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December 3, 2013

DANIEL S. DUCHNIAK, P.E.
GENERAL MANAGER
WAUKESHA WATER UTILITY
115 DELAFEILD STREET
WAUKESHA, WI 53188

Subject: Great Lakes Diversion Application: Demand Estimates

Dear Mr. Duchniak,

As you know, the department has begun its technical review of the City of Waukesha's updated application for a Lake Michigan Water Diversion. The principal goal of this review is to determine if the City's application meets the Great Lakes Compact and state statutory criteria for a diversion to a community within a straddling county. The "exception standard" applying to diversions in both the Great Lakes Compact and Wisconsin statutes requires that any diversion to a community within a straddling county be limited to quantities that are reasonable for the purposes for which the diversion is proposed[1].

The department's preliminary analysis indicates that the application lacks a sufficient explanation for the projected increase in the rate of water use, both in the short term and at full system build-out.

For the department to conclude that the City's demand estimates are reasonable, the department must have a detailed explanation and evidence-based justification for the proposed increase in the demand rate cited in your application.

Alternatively, you may provide the department with a revised demand projection. The attached technical memorandum details the department's specific concerns regarding the demand estimates in your application.

Sincerely,

Eric Ebersberger

Eric Ebersberger
Water Use Section Chief
Bureau of Drinking Water and Groundwater
Wisconsin Department of Natural Resources

[1] See the Great Lakes—St. Lawrence River Basin Water Resources Compact Section 4.9.4.b., and Wis. Stat. §§ 281.343 (4n) (d) 2., and 281.346 (4) (f) 2.

Technical Memorandum

3 December 2013

To: Dan Duchniak – Waukesha Water Utility

From: Bob Smail and Chris Fuchsteiner, WDNR Water Supply Specialists

Subject: Waukesha Diversion Application Demand Rate Projections

The City of Waukesha's updated application for a Lake Michigan Water Diversion uses a combination of methodologies for forecasting future water demand within its proposed water supply service area (WSSA). Residential, commercial, and institutional demand is estimated using per capita coefficients whereas industrial demand is estimated using a per acre coefficient. Unaccounted for water is forecast as a percentage of total sales. To understand how these various factors measured against the City's historic pumpage, the department converted these various demand estimates to total gallons pumped per capita per day (GPCD).

The application provides historical[2] and projected[3] total pumpage and population estimates for the WSSA, allowing for the calculation of historical and projected GPCD. Average daily demand for 2012 was 97 GPCD and is estimated by department staff to be 93 GPCD for 2013[4]. According to the application, based on 2012 demand, the projected average total pumpage will increase 18% to 115 GPCD in 2015. This exceeds the demand rates averaged over the last three, five, ten and fifteen year periods.

Table 1. Historic and projected gallons per capita per day.

Years	Mean Gallons Pumped Per Capita Per Day
15-year average (1998-2012)	111
10-year average (2003-2012)	104
5-year average (2008-2012)	97
3-year average (2010-2012)	97
Projected 2015 Demand	**115**
Projected 2050 Demand	**104**

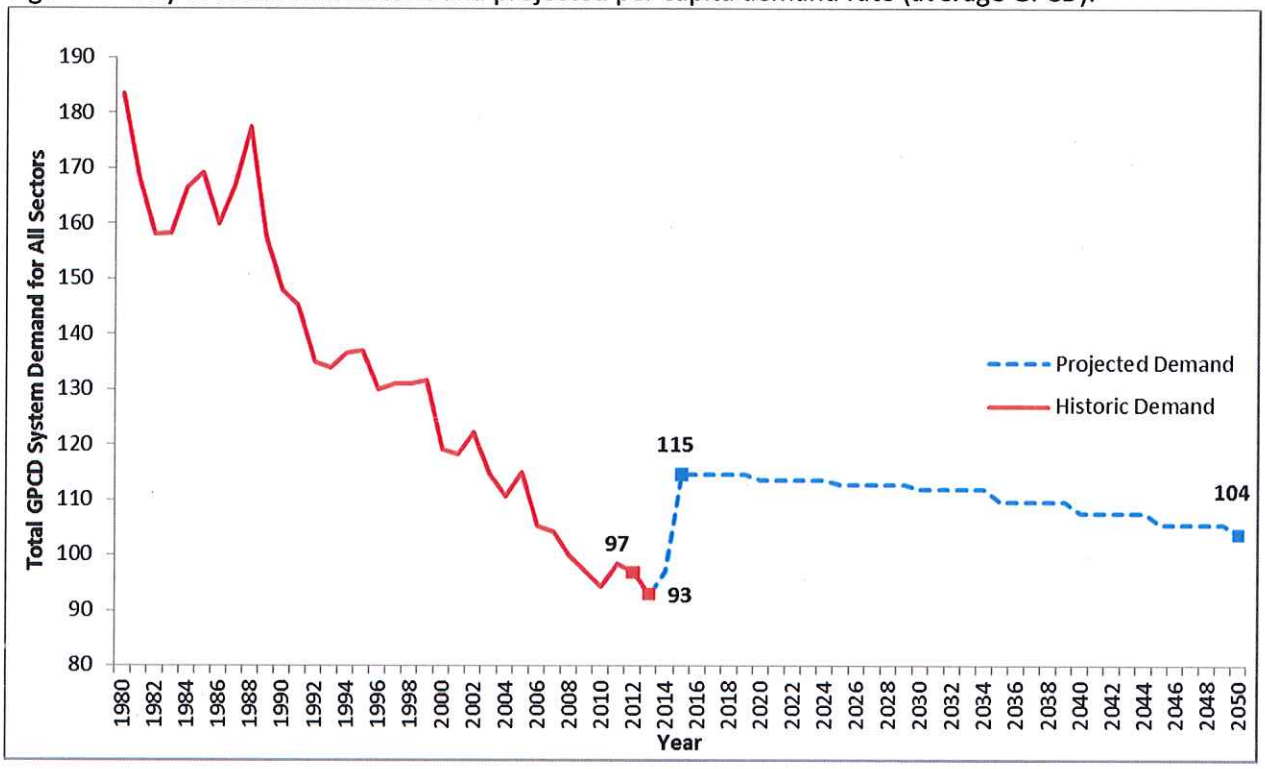
The application notes that efficiencies resulting from the state plumbing code and the City's conservation plan are expected to decrease the average demand rate by 2050 to 104 GPCD. However, this final projected demand rate still exceeds current rates even after 35 years of projected conservation-based reductions and the expectation that regional water demand will continue its long-standing decline. Table 1 and Figure 1 show the historic and projected GPCD provided in the application.

[2] Waukesha Diversion Application vol. 2, Attachment C, Table 1.

[3] Waukesha Diversion Application vol. 2, Appendix C, Table 11

[4] Total reported pumped to WDNR via the Electronic Monthly Operating Report System (EMOR) through October 31 was 2,040,086,400 gallons. Extrapolated to 12 months, this would equal 2,448,103,680 gallons. If population increased by its 30 year historic average of 1.1% to 72,493, the total pumpage per capita per day for 2013 would equal 92.52 gallons.

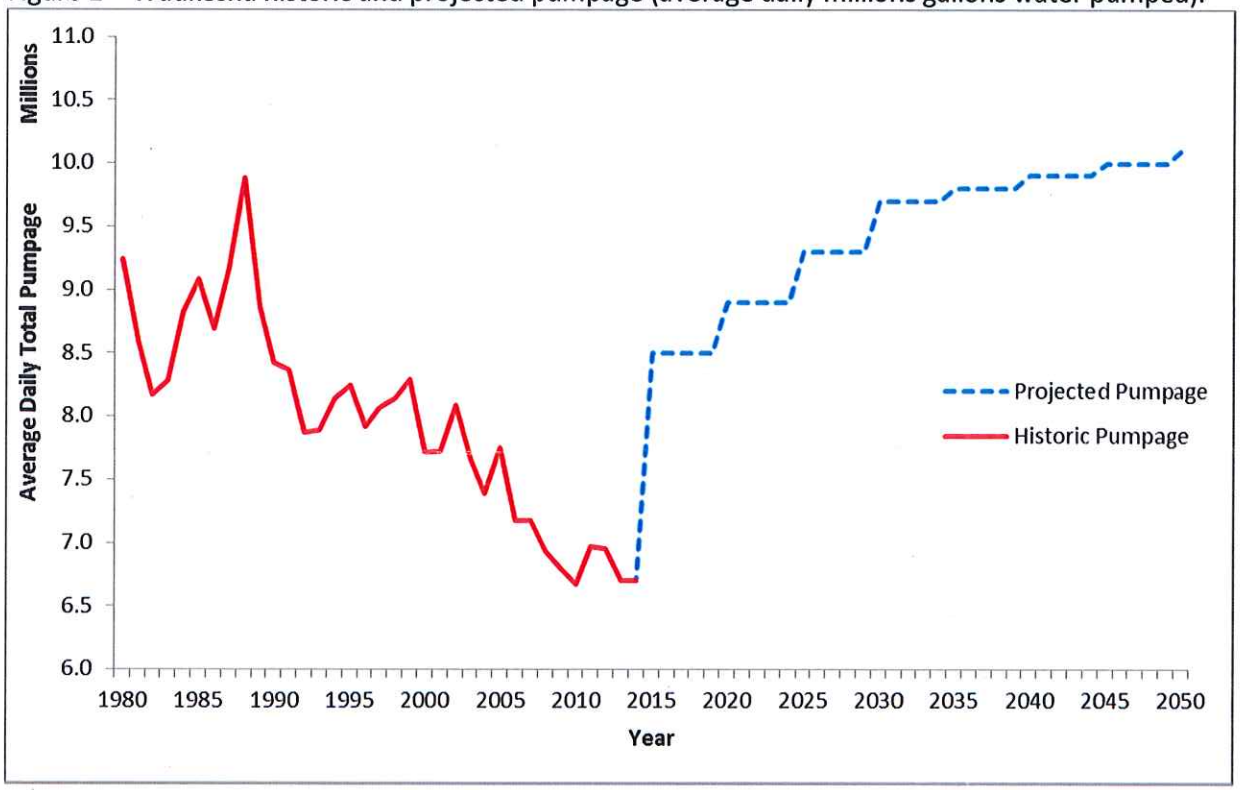
Figure 1 – City of Waukesha historic and projected per capita demand rate (average GPCD).



The City's increased demand estimates are also evident in terms of the total water it plans to deliver to a projected growing population within an expanded service area. For example, the application projects that the population within the proposed WSSA is expected to grow 36% from 71,797 in 2012 to 97,400 by 2050.[5] Additionally, according to the application, average daily demand over this same period will increase 45%, from 6.95 million gallons per day (mgd) to 10.1 mgd[6] (see figure 2). Given the City's proposed conservation efforts and recent trends in declining demand, the application lacks sufficient explanation to justify why demand is projected to grow at a rate exceeding population growth.

[5] Waukesha Diversion Application vol. 2, p. 6-2.
[6] Waukesha Diversion Application vol. 2, p. 6-4.

Figure 2 – Waukesha historic and projected pumpage (average daily millions gallons water pumped).



The City's projected increase in the demand rate is primarily attributable to a projected increase in industrial demand. These demand projections use an industrial rate of 1,297 gallons/acre/per day. This represents a rate that is more than double the 2008-2012 average industrial usage of 642 gallons/acre/day. This increased demand rate is in contrast to long-standing declining trends of industrial water use rates nationally, regionally, and for the City's existing industrial customers.

The City's industrial demand projection extrapolated to full system build-out equals a daily industrial demand of 2.4 mgd, which is more than double the 1.1 mgd projected in the City's original 2010 application.[7] Currently the City has 1,452 acres of industrial use that purchased water at an average rate of 642 gallons/acre/day.[8] There are 380 acres in the proposed WSSA zoned industrial but not yet developed. If the demand for existing industrial customers were to remain constant, new industrial customers would need a demand rate of 3,863 gallons/acre/day—or 6 times the rate of current industrial customers—for the City to meet the 1,297 gallons /acre/day projected in the City's application.

In justifying this industrial demand rate, the application cites a Southeastern Wisconsin Regional Planning Commission (SEWRPC) recommended demand factor of 1,500 gallons per acre per day for new industrial water use to justify its acreage use rate. This recommended planning demand estimate of 1,500 gallons/acre/day was reached by using PSC data for the seven county area SEWRPC serves from the years 2000, 2004, and 2005. Further, the 1,500 gallons/acre/day rate was intended as a generic figure for the region and was derived from historic usage that included densely situated industries in Milwaukee, Kenosha and Racine. The same SEWRPC

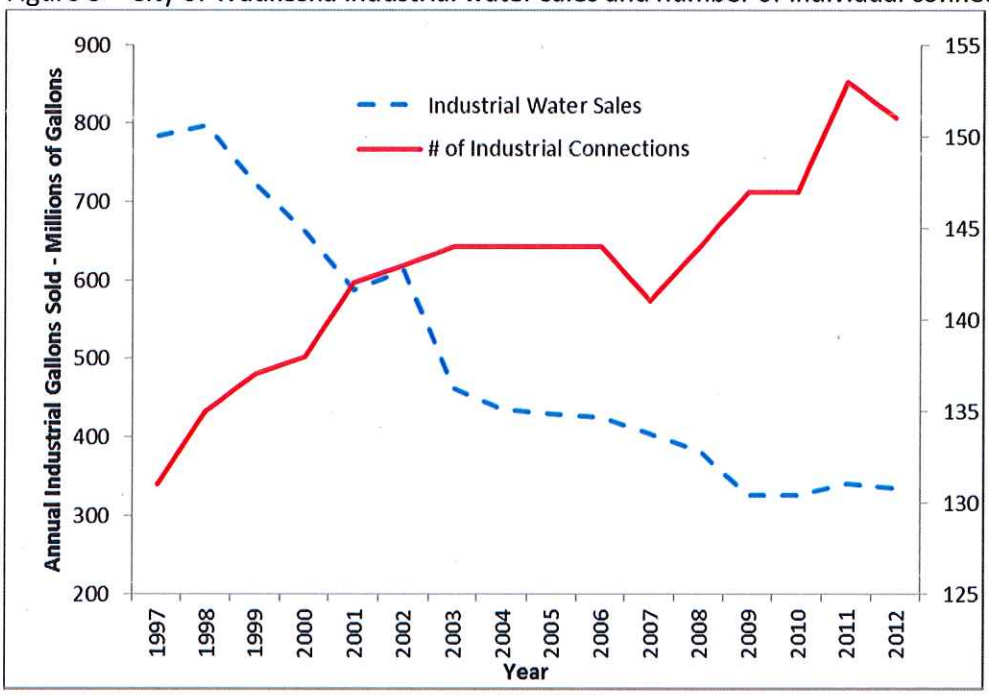
[7] Kathy Beduhn, AECOM. Final Draft Technical Memorandum, May 28, 2009
[8] 642 g/acre/day is the five year average. The 2012 rate was equal to 616 g/acre/day

data shows that Waukesha County had the lowest industrial water use rate, with averages of 1,248 gallons/acre/day in 2000, 862 gallons/acre/day in 2004, and 904 gallons/acre/day in 2005.[9]

The application notes that "water usage is typically projected based on a historical review of water use"[10] and that "weak economic conditions, evidenced after the terrorist attacks on September 11, 2001, and the start of the recession in 2008/2009 resulted in loss of local industry and reduced industrial water use."[11] Analysis by department staff revealed evidence that does not support this assertion:

1. Prior to 2002, industrial sales decreased 25% from 1997-2001. By comparison, industrial sales decreased only 12% from 2008 to 2012.[12]
2. Total volume of industrial sales for Waukesha increased in 2002 immediately following September 11, 2001.[13]
3. A total of 20 industrial connections were added to public water supply between 1997 (131) and 2012 (151).[14] Only 5 industries were reported permanently closed to the Wisconsin Department of Workforce Development within this same time period.

Figure 3 – City of Waukesha industrial water sales and number of individual connections.



[9] SEWRPC. 07/2007. *State-Of-The-Art Of Water Supply Practices.* Technical Report #43 pp. 174-178.
[10] Waukesha Diversion Application vol. 5, Appendix C, p3.
[11] Waukesha Diversion Application vol. 5 p 6-3.
[12] Public Service Commission of Wisconsin Annual Report Data
[13] Ibid.
[14] Ibid.

For the City's projected industrial demand rate to be considered reasonable, detailed justification for the increased industrial demand rate is needed, including, e.g.:

- A description of the types of industries the City intends to attract and their anticipated water demands.
- A detailed account of existing industries that may be currently running at reduced capacity and how economic changes would lead to expanded water use for those facilities.
- An explanation of how a projected significant increase in industrial demand will conform with the City's water conservation plan and its efforts to promote conservation to industrial customers.
- Any other evidence-based explanation for the departure from current declining trends in the industrial demand rate.

Absent the information outlined above, the department recommends the demand numbers be revised to reflect the City's current water use trends.