsletters, and here on the American Water website.

Making water conservation part of your daily routine will save both water and money every day.

Outside your home:

- Lawn watering uses a lot of water. Water your lawn only when it needs it. An easy way to tell if your lawn needs water is to simply walk across the grass. If you leav footprints, your lawn may be thirsty! Generally, lawns only need an inch or so of water per week during the summer months. Water your lawn wisely by:
  - Making the most of your watering by watering in the early morning. As much as 30 percent of water can be lost to evaporation by watering during midday.
  - Planning for fewer, deep-soaking waterings to encourage deep root growth and stronger turf.
- Set your lawn mower one notch higher to make your lawn more drought-tolerant.
- Use drip irrigation hoses to water plants, and water in the early morning or evening.
- Consider using porous pavement (gravel is a good example) instead of asphalt for driveways and walkways. the rain will soak into the soil instead of running off an contributing to erosion.
- Use a broom instead of a hose to clean your sidewalk, driveway, or patio.
- Plant appropriately for your local climate. Check with local nurseries for non-invasive, drought-tolerant plants.
- Check your water meter before and after a two-hour period when no water is being used. If the meter changes at all, you probably have a leak.

Inside your home:

- Run dishwashers and clothes washers only when they are full. If you have a water-saver cycle, use it.
- Adjust the water level of your clothes washer so it matches your load size.
- Regularly check your toilet, faucets, and pipes for leaks. American Water offers leak detection kits, which are available by clicking here for a downloadable .pdf vers you find a leak, have it fixed as soon as possible. One simple check -- Check your water meter before and after a one-hour period when no water is being used. If meter changes at all, you probably have a leak.

Leak Detection Kit (pdf)

Leak Detection Kit Spanish (pdf)

- Consider water and energy-efficient appliances. Products and services that have earned theWaterSense label have been certified to be at least 20 percent more ef

without sacrificing performance. The USEPA reports that EPA-certified Energy Star washing machines may use 35% less water per load. Water-saving shower hea toilets and faucet aerators can also help cut your water usage.

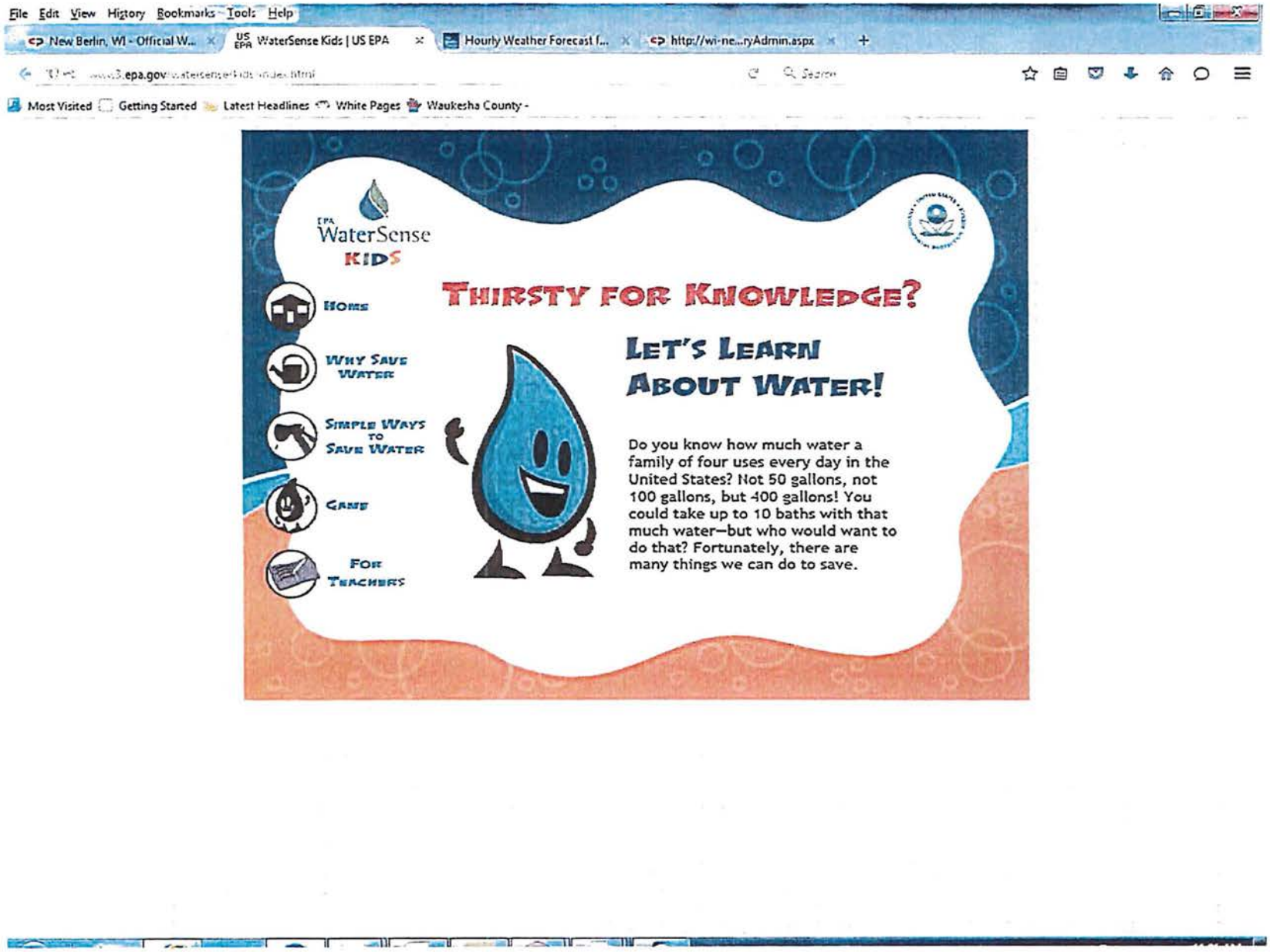
- Insulate exposed water pipes with pre-slit foam insulation. You'll enjoy hot water faster and avoid wasting water while it heats up.
- Keep a bottle of cold tap water in the refrigerator. You'll avoid the cost and environmental impact of bottled water and you'll have cold water available in the summe without running the faucet.
- Turn off the tap while brushing your teeth or washing dishes in the sink.

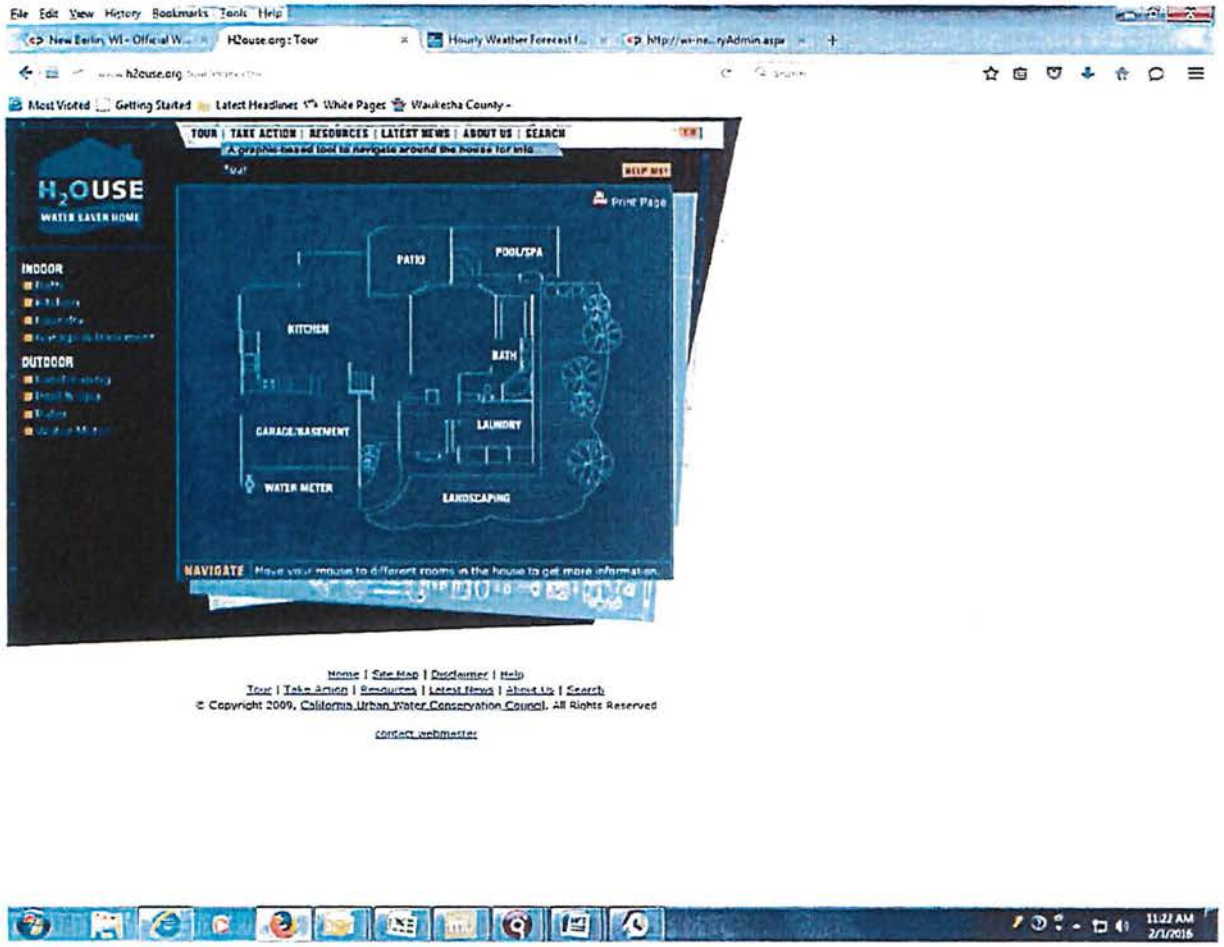
At American Water, we are committed to conserving our most precious resource. With some small changes, you can be a part of this commitment while lowering your wate

Additional Resources:

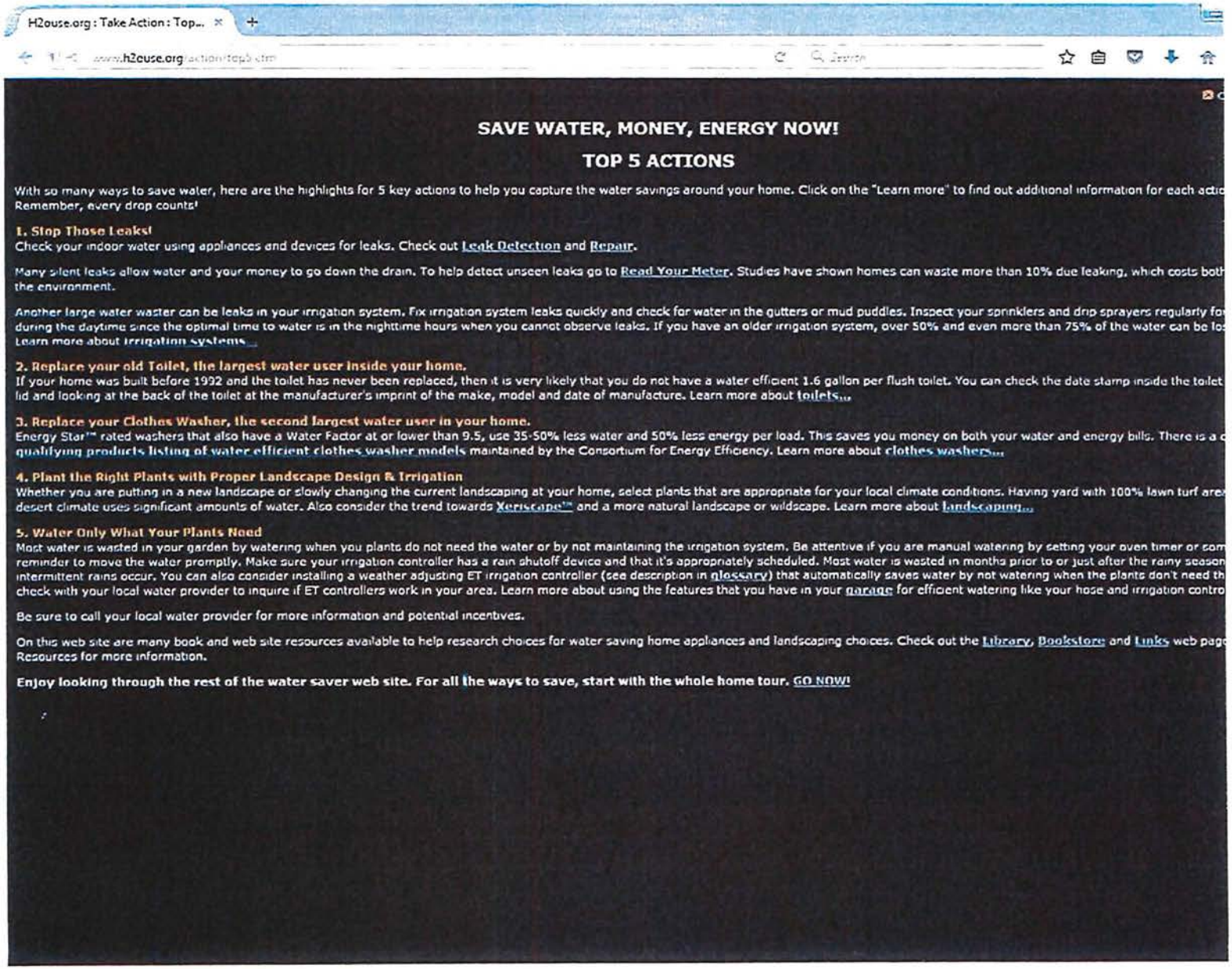
White Papers

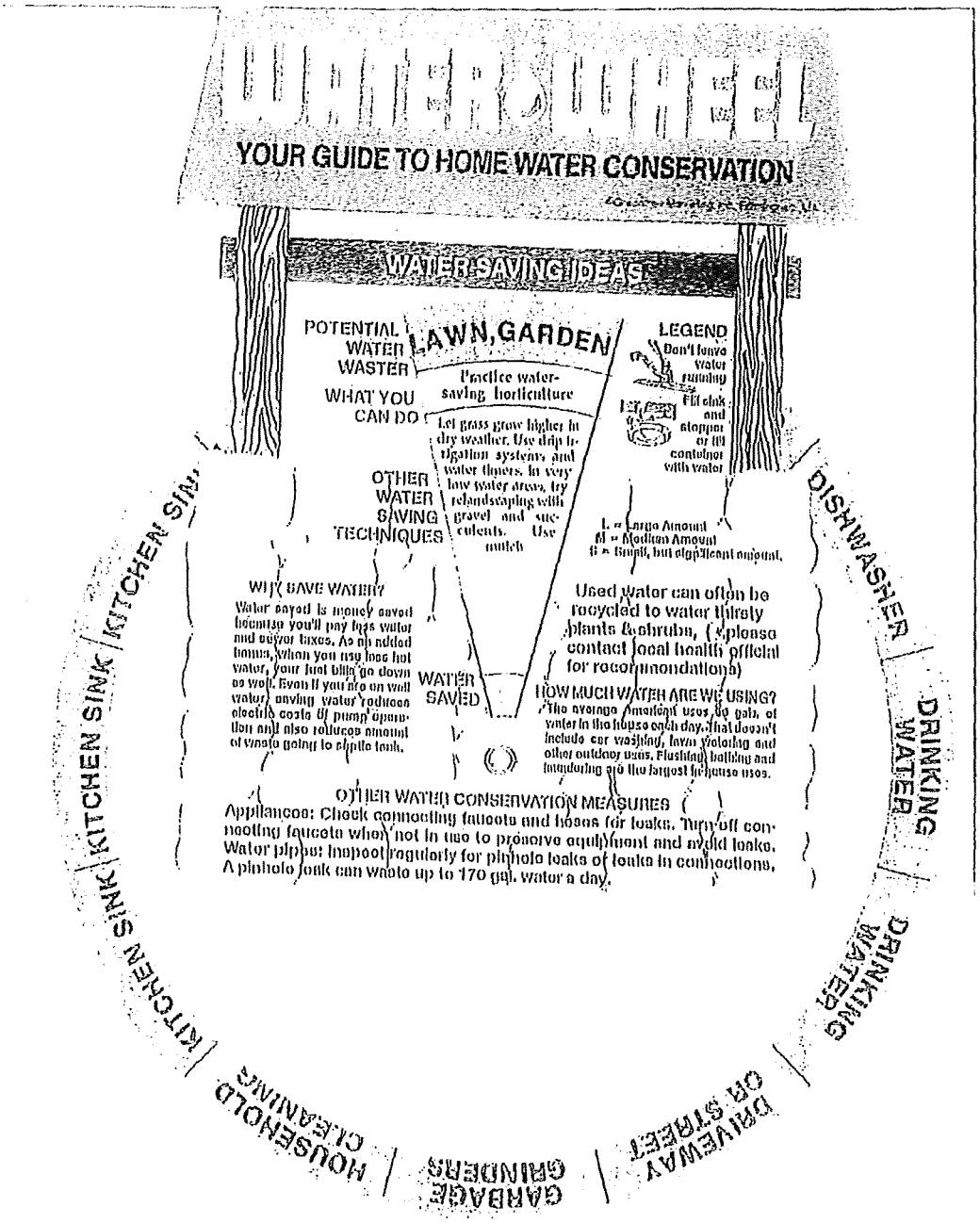
Title	Type	Size
Creating Operational Efficiencies		163.9 KB
Sustainability and Resiliency Planning for Water Utilities		553.1 KB
Bridging the Water Innovation Gap		299.7 KB
Reliable Water Service and the Economy		208.5 KB
Financing Solutions White Paper		390.6 KB
Innovations in Energy Use		254.1 KB
The Value of Water		403.9 KB
Declining Residential Water Usage		472.6 KB

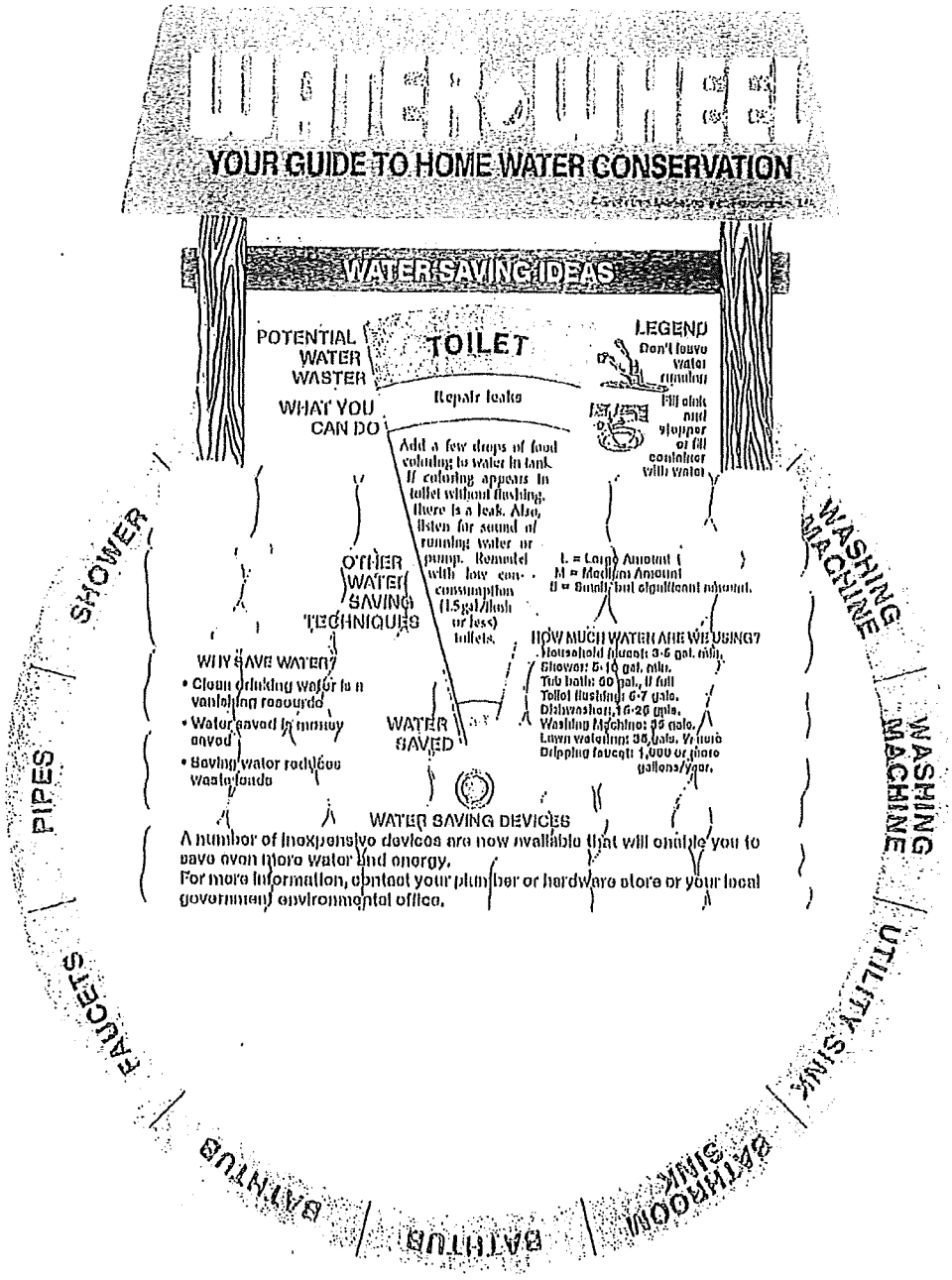

File Edit View History Bookmarks Tools Help
New Berlin, WI - Official W...
US EPA WaterSense Kids | US EPA
Hourly Weather Forecast f...
http://wi-ne...ryAdmin.aspx
Most Visited
Getting Started
Latest Headlines
White Pages
Waukesha County -
EPA WaterSense KIDS
Home
Why Save Water
Simple Ways to Save Water
Game
For Teachers
Thirsty for Knowledge?
Let's Learn About Water!
Do you know how much water a family of four uses every day in the United States? Not 50 gallons, not 100 gallons, but 400 gallons! You could take up to 10 baths with that much water—but who would want to do that? Fortunately, there are many things we can do to save.



Take the tour to investigate your water saving opportunities in each area of your home. Click on each location to show you both the facts and specific advice.


H2ouse.org : Take Action : Top...
www.h2ouse.org
SAVE WATER, MONEY, ENERGY NOW!
TOP 5 ACTIONS
With so many ways to save water, here are the highlights for 5 key actions to help you capture the water savings around your home. Click on the "Learn more" to find out additional information for each actio
Remember, every drop counts!
1. Stop Those Leaks!
Check your indoor water using appliances and devices for leaks. Check out Leak Detection and Repair.
Many silent leaks allow water and your money to go down the drain. To help detect unseen leaks go to Read Your Meter. Studies have shown homes can waste more than 10% due leaking, which costs both
the environment.
Another large water waster can be leaks in your irrigation system. Fix irrigation system leaks quickly and check for water in the gutters or mud puddles. Inspect your sprinklers and drip sprayers regularly fo
during the daytime since the optimal time to water is in the nighttime hours when you cannot observe leaks. If you have an older irrigation system, over 50% and even more than 75% of the water can be lo
Learn more about irrigation systems...
2. Replace your old Toilet, the largest water user inside your home.
If your home was built before 1992 and the toilet has never been replaced, then it is very likely that you do not have a water efficient 1.6 gallon per flush toilet. You can check the date stamp inside the toilet
lid and looking at the back of the toilet at the manufacturer's imprint of the make, model and date of manufacture. Learn more about toilets...
3. Replace your Clothes Washer, the second largest water user in your home.
Energy Star™ rated washers that also have a Water Factor at or lower than 9.5, use 35-50% less water and 50% less energy per load. This saves you money on both your water and energy bills. There is a
qualifying products listing of water efficient clothes washer models maintained by the Consortium for Energy Efficiency. Learn more about clothes washers...
4. Plant the Right Plants with Proper Landscape Design & Irrigation
Whether you are putting in a new landscape or slowly changing the current landscaping at your home, select plants that are appropriate for your local climate conditions. Having yard with 100% lawn turf are
desert climate uses significant amounts of water. Also consider the trend towards Xeriscape™ and a more natural landscape or wildscape. Learn more about landscaping...
5. Water Only What Your Plants Need
Most water is wasted in your garden by watering when you plants do not need the water or by not maintaining the irrigation system. Be attentive if you are manual watering by setting your oven timer or com
reminder to move the water promptly. Make sure your irrigation controller has a rain shutoff device and that it's appropriately scheduled. Most water is wasted in months prior to or just after the rainy season
intermittent rains occur. You can also consider installing a weather adjusting ET irrigation controller (see description in glossary) that automatically saves water by not watering when the plants don't need th
check with your local water provider to inquire if ET controllers work in your area. Learn more about using the features that you have in your garage for efficient watering like your hose and irrigation contro
Be sure to call your local water provider for more information and potential incentives.
On this web site are many book and web site resources available to help research choices for water saving home appliances and landscaping choices. Check out the Library, Bookstore and Links web pag
Resources for more information.
Enjoy looking through the rest of the water saver web site. For all the ways to save, start with the whole home tour. GO NOW!


WATER WHEEL
YOUR GUIDE TO HOME WATER CONSERVATION
WATER-SAVING IDEAS
POTENTIAL WATER WASTER
LAWN, GARDEN
WHAT YOU CAN DO
Practice water-saving horticulture
Let grass grow higher in dry weather. Use drip irrigation systems and water timers. In very low water areas, try relandscaping with gravel and succulents. Use mulch
OTHER WATER SAVING TECHNIQUES
LEGEND
Don't leave water running
Fill sink and stopper or fill container with water
L = Large Amount
M = Medium Amount
S = Small, but significant amount.
WHY SAVE WATER?
Water saved is money saved because you'll pay less water and sewer taxes. As an added bonus, when you use less hot water, your fuel bills go down as well. Even if you are on well water, saving water reduces electric costs of pump operation and also reduces amount of waste going to septic tank.
WATER SAVED
Used water can often be recycled to water thirsty plants & shrubs, (please contact local health official for recommendations)
HOW MUCH WATER ARE WE USING?
The average American uses 60 gals. of water in the house each day. That doesn't include car washing, lawn watering and other outdoor uses. Flushing, bathing and laundering are the largest in-house uses.
OTHER WATER CONSERVATION MEASURES
Appliances: Check connecting faucets and hoses for leaks. Turn off connecting faucets when not in use to preserve equipment and avoid leaks. Water pipes: Inspect regularly for pinhole leaks or leaks in connections. A pinhole leak can waste up to 170 gal. water a day.
DISHWASHER
DRINKING WATER
DRINKING WATER
DRIVEWAY OR STREET
GARBAGE GRINDERS
HOUSEHOLD CLEANING
KITCHEN SINK
KITCHEN SINK
KITCHEN SINK


WATER WHEEL
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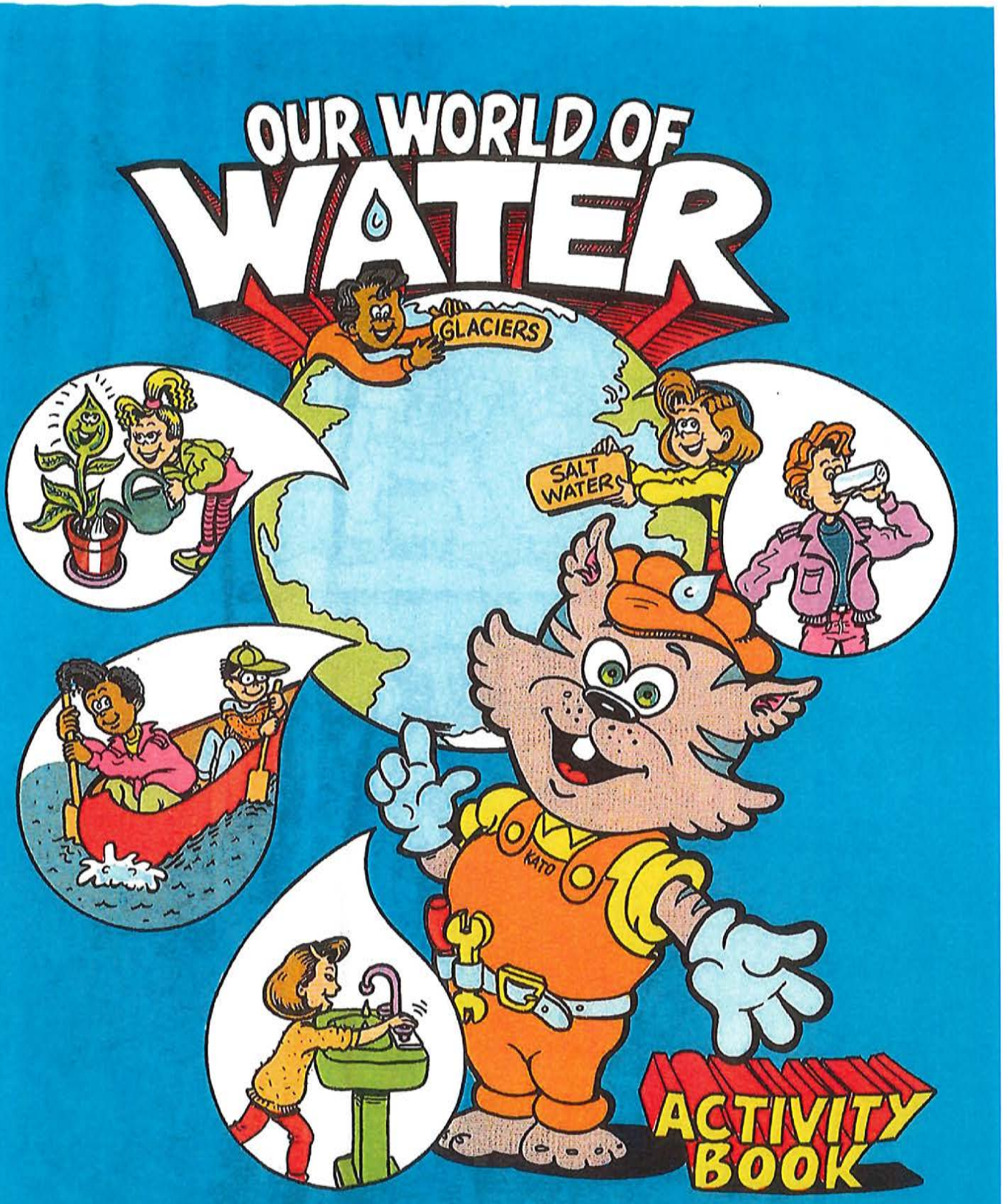
Repair leaks
WHAT YOU CAN DO
Add a few drops of food coloring to water in tank. If coloring appears in toilet without flushing, there is a leak. Also, listen for sound of running water or pump. Remodel with low consumption (1.5gal/flush or less) toilets.
OTHER WATER SAVING TECHNIQUES
LEGEND
Don't leave water running
Fill sink and stopper or fill container with water
L = Large Amount
M = Medium Amount
S = Small, but significant amount.
WHY SAVE WATER?
• Clean drinking water is a vanishing resource
• Water saved is money saved
• Saving water reduces waste loads
WATER SAVED
HOW MUCH WATER ARE WE USING?
Household faucet: 3-5 gal. min.
Shower: 5-10 gal. min.
Tub bath: 30 gal., if full
Toilet flushing: 6-7 gals.
Dishwasher: 16-26 gals.
Washing Machine: 35 gals.
Lawn watering: 35 gals. Yr here
Dripping faucet: 1,000 or more gallons/year.
WATER SAVING DEVICES
A number of inexpensive devices are now available that will enable you to save even more water and energy.
For more information, contact your plumber or hardware store or your local government environmental office.
SHOWER
WASHING MACHINE
WASHING MACHINE
UTILITY SINK
BATHROOM SINK
BATHTUB
BATHTUB
FAUCETS
PIPES

OUR WORLD OF WATER



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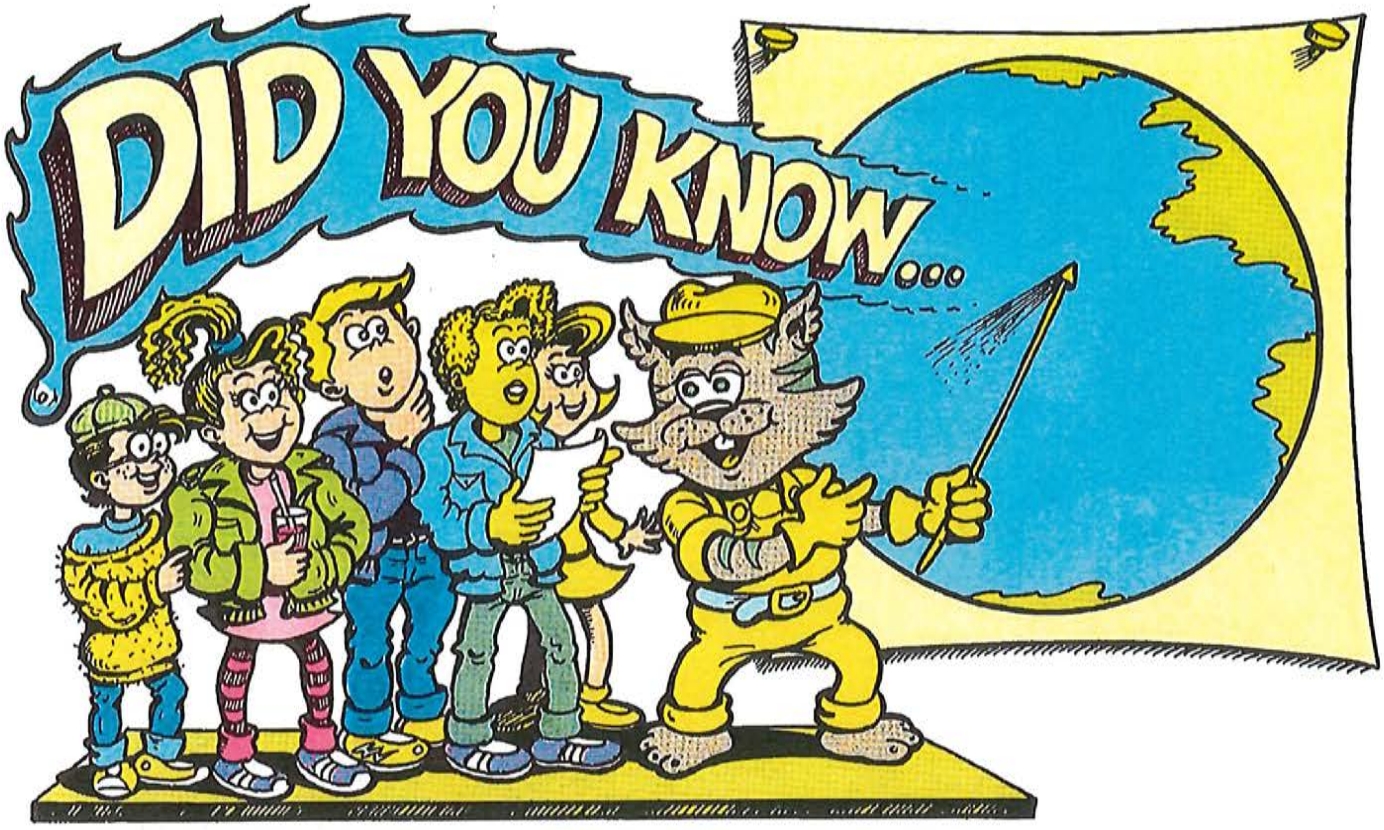


ALMOST 80% OF THE EARTH'S SURFACE IS COVERED BY

UNSCRAMBLE THE LETTERS TO FORM THE WORD THAT COMPLETES THE SENTENCE:

EAWTR

WHAT IS THE CHEMICAL FORMULA FOR WATER?

O2H

UNSCRAMBLE

WHAT IS WATER?

DIRECTIONS FILL IN THE MISSING VOWELS **A,E,I,O,U** SO YOU CAN READ THESE WATER FACTS.

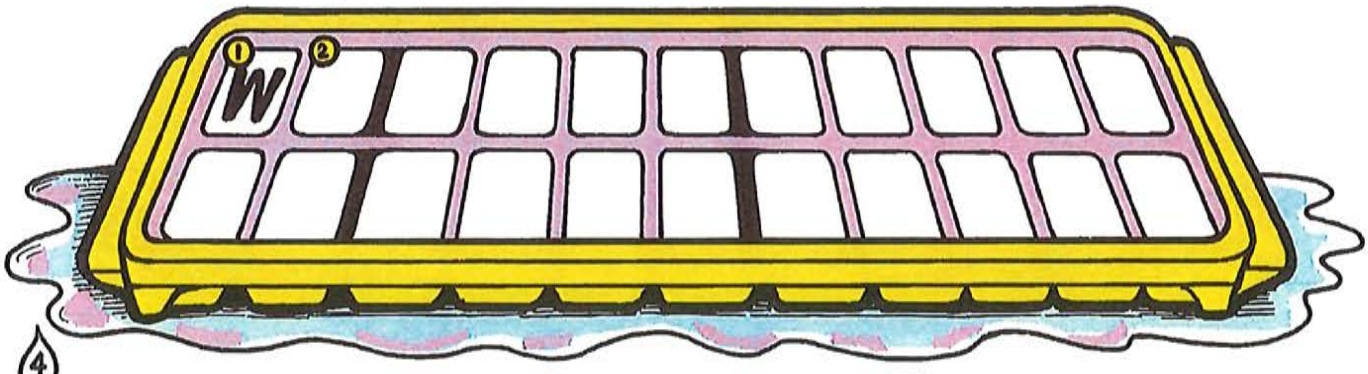
W_T_R C_N B_ _ L_QU_D, S_L_D _R G_S.

W_T_R _S _D_RL_SS C_L_RL_SS, T_ST_L_SS _ND TR_NSP_R_NT.

W_T_R _S _ L_QU_D F_ _ND _N _C_ _NS, L_K_S, R_V_RS _ND P_NDS.

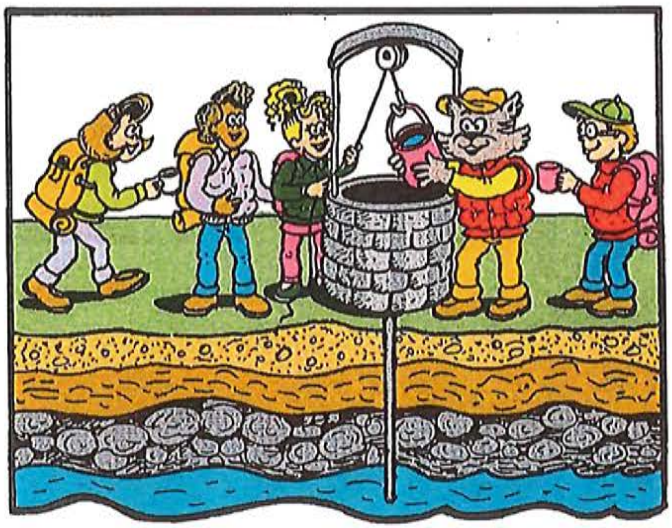
WHY DO WE NEED WATER?

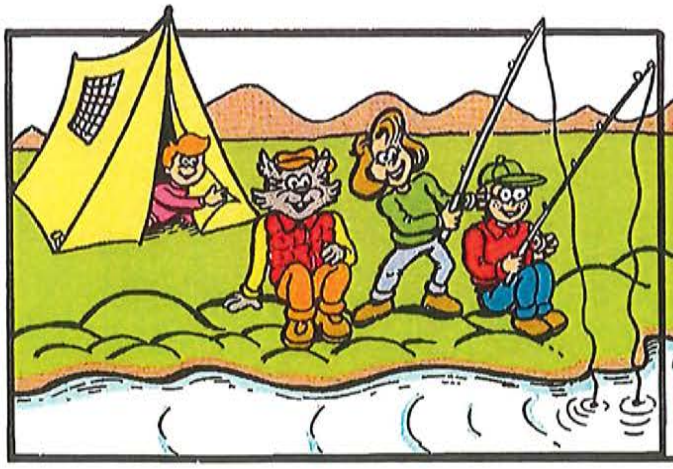
TO FIND THE ANSWER START AFTER THE FIRST LETTER "W" AT THE TOP, GO CLOCKWISE AND WRITE EVERY THIRD LETTER IN THE BOXES BELOW.

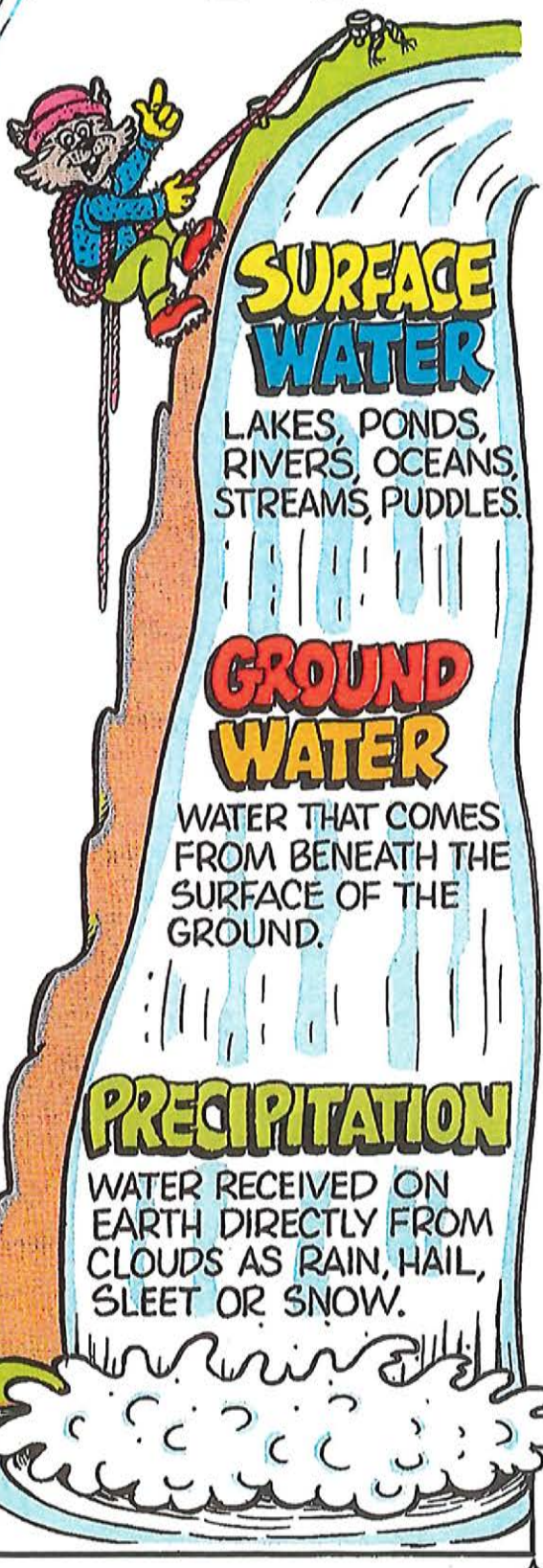


WHERE DO WE GET WATER?

DRAW A LINE FROM THE DEFINITION TO THE PICTURE!







SURFACE WATER

LAKES, PONDS, RIVERS, OCEANS, STREAMS, PUDDLES.

GROUND WATER

WATER THAT COMES FROM BENEATH THE SURFACE OF THE GROUND.

PRECIPITATION

WATER RECEIVED ON EARTH DIRECTLY FROM CLOUDS AS RAIN, HAIL, SLEET OR SNOW.

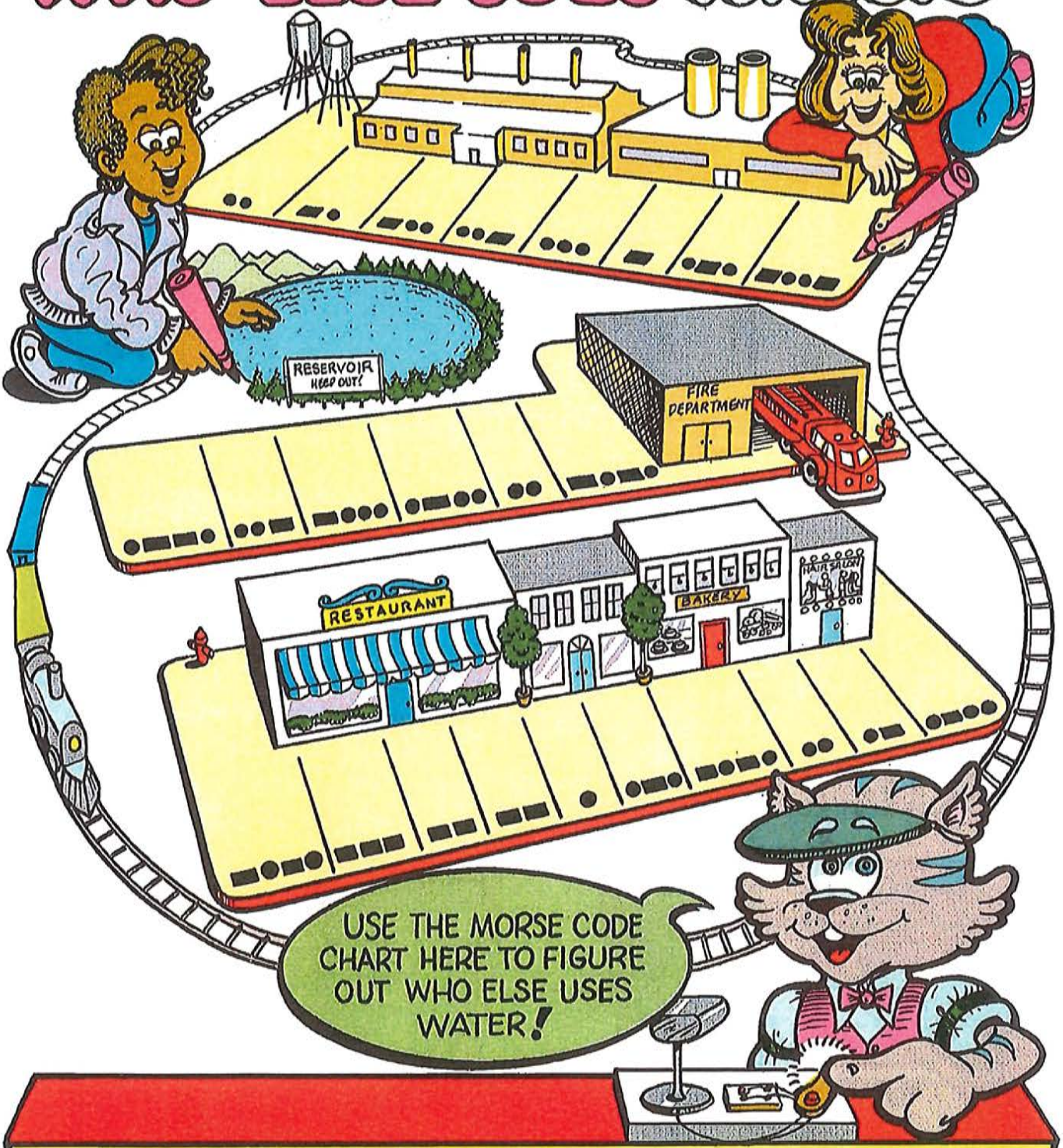
HOW DO YOU USE WATER?

DIRECTIONS: UNSCRAMBLE THE WORDS IN THE PIPE AND...

BGINAHT ONICGOK
ITRWNAEG
IGATBNO WNGASIH

...THEN MATCH THEM TO THE PICTURES THEY EXPLAIN.

WHO ELSE USES WATER?



A •▬	E•	I••	M▬▬	Q▬•▬	U••▬	Y▬•▬
B▬•••	F••▬•	J•▬▬▬	N▬•	R•▬•	V•••▬	Z▬▬••
C▬•▬•	G▬▬•	K▬•▬	O▬▬▬	S•••	W•▬▬	
D▬••	H••••	L•▬••	P•▬▬•	T▬	X▬••▬	

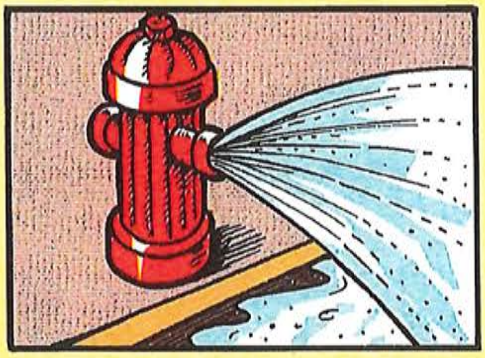
WITH A GR-O-W-ING POPULATION...

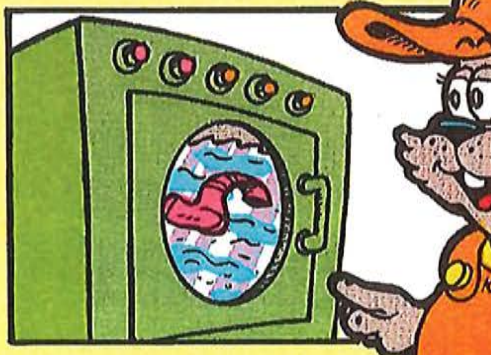
HOW MUCH IS LEFT TO DRINK?

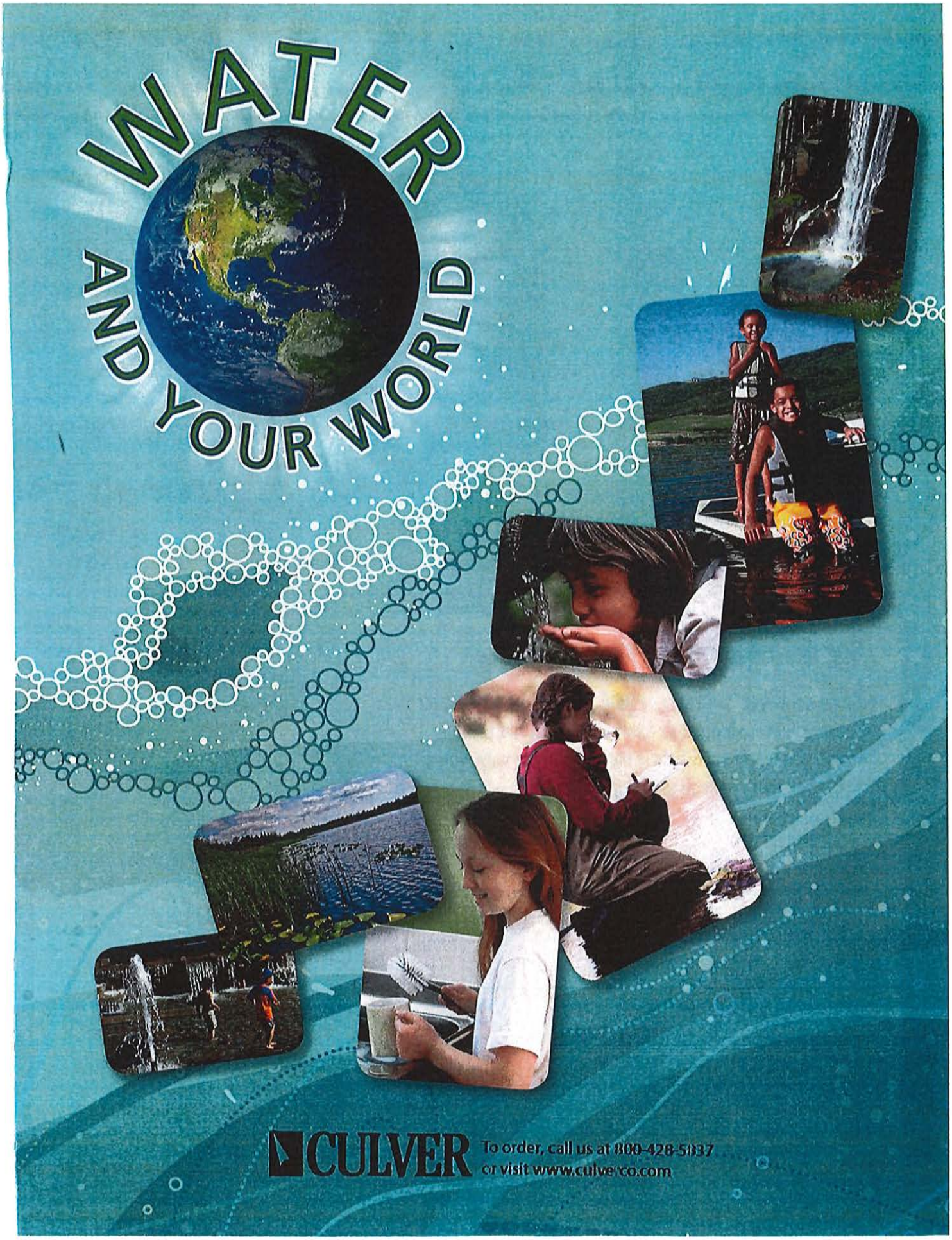
97% OF THE EARTH'S WATER IS SALTY + **2%** OF THE EARTH'S WATER IS IN GLACIERS + **[%]** IS FRESH WATER FOR US TO USE = **100%**

CAN YOU SPOT THE WATER WASTERS?

PUT AN X OVER EACH SCENE WHERE WATER IS BEING WASTED.



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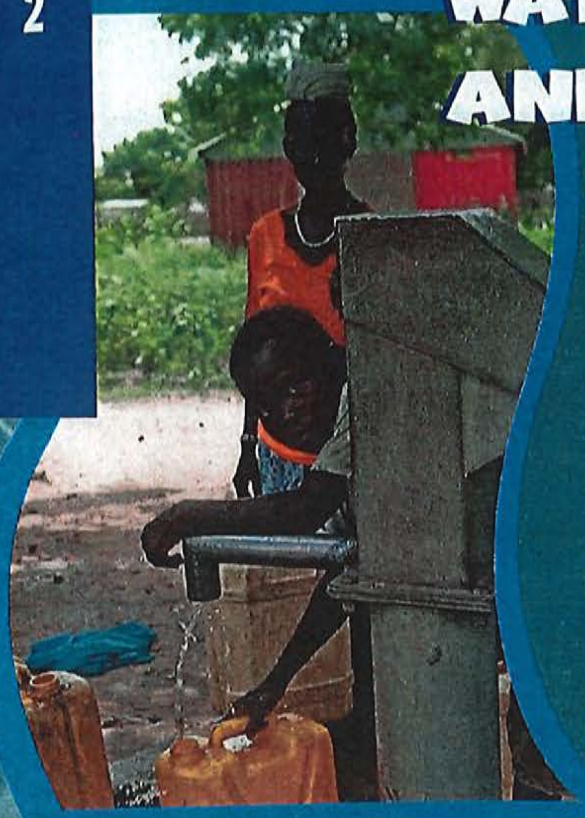
WATER IS A SCARCE AND VITAL RESOURCE



Fresh clean water is essential for life, yet it is one of our most endangered resources.

While the majority of the earth is covered by water, it is mostly salty and undrinkable ocean water. Only about 3% of all the planet's water is fresh water. Most of this is frozen in glaciers, so it's not possible for us to use it. That leaves less than 1% of all water on earth available for drinking and other activities.

Get Water Wise

Water makes up 83% of our blood, 70% of our brain, and 90% of our lung. Overall, our bodies are about 60% water!

Water in Your Life

You may know you can't survive long without drinking water, but have you ever stopped to think about how many other ways you use water in your daily life? List all the ways you can think of that your family uses or enjoys water.

Indoors	Outdoors/For Fun
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Water Words

Find the definitions for the following water vocabulary words in this book. These and other new water words are highlighted in green.

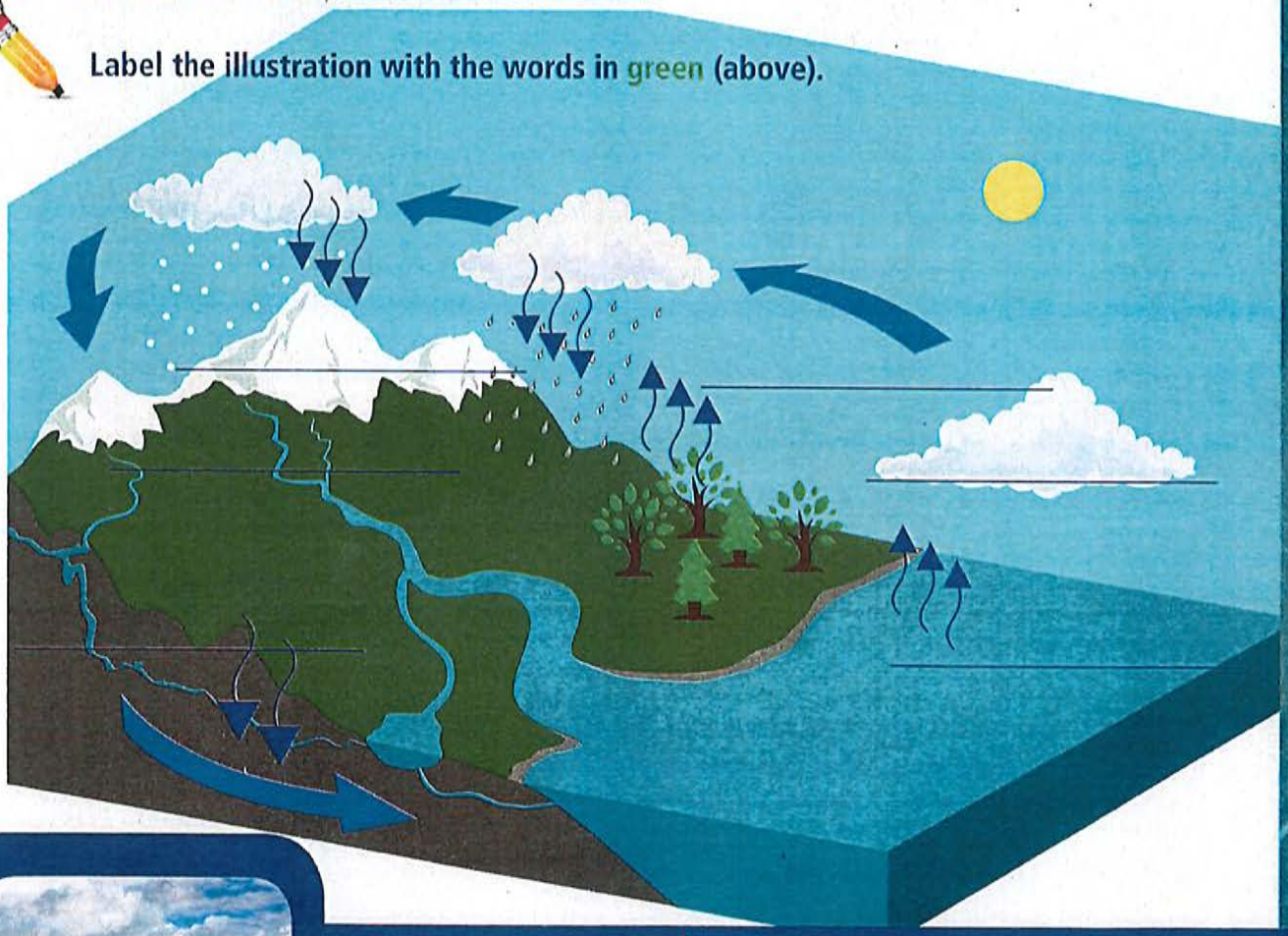
aquifers
condensation
evaporation
groundwater
percolates
pollutants
precipitation
reservoirs
runoff
surface water
transpiration
watershed

THE WATER CYCLE

Water constantly moves and recycles itself. That means that all the water molecules on earth and in our atmosphere today are the same ones that existed when the dinosaurs roamed the earth! Here's how it works:

1. Heat from the sun causes water in the oceans and other large bodies of water to rise into the air (evaporation) in a gas form called vapor.
2. Water from plants evaporates into the air as well, through the process of transpiration.
3. The vapor cools off and forms clouds, and then changes back into a liquid (through condensation).
4. The liquid falls to earth as rain, snow, or hail (precipitation).
5. Some precipitation remains frozen in glaciers or ice caps for thousands of years. But most precipitation becomes runoff. Runoff either travels over the ground's surface and soaks into the earth (percolates), or finds its way to fill lakes, rivers, wetlands, and eventually, oceans.
6. Water evaporates again, and the cycle continues.

Label the illustration with the words in green (above).



The Three States of Water

Water moves between three forms: solid (frozen and hard), liquid (the form we most often use), and gas (steam or vapor).

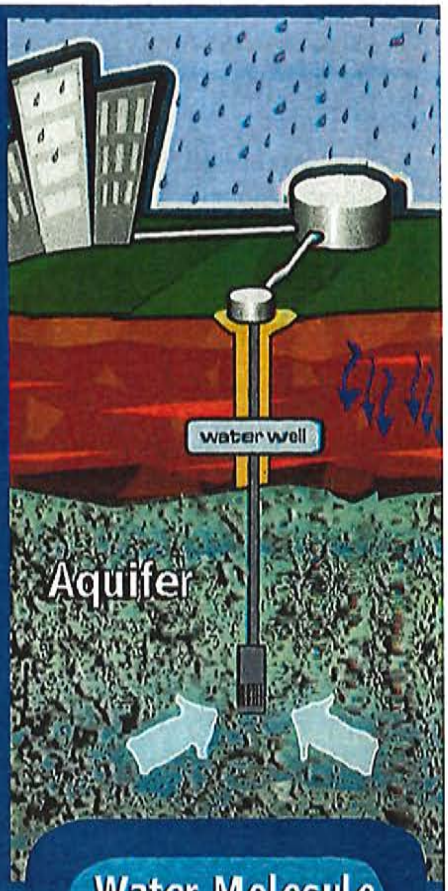
4

WHERE DOES YOUR WATER COME FROM?

Our water supply travels quite a distance before it gets to us for daily use in our homes and schools. After falling as precipitation, it collects either underground, as groundwater, or aboveground as surface water.

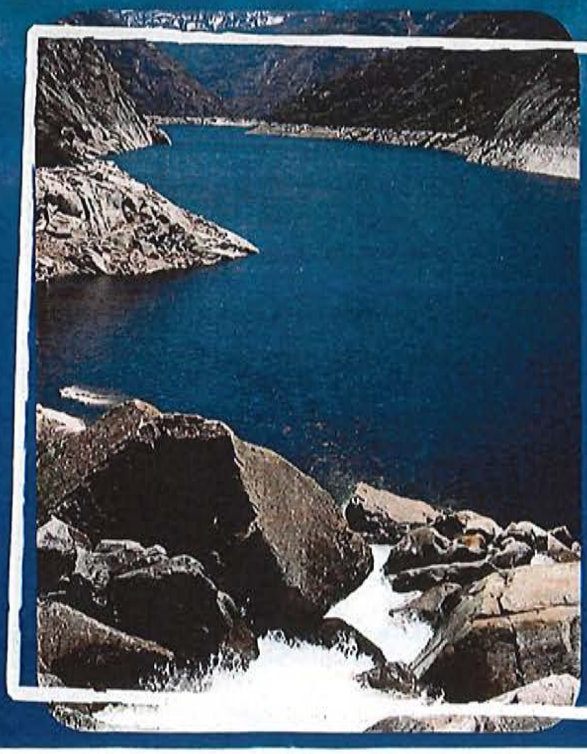
Groundwater is stored in aquifers, which are layers of soil and rock saturated with water. Aquifers are refilled by rainfall, which soaks slowly down through the soil in a process called infiltration. To get groundwater to us, we pump it up through wells.

Surface water is stored in streams, ponds, lakes, or other fresh (not salty) sources. Surface water can also be kept in water tanks or reservoirs (natural or man-made lakes used for storing water). This is sometimes called collection or accumulation.



H_2O: All in the Numbers

A water molecule has three atoms: two hydrogen (H) atoms and one oxygen (O) atom. That's why it is sometimes referred to as H_2O, which is the chemical formula of water. A single drop of water contains billions of water molecules!



Track Your Water

People in the United States rely mostly on either surface water or groundwater, depending on the geological features of where they live. Do some Internet research and/or contact your local water agency to find out the source of your household water.

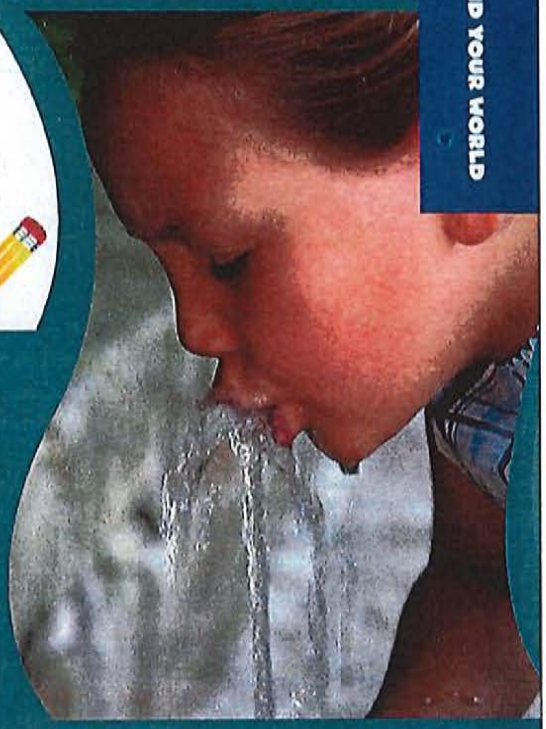
Bonus: Find out whether your water comes to you from a public water agency, a public well, or a private well.

WATER MATTERS

There are many water issues on our minds today: how to conserve it, how to keep it clean, and how to keep it available for everyone.

Thirsty World

By 2050 the world population will be about 10 billion. In addition, increased drought is making less water available for human use. Without more water conservation and recycling, water shortages will spread. With your class, brainstorm some ways people can save water. Then compare your ideas to those suggested on page 13 of this booklet.



Great Lakes Walk

Over the course of six years, Canada's native Ojibway Elder Josephine Mandamin and other tribal members walked around all five of North America's Great Lakes. They found Lake Ontario very polluted, with a terrible odor and dead fish on the shore. In contrast, they found Lake Superior's water to be of "powerful majesty—so clean, so strong, so pure." Mandamin's journey has helped bring attention to the need to preserve all the Great Lakes for future generations.

Such a Bargain!

Not only is water much healthier than soda, it's also a LOT cheaper! **If you drink five cups of tap water a day, the amount you would use in a year (120 gallons) would cost about 25 cents or less!** Do the following equations to find out how the price of water compares to soda. (There are about 10 cans of soda in a gallon.)

$1.00 (price of can of soda) × 10 = _____ (price of gallon of soda)

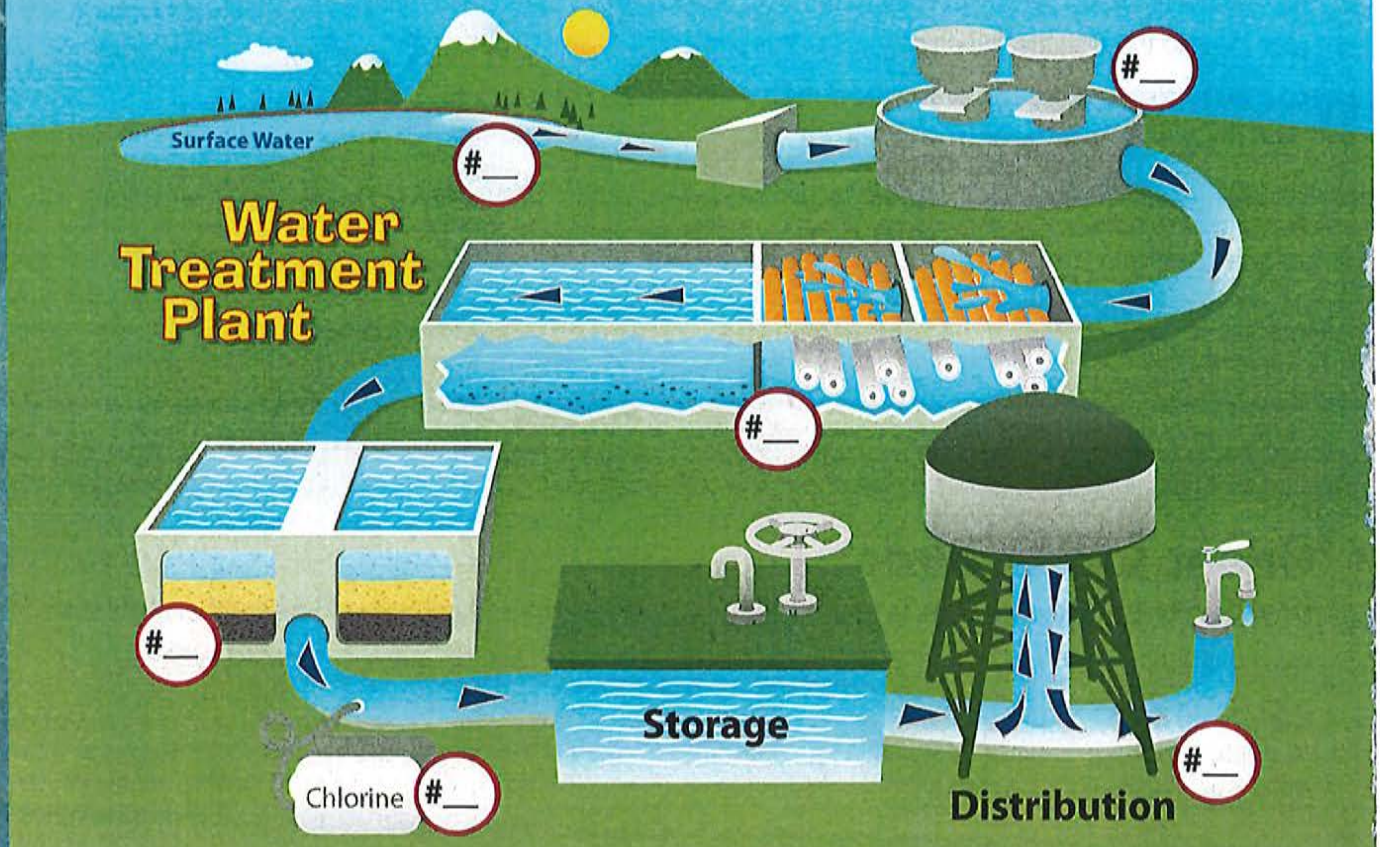
Now calculate the price of 120 gallons of soda and compare that to the cost of the same amount of water.

120 (number of gallons) × _____ (price of gallon of soda) = _____ (price of 120 gallons of soda)

6 MAKING WATER CLEAN

Long ago, most people in this country lived in rural areas and had to get their water from rivers or local wells. Some people still rely on private wells for their water supply. But today, most of us enjoy a public water supply system that does a lot of work to provide clean, treated water to our homes.

Because of water's ability to pick up pollutants and natural contaminants along its travels, it must be cleaned before people use it. This process happens at a water treatment plant. Look at the diagram and write in the number that stands for each of the six steps listed.



1. Water is piped in from its source.
2. Chemicals are added to remove impurities.
3. Substances are added to make dirt and large particles clump together (coagulation). Then they sink into a basin (sedimentation) while the cleaner water flows on.
4. Smaller particles are filtered out through layers of sand, gravel, charcoal, or fiber (filtration).
5. Small, safe amounts of chlorine are added to kill disease-causing bacteria (disinfection).
6. Clean water is distributed for use.

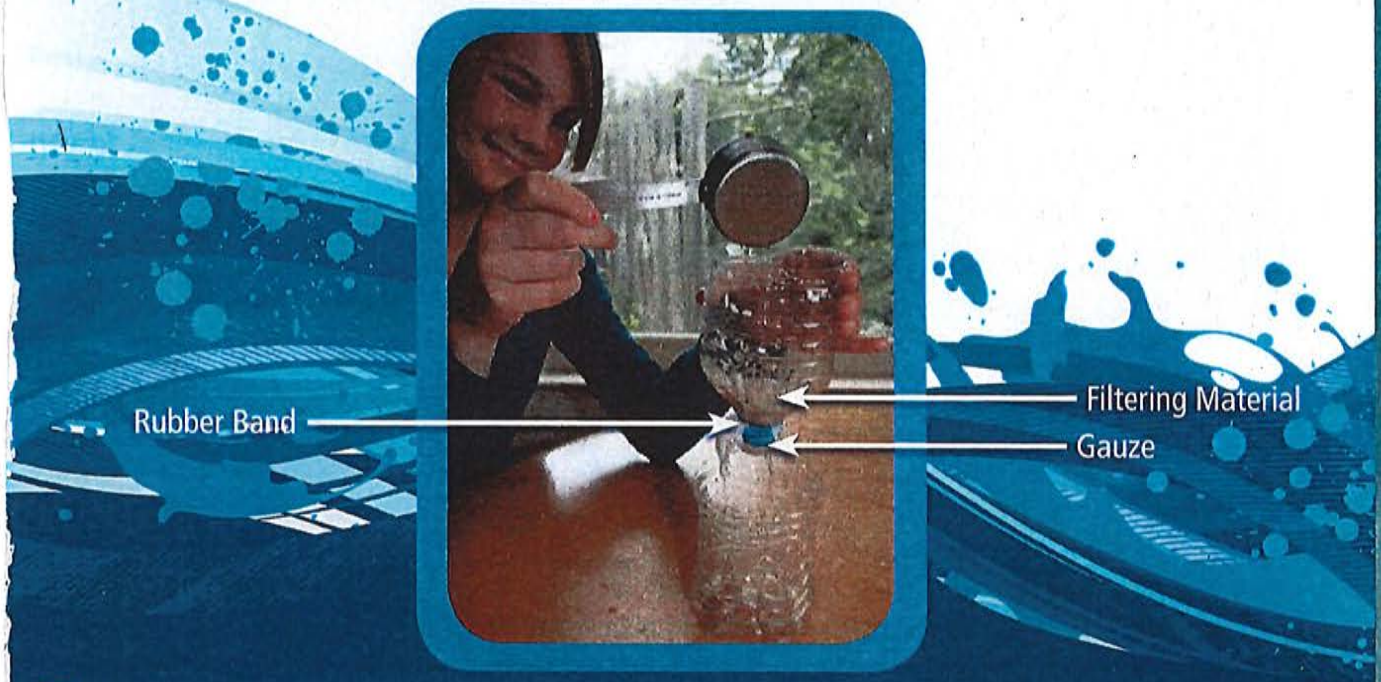
BUILD YOUR OWN WATER FILTER

This experiment will help you understand the process of filtration. You will test how well various filtering materials clean a sample of dirty water.

Materials:

- 1-liter plastic water bottle, cut in half
- 5-6 clear cups
- Several gauze pads*
- Rubber band
- Filtering materials: sand, cotton ball, rice, small gravel
- 6-8 cups water
- ½ cup soil
- Measuring cup and spoon

***NOTE:** Separate the layers of the gauze pads and use only as many as you need to hold the filtering medium in place.

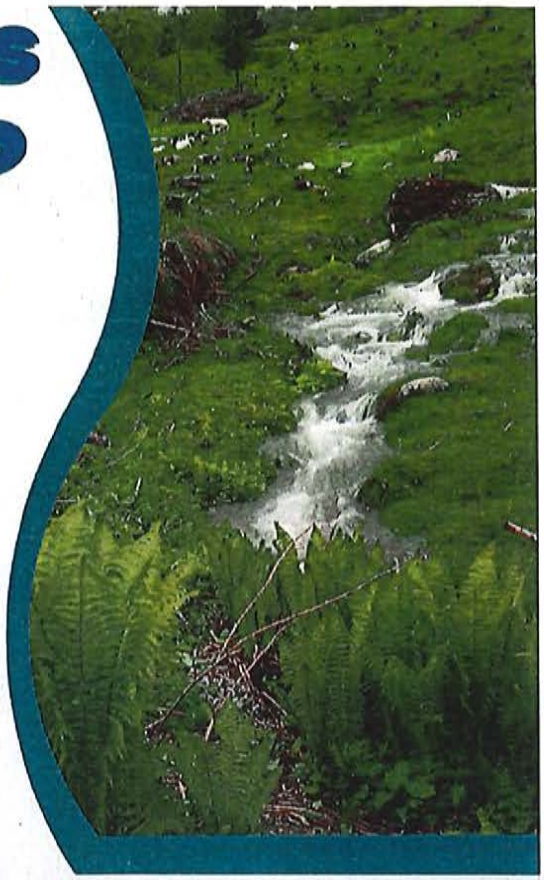


1. **Set Up:** Secure gauze over the mouth of the bottle with a rubber band. Put the top half of the water bottle upside-down (like a funnel) inside the bottom half. Put 1/4 cup of your filtering material (or 1 cotton ball) inside the top half, above the gauze.
2. **Predict:** Which filtering material will clean the water best?
3. **Investigate:** Mix 1 cup of water with a spoonful of soil to create "dirty water." Set this aside and label it as "Dirty Water." Create another cup of dirty water and pour it through your filter, letting it drain into the bottom half of the bottle. Pour the filtered water from the bottom half of the bottle into a cup and label it with the filtering material used.
4. **Repeat:** Repeat with a new batch of dirty water for each of your filtering materials. If needed, add new gauze.
5. **Observe and Reflect:** Compare your cups of filtered water with the dirty water and with each other. Which had the clearest water? Why do you think so? How do your results compare with your prediction?

Going Further: Try layering two or more of the filtering materials on top of each other inside your bottle filter, and do the experiment again. What do you notice about the water now? What happens if you change the order of the layers?

EVERYONE LIVES IN A WATERSHED

No matter where you live—in an urban area, a suburban neighborhood, or rural countryside—you live in a watershed. A watershed is the land area that drains storm water runoff into a body of water. Runoff is precipitation that is not absorbed by soil.



Where Runoff Goes

All watersheds get their water from storms; however, watersheds act differently depending on their location.

- In towns and cities, rain or snowmelt flows as runoff over pavement and other impervious (nonabsorbent) surfaces. It then runs into storm drains, and eventually to rivers and wetlands.
- In the countryside, where there are no storm drains, most water enters lakes and rivers directly as runoff from the surrounding landscape.

Word Game

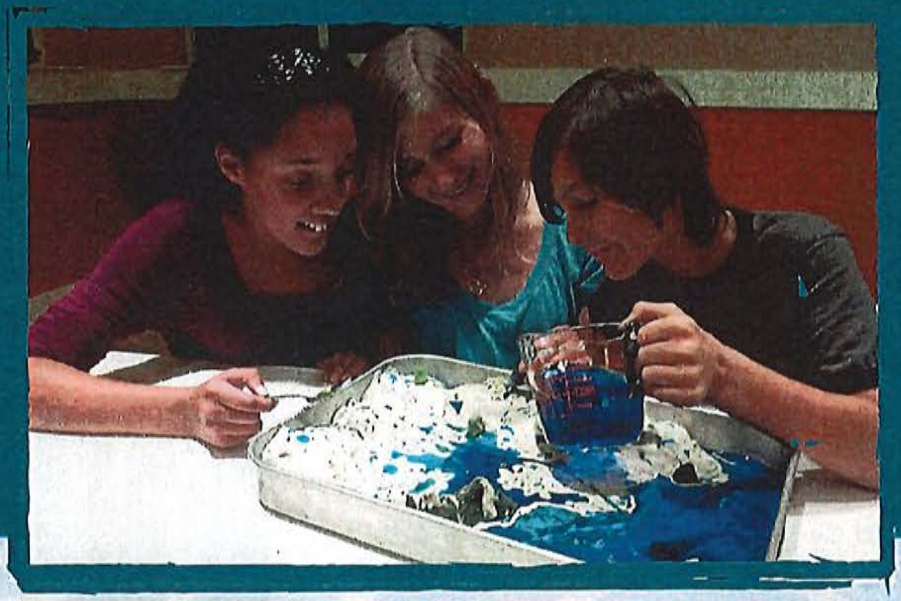
Unscramble these words and then use them to complete the paragraph.

reath apvemnte offunr wtershdea oaks

Excess _____ can cause problems in a _____ such as flooding and erosion (the wearing down or washing away of the _____). Flooding happens when the ground can no longer _____ up all the water passing over it, or when there is too much _____ and not enough ground to absorb it.

CREATE YOUR OWN WATERSHED

See for yourself how a watershed works by building a model watershed with clay and rocks.



Materials:

- Baking pan at least 9" x 13"
- Plastic wrap
- Modeling clay
- Rolling pin for clay
- Variety of small rocks
- Several sheets of newspaper
- Several sheets of aluminum foil
- 1-cup measuring cup full of water
- Blue food coloring
- Ground black pepper
- Thick black marker

1. **Set Up:** Make a landscape in your baking pan. Use rocks, foil, and newspaper to form mountains, hills, and valleys. Roll out several thin layers of clay and spread them over your landscape and part way up the inside edges of the baking pan. Now make rivers and lakes by pressing down into the clay.

2. **Predict:** Where will water flow if you pour it onto the highest point of your landscape? Cover your landscape with a sheet of plastic wrap. Use a marker to show the route that you predict the water will take, and where it will collect in pools. Take the plastic off and set it aside.

3. **Investigate:** Put several drops of food coloring into the water in your measuring cup. Pour at least 1/2 cup of water onto your landscape at its highest point. Observe the path it takes and where it collects in pools, and compare this to the prediction you made. Now put a pinch of "pollution" (black pepper) onto a few dry spots in your landscape. Pour another 1/2 cup of water onto the model from its highest point. Observe what happens to the pollution.

Going Further: In what direction did the water flow? Did it take the route you predicted? What happened to the pollution? What would it take for you to remove the pollution from your landscape now? How is your landscape like a real-life watershed? How is it different?

10 RUNOFF AND THE ENVIRONMENT

As it flows along, runoff collects everything in its path. This includes litter, fertilizer and pesticides, spilled gas and oil, eroded soil, and soapy water from washing cars. These are examples of pollutants, substances that make the water dirty or toxic to life forms.

Polluted runoff is the single biggest threat to the health of our waterways:

- Fertilizer carried into waterways contributes to "dead zones," places where no plants, fish, or animals can live. The nitrogen in the fertilizer causes an overgrowth of algae, which consumes the oxygen in the water and blocks the sunlight needed by plants and animals. There is a dead zone in the Gulf of Mexico the size of the state of Massachusetts!

- Motor oil is another common pollutant carried by runoff. Just one quart of oil can make 250,000 gallons of water toxic to wildlife! (That's as much water as it takes to cover an acre of land almost 1 foot deep.)

Get Involved: Clean Up Your Watershed!

Find out if there are any river, beach, or highway cleanup projects in your area and see if you can participate, either with your family or your class.

Pet Peeve

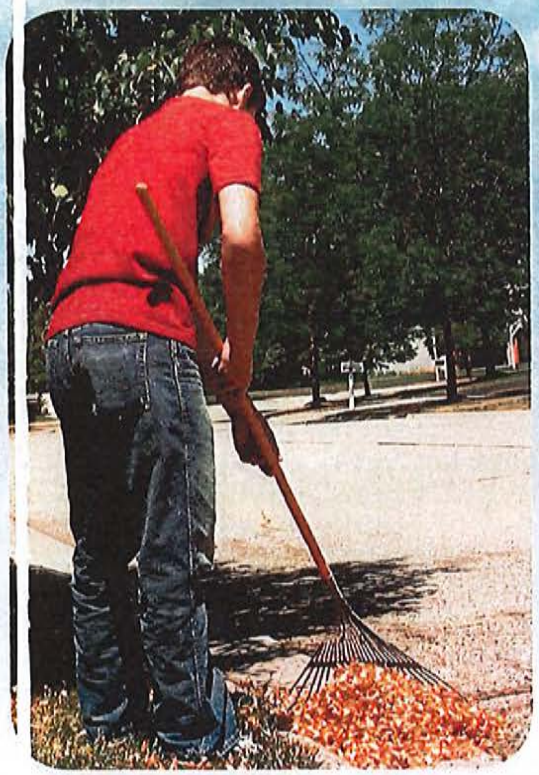
A day's worth of solid waste from a large dog contains about 7.8 billion bacteria, which can make people or animals sick if they come in contact with it or if it gets into runoff. So keep your dog's waste out of the watershed by always carrying a plastic bag and collecting it for proper disposal.

PROTECT OUR WATER

Polluted water can endanger people, plants, and animals. So it's vital that everyone help keep our water clean. We're all in this pond together!

What You Can Do:

- ☐ Keep trash and chemicals out of toilets and drains.
- ☐ Don't litter, and pick up any trash you see.
- ☐ Prevent garbage from getting into storm/sewer drains.
- ☐ Clean up after dogs and properly dispose of their waste in the toilet or garbage.



What Your Family Can Do:

- ☐ Reduce use of chemical-based cleaning products and replace with nontoxic ones like baking soda and vinegar.
- ☐ Use laundry and dish soaps that contain no harmful chemicals.
- ☐ Dispose of unused prescription drugs at a local pharmacy or other collection point in your area, not down the drain.
- ☐ Fix leaks from cars, and properly recycle used motor oil.
- ☐ Take leftover or used paint, pesticides, fuels, batteries, and compact fluorescent light bulbs to proper collection sites.
- ☐ Wash cars at a car wash to keep soap out of water sources.
- ☐ Limit use of lawn fertilizers and yard pesticides. If needed, follow instructions for safe use.
- ☐ Rake up yard waste to keep it out of gutters and storm drains. Compost yard clippings and trimmings.
- ☐ To reduce erosion, replant bare areas of soil.

Place a checkmark beside each of the actions above that you and/or your family already do. Circle the ones you do not yet do but want to start doing, and tell your family about them.

Spread the Word

Create a poster, short video, computer slide show, or blog post promoting your favorite water protection tips from this page. Include a new tip if you know of one not listed above. Present your creation to your class.

OUR WATER SUPPLY IS LIMITED

A growing population and drier weather patterns have led to water shortages in many communities. Now more than ever, we must act to conserve our water supply for future generations.

Use Water Wisely

- **Help the environment.** You save water for fish and animals when you help preserve drinking water supplies. And the less water you send down the drain, the less work our wastewater treatment plants have to do to make it clean again.
- **Save energy.** You save the energy that your water supplier uses to treat and move water to you, and the energy your family or your school uses to heat your water.
- **Save money.** If you use less water, your family, your school, and your community will have more money left to spend on other things.

Be a Leak-Buster!

- **A leaking toilet can waste 200 gallons of water per day.** Ask an adult to help you check your toilets for leaks. Lift the top lid and add a few drops of blue food coloring to the tank. Do not flush, and wait a few minutes. If color appears in the toilet bowl, water is leaking from the tank into the bowl—the flapper valve in the tank may need replacing.
- **A leaking faucet can waste up to 200 gallons per month.** Check the faucets in your home and school. If you spot any leaks, ask an adult to have them fixed.

Water Math

Calculate: 1) How many gallons of water are saved per year by fixing a leaking toilet if it wastes 200 gallons per day? 2) How many gallons are saved per year by fixing a faucet that leaks 200 gallons per month?

HERE'S HOW YOU CAN SAVE WATER!

Put a checkmark beside all the activities that your family already does.

1. ☐ **Flush only when necessary.** Put paper, insects, hair, and other waste into the trash, not the toilet.
2. ☐ **Take short showers, not baths.** Keeping your shower to 5 minutes or less can save up to 1,000 gallons per month! Use a shower timer to help with this. If you do take baths, take half-full ones.
3. ☐ **Turn water off when brushing teeth.** This can save 4 gallons per minute. That's 200 gallons a week for a family of four.
4. ☐ **Collect unused water.** A bucket in the shower or sink can catch water for plants and clean-up jobs.
5. ☐ **Install water-saving fixtures.** Water-efficient showerheads, faucets, and toilets can save thousands of gallons per year. Remind adults to look for bathroom fixtures with the "WaterSense" label for additional water savings.

look for WaterSense Meets EPA Criteria

6. ☐ **Wash clothes in cold water, and do full loads only.** Washing in cold water works just as well as using hot or warm—and it uses less energy.
7. ☐ **Use less water for dishes.** Scrape your dishes clean to reduce rinsing, and run the dishwasher only when it's full. If you wash by hand, use basins rather than running water.
8. ☐ **Limit outdoor water use.** Remind adults to follow the watering guidelines where you live. Be careful to water only the lawn and not the sidewalk or street and never during the heat of the day. Sweep walkways and driveways to remove leaves; don't hose them.
9. ☐ **Stop leaks.** Turn off water faucets tightly so they don't drip. If you find a drippy faucet, tell an adult.
10. ☐ **Reduce lawns.** Replace with native or water-efficient plants.

Sign and Save!

Ask a parent to help your household commit to three water-saving activities listed above that you don't already do. Write them on the lines below and get your family members' signatures to show their commitment.

_____

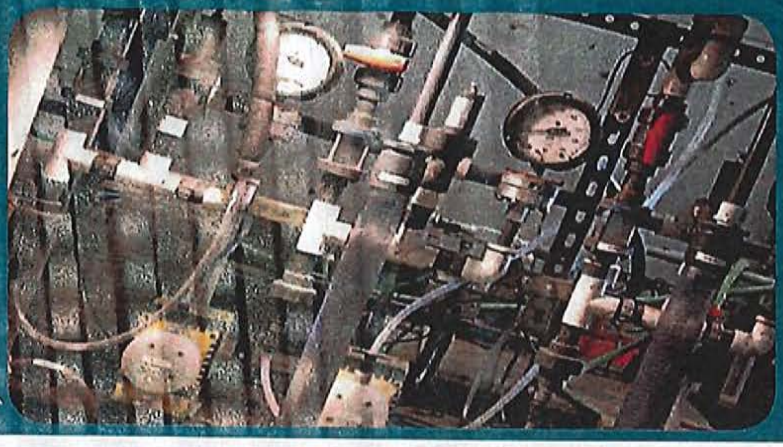
_____

_____

Family Signatures: Date:

WHERE DOES OUR USED WATER GO?

All the water that goes down the drains inside our homes, businesses, and schools is cleaned before it enters our environment. This was not always the case. The first system for treating wastewater to keep disease-causing bacteria out of the water supply was not developed until the early 19th century. Today, the highly complex wastewater treatment system of one large city alone can clean and purify up to 1.8 billion gallons of used water per day.



Inside a Wastewater Treatment Plant

1. After water swirls down our drains and toilets, it finds its way through a complex underground network of pipes to a wastewater treatment plant.
2. The treatment plant separates out sand, grit, and larger solids through screening, settling tanks, and skimming devices. Then it allows heavier particles to settle to the bottom, and skims off lighter particles from the top.
3. The water is then mixed with solids containing tiny organisms that "eat" any remaining particles.
4. Finally, harmful bacteria are destroyed.

After being cleaned, the water is released through pipes to lakes or rivers, which flow to oceans. Along the way, the water may be used again at places like farms and factories. Some of the water simply evaporates into the atmosphere to rejoin the water cycle.

Sludge Cakes

The material that is removed from wastewater at the treatment plant is called sludge. After all excess water is pulled out of it and any harmful bacteria are destroyed, sludge takes the form of dry cakes. These cakes can be used by farmers, placed in landfills, or cleanly burned as fuel.

Septic Exception

If your home is served by a private septic system, your used water does not go to a wastewater treatment plant.

WATER INNOVATIONS

What's Growing On Up There?

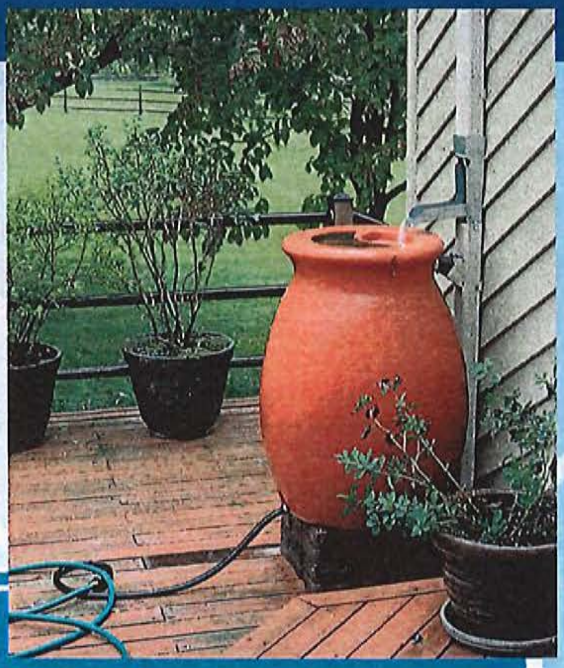
Have you ever seen a green roof? Rooftops with grass or plants growing on them are designed to reduce storm water runoff and save energy. Plants on green roofs absorb precipitation, thus greatly reducing the amount of runoff that is shed into the storm water system. The plant materials also help keep the buildings beneath them warmer in winter and cooler in summer.

From Gray to Green

After sending used water down the drain, some people are reusing it for outdoor use. "Graywater systems" filter leftover water from bathtubs, showers, wash basins, and washing machines and redirect it to lawns and gardens. This water-saving innovation is already used in dry areas that need it most, such as Australia and the Middle East, and in some states in the United States, like Arizona. Using graywater for below-ground watering saves drinking water supplies and also reduces the amount of wastewater sent to water treatment plants.

Save with Rain Barrels

Rain barrels are the simplest way to save water in your own backyard. All you need is a water-tight container placed at the bottom of your gutter system, with a spigot for dispensing the water to a hose. Water collected on rainy days can be used on dry ones for watering lawns and gardens. Before installing a rain barrel, research safety precautions needed for your area.

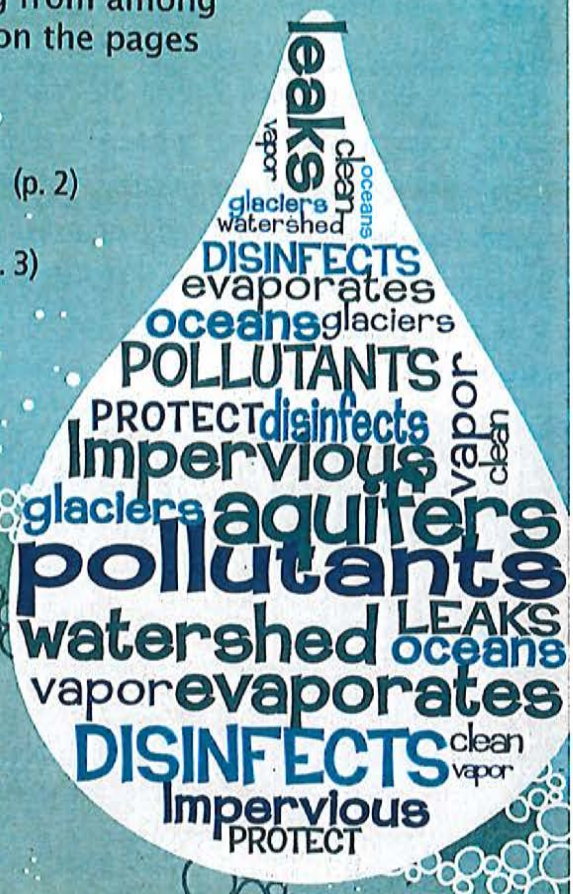


What's Your Idea?

The methods described on this page for saving and protecting water came from innovative thinking. Science always has room for new ideas to address problems like water pollution and shortages. Do you have a water-saving idea of your own? It can be practical or wild! Describe it in a paragraph, and/or draw it. Share your idea with the class.

GET WATER WISE!

Fill in the blanks of the sentences by choosing from among the words you see in the water droplet. Look on the pages listed for clues.



1. Water in its frozen form is stored in _ _ _ _ _ _ _ _ _. (p. 2)
2. The gas form of water is also known as _ _ _ _ _ _. (p. 3)
3. In the water cycle, after water reaches rivers, wetlands, and oceans, it _ _ _ _ _ _ _ _ _ _ back into the air. (p. 3)
4. Groundwater is stored in _ _ _ _ _ _ _ _, which are layers of soil and rock that are saturated with water. (p. 4)
5. A water treatment plant _ _ _ _ _ _ _ _ _ _ _ water piped from its source in order to kill disease-causing bacteria before it gets to our homes. (p. 6)
6. Rainfall is not absorbed into paved surfaces because they are _ _ _ _ _ _ _ _ _ _ _. (p. 8)
7. The land around where you live that drains storm water into a body of water is a _ _ _ _ _ _ _ _ _. (p. 8)
8. Storm water runoff can collect and carry along _ _ _ _ _ _ _ _ _ _ _ as it flows toward lakes and oceans. (p. 10)
9. Each of us must do our part to keep water _ _ _ _ _ _. (p. 11)
10. Cleaning up pet waste is one way to _ _ _ _ _ _ water. (p. 11)
11. A faucet that _ _ _ _ _ _ can waste up to 200 gallons of water per month. (p. 12)
12. Most treated wastewater eventually travels back to the earth's _ _ _ _ _ _ _. (p. 14)

For more water education resources visit www.water-ed.com

WE CARE ABOUT WATER.
IT'S WHAT WE DO.®

AMERICAN WATER

Water on the Home Front

Investments in Conservation

- **Grade Level:** 6-12
- **Objective:** Students will learn how an in-home water audit can help to identify the best ways to save water and money.
- **Subjects:** Mathematics, Environmental Science, Consumer Science, Economics

WATER ON THE HOME FRONT

Investments in Conservation

AMERICAN WATER

INTRODUCTION

Initiatives to reduce freshwater use, establish conservation programs and develop technologies that accomplish these goals are being pursued by industry, agriculture and governmental entities. Ultimately, however, it is the choice of the consumer to embrace a conservation mindset and employ the available programs and devices to achieve sustainable water use and minimize the pressure on this valuable resource that is so essential to life.

Some options for reducing water use are obvious. Behavioral modifications, such as shutting off the water while brushing teeth, taking shorter showers and irrigating crops and gardens based only on need require no monetary investment.

Changes that do require a financial commitment are often modest, such as installing aerators on faucets, modified shower heads and water saving devices in the toilet tank. Significant investments may be required, however, to maximize conservation efforts. Washing machines and dishwashers that reduce water use can cost several hundred dollars more than their conventional counterparts. On a larger scale, some businesses, golf courses and apartment buildings have installed grey water systems, which allow them to recycle the water used for non-drinking purposes. This involves modifying their internal plumbing so that the water used from dishwashers, sinks and washing machines is stored so that it can be reused for non-potable purposes, such as flushing toilets or irrigation. Examples of where American Water has installed grey water systems include the Solaire apartment complex in New York City, the New England Patriots Gillette Stadium located in Foxborough, Massachusetts, and many golf courses.

A variety of modifications can reduce your water usage (and your water bill), but for some, that is not enough of an incentive. Instead, local regulations and, for some, resource use ethics are the driving factors. It is everyone's responsibility to act responsibly and preserve our most precious resource: water.

DID YOU KNOW?

If all U.S. households installed water-efficient appliances, the country would save more than 3 trillion gallons of water and more than $18 billion dollars per year!

MATERIALS NEEDED

- Piece of paper
- Pen or pencil
- Calculator
- Enclosed data sheets

EXERCISE

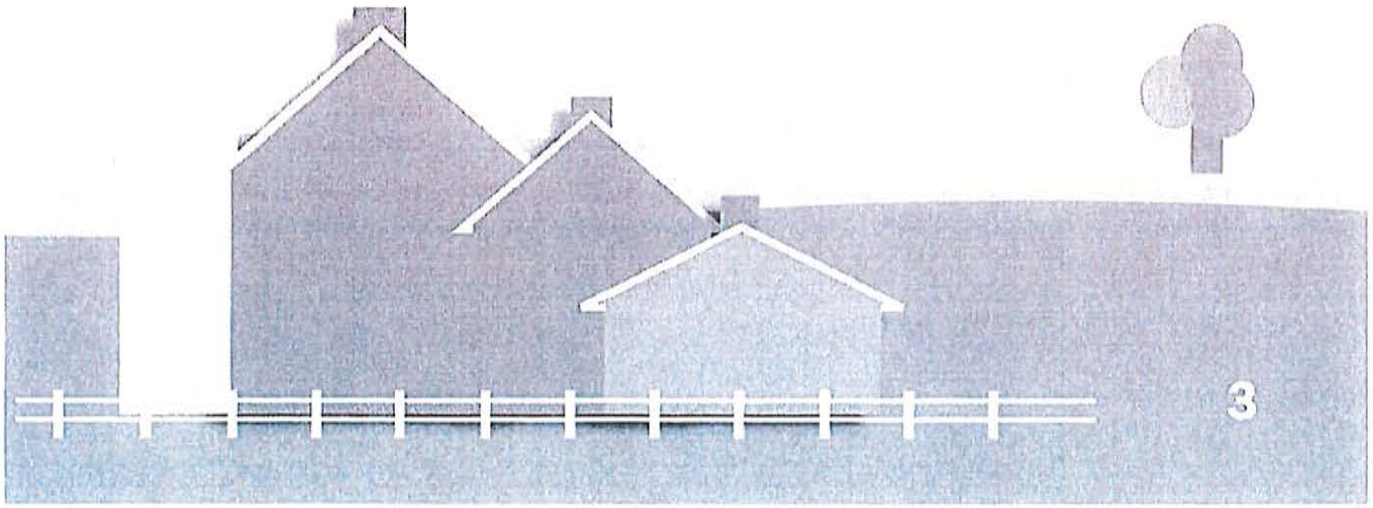
The Smith Family has just moved into a new home. Located on a beautiful two-acre property, the 100-year-old farmhouse is flanked by a barn and guest cottage. The Smiths are planning to restore the house and convert it into a Green Bed and Breakfast business. The family will establish and advertise a business that supports local organic farmers, works towards zero waste by maximizing composting and recycling, uses active and passive solar energy, landscapes with native plants and embraces the latest in water-saving technologies and approaches.

The financial investment in the property has left the family in need of more capital to realize their environmentally-responsible design. A low-interest loan from a non-profit water conservation organization is being reviewed and considered, but it requires that the Smiths install all water conservation devices immediately. The other option is to rent out the guest cottage on a short-term lease and use the income to purchase and make improvements over the course of several months. In order to obtain a state green business certification the family must demonstrate at least a 40 percent reduction in water use for the property. An audit of water use and inventory of water using appliances, plumbing fixtures and property descriptions is provided. The family now needs to weigh their options carefully to determine which approach is the best for their home and business.

TASKS

Using the provided list of existing fixtures, appliances, plumbing and property description; the water-saving data on efficient options and behavioral modifications; and the cost of purchasing and installing these green measures, determine the following:

1. How much water is used by the family of five in the house with current fixtures, appliances and plumbing?
2. How much money is needed up front to attain a 40 percent reduction in water use and the green business certification? NOTE: the 40 percent reduction can come from any conservation methods of choice, but the calculations must be demonstrated.
3. How much money is needed up front to maximize the water-saving effort and employ all possible measures at once?
4. Given a monthly rent of $750 from the rental property, prioritize the order in which you would implement the green measures, i.e., which one would you install first, second and so on. Consider both water savings and financial cost.



WATER ON THE HOME FRONT

Investments in Conservation

AMERICAN WATER

EXISTING FIXTURES, PLUMBING, APPLIANCES AND LANDSCAPE

	Sinks	Toilets	Showers	Washing Machine	Dishwasher
Main Home	7	4	4	1	1
Guest Cottage	3	2	1	1	
Barn	2				
Property Sprinkler System	• The property has 2,000 m² of ornamental non-native flower gardens irrigated by seven sprinkler heads and 300 meters of pipe.				
TOTALS					

WATER AUDIT DATA - CURRENT WATER USE

The below calculations are for each member of the Smith Family (5 members). Values for water use are per appliance or device per person per day unless otherwise noted.

	How Often Used	Gallons Used	Total Daily Use Per Person
Sink Use	5 minutes per day	1.2 gallons per minute	
Toilet Use	5 flushes per day	3.5 gallons per flush	
Shower Use	10 minutes per shower per day	3.8 gallons per minute	
Laundry	.4 loads per day	38.5 gallons per load	
Dishwasher	.2 loads per day	9.3 gallons per load	
Sprinkler System (use Cost Average of 10 days per week)	30 minutes per day	2 gallons per minute	

HIGH EFFICIENCY TECHNOLOGIES AND PROPERTY MODIFICATIONS – COST AND WATER SAVINGS

	Water Savings	Cost to Install	Quantities Needed	Total Cost
High Efficiency Toilet	1.6 gallons per flush	$240 each		
Toilet Flapper Replacement	2.1 gallons per flush	$3 each		
High Efficiency Showerheads	2.2 gallons per minute	$30 each		
Faucet Aerators	1 gallon per minute	$4 each		
High Efficiency Washing Machine	24.3 gallons per load	$590 each		
High Efficiency Dishwasher	6 gallons per load	$450 each		
Irrigation Timers	55 gallon capacity	$110 each		
In-Line Rain Water Harvester	2.2 gallons per minute	$240 each		
Native Plantings	Reduces irrigation needs by 60%	Seed ($1 per m²); mature plantings ($20 per m²)		
Gray Water System*	100 gallons per day	$6,000		

*prevents water from discharging into sewer system. The water saved through this system can only be used for irrigation or groundwater recharge

QUESTIONS

1. Consider behavioral changes in terms of water savings. What aspects of water use outlined in this exercise would be main targets for conservation? Explain.
2. For the above task, why have you ranked the water conservations measures as established? Develop your response.
3. The grey water system is the second most expensive option (mature native plantings for the entire property is first). Given the limitations for water savings and considering the other measures to be taken, do you believe it is appropriate for this property? Explain.
4. What are the pros and cons of purchasing seed vs. mature plantings for the native gardens?
5. The Bed and Breakfast business will advertise "green" practices. How might the Smith family work to ensure that guests of their Inn embrace the same conservation ethic?
6. Do you feel a special certification should be available to businesses that go green? Why or why not?

EXTENSIONS – AT HOME

1. Complete a water conservation audit for your own property and home. Where could you make improvements? Prepare a budget for your family and make a difference where you can.
2. Research local businesses. Are there any that have embraced green technologies and are they using this as part of their advertisement? Stop in and ask the manager/owner why they have embraced environmentally-friendly practices and inquire if it has helped their bottom line.

NOTES

AMERICAN WATER

DEFINITIONS

- **Drip Irrigation:** An irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing and emitters.
- **Faucet Aerators:** Attached to the tip of an indoor water faucet, aerators supply adequate flow while reducing water use by mixing air into the water stream.
- **Grey Water System:** A plumbing system that diverts the water used from sinks, dishwashers and washing machines into a tank that can then be used for non-potable purposes, including flushing toilets, irrigation or groundwater recharge. Water containing human waste and potential pathogens is kept separate.
- **High Efficiency:** The provision of energy that meets the needs of the present without compromising the ability of future generations to meet their needs.
- **Native Plants:** A term used to describe plants endemic (indigenous) or naturalized to a given area in geologic time. These plant species will often grow without significant amendments to the soil and without the need for extensive irrigation.
- **Rain Barrel:** Vessel used to collect and store rain water runoff, from rain gutters for example, for use in irrigation and ground water recharge.
- **Sustainable Resource Use:** A pattern of resource use that aims to meet human needs while preserving the environment, and done so in a way that these needs can be met in the present, and also for generations to come.

REFERENCES

- Visit **www.h2ouse.net** for water saving tips, technologies and ideas.
- For additional lesson plans, visit **www.amwater.com**.

COMMENTS

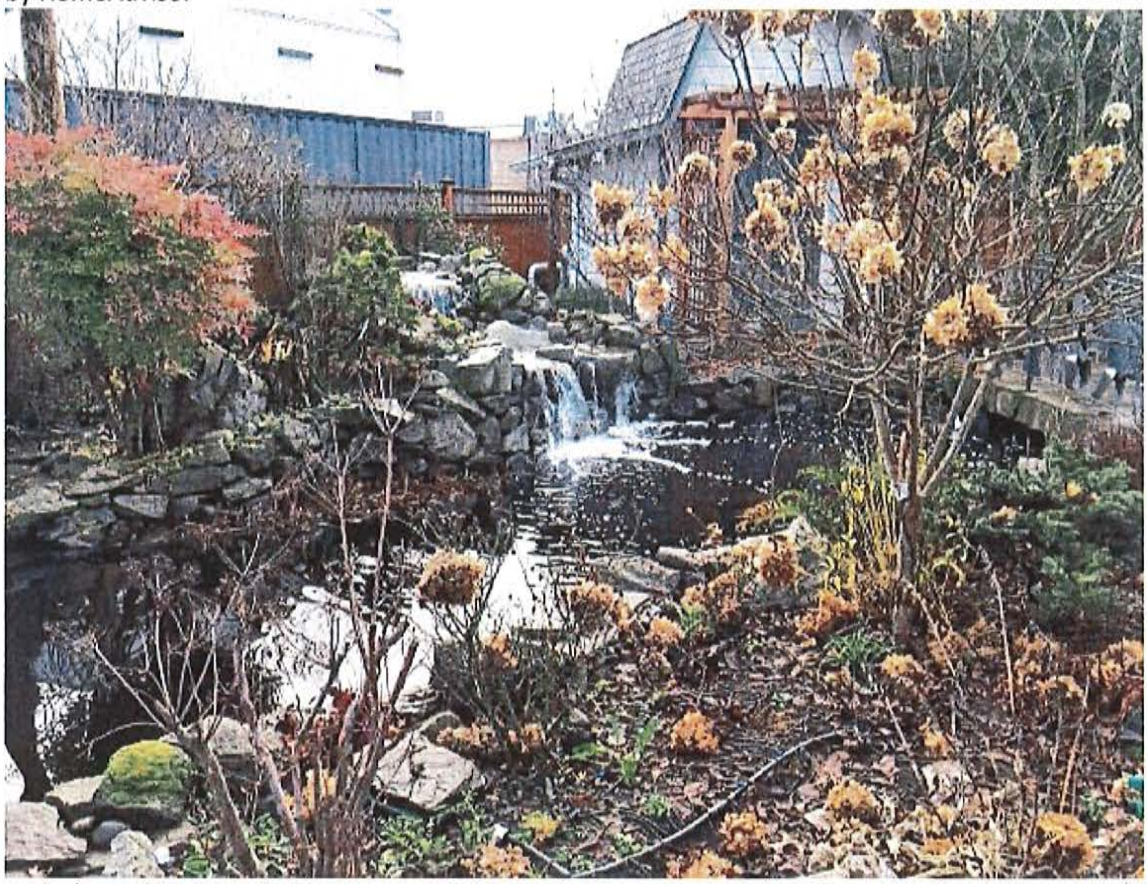
We want to know what you think. Feedback and/or suggestions for improving this lesson plan can be e-mailed to joi.corrado@amwater.com.

A special thanks to Ron Smith for developing the core content of this lesson plan. Ron Smith, a science educator from NJ, has been teaching biology, environmental science and interdisciplinary studies in the classroom, lab and field for 18 years. It was important for us that our lesson plans be crafted by an educator for educators. We appreciate his hard work.

Last updated: 12-2010

Water Conservation Throughout the Home

by HomeAdvisor



Today's modern household uses water for myriad purposes. Everything from cleaning dishes and taking showers to doing loads of laundry and washing the car can add up to several gallons or even hundreds of gallons of water used every month. Conserving the amount of water used at home will not only help to keep your water bill lower, but it's also better for the environment. When you save water, you can help to reduce pollutant and contaminant runoff into natural lakes, rivers, and streams as well as extend the life of your sewer or septic system. If you're considering a water conservation plan for your house, there are several tips and tricks you can use to reduce your water consumption. Once you make these practices a habit, you'll be surprised at just how much water you can save.

In the Kitchen

Only run the dishwasher with a full load. Running the dishwasher multiple times for smaller loads will cause you to use twice as much water. Dishwashers also use less water per load than it would require for you to wash them by hand.

Don't pre-rinse your dishes. If you have a high-quality dishwasher, it should remove food particles and stains without the need for pre-rinsing, saving excess water use.

If you wash your dishes by hand, fill one side of the sink with fresh water and use it for rinsing when the dishes are scrubbed clean rather than rinsing each plate, cup, or utensil individually.

Install a water aerator on your kitchen faucet. An aerator allows the water pressure to remain the same but can help to reduce water use by as much as one full gallon every minute.

Keep a large pitcher of water in the refrigerator for use whenever you need cold water. This will eliminate the need to run the sink and wait for the water to get cold.

In the Bathroom

Consider getting a low-flow shower head in your bathroom that can reduce water use every time you shower without having to sacrifice water pressure.

Check to make sure the parts inside your toilet tank are in good shape and up to date. Worn-out fittings or chains can cause the toilet to run unnecessarily. Many new models of high-efficiency toilets work just as well without using as much water, so consider upgrading.

Never allow the water to run while you are brushing your teeth. This can waste an excessive amount of water every time. Instead, just rinse, turn off the sink while you brush, then rinse again when you're ready to clean off the toothbrush.

Only fill your bathtub halfway instead of all the way to the top. Once you get in the bath, the water should rise to a comfortable level.

Rinse razors in the sink with about one inch of water instead of rinsing them under a running stream from the faucet.

Take shorter showers whenever possible.

Other Indoor Water Conservation

Check to make sure all of your pipes are properly insulated. It can take longer for water to heat up if your pipes are not insulated, which results in the water running for much longer periods of time. You should also cover your hot water heater with a special insulating blanket or cover.
Look for leaks regularly throughout your home. Check under all sinks and under crawl spaces, and be sure to learn how to check and read your water meter. When in doubt, contact a professional plumber to perform regular leak checkups.

Switch to more energy-efficient appliances, like washing machines that load from the front. Front-loading machines use much less water than top-loading washing machines and work just as well to get your clothes clean.

When you wash fresh produce, re-use that same water for your houseplants rather than filling up a watering can.

Saving Water Outside

Water your lawn and garden as early in the morning as possible. This will prevent the water from evaporating as quickly and result in the need for less watering in general.
Put automatic water sprinklers on a timer and make sure they are pointing only at areas where plants will be watered.

Look for drought-resistant plants that can live throughout the year. These hardy plants often rely on their own water reserves and don't need to be directly watered as often as other species.
Place a layer of mulch around your flower bed and garden and under shrubs and trees. Mulch not only looks nice, but it also helps keep water from evaporating as quickly and ensures that the water is getting down to the roots.

When it comes to washing your car, use a bucket filled with soap and water and a sponge rather than running the hose the entire time. You can repeat this by filling the bucket with clean water when you're ready to rinse.

Consider using a rain barrel to catch water to help nourish your outdoor plants. These special containers harvest rain quickly and will prevent you from using a hose or sprinkler system as often.

Just for Kids
Stay away from toys that require constant running water. Instead, use a small pool to enjoy water outside, or use sports-related toys and remote-controlled devices instead.

When washing hands, turn off the sink while kids are lathering up.

Don't let children flush tissues or other items down the toilet. Not only is this wasteful, but it can also cause serious plumbing problems. Encourage your kids to use a wastebasket for tissues and other everyday essentials they may be tempted to flush.

If your children have fish, re-use the water from the tank to provide nourishment to your houseplants instead of pouring it down the drain.

When washing the dog, make sure you wash them on an area of the lawn that needs water so you can accomplish two tasks at once. Just be sure the soap you use is safe for plants.
Teach children to always turn the faucets off tightly to avoid drips and unnecessary water waste.

Additional Resources
Conserve Water in and Around the Home
Water Use Calculator
Outdoor Water Conservation Tips
Home Water Conservation Checklist
100 Ways to Save Water
Water Conservation in Homes
Household Water Use
55 Facts, Figures, and Follies of Water Conservation
Nine Tricks That Save Tons of Water
Avoid Water Waste in Your Garden
Water-Saving Tips
Avoid Overwatering Lawns and Landscapes
How Does Your Water Use Measure Up?
Save Water
Water Conservation: It All Starts With You

Appendix E
Information
Forms and
Reports

WELL #8

State of Wis., Dept. of Natural Resources
dnr.wi.gov

Well / Drillhole / Borehole Filling & Sealing

Form 3300-005 (R 4/08) Page 1 of 2

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between $10-26,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

☐ Verification Only of Fill and Seal

Route to:
☒ Drinking Water ☐ Watershed/Wastewater ☐ Remediation/Redevelopment
☐ Waste Management ☐ Other:

1. Well Location Information

County	WI Unique Well # of Removed Well	Hicap #
Waukesha	BH416	88149

Latitude / Longitude (Degrees and Minutes) 42 · 57.017 N / 88 · 05.472 W — Method Code (see instructions): GPS008

¼¼ NE	¼ SE	Section 26	Township 6 N	Range 20 ☒E ☐W

or Gov't Lot #

Well Street Address: 5155 S. Sunnyslope Rd.

Well City, Village or Town: New Berlin — Well ZIP Code: 53151

Subdivision Name — Lot #

Reason For Removal From Service: Milwaukee Water — WI Unique Well # of Replacement Well: ——————

2. Facility / Owner Information

Facility Name: New Berlin, City of

Facility ID (FID or PWS): 268021710

License/Permit/Monitoring #: 81-0716

Original Well Owner: New Berlin

Present Well Owner: New Berlin

Mailing Address of Present Owner: 16450 West National Ave.

City of Present Owner: New Berlin — State: WI — ZIP Code: 53151

3. Well / Drillhole / Borehole Information

☐ Monitoring Well
☒ Water Well
☐ Borehole / Drillhole

Original Construction Date (mm/dd/yyyy): 9-23-1981

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (specify):

Formation Type:
☐ Unconsolidated Formation ☒ Bedrock

Total Well Depth From Ground Surface (ft.)	Casing Diameter (in.)
1984	18
Lower Drillhole Diameter (in.)	Casing Depth (ft.)
	580

Was well annular space grouted? ☒ Yes ☐ No ☐ Unknown

If yes, to what depth (feet)?	Depth to Water (feet)
580	481

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☒ Yes	☐ No	☐ N/A
Liner(s) removed?	☐ Yes	☐ No	☒ N/A
Screen removed?	☐ Yes	☐ No	☒ N/A
Casing left in place?	☒ Yes	☐ No	☐ N/A
Was casing cut off below surface?	☒ Yes	☐ No	☐ N/A
Did sealing material rise to surface?	☒ Yes	☐ No	☐ N/A
Did material settle after 24 hours?	☒ Yes	☐ No	☐ N/A
If yes, was hole retopped?	☒ Yes	☐ No	☐ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☐ Yes	☐ No	☒ N/A

Required Method of Placing Sealing Material:
☒ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain):

Sealing Materials:
☐ Neat Cement Grout ☐ Clay-Sand Slurry (11 lb./gal. wt.)
☒ Sand-Cement (Concrete) Grout ☐ Bentonite-Sand Slurry " "
☐ Concrete ☐ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:
☐ Bentonite Chips ☐ Bentonite - Cement Grout
☐ Granular Bentonite ☐ Bentonite - Sand Slurry

5. Material Used To Fill Well / Drillhole

From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Surface	600	sand cement	1 to 1 25 yds
830	1,035	25 yards	
1,035	1,075	Neat cement	1 and to 6 gals.
1,075	1,666	Chip. Pea Gravel	28 yds

Sand Cement 25 yds.
Chip. Pea - Gravel
Neat Cement

6. Comments

790'-830' Neat Cement; 790' to 600' Chip Pea Gravel; ~~Cement Plug~~

7. Supervision of Work

Name of Person or Firm Doing Filling & Sealing	License #	Date of Filling & Sealing (mm/dd/yyyy)
Water Well Solutions, Inc.	6685	05/31/2012

Street or Route	Telephone Number
N81W36051 Mapleton St.	(920) 474-4777

City	State	ZIP Code	Signature of Person Doing Work	Date Signed
Oconomowoc	WI	53066		6-4-2012

DNR Use Only

Date Received	Noted By
Comments	

WISCONSIN UNIQUE WELL NUMBER
SOURCE: SWAP PROJECT KEYE(BH416

State of WI-Private Water Systems-DG/2
Department Of Nr ' Resources, Box 7921
Madison, WI 53.

Form 3300-77A
(Rev 12/00)

Property Owner: NEW BERLIN, CITY OF
Telephone Number: 414 - 786 - 7080
Depth 1984 FT

Mailing Address: 16450 W NATIONAL AVE

City: NEW BERLIN | State: WI | Zip Code: 53151

County of Well Location: 68 WAUKESHA | SE | Co Well Permit No: W | Well Completion Date: January 14, 1983

1. Well Location: C | T=Town C=City V=Village of NEW BERLIN | First

Street Address or Road Name and Number: 6165 S SUNNYSLOPE RD #8

Subdivision Name | Lot # | Block #

Well Constructor: MILAEGER WELL @ | License #: 82 | Facility ID (Public): 268021710

Address: 20950 ENTERPRISE AVE | Public Well Plan Approval #: 81-0716

City: BROOKFIELD | State: WI | Zip Code: 53045 | Date Of Approval: 09/23/1981

Temp Permanent Well #: 88149 | Common Well #: 008 | 11.8 gpm/ft

Gov't Lot | or NE 1/4 of SE 1/4 of
Section 26 T 6 N R 20 E

Latitude Deg. 42 Min. 57.0173
Longitude Deg 88 Min. 5.4761

2. Well Type: 1 | 1=New 2=Replacement 3=Reconstruction (See Item 12 below)
of previous unique well # _____ constructed in 0
Reason for replaced or reconstructed Well?

Lat/Long Method

3. Well Serves: M | # of homes and or (eg: barn, restaurant, church, school, industry, etc.)
M=Muni O=OTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole

High Capacity: Well? Property?

1 | 1=Drilled 2=Driven Point 3=Jetted 4=Other

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties?
Well located in floodplain?
Distance in feet from well to nearest: (including proposed)

1. Landfill
2. Building Overhang
3. 1=Septic 2= Holding Tank
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. 1=Shoreline 2= Swimming Pool
9. Downspout/ Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain 1=Cast Iron or Plastic 2=Other
14. Building Sewer 1=Gravity 2=Pressure 1=Cast Iron or Plastic 2=Other
15. Collector Sewer: ___ units ___ in , diam.
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe 1=Gravity 2=Pressure 1=Cast Iron or Plastic 2=Other
23. Other manure Storage
24. Ditch
25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method — Upper Enlarged Drillhole — Lower Open Bedrock

Dia.(in.)	From (ft)	To (ft)
21.0	surface	680
17.3	680	787
15.3	787	1984

1. Rotary - Mud Circulation
2. Rotary - Air
3. Rotary - Air and Foam
4. Drill-Through Casing Hammer
5. Reverse Rotary
X 6. Cable-tool Bit _____ in. dia
7. Temp. Outer Casing _____ in. dia _____ depth ft Removed ?
Other

Geology Codes	8. Geology Type, Caving/Noncaving, Color, Hardness, etc	From (ft.)	To (ft.)
	GLACIAL DRIFT	0	135
L	LIMESTONE NIAGARA	135	369
H	SHALE MAQUOKETA	369	661
L	DOLOMITE GALENA PLATTEVILLE	661	810
N	SANDSTONE TUNNEL	810	1055
S	SANDSTONE EAU CLAIRE	1055	1160
N	SANDSTONE MT SIMON	1160	1984

6. Casing Liner Screen

Dia. (in.)	Material, Weight, Specification Manufacturer & Method of Assembly	From (ft.)	To (ft.)
22.0	ASTM A53B 0 500 WALL 114 81# FT BEV PE	surface	140
16.0	ASTM A53B 0 375 WALL 70 59# FT PE BEV	3	680

Dia.(in.)	Screen type, material & slot size	From	To

9. Static Water Level: 505.0 feet B ground surface A=Above B=Below

10. Pump Test
Pumping level 592.0ft. below surface
Pumping at 1025GPM 48.0Hrs

11. Well Is: 0 in. Grade A=Above B=Below
Developed?
Disinfected?
Capped?

7. Grout or Other Sealing Material
Method
Kind of Sealing Material

Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
NEAT CEMENT	surface	580.0	

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?
If no, explain

13. Initials of Well Constructor or Supervisory Driller: RNM | Date Signed
Initials of Drill Rig Operator (Mandatory unless same as above) | Date Signed

State of Wis., Dept. of Natural Resources
dnr.wi.gov

WELL # 9

Well / Drillhole / Borehole Filling & Sealing

Form 3300-005 (R 4/08) Page 1 of 2

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between $10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

☐ Verification Only of Fill and Seal

Route to:
☒ Drinking Water ☐ Watershed/Wastewater ☐ Remediation/Redevelopment
☐ Waste Management ☐ Other:

1. Well Location Information

County	WI Unique Well # of Removed Well	Hicap #
Waukesha	EQ941	1105

Latitude / Longitude (Degrees and Minutes)	Method Code (see instructions)
42 · 57 · 07.3 N 88 · 05 · 94.6 W	GPS008

¼ ¼	¼	Section	Township	Range
NW	SE	26	6 N	20 ☒ E ☐ W

or Gov't Lot #

Well Street Address: Small Road

Well City, Village or Town: New Berlin
Well ZIP Code: 53151
Subdivision Name:
Lot #:

Reason For Removal From Service: Milwaukee Water
WI Unique Well # of Replacement Well: — — — — —

2. Facility / Owner Information

Facility Name: New Berlin, City of
Facility ID (FID or PWS): 268021710
License/Permit/Monitoring #: 920548
Original Well Owner: New Berlin
Present Well Owner: New Berlin
Mailing Address of Present Owner: 16450 West National Ave
City of Present Owner: New Berlin
State: WI
ZIP Code: 53151

3. Well / Drillhole / Borehole Information

☐ Monitoring Well
☒ Water Well
☐ Borehole / Drillhole

Original Construction Date (mm/dd/yyyy): June 17, 1993
If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (specify):

Formation Type:
☐ Unconsolidated Formation ☒ Bedrock

Total Well Depth From Ground Surface (ft.)	Casing Diameter (in.)
342	12

Lower Drillhole Diameter (in.)	Casing Depth (ft.)
12	70

Was well annular space grouted? ☒ Yes ☐ No ☐ Unknown

If yes, to what depth (feet)?	Depth to Water (feet)
70	27

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☒ Yes	☐ No	☐ N/A
Liner(s) removed?	☐ Yes	☐ No	☒ N/A
Screen removed?	☐ Yes	☐ No	☒ N/A
Casing left in place?	☒ Yes	☐ No	☐ N/A
Was casing cut off below surface?	☐ Yes	☒ No	☐ N/A
Did sealing material rise to surface?	☒ Yes	☐ No	☐ N/A
Did material settle after 24 hours?	☒ Yes	☐ No	☐ N/A
If yes, was hole retopped?	☒ Yes	☐ No	☐ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☐ Yes	☐ No	☒ N/A

Required Method of Placing Sealing Material
☒ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain):

Sealing Materials
☐ Neat Cement Grout ☐ Clay-Sand Slurry (11 lb./gal wt.)
☒ Sand-Cement (Concrete) Grout ☐ Bentonite-Sand Slurry " "
☐ Concrete ☐ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:
☐ Bentonite Chips ☐ Bentonite - Cement Grout
☐ Granular Bentonite ☐ Bentonite - Sand Slurry

5. Material Used To Fill Well / Drillhole

Material	From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Sand Cement Grout	Surface	342	11.5 yds	1:1

6. Comments

7. Supervision of Work

Name of Person or Firm Doing Filling & Sealing	License #	Date of Filling & Sealing (mm/dd/yyyy)
Water Well Solutions, Inc	6685	4/25/2012

Street or Route: N57W36051 Mapleton St.
Telephone Number: 920) 474-4777
City: Oconomowoc
State: WI
ZIP Code: 53066
Signature of Person Doing Work: Mark Hansen
Date Signed: 5-3-12

DNR Use Only
Date Received:
Noted By:
Comments:

WISCONSIN UNIQUE WELL NUMBER

SOURCE: WELL CONSTRUCTION — EQ941

State of Wisconsin Private Water Systems-DG/2 — Form 3300-77A (Rev 12/00)

Department Of Natural Resources, Box 7921, Madison, WI 53

Depth 343 FT

Property Owner: NEW BERLIN — Telephone Number: 414 – 786 – 8610

Mailing Address: 3805 S CASPER

City: NEW BERLIN — State: WI — Zip Code: 53151

County of Well Location: 68 WAUKESHA — Co Well Permit No: SE W — Well Completion Date: June 17, 1993

Well Constructor: LAYNE NORTHWEST — License #: 582 — Facility ID (Public): 268021710

Address: W229 N5005 DUPLAINVI — Public Well Plan Approval#: 920548

City: PEWAUKEE — State: WI — Zip Code: 53072 — Date Of Approval: 05/01/1992

Hcap Permanent Well #: 1105 — Common Well #: 009 — 60 gpm/ft

1. Well Location: C (T=Town C=City V=Village) of NEW BERLIN — Fire#

Street Address or Road Name and Number: SMALL RD

Subdivision Name — Lot# — Block #

Gov't Lot — or NW 1/4 of SE 1/4 of Section 26 T 6 N R 20 E

Latitude Deg. 42 Min. 57.0082

Longitude Deg 88 Min. 5.867

2. Well Type: 1 (1=New, 2=Replacement, 3=Reconstruction) (See item 12 below) — Lat/Long Method

of previous unique well # _____ constructed in 0

Reason for replaced or reconstructed Well?

1 (1=Drilled 2=Driven Point 3=Jetted 4=Other)

3. Well Serves: M (M=Munic O=OTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole) — # of homes and or CITY (eg: barn, restaurant, church, school, industry, etc.)

High Capacity: Well? Y — Property? Y

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties?

Well located in floodplain?

Distance in feet from well to nearest: (including proposed)

1. Landfill
2. Building Overhang
3. 1=Septic 2= Holding Tank
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. 1=Shoreline 2= Swimming Pool
9. Downspout/ Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain 1=Cast Iron or Plastic 2=Other
14. Building Sewer 1=Gravity 2=Pressure 1=Cast Iron or Plastic 2=Other
15. Collector Sewer: ___ units ___ in . diam.
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe 1=Gravity 2=Pressure 1=Cast Iron or Plastic 2=Other
23. Other manure Storage
24. Ditch
25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method

Dia.(in.)	From (ft)	To (ft)
10.0	surface	70
12.0	70	342

Upper Enlarged Drillhole — Lower Open Bedrock

X -- 1. Rotary - Mud Circulation
-- 2. Rotary - Air
-- 3. Rotary - Air and Foam
-- 4. Drill-Through Casing Hammer
-- 5. Reverse Rotary
-- 6. Cable-tool Bit ____ in. dia
-- 7. Temp. Outer Casing ____ in. dia. ____ depth ft. Removed ?

Other

6. Casing Liner Screen — Material, Weight, Specification, Manufacturer & Method of Assembly

Dia. (in.)	Material, Weight, Specification, Manufacturer & Method of Assembly	From (ft.)	To (ft.)
12.0	BL NEW STEEL P.E. 49 56 LB WELDED	surface	70

Dia.(in.)	Screen type, material & slot size	From	To

7. Grout or Other Sealing Material

Method	Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
TREMIE PUMPED	NEAT CEMENT	surface	70.0	67 S

Geology Codes	8. Geology Type, Caving/Noncaving, Color, Hardness, etc	From (ft.)	To (ft.)
K_I_	BLACK DIRT	0	6
T_CG	BROWN CLAY WITH BOULDERS	6	10
__Z_	CLAY WITH GRAVEL	10	20
__ZG	CLAY AND GRAVEL WITH	20	29
G_L_	GRAY LIME STONE	29	70
I_L_	WHITE LIME STONE	70	160
T_L_	LIGHT BROWN LIME STONE	160	210
G_L_	GRAY LIME STONE	210	220
T_L_	BROWN LIMESTONE	220	329
__H_	SHALE	329	343

9. Static Water Level: 8.0 feet B ground surface (A=Above B=Below)

10. Pump Test: Pumping level 132.0ft. below surface — Pumping at 750.0GPM 12.0Hrs

11. Well Is: A (A=Above B=Below) Grade — 24 in.

Developed? Y — Disinfected? Y — Capped? Y

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?

If no, explain

13. Initials of Well Constructor or Supervisory Driller: WM — Date Signed: 5/19/93

Initials of Drill Rig Operator (Mandatory unless same as above) — Date Signed

State of Wis., Dept. of Natural Resources
dnr.wi.gov

Well #10

Well / Drillhole / Borehole Filling & Sealing

Form 3300-005 (R 4/08)

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between $10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

☐ Verification Only of Fill and Seal

Route to:
☒ Drinking Water ☐ Watershed/Wastewater ☐ Remediation/Redevelopment
☐ Waste Management ☐ Other:

1. Well Location Information

County: Waukesha
WI Unique Well # of Removed Well: MK401
Hicap #: 2285
Latitude / Longitude (Degrees and Minutes): 42 · 57 · 093 N / 88 · 06 42 2 W
Method Code (see Instructions): GPS008
¼ ¼ SW ¼ NW
or Gov't Lot #
Section: 26
Township: 6 N
Range: 20 ☒ E ☐ W
Well Street Address: Moorland Road
Well City, Village or Town: New Berlin
Well ZIP Code: 53151
Subdivision Name:
Lot #:
Reason For Removal From Service: Milwaukee Water
WI Unique Well # of Replacement Well:

2. Facility / Owner Information

Facility Name: New Berlin, City of
Facility ID (FID or PWS): 268021710
License/Permit/Monitoring #: 961408
Original Well Owner: New Berlin
Present Well Owner: New Berlin
Mailing Address of Present Owner: 16450 West National Ave
City of Present Owner: New Berlin
State: WI
ZIP Code: 53151

3. Well / Drillhole / Borehole Information

☐ Monitoring Well
☒ Water Well
☒ Borehole / Drillhole
Original Construction Date (mm/dd/yyyy): 9-23-1996
If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (specify):

Formation Type:
☐ Unconsolidated Formation ☒ Bedrock

Total Well Depth From Ground Surface (ft.): 345
Casing Diameter (in.): 14
Lower Drillhole Diameter (in.): 13.3
Casing Depth (ft.): 68
Was well annular space grouted? ☒ Yes ☐ No ☐ Unknown
If yes, to what depth (feet)? 68
Depth to Water (feet): 32

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☒ Yes	☐ No	☐ N/A
Liner(s) removed?	☐ Yes	☐ No	☒ N/A
Screen removed?	☐ Yes	☐ No	☒ N/A
Casing left in place?	☒ Yes	☐ No	☐ N/A
Was casing cut off below surface?	☐ Yes	☒ No	☐ N/A
Did sealing material rise to surface?	☒ Yes	☐ No	☐ N/A
Did material settle after 24 hours?	☒ Yes	☐ No	☐ N/A
If yes, was hole retopped?	☒ Yes	☐ No	☐ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☐ Yes	☐ No	☒ N/A

Required Method of Placing Sealing Material
☒ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain):

Sealing Materials
☐ Neat Cement Grout ☐ Clay-Sand Slurry (11 lb./gal. wt.)
☒ Sand-Cement (Concrete) Grout ☐ Bentonite-Sand Slurry " "
☐ Concrete ☐ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:
☐ Bentonite Chips ☐ Bentonite - Cement Grout
☐ Granular Bentonite ☐ Bentonite - Sand Slurry

5. Material Used To Fill Well / Drillhole

From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Surface	345	11 yds.	1:1

Sand Cement Grout

6. Comments

7. Supervision of Work

Name of Person or Firm Doing Filling & Sealing: Water Well Solutions, Inc.
License #: 6685
Date of Filling & Sealing (mm/dd/yyyy): 4-26-2012
Street or Route: N87W36051 Mapleton St.
Telephone Number: (920) 474-4777
City: Oconomowoc
State: WI
ZIP Code: 53066
Signature of Person Doing Work:
Date Signed:

DNR Use Only
Date Received:
Noted By:
Comments:

WISCONSIN UNIQUE WELL NUMBER: MK401

SOURCE: WELL CONSTRUCTION

Department Of Natural Resources, Box 7921, Madison, WI 537

Form 3300-77A (Rev 12/00)

Depth 346 FT

Property Owner: NEW BERLIN	Telephone Number: 414 – 786 – 7086		
Mailing Address: 16450 W NATIONAL AVE			
City: NEW BERLIN	State: WI	Zip Code: 53151	
County of Well Location: 68 WAUKESHA	Co Well Permit No: W	Well Completion Date: October 17, 1997	

1. Well Location: C (T=Town C=City V=Village) of NEW BERLIN; Fire#

Street Address or Road Name and Number: MOORLAND RD

Subdivision Name; Lot#; Block #

Well Constructor: LAYNE CHRISTENSEN	License #: 582	Facility ID (Public): 268021710	
Address: W229 N5005 DUPLAINVI		Public Well Plan Approval#: 961408	
City: PEWAUKEE	State: WI	Zip Code: 53072	Date Of Approval: 09/23/1998
Hicap Permanent Well #: 2285	Common Well #: 010	43 gpm/ft	

Gov't Lot or SW 1/4 of NW 1/4 of Section 26 T 6 N R 20 E

Latitude Deg. 42 Min. 57.2102

Longitude Deg 88 Min. 6.3621

Lat/Long Method

2. Well Type: 1 (1=New, 2=Replacement, 3=Reconstruction) (See item 12 below)

of previous unique well # _____ constructed in 0

Reason for replaced or reconstructed Well? WATER SUPPLY

1 (1=Drilled 2=Driven Point 3=Jetted 4=Other)

3. Well Serves: # of homes and or CITY (eg: barn, restaurant, church, school, industry, etc.) M (M=Munic O=DTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole)

High Capacity: Well? Y Property? Y

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties? Y

Well located in floodplain? N

Distance in feet from well to nearest: (including proposed)

1. Landfill
2. Building Overhang
3. (1=Septic 2= Holding Tank)
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. (1=Shoreline 2= Swimming Pool)
9. Downspout/ Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain (1=Cast Iron or Plastic 2=Other)
14. Building Sewer (1=Gravity 2=Pressure; 1=Cast Iron or Plastic 2=Other)
15. Collector Sewer: ___ units ___ in. diam.
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe (1=Gravity 2=Pressure; 1=Cast Iron or Plastic 2=Other)
23. Other manure Storage
24. Ditch
25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method

Dia.(in.)	From (ft)	To (ft)
18.0	surface	68
13.3	68	321
13.3	321	345

Upper Enlarged Drillhole — Lower Open Bedrock

X -- 1. Rotary - Mud Circulation

X -- 2. Rotary - Air

-- 3. Rotary - Air and Foam

-- 4. Drill-Through Casing Hammer

-- 5. Reverse Rotary

-- 6. Cable-tool Bit _____ in. dia

-- 7. Temp. Outer Casing _____ in. dia. _____ depth ft. Removed ?

Other

Geology Codes	8. Geology Type, Caving/Noncaving, Color, Hardness, etc	From (ft.)	To (ft.)
CG	CLAY WITH STONES	0	38
ZL	LAYERS OFLIMESTONE W CLAY	38	69
T_L_	TAN LIMESTONE	69	175
G_L_	GRAY LIMESTONE	175	195
T_L_	TAN LIMESTONE	195	330
G_L_	GRAY LIMESTONE	330	340
G_H_	GRAY SHALE	340	345

6. Casing Liner Screen

Dia. (in.)	Material, Weight, Specification Manufacturer & Method of Assembly	From (ft.)	To (ft.)
14.0	BL NEW STEE P E WELDED A 53 GRB 54 57 LB VICTORY	surface	68

Dia.(in.)	Screen type, material & slot size	From	To

9. Static Water Level: 32.0 feet B (A=Above B=Below) ground surface

11. Well Is: A (A=Above B=Below) Grade 24 in.

10. Pump Test: Pumping level 195.0ft. below surface; Pumping at 699.0GPM 48.0Hrs

Developed? Y

Disinfected? Y

Capped? Y

7. Grout or Other Sealing Material

Method	Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
BARDEN HEAD PUMPED	NEAT CEMENT	surface	68.0	75 S

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?

If no, explain

13. Initials of Well Constructor or Supervisory Driller: WM Date Signed: 1/9/98

Initials of Drill Rig Operator (Mandatory unless same as above) Date Signed

City of New Berlin Utility

Hydrant Flushing Data

Water flushed in gallons

	Spring-Groundwater	Spring-Milwaukee Water	Fall - Groundwater	Fall - Milwaukee Water	Annual Total	
2003	15,650,100		14,659,100		30,309,200	
2004	16,279,900		15,112,000		31,391,900	
2005	18,417,200		8,477,300	4,851,500	31,746,000	
2006	10,502,600	3,674,900	7,477,600	2,773,500	24,428,600	*
2007	4,631,400	2,749,900	6,919,600	2,847,800	17,148,700	
2008	6,464,000	3,074,800	8,542,200	2,827,500	20,908,500	
2009	5,421,100	3,365,600		5,721,000	14,507,700	**
2010		5,591,700		4,115,375	9,707,075	
2011		5,089,600		5,207,800	10,297,400	
2012		5,207,800		5,073,000	10,280,800	
2013		4,554,200		4,844,600	9,398,800	
2014		4,905,300		4,325,800	9,231,100	
2015		5,093,700		4,971,800	10,065,500	
2016		5,230,000		5,441,700	10,671,700	
2017		4,954,500		5,066,300	10,020,800	
2018		5,438,500		5,285,300	10,723,800	
2019		6,224,200		5,578,400	11,802,600	
2020		5,609,300		4,478,430	10,087,730	

*Note: Milwaukee Water is pumped to Eastern portion of service area starting in July 2005

**Note: Milwaukee Water is pumped to entire service area starting in July 2009

Significant drops of water usage were noted in 2006 and 2010 following the switch to Milwaukee Water.

Each hydrant is now flushed once each year - either spring or fall since the groundwater wells were abandoned.

City of New Berlin

PRESS RELEASE

City of New Berlin • 3805 S. Casper Drive • New Berlin, Wisconsin 53151-0921 • (262)786-8610 • www.newberlin.org

For Immediate Release

Date: July 9, 2012
Contact: Jim Hart, Utility Supervisor
City of New Berlin Water Utility
16450 W National Ave
New Berlin, WI 53151-5510
Phone: 262-786-7086

SPRINKLING SCHEDULE ISSUED

By order of Jim Hart, City of New Berlin Water Utility Supervisor due to extremely dry conditions and unusually high temperatures, we are experiencing higher than normal water use for lawn sprinkling. *Effective Immediately* the City of New Berlin has issued a lawn sprinkling schedule for New Berlin Water Utility customers until further notice. Please follow the Lawn Sprinkling Water Conservation Schedule as follows:

Water only from 6:00 p.m. to 10:00 p.m. on Even calendar dates or Odd calendar dates, depending on your address. (i.e. If your address is 16450, please water on even calendar dates - July 10th, 12th, 14th etc.)

Water Use Restriction is authorized by Ordinance 2075 and section 267-5 of the Municipal Code of the City of New Berlin.

The purpose of this schedule is to insure an adequate water supply for public safety concerns, especially fire fighting and other emergency uses. High water consumption caused by lawn sprinkling could draw City reserves down to the point that we potentially could not provide enough water for fire fighting.

Individuals who are trying to establish a new lawn should contact the Utility office at (262) 786-7086 for a Special Use Permit. There is no charge for this Permit.

Hand held watering of flowers and small gardens are permitted; however, hoses must not be left unattended.

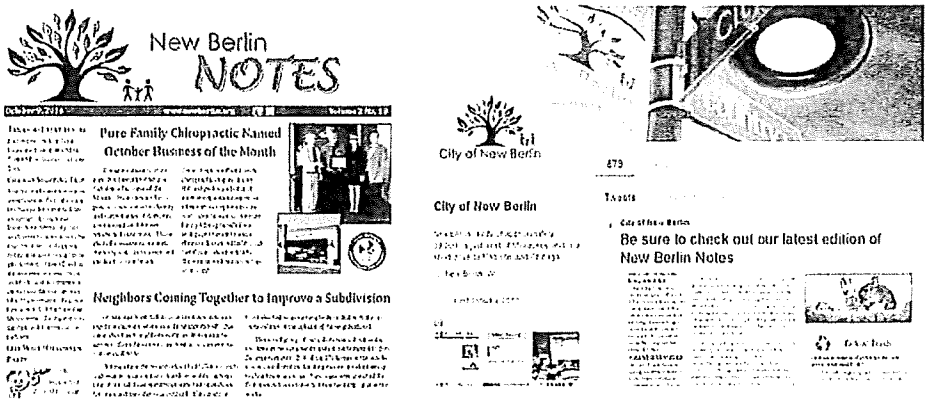
If you have any questions, please contact the Utility Office at (262) 786-7086 between the hours of 7:00 a.m. and 3:30 p.m. After hours, leave a message.

#

cc: Aldermen
Media

STAY CONNECTED

Stay connected to the City of New Berlin! Keep up-to-date with the latest happenings from your home computer, tablet or mobile device! You can get election events, City meeting news and community events to your e-mail or cell phone! The City Leaflet/New Berlin Notes is another great way to receive important information and updates! This briefing helps to strengthen the City's initiative to increase government transparency and open communication with our residents. To sign up for any of these please go to the City's website, www.newberlin.org, by using the "Notify Me" module.



"Notify Me" is simple and easy to use! Go to the City's home page at www.newberlin.org and click on the "Notify Me" icon to sign-up.

Job Opportunities

You can now apply on-line for job openings at the City of New Berlin! Visit www.newberlin.org to view openings.

HYDRANT FLUSHING

Spring: April 13th-May 15th
Fall: September 7th-October 16th
Water Utility Crews will be performing maintenance within the water system at this time. Questions please call (262)786-7086.

METER READING

2nd Quarter: May 12th-June 4th
3rd Quarter: August 18th-September 4th
All personnel will have ID badges and vehicles marked City of New Berlin. Please bring pets inside. Questions please call (262)786-7086.

THE CITY OF NEW BERLIN WOULD LIKE TO WELCOME THE FOLLOWING NEW BUSINESSES:

Acuity Foam
2361 S. Commerce Drive

Badger Lighting & Signs
16271 W. Lincoln Avenue

Capital Heating
16920 W. Cleveland Avenue

Children's Orchard
14145 W. Greenfield Avenue

Chiropractic Care Center of New Berlin
3333 S. Sunny Slope Road

Gleischman Sumner
2226 W. 162nd Street

Next Step Day In Services, LLC
2616-2620 S. 162nd Street

OSG Billing Services
2471 S. Commerce Drive

PRN Rx
17755 W. Liberty Lane

Ron Opichka State Farm Office
14027 W. Greenfield Avenue

RSG Construction
16813 W. Greenfield Avenue

Subway (inside Wal-mart)
15205 W. Greenfield Avenue

THANK YOU FOR CHOOSING OUR CITY!

Rain Garden Display

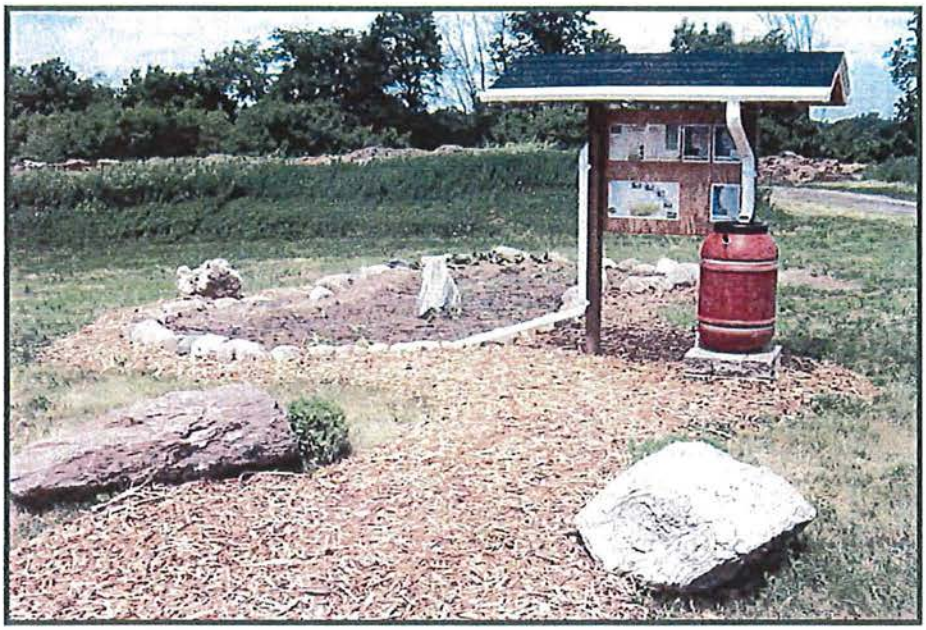
Are you looking to install a rain garden in your yard?

The Waukesha County Website has information on where to purchase rain barrels and information on rain gardens For more info
The Root-Pike Win Group has information on the Rain Garden Initiative Program

You can find an example of a rain garden at the Recycling Center.

The Rain Garden was built by Street Department Employees Tom Koss, Steve Brooks and Pat Subel, and plants donated by Tom Koss. All plants used are local native Wisconsin Prairie plants.

There are reference materials available through the Wisconsin DNR website.



Rain Garden - finished view. Rain barrels can be purchased through MMSD

Layout and list of plants at Recycling Center

Rain Garden List

OBJECTID	ID	TYPE	TAXKEY	ADDRESS	ADDRESS_ST
174	BPD304221001	Rain Garden	1237996	15885	NATIONAL AVE
198	BPC512271001	Rain Garden	1257994001	5055	EMMER DR
207	BPC516334001	Rain Garden	1284987	17455	SMALL RD
220	BPU108011001	Rain Garden	1153071	1627	124TH ST
259	BPR212123006	Rain Garden	1199974001	2950	SUNNY SLOPE RD
130	BPP720074001	Bioretention	1180996	2955	JOHNSON RD
139	BPP712094003	Bioretention	1188992001	2815	CALHOUN RD
141	BPD312101002	Bioretention	1189016	2601	MOORLAND RD
160	BPD304143013	Bioretention	1207986001	15450	NATIONAL AVE
167	BPP709221001	Bioretention	1212991001	16000	NATIONAL AVE
179	BPP301224002	Bioretention	1240999	4315	MOORLAND RD
197	BPC506271008	Bioretention	1257989004	4935	MOORLAND RD
201	BPC501274002	Bioretention	1260997	15700	SMALL RD
204	BPP703294001	Bioretention	1268994006	5120	RACINE AVE
205	BPP703294002	Bioretention	1268994006	5120	RACINE AVE
214	BPR249364006	Bioretention	1296999003	12601	JANESVILLE RD
218	BPD315033005	Bioretention	1163997001	16555	ROGERS DR
219	BPD315033004	Bioretention	1163997001	16555	ROGERS DR

4197 S REGAL CT

07/25/2012 14:36 | CITY OF NEW BERLIN | PG 1
9740fsal | UB Consumption History Report | utdmding

Account # / Service	Man	Meter #	Customer Cd	Name Read Date	By	Bill#	Parcel Curr Read	Location Usage	Repl Usage	Billed Usage	Charge Amt	Status Billed Amt	Days
10111030			301884	OCCUPANT			1242338					CURRENT	
1101	1	BADG05051801	A	05/22/2012		31720	5	5	2	7	43.04	215.16	70
1101	1	BADG05051801		03/13/2012		31720	312	2	2	0	43.04	215.16	70
1101	1	BADG05051801	A	02/24/2012		11722	310	7	0	7	43.04	215.16	101
1101	1	BADG05051801	A	11/15/2011		71725	303	9	0	9	50.96	226.92	84
1101	1	BADG05051801	A	08/23/2011		51725	294	10	0	10	54.92	232.81	88
1101	1	BADG05051801	A	05/27/2011		31725	284	8	0	8	47.00	221.04	91
1101	1	BADG05051801	A	02/25/2011		11725	276	15	0	15	72.05	259.56	101
1101	1	BADG05051801	A	11/16/2010		71725	261	12	0	12	61.76	228.34	77
1101	1	BADG05051801	A	08/31/2010		51725	249	10	0	10	54.90	217.98	95
1101	1	BADG05051801	A	05/28/2010		31757	239	11	0	11	58.33	223.16	85
1101	1	BADG05051801	A	03/04/2010		11733	228	10	0	10	54.90	217.98	106
1101	1	BADG05051801	A	11/18/2009		71733	218	7	0	7	44.61	202.44	71
1101	1	BADG05051801	A	09/08/2009		51733	211	10	0	10	52.46	215.54	98
1101	1	BADG05051801	A	06/02/2009		31733	201	10	0	10	48.18	211.26	92
1101	1	BADG05051801	A	03/02/2009		11732	191	15	0	15	62.33	234.15	98
1101	1	BADG05051801	A	11/24/2008		71731	176	14	0	14	59.50	229.57	83
1101	1	BADG05051801	A	09/02/2008		51730	162	15	0	15	62.33	230.65	102
1101	1	BADG05051801	A	05/23/2008		31730	147	13	0	13	56.67	224.99	78
1101	1	BADG05051801	A	03/06/2008		11731	134	13	0	13	56.67	224.99	99
1101	1	BADG05051801	A	11/28/2007		71730	121	13	0	13	56.67	224.99	93
1101	1	BADG05051801	A	08/27/2007		51731	108	8	0	8	42.52	202.10	89
1101	1	BADG05051801	A	05/30/2007		31730	100	10	0	10	47.05	210.13	84
1101	1	BADG05051801	A	03/07/2007		11726	90	13	0	13	55.54	223.86	86
1101	1	BADG05051801	A	12/11/2006		65722	77	11	0	11	49.88	214.71	97
1101	1	BADG05051801	A	09/05/2006		51719	66	13	0	13	55.54	223.86	105
1101	1	BADG05051801	A	05/23/2006		31709	53	9	0	9	44.22	205.55	75
1101	1	BADG05051801	A	03/09/2006		11707	44	13	0	13	55.54	223.86	90
1101	1	BADG05051801	A	12/09/2005		61701	31	11	0	11	49.88	214.71	90
1101	1	BADG05051801	A	09/10/2005		45700	20	11	0	11	49.88	211.21	94
1101	1	BADG05051801	A	06/08/2005		31699	9	9	1	10	40.10	203.18	86
1101	1	BADG05051801		03/14/2005		31699	2,395	1	1	0	40.10	203.18	86
1101	1	BADG05051801	A	03/09/2005		11699	2,394	9	0	9	37.89	199.22	84
1101	1	BADG05051801	A	12/15/2004		90001694	2,385	11	0	11	42.31	207.14	91
1101	1	BADG05051801		09/15/2004		10111030	2,374	11	0	0	42.31	207.14	92
1101	1	BADG05051801		09/15/2004		1723	2,374	11	0	0	.00	.00	92

Toilet Rebate Program- Example of
Consumption History reductions
2 Low Flow Toilets installed March 2011

3715 S 158TH ST

07/26/2012 14:44 | CITY OF NEW BERLIN | PG 1
9740fsal | UB Consumption History Report | utdmding

Account # / Service	Man	Meter #	Customer Cd	Name Read Date	By	Bill#	Parcel Curr Read	Location Usage	Repl Usage	Billed Usage	Charge Amt	Status Billed Amt	Days
10260680			303918	OCCUPANT			1212083					CURRENT	
1101	1	BADG06177650	A	05/31/2012		33704	1,232	15	0	15	74.72	262.23	87
1101	1	BADG06177650	A	03/05/2012		13706	1,217	18	0	18	86.60	279.88	104
1101	1	BADG06177650	A	11/22/2011		73707	1,199	15	0	15	74.72	262.23	90
1101	1	BADG06177650	A	08/24/2011		53709	1,184	16	0	16	78.68	268.11	89
1101	1	BADG06177650	A	05/27/2011		33710	1,168	17	0	17	82.64	273.99	88
1101	1	BADG06177650	A	02/28/2011		13710	1,151	35	0	35	140.65	366.63	96
1101	1	BADG06177650	A	11/24/2010		73710	1,116	28	0	28	116.64	311.20	82
1101	1	BADG06177650	A	09/03/2010		53710	1,088	33	0	33	133.79	337.09	98
1101	1	BADG06177650	A	05/28/2010		33743	1,055	28	0	28	116.64	311.20	91
1101	1	BADG06177650	A	03/08/2010		13719	1,027	33	0	33	133.79	337.09	105
1101	1	BADG06177650	A	11/23/2009		73719	994	25	0	25	106.35	295.66	82
1101	1	BADG06177650	A	09/02/2009		53719	969	34	0	34	129.74	319.05	93
1101	1	BADG06177650	A	06/01/2009		33719	935	32	0	32	110.44	311.99	96
1101	1	BADG06177650	A	02/25/2009		13718	903	25	0	25	90.63	279.94	86
1101	1	BADG06177650	A	12/01/2008		73717	878	23	0	23	84.97	270.78	87
1101	1	BADG06177650	A	09/05/2008		53716	855	28	0	28	99.12	288.43	101
1101	1	BADG06177650	A	05/27/2008		33716	827	24	0	24	87.80	275.36	81
1101	1	BADG06177650	A	03/07/2008		13717	803	25	0	25	90.63	279.94	100
1101	1	BADG06177650	A	11/28/2007		73716	778	21	0	21	79.31	261.62	84
1101	1	BADG06177650	A	09/05/2007		53717	757	25	0	25	90.63	272.94	103
1101	1	BADG06177650	A	05/25/2007		33717	732	20	0	20	75.35	255.92	86
1101	1	BADG06177650	A	02/28/2007		13713	712	21	0	21	78.18	260.49	83
1101	1	BADG06177650	A	12/07/2006		67709	691	22	0	22	81.01	265.07	97
1101	1	BADG06177650	A	09/01/2006		53706	669	2	22	24	86.67	270.73	11
1101	1	BADG06177650		08/21/2006		53706	667	22	22	0	86.67	270.73	11
1101	1	BADG06177650	A	05/24/2006		33696	645	16	0	16	64.03	237.60	77
1101	1	BADG06177650	A	03/08/2006		13694	629	22	0	22	81.01	265.07	90
1101	1	BADG06177650	A	12/08/2005		63689	607	20	0	20	75.35	255.92	96
1101	1	BADG06177650	A	09/03/2005		47688	587	28	0	28	97.99	292.55	85
1101	1	BADG06177650	A	06/10/2005		33687	559	38	0	38	101.17	313.21	94
1101	1	BADG06177650	A	03/08/2005		13687	521	32	0	32	88.72	290.27	83
1101	1	BADG06177650	A	12/15/2004		90003682	489	35	0	35	95.35	302.15	91
1101	1	BADG06177650		09/15/2004		10260680	454	37	0	0	99.23	288.54	92
1101	1	BADG06177650		09/15/2004		3719	454	37	0	0	.00	.00	92

Toilet Rebate Program – Example of
Consumption History reductions.
2 Low Flow Toilets installed April 2011

13411 W NORTH LANE

07/25/2012 14:52 | CITY OF NEW BERLIN | PG 1
9740fsal | UB Consumption History Report | utdmding

Account# / Service		Man	Meter #	Customer Cd	Name Read Date	By	Bill#	Parcel Curr Read	Location Usage	Repl Usage	Billed Usage	Charge Amt	Status Billed Amt	Days
10200882				302934	OCCUPANT			1203048						CURRENT
1101	1	BADG	02097434	A	05/25/2012		32745	1,263	6	0	6	39.08	209.27	88
1101	1	BADG	02097434	A	02/27/2012		12747	1,257	6	0	6	39.08	209.27	103
1101	1	BADG	02097434	A	11/16/2011		72748	1,251	7	0	7	43.04	215.16	84
1101	1	BADG	02097434	A	08/24/2011		52750	1,244	12	0	12	62.84	242.65	90
1101	1	BADG	02097434	A	05/26/2011		32751	1,232	8	0	8	47.00	221.04	91
1101	1	BADG	02097434	A	02/24/2011		12751	1,224	11	0	11	58.33	238.14	98
1101	1	BADG	02097434	A	11/18/2010		72751	1,213	10	0	10	54.90	217.98	79
1101	1	BADG	02097434	A	08/31/2010		52751	1,203	11	0	11	58.33	223.16	90
1101	1	BADG	02097434	A	06/02/2010		32784	1,192	10	0	10	54.90	217.98	83
1101	1	BADG	02097434	A	03/11/2010		12760	1,182	11	0	11	58.33	223.16	100
1101	1	BADG	02097434	A	12/01/2009		72760	1,171	11	0	11	58.33	223.16	88
1101	1	BADG	02097434	A	09/04/2009		52760	1,160	11	0	11	55.68	217.01	99
1101	1	BADG	02097434	A	05/28/2009		32760	1,149	9	0	9	45.35	206.68	91
1101	1	BADG	02097434	A	02/26/2009		12759	1,140	9	0	9	45.35	205.68	85
1101	1	BADG	02097434	A	12/03/2008		72758	1,131	9	0	9	45.35	206.68	94
1101	1	BADG	02097434	A	09/10/2008		52757	1,122	13	0	13	56.67	216.25	111
1101	1	BADG	02097434	A	05/22/2008		32757	1,109	8	0	8	42.52	202.10	76
1101	1	BADG	02097434	A	03/07/2008		12758	1,101	8	0	8	42.52	202.10	92
1101	1	BADG	02097434	A	12/06/2007		72757	1,093	11	0	11	51.01	215.84	98
1101	1	BADG	02097434	A	08/30/2007		52758	1,082	13	0	13	56.67	218.00	93
1101	1	BADG	02097434	A	05/29/2007		32758	1,069	10	0	10	47.05	210.13	82
1101	1	BADG	02097434	A	03/08/2007		12754	1,059	9	0	9	44.22	205.55	90
1101	1	BADG	02097434	A	12/08/2006		66750	1,050	9	0	9	44.22	205.55	94
1101	1	BADG	02097434	A	09/05/2006		52747	1,041	13	0	13	55.54	215.12	104
1101	1	BADG	02097434	A	05/24/2006		32737	1,028	8	0	8	41.39	200.97	72
1101	1	BADG	02097434	A	03/13/2006		12735	1,020	8	0	8	41.39	200.97	90
1101	1	BADG	02097434	A	12/13/2005		62730	1,012	9	0	9	44.22	205.55	94
1101	1	BADG	02097434	A	09/10/2005		46729	1,003	19	0	19	72.52	230.35	93
1101	1	BADG	02097434	A	06/09/2005		32728	984	8	0	8	35.68	195.26	91
1101	1	BADG	02097434	A	03/10/2005		12728	976	7	0	7	33.47	191.30	85
1101	1	BADG	02097434	A	12/15/2004		90002725	969	12	0	12	44.52	211.10	91
1101	1	BADG	02097434		09/15/2004		10200882	957	9	0	0	37.89	195.72	92
1101	1	BADG	02097434		09/15/2004		2759	957	9	0	0	.00	.00	92

Toilet Rebate Program - Example of
Consumption History reductions
2 Low Flow Toilets installed April 2011

4595 SOVEREIGN DR

07/26/2012 14:55 | CITY OF NEW BERLIN | PG 1
9740fsal | UB Consumption History Report | utdmding

Account# / Service		Man	Meter #	Customer Cd	Name Read Date	By	Bill#	Parcel Curr Read	Location Usage	Repl Usage	Billed Usage	Charge Amt	Billed Amt	Status Days
10360180				304891	OCCUPANT			1240085						CURRENT
1101	1	BADG	05020471	A	05/24/2012		34628	410	9	0	9	50.96	226.92	87
1101	1	BADG	05020471	A	02/27/2012		14630	401	10	0	10	54.92	282.81	101
1101	1	BADG	05020471	A	11/18/2011		74631	391	9	0	9	50.96	226.92	86
1101	1	BADG	05020471	A	08/24/2011		54633	382	14	0	14	70.76	250.57	85
1101	1	BADG	05020471	A	05/31/2011		34634	368	0	0	0	15.32	173.97	95
1101	1	BADG	05020471	A	02/25/2011		14634	355	11	0	11	58.33	238.14	94
1101	1	BADG	05020471	A	11/23/2010		74634	344	15	0	15	72.05	243.87	82
1101	1	BADG	05020471	A	09/02/2010		54634	329	15	0	15	72.05	242.12	97
1101	1	BADG	05020471	A	05/28/2010		34667	314	11	0	11	58.33	223.16	84
1101	1	BADG	05020471	A	03/05/2010		14643	303	14	0	14	68.62	238.69	106
1101	1	BADG	05020471	A	11/19/2009		74643	289	11	0	11	58.33	223.16	78
1101	1	BADG	05020471	A	09/02/2009		54643	278	16	0	16	71.78	236.61	92
1101	1	BADG	05020471	A	06/02/2009		34643	262	13	0	13	56.57	224.99	96
1101	1	BADG	05020471	A	02/26/2009		14642	249	11	0	11	51.01	215.84	87
1101	1	BADG	05020471	A	12/01/2008		74641	238	12	0	12	53.84	220.42	83
1101	1	BADG	05020471	A	09/09/2008		54640	226	25	0	25	90.53	260.70	105
1101	1	BADG	05020471	A	05/27/2008		34640	201	11	0	11	51.01	215.84	81
1101	1	BADG	05020471	A	03/07/2008		14641	190	14	0	14	59.50	229.57	100
1101	1	BADG	05020471	A	11/28/2007		74640	176	16	0	16	65.16	238.73	96
1101	1	BADG	05020471	A	08/24/2007		54641	160	20	0	20	76.48	239.56	90
1101	1	BADG	05020471	A	06/05/2007		34641	140	14	0	14	58.37	228.44	98
1101	1	BADG	05020471	A	02/27/2007		14637	126	10	0	10	47.05	210.13	84
1101	1	BADG	05020471	A	12/05/2006		68633	116	12	0	12	52.71	219.29	91
1101	1	BADG	05020471	A	09/05/2006		54630	104	24	0	24	86.67	253.25	103
1101	1	BADG	05020471	A	05/25/2006		34620	80	9	0	9	44.22	205.55	78
1101	1	BADG	05020471	A	03/08/2006		14618	71	12	0	12	52.71	219.29	90
1101	1	BADG	05020471	A	12/08/2005		64613	59	11	0	11	49.88	214.71	85
1101	1	BADG	05020471	A	09/14/2005		48612	48	37	0	37	123.10	287.93	97
1101	1	BADG	05020471	A	06/09/2005		34611	11	11	0	11	42.31	207.14	93
1101	1	BADG	05020471		03/08/2005		34611	2,119	0	0	0	42.31	207.14	93
1101	1	BADG	05020471	A	03/08/2005		14611	2,119	11	0	11	42.31	207.14	83
1101	1	BADG	05020471	A	12/15/2004		90004606	2,108	17	0	17	55.57	230.89	91
1101	1	BADG	05020471		09/15/2004		10360180	2,091	19	0	0	59.99	224.82	92
1101	1	BADG	05020471		09/15/2004		4648	2,091	19	0	0	.00	.00	92

Toilet Rebate Program - Example of
Consumption History reductions
1 Low Flow Toilet installed May 2011

4485 CHURCH DR

07/25/2012 14:56 | CITY OF NEW BERLIN | PG 1
9740fsal | U3 Consumption History Report | utanding

Account # / Service	Man	Meter #	Customer Cd	Name Read Date	By	Bill#	Parcel Curr Read	Usage	Repl Usage	Location Billed Usage	Charge Amt	Billed Amt	Status Days
10180420			302669	OCCUPANT			1240126						CURRENT
1101	1	BADG03013130	A	05/23/2012		32498	838	17	0	17	82.64	273.99	86
1101	1	BADG03013130	A	02/27/2012		12500	821	17	0	17	82.64	273.99	101
1101	1	BADG03013130	A	11/18/2011		72501	804	15	0	15	74.72	262.23	86
1101	1	BADG03013130	A	08/24/2011		52503	789	21	0	21	98.48	295.60	85
1101	1	BADG03013130	A	05/31/2011		32504	768	19	0	19	90.56	285.76	92
1101	1	BADG03013130	A	02/28/2011		12504	749	20	0	20	89.20	286.32	98
1101	1	BADG03013130	A	11/22/2010		72504	729	22	0	22	96.06	280.12	81
1101	1	BADG03013130	A	09/02/2010		52504	707	29	0	29	120.07	305.38	98
1101	1	BADG03013130	A	05/27/2010		32537	678	20	0	20	89.20	269.77	82
1101	1	BADG03013130	A	03/05/2010		12513	658	23	0	23	99.49	285.30	106
1101	1	BADG03013130	A	11/19/2009		72513	635	24	0	24	102.92	290.48	78
1101	1	BADG03013130	A	09/02/2009		52513	611	42	0	42	154.59	340.40	93
1101	1	BADG03013130	A	06/01/2009		32513	569	26	0	26	93.46	284.52	95
1101	1	BADG03013130	A	02/26/2009		12512	543	23	0	23	84.97	270.78	91
1101	1	BADG03013130	A	11/27/2008		72511	520	19	0	19	73.65	252.47	79
1101	1	BADG03013130	A	09/09/2008		52510	501	29	0	29	101.95	293.01	105
1101	1	BADG03013130	A	05/27/2008		32510	472	19	0	19	73.65	252.47	81
1101	1	BADG03013130	A	03/07/2008		12511	453	26	0	26	93.46	284.52	100
1101	1	BADG03013130	A	11/28/2007		72510	427	25	0	25	90.63	279.94	96
1101	1	BADG03013130	A	08/24/2007		52511	402	23	0	23	84.97	270.78	91
1101	1	BADG03013130	A	06/04/2007		32510	379	26	0	26	92.33	283.39	97
1101	1	BADG03013130	A	02/27/2007		12506	353	23	0	23	83.84	269.65	84
1101	1	BADG03013130	A	12/05/2006		66502	330	24	0	24	86.67	274.23	91
1101	1	BADG03013130	A	09/05/2006		52499	306	29	0	29	100.82	286.53	104
1101	1	BADG03013130	A	05/24/2006		32489	277	17	0	17	66.86	242.18	76
1101	1	BADG03013130	A	03/09/2006		12487	260	23	0	23	83.84	269.65	92
1101	1	BADG03013130	A	12/07/2005		62481	237	23	0	23	83.84	269.65	90
1101	1	BADG03013130	A	09/08/2005		46480	214	23	0	23	83.84	267.90	92
1101	1	BADG03013130	A	06/08/2005		32479	191	26	0	26	75.46	266.52	91
1101	1	BADG03013130	A	03/09/2005		12479	165	22	0	22	66.62	250.68	84
1101	1	BADG03013130	A	12/15/2004		90002474	143	28	0	28	79.88	274.44	91
1101	1	BADG03013130		09/15/2004		10180420	115	25	0	0	73.25	259.06	92
1101	1	BADG03013130		09/15/2004		2503	115	25	0	0	.00	.00	92

Toilet Rebate Program - Example of
Consumption History reductions
2 Low Flow Toilets installed May 2011

1436 RIDGEWAY RD

07/26/2012 15:12 | CITY OF NEW BERLIN | PG 1
9740fsal | UB Consumption History Report | utdmding

Account # / Service	Man	Meter #	Customer Cd	Name Read Date	By	Bill#	Parcel Curr Read	Location Usage	Repl Usage	Billed Usage	Charge Amt	Status Billed Amt	Days
10290120			304125	OCCUPANT			1165980					CURRENT	
1101	1	BADG05051915	A	05/24/2012		33907	177	9	0	9	50.96	226.92	91
1101	1	BADG05051915	A	02/23/2012		13909	168	10	0	10	54.92	232.81	101
1101	1	BADG05051915	A	11/14/2011		73910	158	9	0	9	50.96	226.92	83
1101	1	BADG05051915	A	08/23/2011		53912	149	12	0	12	62.84	240.73	90
1101	1	BADG05051915	A	05/25/2011		33913	137	9	0	9	50.96	226.92	92
1101	1	BADG05051915	A	02/22/2011		13913	128	10	0	10	54.90	232.79	97
1101	1	BADG05051915	A	11/17/2010		73913	118	10	0	10	54.90	217.98	83
1101	1	BADG05051915	A	08/26/2010		53913	108	13	0	13	65.19	231.77	92
1101	1	BADG05051915	A	05/26/2010		33946	95	9	0	9	51.47	212.80	85
1101	1	BADG05051915	A	03/02/2010		13922	86	12	0	12	61.76	228.34	105
1101	1	BADG05051915	A	11/17/2009		73922	74	9	0	9	51.47	212.80	78
1101	1	BADG05051915	A	08/31/2009		53922	65	12	0	12	58.90	225.48	95
1101	1	BADG05051915	A	05/28/2009		33922	53	9	0	9	45.35	206.68	87
1101	1	BADG05051915	A	03/02/2009		13921	44	12	0	12	53.84	220.42	102
1101	1	BADG05051915	A	11/20/2008		73920	32	8	0	8	42.52	202.10	78
1101	1	BADG05051915	A	09/03/2008		53919	24	14	0	14	59.50	219.08	105
1101	1	BADG05051915	A	05/21/2008		33919	10	9	0	9	45.35	206.68	82
1101	1	BADG05051915	A	02/29/2008		13920	1	1	7	8	42.52	202.10	21
1101	1	BADG05051915		02/08/2008		13920	1,545	7	7	0	42.52	202.10	21
1101	1	BADG05051915	A	11/28/2007		73919	1,538	13	0	13	56.67	224.99	96
1101	1	BADG05051915	A	08/24/2007		53920	1,525	18	0	18	70.82	232.15	91
1101	1	BADG05051915	A	05/25/2007		33920	1,507	10	0	10	47.05	210.13	86
1101	1	BADG05051915	A	02/28/2007		13916	1,497	9	0	9	44.22	205.55	86
1101	1	BADG05051915	A	12/04/2006		67912	1,488	8	0	8	41.39	200.97	94
1101	1	BADG05051915	A	09/01/2006		53909	1,480	14	0	14	58.37	223.20	109
1101	1	BADG05051915	A	05/15/2006		33859	1,466	10	0	10	47.05	210.13	90
1101	1	BADG05051915	A	02/14/2006		13897	1,456	11	0	11	49.88	214.71	92
1101	1	BADG05051915	A	11/14/2005		63892	1,445	9	0	9	44.22	205.55	76
1101	1	BADG05051915	A	08/30/2005		47891	1,436	15	0	15	61.20	224.28	99
1101	1	BADG05051915	A	05/23/2005		33890	1,421	5	6	11	42.31	207.14	35
1101	1	BADG05051915		04/18/2005		33890	1,416	6	6	0	42.31	207.14	35
1101	1	BADG05051915	A	02/21/2005		13890	1,410	10	0	10	40.10	203.18	68
1101	1	BADG05051915	A	12/15/2004		90003885	1,400	17	0	17	55.57	230.89	91
1101	1	BADG05051915		09/15/2004		10290120	1,383	16	0	0	53.36	223.43	92
1101	1	BADG05051915		09/15/2004		3922	1,383	16	0	0	.00	.00	92

Toilet Rebate Program - Example of
Consumption History reductions
2 Low Flow Toilets installed July 2011

Did you know...

Your water can become contaminated if connections to your plumbing system are not properly protected!

The purpose of the local Cross-Connection Control Program, as required by State Plumbing Code and Regulations, is to ensure that everyone in the community has safe, clean drinking water.

Public Health & Safety...

To avoid contamination, backflow preventers are required by state plumbing codes wherever there is an actual or potential hazard for a cross-connection. The Wisconsin Department of Natural Resources requires all public water suppliers to maintain an on-going Cross-Connection Control Program involving public education, onsite inspections, and possible corrective actions by building owners if required.

More Information:

WI Department of Safety and Professional Services (formerly DOC)
www.dsps.wi.gov

WI Department of Natural Resources
www.dnr.wi.gov

Environmental Protection Agency (EPA)
www.epa.gov

Cross-Connection Control / Backflow Prevention
www.hydrodesignsinc.com/wiccc.html

City of New Berlin

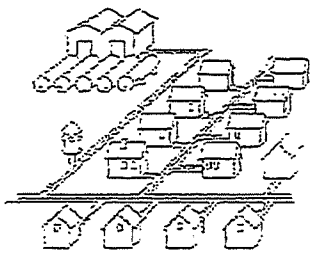
City of New Berlin Water Utility
16450 W. National Avenue
New Berlin, WI 53151
(262) 786-7086

Drinking Water Information

City of New Berlin Water Utility
16450 West National Avenue
New Berlin, WI 53151

Residential Water User Cross-Connection Hazards

Bathrooms & Kitchens



We're All Connected.....

Maintaining the integrity of your public drinking water system.

What is a Cross-Connection?

A cross-connection is an actual or potential connection between the safe drinking water (potable) supply and a source of contamination or pollution. State plumbing codes require approved backflow prevention methods to be installed at every point of potable water connection and use. Cross-Connections must be properly protected or eliminated.

How does contamination occur?

When you turn on your faucet, you expect the water to be as safe as when it left the treatment plant. However, certain hydraulic conditions left unprotected within your plumbing system may allow hazardous substances to contaminate your own drinking water or even the public water supply.

Water normally flows in one direction. However, under certain conditions, water can actually flow backwards; this is known as Backflow. There are two situations that can cause water to flow backward: backsiphonage and backpressure.

Backsiphonage

May occur due to a loss of pressure in the municipal water system during a fire fighting emergency, a water main break or system repair. This creates a siphon in your plumbing system which can draw water out of a sink or bucket and back into your water or the public water system.

Backpressure

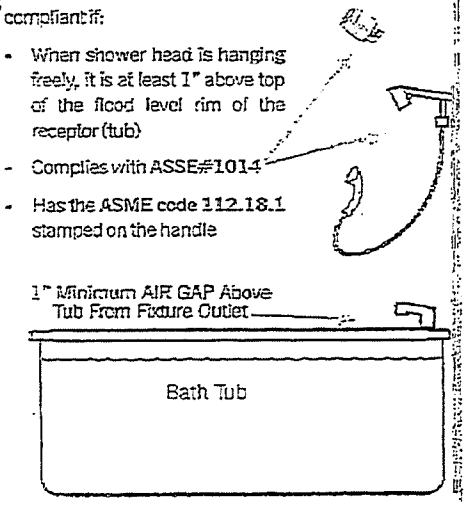
May be created when a source of pressure (such as a boiler) creates a pressure greater than the pressure supplied from the public water system. This may cause contaminated water to be pushed into your plumbing system through an unprotected cross-connection.

20

In the Bathroom - Hand Held Shower Fixture

The hand held shower fixture is compliant if:

- When shower head is hanging freely, it is at least 1" above top of the flood level rim of the receptor (tub)
- Complies with ASSE#1014
- Has the ASME code 112.18.1 stamped on the handle

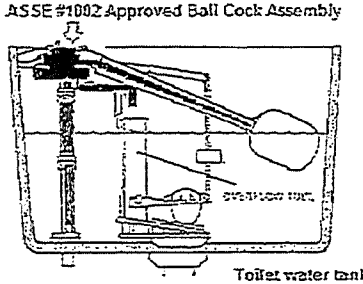


In the Bathroom - Toilet Tanks

There are many unapproved toilet tank fill valve products sold at common retailers which do not meet the state plumbing code requirements for backflow prevention.

- Look for the ASSE #1002 Standard symbol on the device and packaging
- Replace any unapproved devices with an ASSE #1002 approved anti siphon ball-cock assembly. Average cost is typically $12 to $22 at home improvement stores
- Verify overflow tube is one inch below critical level (CL) marking on the device

ASSE #1002 Approved Ball Cock Assembly



Toilet water tank

Insights to protect your drinking water

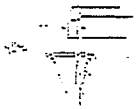
Do...

- Keep the ends of hoses clear of all possible contaminants.
- Make sure dishwashers are installed with a proper air gap device.
- Verify and install a simple hose bibb vacuum breaker on all threaded faucets around your home.
- Make sure water treatment devices such as water softeners have the proper "air gap", which is a minimum of one inch above any drain.

Hose bibb Vacuum Breaker

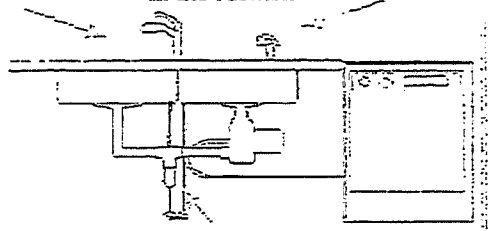
Don't...

- Submerge hoses in buckets, pools, tubs, sinks or ponds.
- Use spray attachments without a backflow prevention device.
- Connect waste pipes from water softeners or other treatment systems directly to the sewer or submerged drain pipe. Always be sure there is a one inch "air gap" separation.



Air Gap

In the Kitchen



Hoses and water treatment devices may create a potential backflow hazard if not properly isolated with backflow prevention methods.

Cross Connection Control Program

Why?

NR 810.15

NR 810.15 Cross connections and interconnections.
Unprotected cross-connections are prohibited. Cross-connections shall be protected as required in Chapter Comm 82.41.

(1) CROSS CONNECTION CONTROL PROGRAM. In order to protect the public water supply system, the water supplier for every municipal water system shall develop and implement a comprehensive cross connection control program for the elimination of all existing unprotected cross-connections and prevention of all future unprotected cross- connections to the last flowing tap or end-use device. The program may include providing public education materials in lieu of inspections of low hazard portions of residential or commercial facilities. Low hazard areas consist of normal kitchen and bathroom fixtures. The water supplier shall keep a current record of the cross connection control program available for annual review by the department. The cross connection control program shall include:

Requires municipal water suppliers have CCC Program in place

(A) Complete description of the program and the administration procedures, including designation of the inspection or enforcement agency or agencies.

(B) Local authority for implementation of the program, such as ordinance or other governing rule.

Program must be documented and inspections on a time schedule

(c) A time schedule for public education materials, surveys and follow up surveys of consumer premises for cross connections including appropriate record keeping. Unless otherwise authorized by the department, water suppliers for each municipal water system shall cause a survey to be conducted for every residential service a minimum of once every ten years or on a schedule matching meter replacement. Public educational materials, when being provided in lieu of low hazard inspections, shall be provided to the customer no less than every 3 years and with every cross connection survey. Unless a detailed alternative schedule is included in the cross connection control program and is approved by the department, water suppliers for each municipal water system shall cause a survey to be conducted for every industrial, commercial and public authority service a minimum of once every 2 years. Commercial properties of similar or lesser risk to residential properties may follow the same schedule as residential properties. Completed survey results shall be maintained by the water supplier until corrections and follow up surveys have been made.

Inspection frequency and facility hazard type must be authorized by DNR

(d) A complete description of the methods, devices, and assemblies which will be used to protect the potable water supply. Compliant methods, devices and assemblies are listed in s. Comm 82.41.

Must refer to Comm. 82.41 plumbing code

(e) Provisions for denial or discontinuance of water service, after reasonable notice, to any premises where an unprotected cross connection exists or where a survey could not be conducted due to denial.

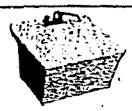
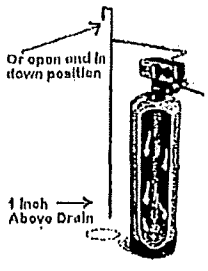
(f) Submission to the department of a copy of an ordinance establishing a cross connection Control Program, an annual report including a total number of all service connections by Category and a report indicating the number of surveys completed in each category for that year.

All well to city water interconnections must be permitted individually by DNR

(2) INTERCONNECTIONS WITH OTHER ACCEPTABLE WATER SOURCES. Interconnections between the public water supply system and another source of water are prohibited unless permitted by the department in individual cases. Approval of the department shall be obtained prior to the interconnection.

History: CR 09-073: cr. Register November 2010 No. 659, eff. 12-1-10.

Cross Connection Control Program - Requirement Reference Sheet

Backflow Preventer:	Specific Required Corrective Action:	Required ?
	Lawn Sprinkler Backflow Preventers If box "A" is checked -*Install Pressure Vacuum Breaker with Product Standard Approval # ASSE 1020 in Supply to Lawn Irrigation System. Device must be tested and registered with the Dept of Commerce by a Certified Tester upon installation.* Location/Comments:	A☐
	Toilet Tank Anti-Siphon Valves If box "B" is checked -*Install Anti-Siphon Ballcock Assembly with Product Standard Approval # ASSE 1002 inside toilet water tank. This device may be installed by homeowner and purchased for less than $20 at hardware/home improvement stores.* Location/Comments:	B☐
	Boiler Backflow Preventer – High Hazard Type If box "C" is checked -*Install Reduced Pressure Principle Backflow Preventer with Product Standard Approval # ASSE 1013 in Supply to Chemically Treated Boiler System. Device must be tested and registered with the Dept of Commerce by a Certified Tester upon installation.* Location/Comments:	C☐
	Boiler Backflow Preventer – Low Hazard Type If box "D" is checked -Install Vented Dual Check Valve Product Standard Approval # ASSE 1012 in Supply to Non-Chemically Treated Boiler System. Consult a licensed plumber for proper installation. Location/Comments:	D☐
	Outside Hose Bibb Fixture If box "E" is checked - Install Hose Bibb Vacuum Breaker Product Standard Approval # ASSE 1011 on hose threads of hose bibb or install ASSE # 1019 fixture. For cold weather/season installation, make sure hose is disconnected and relief valve has drained any water contained within the hose bibb. During winter/ below freezing weather, shut off interior control valve supply to each exterior hose bibb and open to drain the hose bibb fixture to prevent freezing and expansion damage. Location/Comments:	E☐
	Standard Hose Bibb If box "F" is checked - *Install Hose BibbVacuum Breaker Product Standard Approval # ASSE 1011 on hose threads of hose bibb.This device may be installed by homeowner and purchased for less than $15 at hardware/home improvement stores.* Location/Comments:	F☐
	Laundry Tub Threaded Fixture If box "G" is checked - Install Hose Connection Vacuum Breaker Product Standard Approval # ASSE 1011 on hose threads of Laundry Tub Faucet. This device may be installed by homeowner and purchased for less than $15 at hardware/home improvement stores. Location/Comments:	G☐
	Water Softener Back Flush Drain Hose If box "H" is checked - Install a minimum 1" physical air gap between Back Flush Drain Piping or install an open ended "T" with elbow in the downward position and open to atmosphere to prevent backflow potential. This correction may be installed by homeowner and corrected for less than $15 with materials available at hardware/home improvement stores. Location/Comments:	H☐

 www.HydroDesignsInc.com www.BackFlowNews.com

SAMPLE

Residential Cross Connection Survey

This survey is being performed in accordance with; WI DNR 810.15, Chapter-Comm. 81, 82, 84 and the Local Municipal Ordinance for Cross Connection Control to ensure safe drinking water.

Compliant? Yes ☐ (no further action required Non-Compliant ☒ see table below for corrective action

Name Mary Germane PAUL H.

Address 12660 CRAWFORD. City _____

Phone 262-784-9184 -22-12

Brochure provided in lieu of sur om fixtures? Yes ☐

Add as 22A, B? or C and

Fixture Type	Approved		*Device
Water Softener Drain	Y/(N)	NEEDS.	ASME A112.1.2 Vacuum breaker tee, ASME a112.1.3
Laundry Tub with hose threads	(Y)/N	OK	ASSE 1011,1052
Inside Hose Bibb(s)	(Y)/N	OK	ASSE 1011,1052
Toilet(s)	(Y)/N	OK	ASSE 1002
Boiler	Y/(N)	N/A.	ASSE 1012** - Low Hazard ASSE 1013** - High Hazard
Humidifier	Y/(N)	N/A.	ASME A112.1.2** ASSE 1012**
Outside Hose Bibb(s)	(Y)/N	CUSTOMER PROVIDED WITH 3-VB HOSE BIB 21.00 ea.	ASSE 1019, 1053 ASSE 1011, 1052
Lawn Irrigation	Y/(N)	N/A.	ASSE 1001** ASSE 1020** ASSE 1013**
Hand Held showers	Y/(N)	N/A.	ASSE 1014 ASME A112.18.1
Water Powered Sump Pump		OK	ASSE 1013**
Pools / Spa /Hot Tubs	Y/(N)	N/A.	ASME A112.1.2 ** ASSE 1001**
Kitchen Faucets	Y/N		ASME A112.18.1
Other			
Other			
Other			

Notes: NEED 2" AIR GAP ON SOFTNER DISCHARGE HOSE.

Sample

Residential Cross Connection Survey

This survey is being performed in accordance with; WI DNR 810.15, Chapter-Comm. 81, 82, 84 and the Local Municipal Ordinance for Cross Connection Control to ensure safe drinking water.

Compliant? Yes ☑ (no further action required Non-Compliant ☒ TB See table below for corrective action

Name John Wobaril — Tom Bauer

Address 3095 Calhoun Rd City New Berlin

Phone _____ Date of Survey 10/9/12

Brochure provided in lieu of surveying normal kitchen and bathroom fixtures? Yes ☒

Fixture Type	Approved	Location / Description	*Device
Water Softener Drain	Y/N	N/A	ASME A112.1.2 Vacuum breaker tee, ASME a112.1.3
Laundry Tub with hose threads	(Y)N		ASSE 1011,1052
Inside Hose Bibb(s)	Y/N	Gave customer AUB	ASSE 1011,1052
Toilet(s)	Y/N	N/A	ASSE 1002
Boiler	Y/N	N/A	ASSE 1012** - Low Hazard ASSE 1013** - High Hazard
Humidifier	Y/N	N/A	ASME A112.1.2** ASSE 1012**
Outside Hose Bibb(s)	(Y)N	OK	ASSE 1019, 1053 ASSE 1011, 1052
Lawn Irigation	Y/N	N/A	ASSE 1001** ASSE 1020** ASSE 1013**
Hand Held showers	Y/N	N/A	ASSE 1014 ASME A112.18.1
~~Water Powered Sump~~ Pump	OK		ASSE 1013**
Pools / Spa / Hot Tubs	Y/N	N/A	ASME A112.1.2 ** ASSE 1001**
Kitchen Faucets	Y/N	N/A	ASME A112.18.1
Other			
Other			
Other			

Notes: _____

METER/ROM/GEN PULL
Account# 10010435 TG-1

Date: 2/6/12 Initials TB / DD

Address: 2460 Commerce

Meter Size: 5/8 M25

Gen Reading: 20580

ROM Reading: —

New/Final Reading: 20

Old Meter Serial #: 02097404

New Meter Serial# 00189335

Old ROM # RTR 82141340

New ROM# —

Remarks: W/O Softener

Parts: —

Year Installed: 02

METER/ROM/GEN PULL
Account# 10010860

Date: 1/31/12 Initials TB / DD

Address: 2020 Calhoun Rd

Meter Size: 1.5" M120

Gen Reading: 69000

ROM Reading: —

New/Final Reading: 69

Old Meter Serial# 97396682

New Meter Serial# 96479181

Old ROM# RTR 80410741

New ROM# —

Remarks: W/O Water Softener

Parts: —

Year Installed: 1/09

METER/ROM/GEN PULL
Account# 1012 12410 TG-1

Date: 3-9-12 Initials DO/TB

Address: 15155 Kings Way

Meter Size: 5/8 M25

Gen Reading: 769880 PSC Adjust

ROM Reading: 769900

New/Final Reading: 0

Old Meter Serial #: 02097510

New Meter Serial# 03110643

Old ROM # 84338877

New ROM# 84338877

Remarks:

Parts: W/O Softener on bypass

METER/ROM/GEN PULL
Account# 1001 0680 TG-1

Date: 2-13-12 Initials DO/TB

Address: 16350 16330-50 Glendale Rd

Meter Size: 1" M70

Gen Reading: 235730

ROM Reading: —

New/Final Reading: 235

Old Meter Serial #: 90399159

New Meter Serial# 0107 8558

Old ROM # 8270 4684

New ROM# Same

Remarks:

Parts: W/O Water Softener

For Immediate Release
July 13, 2005

Contact: Ray Grzys, Director Utilities and Streets
City of New Berlin
(262) 780-4609

New Berlin Celebrates Tapping Lake Michigan Water

A landmark agreement between the City of New Berlin and Milwaukee will be celebrated on July 21st. Lake Michigan water service to New Berlin started on June 28th, culminating over 3 years of cooperation between the two Cities. The agreement provides relief for New Berlin's water worries while providing an additional source of revenue to the City of Milwaukee.

As a result of a water service agreement that was signed in June of 2003, the eastern portion of New Berlin will be using Lake Michigan water. The western portion of New Berlin will continue to use a local aquifer as its water source. The use of Lake Michigan water will relieve the pressure to draw more water from the local aquifer. New Berlin has frequently had to impose water restrictions during the summer months because of the demand for water.

The ceremony will feature political figures from both municipalities and others involved in the project. Details can be obtained from the city at 262-780-4609.

Milwaukee
Water Works

Comparison Of Water Quality Characteristics

Parameter	New Berlin Wells 1 and 4	Milwaukee Lake Water
Temperature (° F)	45 - 55	32 - 70
pH	~ 7.5	~ 7.5
Hardness (mg/L as $CaCO_3$)	350 - 400	125 - 165*
Hardness (grains per gallon)	~ 22	~ 8*
Alkalinity (mg/L as $CaCO_3$)	~ 270	95 - 118
Chlorine (mg/L)	~ 0.05 free	~ 1.0 combined
Turbidity (NTU)	2 - 3 NTU	0.1 - 0.6 NTU
Total Dissolved Solids (TDS)	550 - 600	120 - 180
Calcium (mg/L)	100 - 140	25 - 35
Fluoride (mg/L)	~ 0.5	~ 1.0
Iron (mg/L)	0.12 - 0.22	Less than 0.4
Magnesium (mg/L)	52 - 66	12 - 13 mg/L
Manganese (mg/L)	0.02 - 0.03	Less than 0.001
Sodium (mg/L)	~ 20	~ 10
Sulfate (mg/L).	~120	~ 25
Radium 226/228 (pCi/L)	4 - 6	Less than 0.85
Gross alpha (pCi/L)	15 - 22	Less than 3
Gross beta (pCi/L)	10 - 11	Less than 4

* Water softening is not necessary

Detailed analytical results of Milwaukee Water Works' 2004 testing can be found at http://www.mpw.net/Pages/water/docs/2004FinishedWaterQuality.pdf.

Prepared for June 4, 2005 Public Informational Meeting

841 N. Broadway
Zeidler Municipal Building
Room 409
Milwaukee, Wisconsin 53202

www.water.mpw.net

Safe, Abundant Drinking Water.

Utilities Division
16460 West National Avenue
New Berlin, Wisconsin 53151-5097

(262) 786-7086
Fax (262) 786-0792
www.newberlin.org

June 26, 2009

Important Water Supply Notice!!!
Change from Well Water to Lake Michigan Water

Dear Customer:

The City of New Berlin Water Utility will begin purchasing Lake Michigan Water for utility customers west of the sub continental divide that currently receive water from our deep wells. The change will occur during the month of July, 2009. Once the change is made, your property will be receiving Lake Michigan water service.

The precise timetable for the change over is governed by some ongoing construction projects and the need for utility staff to make some changes to the system operations.

The change over requires no action on your part unless you are a kidney dialysis patient or are a fish owner (see information below – Reference: Washington DC Department of Health). There will be no change in the level of water supply or pressure from that which you currently receive.

Kidney Dialysis Patients

Milwaukee uses a disinfection technique called Chloramination. Chloramines use both chlorine and ammonia in the disinfection process and are the preferred method of disinfection for surface water supplies. Customers who use drinking water for dialysis treatment, in fish tanks, in aquaculture and for certain other uses may need to make some changes. Customers with home dialysis equipment should contact their physicians regarding chloramination and how it will affect them. They should also check with the equipment manufacturer for information.

Fish Owners

Chloramines should be removed from water that is used in fish tanks, ponds and aquariums. Tropical fish shops and other businesses that keep fish or other animals in aquariums or ponds are encouraged to contact a pet supply company about how to treat the water to remove chloramines before using drinking water in aquariums.

Softening

One water quality difference everyone may notice is the much lower level of natural hardness present in lake water compared to well water. Lake water hardness is about one fourth that of the City well supply. Each property has the option to continue to soften if they chose to do so.

The decrease in hardness may not be experienced immediately due to the build up of minerals in the water mains. Experience has shown that a few months or more may be required before hardness is reduced to a point where you may desire to stop softening. We recommend you monitor hardness yourself or contact the utility for their current hardness data. We also recommend that you work with your water softenor provider on settings for your softener if you choose to continue to use your softener. The City will be retaining some of its well-based facilities to preserve our past investments and to provide capacity in the form of storage for situations that may require additional water supply. In order to assure that our well based facilities will operate reliably when they are called upon, we will be exercising the facilities regularly. This will result in a small portion of well water mixing with the lake water on a very limited basis for the next few years. The increase in hardness of the blended water will be negligible and you should not notice it. You can go to the

American Water Works Association MEMBER

City's website link at http://www.newberlin.org/government/departments/utilities/water-quality-report.aspx to access the Milwaukee Water Works Water Quality Report for 2008. If you have any questions regarding this notice, please call the City of New Berlin Water Utility Department at 262-786-7086.

City of New Berlin Water Utility

Rick Johnson, Utility Manager

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Water Quality Basics

Milwaukee
Water Works

Safe, Abundant Drinking Water.

Typical Finished Water Values

Parameter	Median Value	Range
Alkalinity	100 mg/L (as $CaCO_3$)	90-110 ppm
Calcium	35 mg/L	27-37 mg/L
Chlorine Residual*	0.95 mg/L	0.3–1.3 mg/L
Conductivity	305 uS/cm	280–350 uS/cm
Fluoride	0.86 mg/L	0.3–1.2 mg/L
Hardness	7.5 grains per gallon	7–9 grains per gallon
Hardness	127 mg/L (as $CaCO_3$)	117–146 mg/L
Iron	0.02 mg/L	0.002-0.32 ppm
Nitrate, as N	0.3 mg/L	0.2–0.7 mg/L
pH	7.45	7.2–7.9
Potassium	1.2 mg/L	0.8–1.4 mg/L
Sodium	7.6 mg/L	6–12 mg/L
Temperature	58°F	32°-70°F
Total Dissolved Solids	177 mg/L	126–195 mg/L
Turbidity	< 0.4 NTU	0.1–1.0 NTU

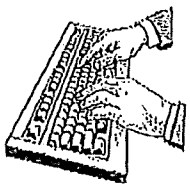
Definitions
< = "is less than"
mg/L = milligrams per liter = ppm = parts per million
gpg = grains per gallon
NTU = nephelometric turbidity units
uS/cm = microsiemens per centimeter
* As total chloramine residual

For more information, please see www.water.mpw.net, select About MWW, and click on Water Quality.

The Milwaukee Water Works is recognized by the U.S. Environmental Protection Agency and the American Water Works Association as a leader in providing the highest quality drinking water and monitoring water quality. The City of Milwaukee-owned utility treats Lake Michigan for the benefit of 860,000 people in 16 communities in southeastern Wisconsin.

Welcome to Water Value Company web site.
Reliable solutions for your water problems.

Water Weekly Newsletter



Water Softener Regeneration Water Usage

Products

Backwashing Filters
Cartridge Filters
Chlorinators
Reverse Osmosis
RO Parts
Scale Prevention
Softeners
Softener Parts
UV Filters
Water Test Kits
Whole-House Filters

How Much Water Will My Water Softener Use?

This is a very often asked question and does not have a simple answer. Basically, we will produce a table of the different sizes and brands of water softeners that we carry and support with the average usage posted in the table, but a few words about how we arrive at these data are in order.

The table below will show the make, model and size of softener along with the amount of water in US gallons that the softener will use during regeneration. The information on injectors, brine line flow control rates and drain line flow control rates along with cycle durations which we use to determine total gallons used, will come from the manufacturer's specification sheets or service manuals. Water pressure is assumed to be 60psi. It is important to keep in mind that these results will vary a great deal depending on water pressure and temperature. It is also noted that while the flow rate for a given cycle is based on the duration of the cycle, not all cycles actually require water flow throughout the entire cycle. For example, the Fleck 5600 refill cycle is 24 minutes. The valve is not refilling the brine tank for the entire 24 minutes. The amount of water returned to the brine tank is dependent on an adjustable cam lobe in the back of the controller. There are numerous other factors that could alter these results. This table is meant as a general comparison guide only.

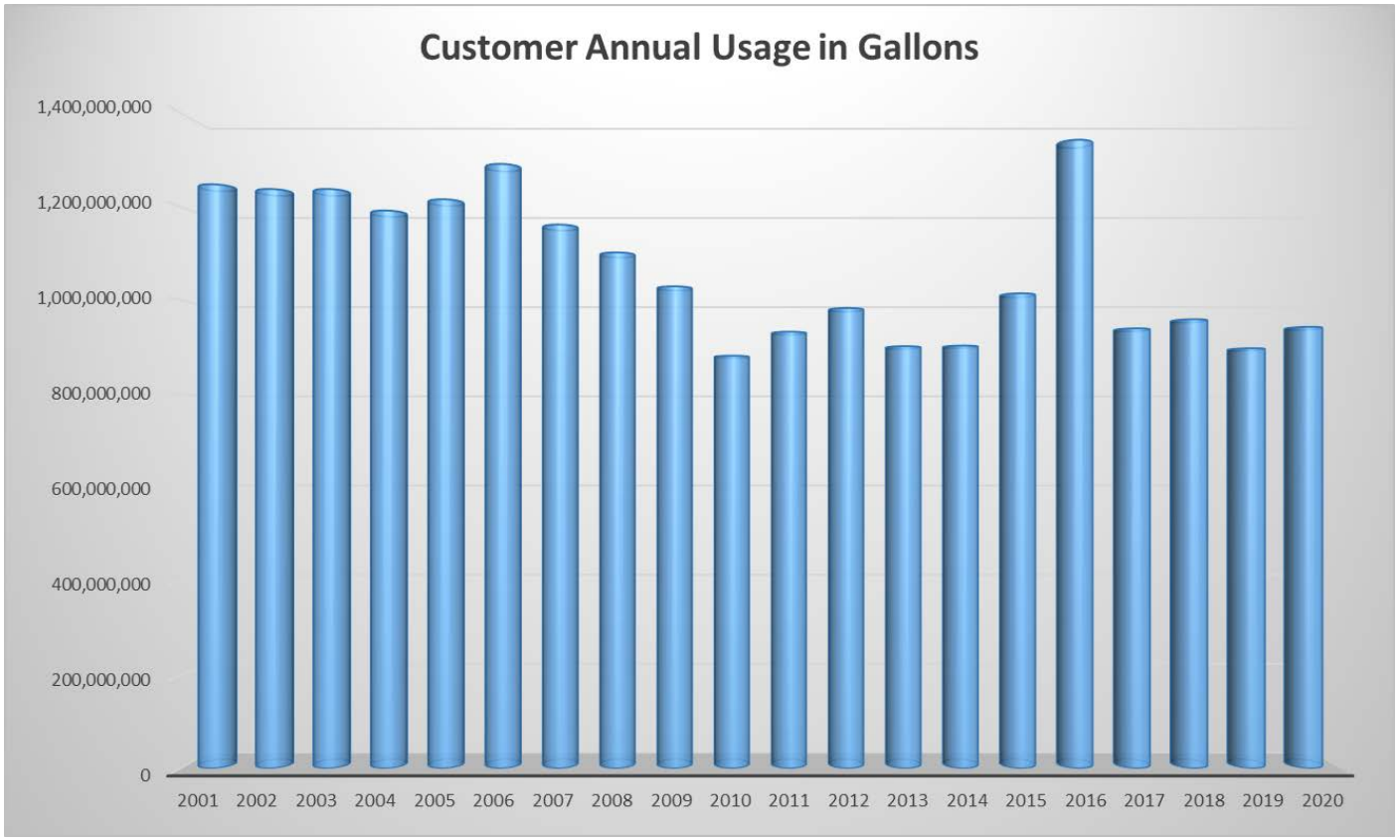
Make/Model	Size	Gallons Per Regenerati

Fleck 2510	24,000 grain	43
Fleck 2510	32,000 grain	61
Fleck 2510	40,000 grain	79.4
Fleck 2510	48,000 grain	79.4
Fleck 2510	64,000 grain	107
Fleck 2510	80,000 grain	132.5
Fleck 2510	110,000 grain	132.5
Fleck 5600	24,000 grain	62.02
Fleck 5600	32,000 grain	74.52
Fleck 5600	40,000 grain	84.52
Fleck 5600	48,000 grain	84.52
Fleck 5600	64,000 grain	142.24
Fleck 9000	24,000 grain x 2	51
Fleck 9000	32,000 grain x 2	58
Fleck 9000	40,000 grain x 2	63.6
Fleck 9000	48,000 grain x 2	63.6
Fleck 9000	64,000 grain x 2	119.5
Fleck 9000	80,000 grain x 2	122
Fleck 9000	110,000 grain x 2	136
Autotrol 255 & 268	24,000 grain	32
Autotrol 255 & 268	32,000 grain	39.3
Autotrol 255 & 268	40,000 grain	68.82
Autotrol 255 & 268	48,000 grain	68.82
Autotrol 255 & 268	64,000 grain	78.2
Autotrol 255 & 268	80,000 grain	104.5

Cycle times and injector flow rates for the Fleck model 7000 were unavailable at the time of this writing. The injector flow rates for the Autotrol models 255 and 268 were taken from a 4 year old publication which may or may not apply to today's Logix controlled systems. The older publication (Dealer Operation, Installation manual) is all that is available from the GE Water & Process Technologies web site.

Customer Annual Usage Information

Year	Customer Annual Usage in Gallons
2001	1,248,214,000
2002	1,238,204,000
2003	1,238,189,000
2004	1,192,110,000
2005	1,216,117,000
2006	1,291,714,000
2007	1,162,095,000
2008	1,102,643,000
2009	1,030,084,000
2010	881,894,000
2011	933,145,000
2012	983,755,000
2013	902,230,120
2014	903,529,120
2015	1,015,102,000
2016	1,343,159,000
2017	940,313,792
2018	959,770,020
2019	897,864,383
2020	943,567,539



Historical Average Annual Rainfall Totals for New Berlin is 34.07 inches

Rainfall Total for 2020 was 38.06 inches

City of New Berlin					
5 Year Water Use Analysis					
All Pumpages are in 1000's of Gallons					
Year	**2016**	**2017**	**2018**	**2019**	**2020**
Water Source	**Purchased Water**	**Purchased Water**	**Purchased Water**	**Purchased Water**	**Purchased Water**
January	78,615	82,235	90,206	78,456	74,871
February	78,824	69,791	68,994	65,063	65,262
March	78,873	74,884	69,263	68,033	76,804
April	75,283	69,099	77,861	73,959	71,524
May	89,249	83,858	89,908	73,187	75,125
June	96,567	84,968	80,367	71,179	94,202
July	99,352	83,987	98,875	93,502	93,489
August	103,403	90,102	92,233	84,023	94,834
September	82,629	85,968	75,171	78,190	80,089
October	77,646	79,025	81,541	72,560	72,004
November	72,272	70,015	70,273	62,958	73,160
December	71,970	66,381	65,077	76,754	72,203
Total Annual Pumpage	1,004,683	940,313	959,769	897,864	943,567
Max Daily Pumpage	4,684	4,347	5,919	4,432	4,838
Max Daily Date	July 20th	December 14th	May 28th	July 15th	August 20th
Average Day	2,745	2,576	2,630	2,360	2,578
Peak to Ave Ratio	1:1.59	1:1.69	1:2.25	1:1.81	1:1.87