Application for Allocation Permit
for
Lake Michigan Water

Fox Lake Hills Water System
Lake County Public Works Department
Lake County, Illinois

July 2009

Applied Technologies
Engineers - Architects
468 Park Avenue • Lake Villa, Illinois 60046

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July 17, 2009

Prepared By

Applied Technologies, Inc.
468 Park Avenue
Lake Villa, IL 60046
847-265-7325

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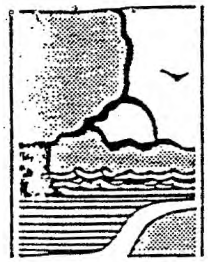


ILLINOIS
DEPARTMENT OF
NATURAL RESOURCES
Office of Water Resources

Dept. of Natural Resources
Office of Water Resources
36 S. Wabash Ave./Suite 1415
Chicago, IL 60603

APPLICATION FOR PERMIT TO WITHDRAW LAKE MICHIGAN WATER

An application for permit to withdraw Lake Michigan Water requires that the applicant express all amounts, usage, demands, etc in units of million gallons per day (MGD) for each accounting year beginning October 1 and ending September 30. The applicant should not include any water that is sold or transferred to any other distribution system unless expressly indicated otherwise in this application. In support of the application, the applicant must complete and answer the following questions, and provide the information that is requested in each of the sections contained in this application. After completing this form, please return it to the Illinois Department of Natural Resources, Office of Water Resources, 36 S. Wabash Avenue, Suite 1415, Chicago, IL 60603.

SECTION I - GENERAL INFORMATION

Name, address and phone number of applicant:

Lake County Public Works Department Fox Lake Hills

650 Winchester Road

Libertyville, Illinois 60048

847-377-7500

Name, address and phone number of the contact person for the applicant:

Frank Tiefert, PE, Applied Technologies, Inc.

468 Park Avenue

Lake Villa, Illinois 60046

847-265-7325

Authorized Official

Name: Peter Kolb

Title: Director, Lake County Public Works

Date _____

Subscribed and sworn to before me this ____

day of _____, 19 ____.

SECTION II - PROPOSED WATER USAGE

The applicant applies for a permit to withdraw Lake Michigan water in the amounts for the years listed below:

Year	Amount (MGD)	Year	Amount (MGD)
2009	0.277	2020	0.339
2010	0.282	2021	0.345
2011	0.288	2022	0.352
2012	0.293	2023	0.358
2013	0.299	2024	0.364
2014	0.304	2025	0.371
2015	0.310	2026	0.378
2016	0.316	2027	0.384
2017	0.322	2028	0.391
2018	0.328	2029	0.398
2019	0.333	2030	0.406

SECTION III - HISTORIC WATER USAGE

A. HISTORIC WATER USAGE BREAKDOWN

List the total historic water usage (MGD) for at least 10 consecutive prior years, if available, from the date of the application and the contribution of each water source to that total.

Year	Total Water Usage	Lake Michigan	Deep Aquifer	Shallow Aquifer	*
1998	0.165	-0-	-0-	0.165	
1999	0.164	-0-	-0-	0.164	
2000	0.159	-0-	-0-	0.159	
2001	0.160	-0-	-0-	0.160	
2002	0.166	-0-	-0-	0.166	
2003	0.162	-0-	-0-	0.162	
2004	0.159	-0-	-0-	0.159	
2005	0.173	-0-	-0-	0.173	
2006	0.173	-0-	-0-	0.173	
2007	0.195	-0-	-0-	0.195	

* Specify any other source

B. TYPE OF HISTORIC WATER USAGE

Based on Total Historic Water Usage figures tabulated in Section III A indicate the type of historic water usage (MGD) as shown below. If the data is estimated, indicate with an asterisk (*). Population should reflect census figures when applicable. Data should be shown for a minimum of 10 years prior to the date of the application.

Year	Residential Water Usage	Commercial Water Usage	Manufacturing Water Usage	Population
1998	0.149	0.017	-0-	2,880
1999	0.148	0.016	-0-	2,898
2000	0.143	0.016	-0-	2,916
2001	0.144	0.016	-0-	2,934
2002	0.149	0.017	-0-	3,044
2003	0.146	0.016	-0-	2,971
2004	0.143	0.016	-0-	2,916
2005	0.156	0.017	-0-	3,173
2006	0.156	0.017	-0-	3,173
2007	0.174	0.019	-0-	3,540

SECTION IV - PROJECTED WATER DEMAND

A. PROJECTED TOTAL WATER DEMAND BREAKDOWN

List the projected water demand (MGD) and projected contribution (MGD) of each water source to the total water demand to the year 2020.

Year	Projected Total Water Demand	Projected Contribution			
		Lake Michigan	Deep Aquifer	Shallow Aquifer	*
2009	0.276	-0-	-0-	0.276	
2010	0.282	-0-	-0-	0.282	
2011	0.287	-0-	-0-	0.287	
2012	0.293	-0-	-0-	0.293	
2013	0.299	-0-	-0-	0.299	
2014	0.305	0.305	-0-	-0-	
2015	0.310	0.310	-0-	-0-	
2016	0.316	0.316	-0-	-0-	
2017	0.322	0.322	-0-	-0-	
2018	0.327	0.327	-0-	-0-	
2019	0.333	0.333	-0-	-0-	
2020	0.339	0.339	-0-	-0-	
2021	0.345	0.345	-0-	-0-	
2022	0.352	0.352	-0-	-0-	
2023	0.358	0.358	-0-	-0-	
2024	0.364	0.364	-0-	-0-	
2025	0.371	0.371	-0-	-0-	
2026	0.378	0.378	-0-	-0-	
2027	0.384	0.384	-0-	-0-	
2028	0.391	0.391	-0-	-0-	
2029	0.398	0.398	-0-	-0-	
2030	0.406	0.406	-0-	-0-	

* Specify any other source.

B. TYPE OF PROJECTED WATER DEMAND

Based on Projected Total Water Demand tabulated in Section IV A, indicate the type of projected water demand (MGD) as shown below to the year 2020.

Year	Residential Water Usage	Commercial Water Usage	Manufacturing Water Usage	Population
2009	0.249	0.028	-0-	3,683
2010	0.254	0.028	-0-	3,756
2011	0.259	0.029	-0-	3,831
2012	0.264	0.029	-0-	3,908
2013	0.269	0.030	-0-	3,986
2014	0.274	0.030	-0-	4,066
2015	0.279	0.031	-0-	4,139
2016	0.284	0.032	-0-	4,213
2017	0.290	0.032	-0-	4,289
2018	0.295	0.033	-0-	4,366
2019	0.300	0.033	-0-	4,445
2020	0.305	0.034	-0-	4,525
2021	0.311	0.035	-0-	4,600
2022	0.317	0.035	-0-	4,693
2023	0.322	0.036	-0-	4,773
2024	0.328	0.036	-0-	4,853
2025	0.334	0.037	-0-	4,947
2026	0.340	0.038	-0-	5,040
2027	0.346	0.038	-0-	5,120
2028	0.352	0.039	-0-	5,213
2029	0.358	0.040	-0-	5,307
2030	0.365	0.041	-0-	5,413

SECTION V - BREAKDOWN OF LATEST ANNUAL WATER USES WATER YEAR 2007.

Enter the amount of water pumped and utilized for each item shown below. All amounts entered in this section must be in units of million gallons per day (MGD) rounded off to 3 decimal places to the right of the decimal. Conversion calculations are provided for your use in Section VIII to convert other commonly used units to MGD.

A. Pumpage Data

Water bought or received from the following distribution systems:

_____, _____,
_____, _____.

1.	Lake Michigan Pumpage	MGD
2.	Shallow Aquifer Pumpage	0.195 MGD
3.	Deep Aquifer Pumpage	MGD
4.	Total Pumpage (Add lines 1, 2 & 3)	0.195 MGD
5.	Water Treatment Use	0.006 MGD
6.	Gross Annual Pumpage (subtract line 5 from line 4)	0.189 MGD

Water sold or provided to any other distribution systems (enter the name of each system and the amount sold o provided to that system on lines 7 through 12). If additional lines are required, attach an additional sheet listing each system and amount.

7.	_____	MGD
8.	_____	MGD
9.	_____	MGD
10.	_____	MGD
11.	_____	MGD
12.	_____	MGD
13.	Total (add lines 7 through 12 and any additional amounts).	MGD
14.	Net Annual Pumpage (subtract line 13 from line 6)	0.189 MGD

B. Metered Uses (Water Uses Within Permittee's Distribution System)

15.	Residential	0.128 MGD
16.	Commercial and Manufacturing	0.014 MGD
17.	Municipal	MGD
18.	Construction	MGD
19.	Total Metered Uses (add lines 15 through 18)	0.142 MGD
20.	Percentage of Metered Use to Net Annual Pumpage (divide line 19 by line 14 and multiply by 100)	75.1 %

C. Unmetered Hydrant Uses (Water Uses Within Permittee's Distribution System)

21.	Firefighting and Training	MGD
22.	Water Main Flushing	0.003 MGD
23.	Sewer Cleaning	0.001 MGD
24.	Street Cleaning	MGD
25.	Construction	MGD
26.	Other (attach explanation)	MGD
27.	Total Unmetered Hydrant Use (add lines 21 through 26)	0.004 MGD
28.	Percentage of Unmetered Hydrant Use to Net Annual Pumpage (divide line 27 by line 14 and multiply by 100)	1.9 %
29.	Department Requirement for Hydrant use	10 %
30.	Excessive hydrant use (subtract line 29 from line 28) If the percentage is greater than 0.0, attach explanation (consult Rule 730.307 (e))	0.9 %

D. Unavoidable Leakage and Unaccounted For Flow

31.	Maximum Unavoidable Leakage (Do worksheet in Section VII enter amount from line 11 of the worksheet)	0.015 MGD
32.	Percentage of Maximum Unavoidable Leakage to Net Annual Pumpage (divide line 31 by line 14 and multiply by 100)	8.2 %
33.	Total Accounted for Flow (add lines 19, 27 and 31)	0.1612 MGD
34.	Percentage of Total Accounted for Flow to Net Annual Pumpage (divide line 33 by line 14 and multiply by 100)	85.3 %
35.	Total Unaccounted for Flow (subtract amount on line 33 from line 14)	0.028 MGD
36.	Percentage of Total Unaccounted for Flow to Net Annual Pumpage	14.7 %

SECTION VI - ADDITIONAL INFORMATION

A. Indicate Well Data and Production for the latest 12 month period as shown below

Well No. & Location	Depth of Well	Capacity gallons/minute	Total Water Production	Quality-What wells violate State standards? If yes, include a current water quality analysis report.
Well #1 Lehmann Blvd	130	177	17,778,100	
Well #2 Lincoln Drive	126	428	53,357,300	

B. Do any of the wells interfere with each other during simultaneous pumping? If yes, please describe type/basis of interference.

No

C. What problems do you anticipate with your well supply between now and 2020?

None

D. If an allocation of Lake Michigan water is granted, what is the earliest date that Lake Michigan water could be used? 2014

E. Specify present and/or proposed point(s) of withdrawal from Lake Michigan.
Lake County Public Water District: 500 17th Street Zion, IL 60099
42-inch, prestressed concrete cylinder raw water intake pipe, extending approximately 3,000 lineal feet into Lake Michigan.

F. Provide a map of your water service area. Include any projected service areas (annexations), well locations, and Lake Michigan water supply locations.

G. Specify the location of discharge after the water is used (sewage treatment plant effluent), and describe the route the discharge will follow to reach an identifiable stream: The System discharges to the Northwest Region Water Reclamation Facility and finally to the Fox River.

H. Is the discharge after use being treated in any manner? (Describe): The facility utilizes physical, biological and chemical processes to remove impurities and achieve the required degree of treatment to protect the receiving waters of the Fox River. The processes include screening, primary settlement, activated sludge, and UV disinfection.

I. Include with this application a copy of any approved water conservation ordinance.

J. Provide additional data and/or information you may have to further justify your water allocation on a separate sheet.

SECTION VII - MAXIMUM UNAVOIDABLE LEAKAGE WORKSHEET

Complete the following calculations to determine your maximum unavoidable leakage. Enter the appropriate amounts in the spaces provided.

A. Cast Iron Pipes With Lead Joints

	Age of Pipe	Miles of Pipe	Leakage Rate*	Maximum Unavoidable Leakage**
1.	60 yrs. or greater		x 3000 g/d/mi =	g/d
2.	40-60 yrs.		x 2500 g/d/mi =	g/d
3.	20-40 yrs.		x 2000 g/d/mi =	g/d
4.	20 yrs. or less		x 1500 g/d/mi =	g/d

B. All Other Types of Pipes and Joints

	Age of Pipe	Miles of Pipe	Leakage Rate*	Maximum Unavoidable Leakage**
5.	60 yrs. or greater		x 2500 g/d/mi =	g/d
6.	40-60 yrs.		x 2000 g/d/mi =	g/d
7.	20-40 yrs.	8.80	x 1500 g/d/mi =	13,200 g/d
8.	20 yrs. or less	2.27	x 1000 g/d/mi =	2,270 g/d

9. Total Miles of Pipe (add lines 1 through 8 under "Miles of Pipe") ..... 11.07 miles
10. Total Maximum Unavoidable Leakage (sum amounts on lines 1 through 8 under "Maximum Unavoidable Leakage") ..... 15,470 g/d
11. Total Maximum Unavoidable Leakage MGD (divide line 10 by 1,000,000 ..... 0.015 MGD
    (Enter this amount on line 31 of **"Section V - Water Use Audit"**)

---

* Leakage Rate expressed in gallons per day per mile (g/d/mi)
** Maximum Unavoidable Leakage expressed in gallons per day (g/d)

Section IV – Conversion Table

Below are conversion calculations to convert the most commonly used units to units of million gallons per day (MGD).

To convert cubic feet per year (cf) to (MGD) use:
cf x 7.48 ÷ 1,000,000 ÷ 365 = MGD

To convert gallons per year (g) to (MGD) use:
g ÷ 1,000,000 ÷ 365 = MGD

To convert gallons per day g/d to (MGD) use:
g/d ÷ 1,000,000 = MGD

To convert million gallons per year (mg) to (MGD) use:
mg ÷ 365 = MGD

SECTION VIII CONVERSION TABLE

Below are conversion calculations to convert the most commonly used units to units of million gallons per day (MGD).

To convert cubic feet per year (cf) to (MGD) use:

cf x 7.48 - 1,000,000 - 365 = MGD

To convert gallons per year (g) to (MGD) use:

g - 1,000,000 - 365 = MGD

To convert gallons per day (g/d) to (MGD) use:

g/d - 1,000,000 = MGD

To convert million gallons per year (mg) to (MGD) use:

mg - 365 = MGD

13451

SECTION 1

INTRODUCTION

FOX LAKE HILLS WATER SYSTEM

LAKE COUNTY, ILLINOIS

The community of Fox Lake Hills is an unincorporated area in northwest Lake County, located on the west side of Lake Villa Township. The Fox Lake Hills Water System is owned and operated by the Lake County Public Works Department. The water system serves approximately 900 homes and businesses. The present service area is about 1.3 square miles.

Fox Lake Hills is expected to see significant growth over the next 20 years. The present population is 3,540, and the projected future population is 5,413. Future average day water demand is projected to be 0.41 mgd.

The Fox Lake Hills Water System presently operates two wells in the shallow, sand and gravel aquifer.

Population growth and consequent growth in water demand have created concerns regarding the area's water supply. Water volume will become an issue as increased well pumping in the area draws down the ground water elevation. The wells produce hard water, and the water contains iron. Treatment is provided at one of the wells to remove the iron.

The recent formation of the Northern Lake County Lake Michigan Water Planning Group has created the possibility of using Lake Michigan as a water source for a group of Lake County communities including Fox Lake Hills. The combined water demand and resources of the several communities are sufficient to make a Lake Michigan water supply system feasible. A Lake Michigan water supply system would address and resolve the local concerns regarding water supply volume and quality. For these reasons, the Lake County Public Works Department has decided to request an allocation of Lake Michigan water for the Fox Lake Hills Water System.

SECTION 2

PROPOSED USES OF THE ALLOCATION

The Lake County Public Works Department proposes to use an allocation of Lake Michigan water as the source of water for the Fox Lake Hills Water System. The average quantity of water would start at 0.31 mgd in the year 2014 and grow to 0.41 mgd in the year 2030. Maximum day water demand in 2030 is projected be to 0.72 mgd. About 90% of the water will be for residential use and the remaining 10% will be used by commercial establishments.

The present maximum day water demand is 0.40 mgd (2007), which is a maximum to average day ratio of 2.0. High maximum day to average ratios can result in building pipelines and other facilities that are fully utilized on only a few days per year, and are oversized compared to their typical daily use. Infrequent maximum demands can be accommodated by means other than larger pipelines. A maximum to average day ratio of 1.75 was employed for use in Lake Michigan water supply system. Using the ratio of 1.75, the maximum day water demand for the year 2030 will be limited to 0.72 mgd. The Fox Lake Hills Water System will accommodate the maximum day demand in excess of 0.72 mgd by providing additional local storage.

The present water supply is from two wells in the shallow, sand and gravel aquifer. As the area continues to grow, additional water supply will be needed. Without an allocation of Lake Michigan water, additional wells will be necessary. The future wells could be from either the shallow aquifer or the deep aquifer.

SECTION 3

EXISTING AND PROPOSED WATER SYSTEM

Existing Water System

The Lake County Public Works Department owns and operates the Fox Lake Hills Water System for the benefit of the area residents. The water system is composed of two shallow aquifer wells, one elevated storage tank, and 11.07 miles of pipe. The capacity of the elevated tank is 150,000 gallons. The wells are described in the following section of this report. The piping network is shown on the Water Atlas, a copy of which is in Appendix A.

The present average day water demand (2007) is 0.20 mgd, and the present maximum day demand is 0.40 mgd. Based on a present day population of 3,540 people, the current water demand is 56 gallons per person per day. The ratio of maximum day demand to average day demand is 2.0.

Both of the wells draw water from the shallow sand and gravel aquifer. Water quality from the two shallow wells is similar quality water. The water is hard, and has a significant level of iron. The larger well (Well #2) is equipped with an iron filter. All of the water is disinfected using chlorine, and polyphosphates are added Well #1 to sequester iron.

The County prepares and distributes an Annual Drinking Water Quality Report for the Fox Lake Hills Water System. A copy of the most recent report is in Appendix B.

Existing Water Supply Issues

Both wells draw from the shallow sand and gravel aquifer. Shallow wells are typically recharged from the immediate area. Additional production from this aquifer as demand increases may become problematic. In addition, production from Well #1 is relatively low. An additional well may be necessary to provide adequate system redundancy.

The summer months of July, August and September are frequently dry months. Little precipitation falls, and little percolates to the shallow aquifer. These months also correspond to the highest water demand period. Residents use water for gardening, to water lawns when permitted, and for children's summer play. The summer time convergence of minimal recharge and increasing demand points to high stress on the water supply system.

The summer of 2005 was a drought year. Water levels approached the pump settings. Emergency watering restrictions were necessary to reduce demand to the available supply.

Proposed Water System

The Lake County Public Works Department is a part of the Northern Lake County Lake Michigan Water Planning Group (Planning Group) on behalf of the Fox Lake Hills Water System. The Planning Group includes the County and the following Lake County communities: Antioch, Grandwood Park, Fox Lake, Lake Villa, Lake Zurich, Lindenhurst, Long Grove, Volo, and Wauconda. The Grandwood Park Water System is also owned and operated by the Lake County Public Works Department.

The Planning Group conducted an initial study to determine if it is technically and economically feasible to construct a water system to supply Lake Michigan water to all of these communities. The initial study, titled "Lake Michigan Water Feasibility Study," dated November, 2007, was prepared by Applied Technologies, Inc. The initial study included the Villages of Antioch, Fox Lake, Lake Villa, Lindenhurst, Old Mill Creek, and Wauconda, as well as the unincorporated areas of Fox Lake Hills and Grandwood Park. The initial study concluded that a Lake Michigan water supply system for these communities is technically and economically feasible. Grandwood Park and Old Mill Creek are now being considered as a single system because they will both served by the same Lake County water system, and they share a common border.

"Amendment No. 1 to the Lake Michigan Water Feasibility Study," dated September, 2008, added the Villages of Hawthorn Woods, Lake Zurich, Long Grove, and Volo to the study. The amendment concluded that a Lake Michigan water supply system was also technically and economically feasible with these additional communities added to the system.

It should be noted that Hawthorn Woods decided that they would not pursue a Lake Michigan water allocation at this time. Hawthorn Woods has, in effect, resigned from the Planning Group. The financial analysis in the Amendment indicated that inclusion of Hawthorn Woods, by itself, in the system was financially neutral to the overall system, so that it can be inferred that the exclusion of Hawthorn Wood is similarly a neutral impact.

The largest cost item for the Lake Michigan water supply system is the long pipeline. Other system costs include treatment, storage and pumping costs. The financial feasibility of the system is dependant upon having a sufficiently large customer base to pay for the system with reasonable rates. None of the communities is large enough by itself to fund a Lake Michigan water supply system. The Feasibility Study demonstrated that the original group of communities was large enough to fund the system, and Amendment No. 1 showed that the system could be extended to the additional communities. The sensitivity of the system to the potential loss of communities has not been fully examined. It is clear that the loss of communities on the far end of the system, such as Hawthorn Woods, will not collapse the system. Similarly, the loss of the smallest communities will not collapse the system. However, the loss of one or more of the larger group members would certainly put the system in jeopardy. The financial feasibility evaluation will need to be reviewed if this were to occur.

The system will be constructed as a common water supply system for all of the communities. Each individual community will receive water from the system on a wholesale basis, and then distribute the water to the residents of the community. The common water supply system will be owned and operated by a new governmental entity, most likely a Joint Action Water Agency (JAWA).

The common water supply system will be composed of a water intake and water treatment plant located in Zion, and approximately 57 miles of pipe to convey the water to each of the communities. The system is illustrated on Figure 3-1 on the following page. The water intake site in Zion is the water treatment plant property of the Lake County Public Water District (LCPWD), which supplies water to Zion, Winthrop Harbor and Illinois Beach State Park. The existing LCPWD facilities do not have the capacity to supply the proposed system. However, the intake pipe has excess capacity, and the site has sufficient room for a new treatment plant for the new JAWA.

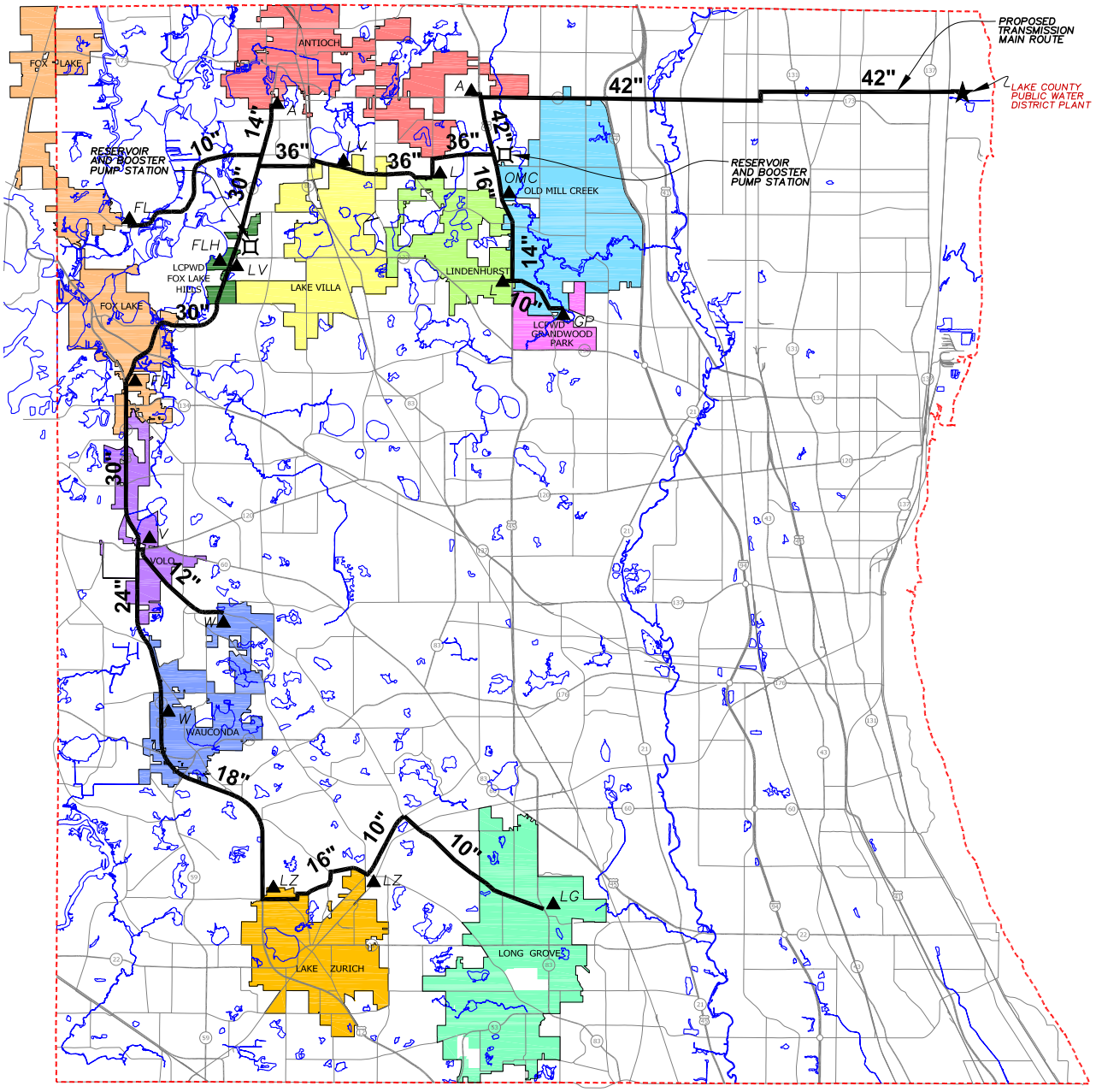
Preliminary calculations have indicated that the existing 3,000 foot long, 42-inch diameter raw water intake line has sufficient capacity for the short term needs of the LCPWD and the new agency. Based on the calculations, the existing intake should have a capacity in excess of 30 mgd, more than meeting the needs of both groups for several years. If the project moves ahead, hydraulic field tests will be performed on the intake line to verify its capacity.

The LCPWD has indicated a willingness to work with the new agency to the mutual benefit of both groups. A copy of a letter from LCPWD expressing support for the new agency is presented in Appendix G. Discussions leading to formal agreements between the two groups are expected to begin following receipt of Lake Michigan allocations by the member communities.

The new water system will use the existing LCPWD intake pipe. A new water treatment facility will be constructed on the LCPWD site. The facility will include low lift pumps, a membrane filtration system, disinfection, storage, and high lift pumps. Approximately 300,000 feet (57 miles) of pipe, ranging in size from 10-inch through 42-inch, will convey the water to the member communities. The system will include two reservoirs and booster pumping stations at strategic points in the system.

The Fox Lake Hills Water System will receive Lake Michigan water from the system at a single point within the area. The local water system will provide a storage tank to receive water at this location. The local water system will install a booster pump system at the storage tank to transfer the water into the local distribution system at the appropriate pressure. The local water system will require improvements to the distribution system, composed of additional elevated storage.

Schedule



PIPE (INCHES)	LENGTH (FEET)
42	64,000
36	30,000
30	53,000
24	20,000
18	26,000
16	18,000
14	18,000
12	13,000
10	58,000
TOTAL (FEET)	300,000
TOTAL (MILES)	57

N
W E
S

0 6 12,000 18 24,000
SCALE: 1" = 12,000'

LEGEND

- TRANSMISSION MAIN ROUTE
- COMMUNITY CONNECTION POINTS
- RESERVOIR BOOSTER PUMP STATION

FIGURE 3-1
SYSTEM MAP
LAKE MICHIGAN WATER SUPPLY
Lake County, Illinois

Applied Technologies
Engineers-Architects

The overall schedule for the regional water system will be determined by the new water agency. The agency is in the process of being established. It is anticipated that the agency schedule will include the following elements:

Early project discussions	2006 (complete)
Project feasibility study:	2007 and 2008 (complete)
Allocation applications	2009
Agency formation	2009
Route study, preliminary design	2009 and 2010
Final design	2010 and 2011
Construction	2011 through 2013
Startup	2014

Improvements to the Fox Lake Hills Water System will follow a parallel schedule so that the local system is ready to accept Lake Michigan water on the day that the regional system starts delivery. The schedule includes the following components.

Design storage tanks, booster stations, and water main improvements	2012
Construction	2013
Startup	2014

SECTION 4

PRESENT SOURCES OF WATER

The Fox Lake Hills Water System obtains all of its water from two shallow wells. The depth and capacity of each of the wells are shown in Table 4-1, below.

TABLE 4-1
Fox Lake Hills
Water System Overview

Wells	Depth (ft)	Capacity (gpm)
Shallow Wells		
1	130	177
2	126	428
Total Pumping Capacity		**605 gpm**
Firm Pumping Capacity		**177 gpm**

The depths of Fox Lake Hills shallow wells are 126 feet and 130 feet. The capacities of the wells are 177 gpm and 428 gpm. The shallow wells draw water from the sand and gravel aquifer.

The firm capacity of the water system is develop by assuming that the largest well is out of service, and that the remaining well is operated for 18 hours per day. Based on these criteria, the Fox Lake Hills Water System can deliver 0.19 mgd.

The Fox Lake Hills water system does not have sufficient capacity to meet current demand if the large well is out of service for an extended period of time. Without the Lake Michigan supply, improvements in the water supply will be needed in the near future (2010 to 2012) to meet the projected water demands.

SECTION 5

ANTICIPATED FUTURE NEEDS

Future water demands are projected as a function of the future population of the area. Water is presently used at rate of 56 gallons per capita per day (gpcd). The usage rate includes the water used by residents as well as all of the commercial, industrial and public water uses. This rate is low compared to other values in Lake County of 85 to 120 gpcd. The future usage rate is expected to increase.

The projected population for the year 2030 is 5,413. The future average demand is projected to be 0.41 mgd. The future usage rate is projected to be 76 gpcd.

The current ratio of maximum day water usage to average water usage is 2.0. Assuming that the present water use pattern can be used to predict future water demand, the future maximum day demand will be 0.82 mgd.

As a part of the new Lake Michigan water supply system, the local system will be limited to a maximum day to average day water demand ratio of 1.75, which will result in a maximum water delivery to the local system of 0.72 mgd. The future maximum day demand of 0.82 mgd will be somewhat greater that the maximum day supply of 0.72 mgd. The local system will provide sufficient storage to accommodate short term demands in excess of 0.72 mgd. In addition, Lake County Public Works Department is committed to controlling peak water usage by appropriate water conservation policies and regulations. Conservation practices are addressed in Section 8.

Water demands for the Fox Lake Hills Water System are summarized in Table 5-1, below. The table includes present day water demand (2007), demand for the startup year for the proposed Lake Michigan water supply system (2014), and water demand for the design year (2030).

TABLE 5-1
Fox Lake Hills Water System
Present and Future Water Demand

Year	2007	2014	2030
Population	3,540	4,066	5,413
Average Day Water Demand (mgd)	0.20	0.31	0.41
Average Day Water Demand (gallons per capita per day)	56	76	76
Maximum Day Water Demand (mgd)	0.40	0.62	0.82
Maximum to Average Ratio	2.0	2.0	2.0
Controlled Maximum Day Water Demand (mgd)		0.54	0.72
Controlled Maximum to Average Ratio		1.75	1.75

SECTION 6

COST EVALUATION

This section presents a cost evaluation of two water system alternatives available for the Fox Lake Hills Water System. The evaluation is designed to compare the cost for Lake Michigan water to the cost of a groundwater system of equivalent water quality.

Both the Lake Michigan Water Alternative and the Ground Water Alternative have significant costs for the Fox Lake Hills Water System. The Lake Michigan Water Alternative will include the local share of the cost of the multi-community water supply system, as well as local costs for improvements to the local water distribution system. The Ground Water Alternative will be completely composed of local costs. These costs will include new wells and storage, as well as a central water plant to treat the water to a quality level equivalent to Lake Michigan water.

LAKE MICHIGAN WATER ALTERNATIVE

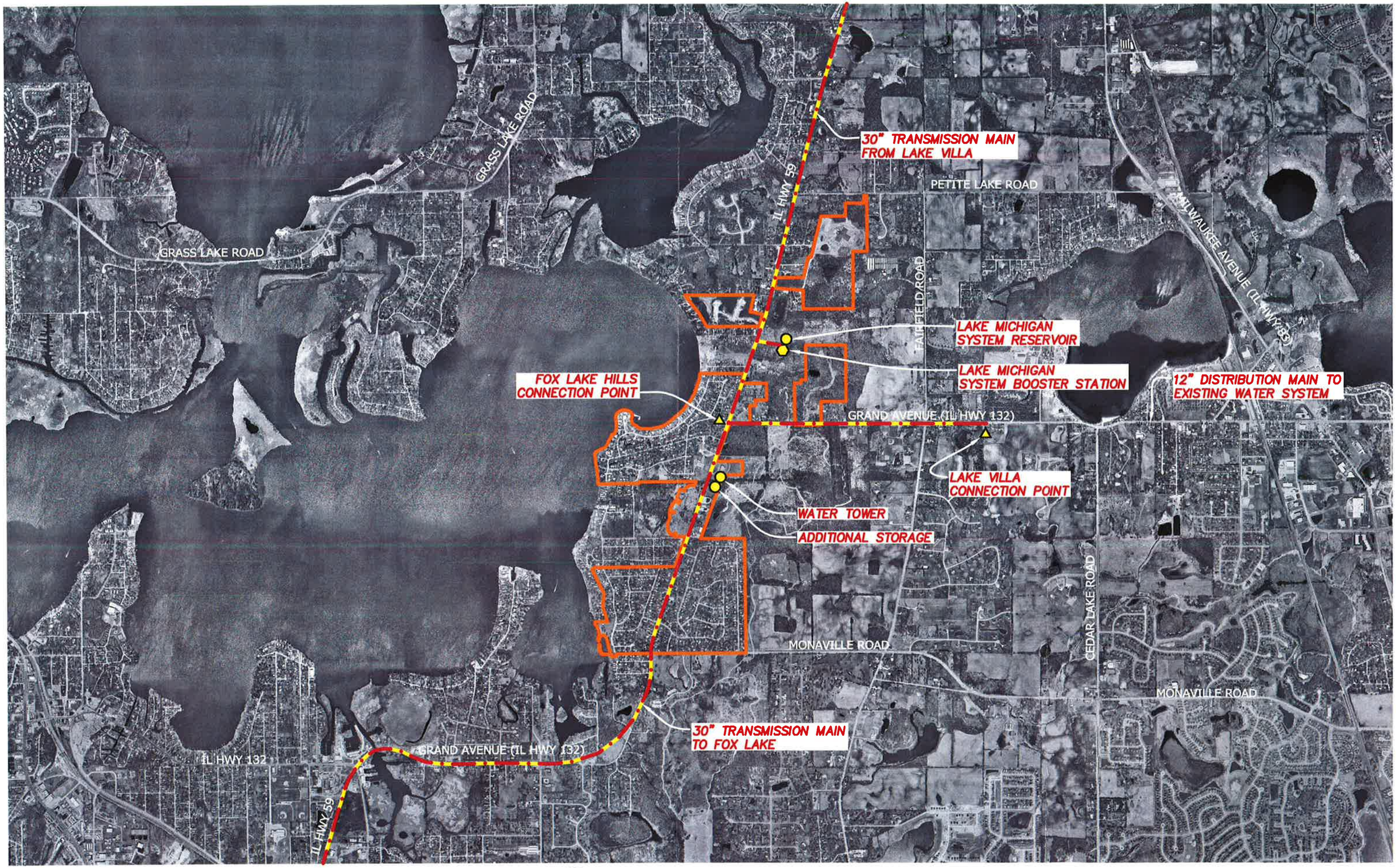
Lake Michigan water will be delivered to the Fox Lake Hills Water System at a single community connection point, at the intersection of Grand Avenue and Highway 59. A map showing connecting mains and improvements to the existing distribution system is shown in Figure 6-1.

At the connection point water will flow through a metering station into a storage tank and booster pump station. The booster station will be connected to the existing Fox Lake Hills distribution system. The existing distribution network will provide water service to Fox Lake Hills water customers. Improvements to the distribution system will include additional storage, which is needed to accommodate the expected growth in the community.

GROUND WATER ALTERNATIVE

In order to compare the local system's current groundwater supply to the Lake Michigan alternative, the groundwater supply alternative will include increasing system capacity and providing water treatment to a quality standard equivalent to the treated Lake Michigan water. The treatment system will include consideration of the existing hardness and iron content of the shallow aquifer water as well as for hardness and radium content of the deep aquifer water.

A number of traditional technologies are available to treat the well water and achieve the criteria, such as coagulation, settling, filtration, iron filters, ion exchange, and lime softening. Available new technologies include various membrane technologies up to the maximum treatment level of reverse osmosis (RO).



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0 1000 2000 3000 4000
SCALE: 1"=1000'

FIGURE 6-1
LAKE MICHIGAN ALTERNATIVE
Fox Lake Hills

For this evaluation, an iron filter will be used for 100% of the water, and a RO membrane system will be used to remove hardness and radium. A portion of the water will be assumed to bypass the RO unit so as to produce water with hardness approximately equivalent to Lake Michigan water hardness, with the assumption that this level of treatment will remove sufficient hardness and radium. For this analysis, 70% of the water will be treated through the RO membrane, and the remaining 30% will bypass the RO membrane system. The product water will be disinfected using chlorine.

The Fox Lake Hills ground water treatment system will be a single, central treatment plant. New water mains will be necessary to convey the raw well water to the new facility from both existing and new wells. Finished water will be conveyed to the water customers using the existing distribution system. A map showing connecting mains from the existing Village wells to a plant location in the center of the community is shown in Figure 6-2. Improvements to the system will include and additional well and additional storage, which are needed to accommodate the expected growth in the community.

PRESENT WORTH COST EVALUATION

Present worth cost evaluation is a standard method for comparing alternatives. The costs considered in this analysis include the initial capital costs to build the system, plus the annual costs to operate the system for a period of 20 years. After the 20 year period of time, there will be system components that have remaining value. For example, a building is considered to have a service life of 40 years. At the twenty year point, it would still have 50% of its original value. Present worth analysis includes a "salvage value" for components that have value remaining at the end of the evaluation period.

Present worth evaluation involves calculating all of the system costs as a single lump sum number. Initial capital costs are included at their estimated cost. Annual operating costs for a 20 year period are discounted to present day using an interest rate of 8%. This calculation develops a dollar value that, if invested at the beginning of the project in an interest bearing account, would provide sufficient funds to pay the annual costs for the 20 year period and become entirely depleted at the end of the period. Salvage values are also discounted to the beginning of the project using an 8% interest rate. The project total present worth is the sum of the initial capital costs, plus the discounted annual costs for 20 years, minus the discounted salvage value.

A present worth value is developed for each of the project alternatives. The evaluation will show that one of the two alternatives has a lower present worth, and is thus considered a better alternative. This information is then useful as part of the information available for making a decision regarding the future water system for the Fox Lake Hills Water System.

Present Worth – Lake Michigan Water Supply

GRASS LAKE ROAD

GRASS LAKE ROAD

IL HWY 59

PETTITE LAKE ROAD

MILWAUKEE AVENUE (IL HWY 83)

FAIRFIELD ROAD

WELLS NO. 3 & 4

GRAND AVENUE (IL HWY 132)

WELL NO. 1

TREATMENT PLANT

WATER TOWER

ADDITIONAL STORAGE

CEDAR LAKE ROAD

MONAVILLE ROAD

WELL NO. 2 IRON REMOVAL FACILITY

MONAVILLE ROAD

IL HWY 132

GRAND AVENUE (IL HWY 132)

IL HWY 59

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0 1000 2000 3000 4000
SCALE: 1"=1000'

FIGURE 6-2
GROUND WATER ALTERNATIVE
Fox Lake Hills

The cost details for developing the present worth for the Fox Lake Hills Lake Michigan water supply system are presented in Appendix C, and described below.

Table C-1 presents the capital costs for the multi-community Lake Michigan Water Supply system (referred to as the "Wholesale" water system). This is the part of the project that will supply water to 10 communities. These costs, for purposes of the present worth analysis, need to be apportioned among the communities. The financing method being considered for the multi-community system capital costs includes two sets of bonds. The first set of bonds is based on Special Service Area (SSA) taxes, which are apportioned among the communities based on equalized assessed valuation (EAV). Table C-2 presents the EAV breakdown by each of the communities, and Table C-3 assigns a bond principal amount to each community.

The second set of bonds for the wholesale water system is Revenue Bonds, which are financed by revenue from each of the communities from customer water bills. These bonds are based on metered water consumption. The principal amount for these bonds is apportioned among the communities based on average day water usage as presented in Table C-4. The year 2020 was selected as a representative year for apportioning these costs.

Table C-1 also shows salvage values for the wholesale water system. Salvage values for the wholesale water system are apportioned among the communities in the same manner as capital costs. These cost distributions are shown on Table C-5 and C-6.

Table C-7 shows the wholesale system annual operations, maintenance and replacement (OM&R) costs, based on a unit cost of $1.50 per 1,000 gallons. These costs are developed into a present worth, assuming that the beginning point for the analysis is the year 2010 and that the system is constructed and operating by the year 2014. Table C-8 apportions the present worth of the annual costs among the communities based on flow, using the flows for the year 2020 as a representative year.

The wholesale system anticipates a revenue stream from connection fees. Table C-9 shows this income, and develops a present worth value for these fees. Table C-10 apportions the present worth of these fees among the communities based on flow.

Finally, Table C-11 summarizes these present worth values as they apply to the Fox Lake Hills Water System. The present worth of the wholesale water system that is apportioned to the Fox Lake Hills Water System is $5,202,000.

The next component for the present worth evaluation is the local costs associated with the Lake Michigan Water system.

Table C-12 presents the capital costs and salvage values for the local improvements needed for the Lake Michigan water supply.

Table C-13 presents the local operating costs for the Lake Michigan water system, based on the present County budget for operating the existing water system. The table shows reduced operating costs for the Lake Michigan water system, because the County will be able to eliminate operation of the existing well pumps, and will be able to substantially reduce chemical costs associated with the system.

Table C-14 summarizes the present worth for the local costs associated with the Lake Michigan water supply system. The present worth of the local costs is $5,326,000.

The total present worth of the Lake Michigan water supply system for the Fox Lake Hills Water System is the sum of the present worth of the local share of the wholesale system and the present worth of the local costs:

Present Worth, Fox Lake Hills local costs	$5,326,000
Present Worth, Fox Lake Hills portion of the wholesale system	$5,202,000
TOTAL PRESENT WORTH,	
Fox Lake Hills Lake Michigan Water Supply	**$10,528,000**

Present Worth – Ground Water Supply

The cost details for developing the present worth for the Fox Lake Hills ground water supply system are presented in Appendix D, and described below.

Table D-1 presents the capital cost of the local well water system. The capital costs include costs for a central water treatment facility, as well as costs for additional wells, storage, and water mains. Salvage costs are included on this table as well.

Table D-2 presents the annual operating costs for the local ground water supply system, based on the current County budget for operating the existing system. The table shows increased operating costs, showing the effect of operating the water treatment system. One additional line item is included to show the cost of disposing the backwash water from the iron filter and the reject water from the RO membrane. The reject water from the RO system can be 10% to 20% of the forward flow.

Table D-3 summarizes the present worth of the Fox Lake Hills ground water supply system, with treatment to a quality equivalent to Lake Michigan water. The present worth is:

TOTAL PRESENT WORTH,	
Fox Lake Hills Ground Water Supply	**$12,548,000**

Based on the information presented above, the total present worth of the Lake Michigan water supply system is less that the total present worth of the ground water supply system, by $2,020,000.

WATER RATE EVALUATION

A second method of comparing alternatives on a cost basis is to estimate the water rate that the County would need to charge its customers to meet all of the costs of operating the system. This analysis will provide a unit cost for each alternative in terms of dollars per one thousand gallons of water ($/1,000 gallons). The analysis will be based on the assumption that all revenue will come from the water rate. In actual practice, the water utility would receive revenue from multiple sources, such as connection fees and property taxes.

The water rate analysis involves considering all costs in terms of equivalent annual costs, and then dividing the annual costs by the anticipated annual volume of water. Capital costs are converted to annual costs by assuming all capital costs are financed, similar to a 0% down mortgage. In this case, a 30 year term will be used for financing, with a constant 8% interest cost. Salvage values, used in the above present worth analysis, are not included in this water rate analysis. Annual operating costs for the year 2030 are used in this analysis.

A water rate is developed for both of the project alternatives. One of the alternatives will provide a lower rate, and will be considered a better alternative. The water rate information is then available as part of the information needed for making a decision regarding the future water system for the Fox Lake Hills Water System.

Water Rate Evaluation – Lake Michigan Water Supply

The cost details for developing water rates for the Fox Lake Hills Lake Michigan water supply system are presented in Appendix E, and discussed below.

Table E-1 presents the capital costs for the wholesale water supply system. The costs are the same as those in Table C-1, except that salvage values are excluded. In the same manner as in the present worth analysis, the capital costs are apportioned among the communities in Tables E-2, E-3 and E-4. The capital costs per community are summed on Table E-5, and annualized using a 30 year term and 8% interest.

Connection fee income for the wholesale water supply system is presented in Table E-6. The connection fee income is distributed among the communities in Table E-7.

Annual OM&R costs for the wholesale system are shown on Table E-8, and are distributed among the communities on Table E-9.

The annualized capital costs, the annual connection fee income, and the annual OM&R costs are summed on Table E-10. The total is divided by the annual water consumption to develop the wholesale water rate for Fox Lake Hills.

The next several tables develop the local costs associated with the Lake Michigan water system. Table E-11 presents the capital costs and converts those costs to annual costs using a 30 year term and 8% interest.

Table E-12 presents local operating costs for the Lake Michigan water system, based on the present County budget, with adjustments based on the conversion to Lake Michigan water supply.

In Table E-13, the local annualized capital costs and local annual operating costs are summed, and divided by the annual water consumption to determine the local component of the water rates. The local component and the wholesale component are added to determine the total water rate:

WATER RATE,
Fox Lake Hills Lake Michigan Water Supply $7.18 per 1,000 gallons

Water Rate Evaluation – Ground Water Supply

The cost details for developing water rates for the Fox Lake Hills ground water supply system are presented in Appendix F and described below.

Table F-1 presents the capital costs for a local well water system, including a central treatment system. The capital costs are converted to annual costs using a 30 year term and 8% interest.

Table F-2 presents the annual operating costs for the local ground water supply system, based on the present County budget for operating the existing system. As in Table D-2, the table shows increased operating costs, showing the effect of operating the water treatment system.

Finally, in Table F-3, the annualized capital costs and annual operating costs are summed, and divided by the annual water consumption to determine the total water rate:

WATER RATE,
Fox Lake Hills Ground Water Supply $8.16 per 1,000 gallons

Based on the information presented above, the calculated water rate for the Lake Michigan water supply system is $0.98 per 1,000 gallons less than the calculated water rate for the ground water system.

SUMMARY

This section of the Fox Lake Hills Allocation Application provided two cost comparisons for two water supply alternatives for the community. The two water supply alternatives were a Lake Michigan water supply as part of a multi-community system, and a local ground water supply with treatment to produce equivalent quality water. The first comparison was a present worth analysis. The Lake Michigan water supply system was favored in the present worth analysis. The second comparison was a water rate comparison. Again, the Lake Michigan water supply system was favored.

The favorable cost analysis supports the Fox Lake Hills application for an allocation of Lake Michigan water.

A factor that was not included in this analysis is the savings to the residents due to the elimination of home water softeners. Both of the water systems described above will deliver comparatively soft water, allowing residents to discontinue the use of home softening equipment if they so choose. The typical cost to operate a home water softening system is $300 per year, including both equipment rental and salt. For the 1,804 homes in Fox Lake Hills in the year 2030, this could be a total annual savings of $540,000.

SECTION 7

REDUCED USE OF DEEP AQUIFER

The Fox Lake Hills Water System does not presently use water from the deep, sandstone aquifer. There will be a need to substantially increase the water supply system to satisfy the requirements of a growing population.

The current firm capacity of the Fox Lake Hills Water System is 0.19 mgd. However, the present maximum day demand is 0.40 mgd, indicating an existing supply shortfall of 0.21 mgd. The future maximum day capacity is projected to be 0.72 mgd in the year 2030. The present system firm capacity will need to be increased by 0.53 mgd to provide reliable water supply through the year 2030. Based on an 18 hours of well operation per day, the local system will need new wells to supply an additional 491 gpm. This additional capacity will require one to two additional wells. The new wells could be either shallow wells or deep wells

Lake Michigan water as a supply for the Fox Lake Hills Water System will eliminate the need for ground water use in this area. Thus the use of existing shallow wells will be eliminated. More importantly, the use of Lake Michigan water in place of local well water will eliminate the need for future wells in the deep aquifer.

The projected average day water demand for the year 2030 is 0.41 mgd. Assuming that the local system would draw 25% of its water from the deep aquifer in the future, changing to a Lake Michigan water supply would eliminate a future average day demand (year 2030) on the deep aquifer of 0.1 mgd.

SECTION 8

CONSERVATION PRACTICES

The Lake County Public Works Department has a water conservation program in its Code of Ordinances. The water conservation program limits outside water uses between May 15th and September 15th of every year. Properties with even numbered addresses are permitted to use water outside only on even numbered calendar days, and properties with odd numbered addresses are permitted to use water outside only on odd numbered calendar days. Further, outside water use is prohibited between the hours of 10:00 AM and 6:00 PM. In effect, an individual may use water outside no more frequently than every other day, and then only in the morning or at night. Outside water use includes watering lawns and gardens, washing cars, and filling pools. An exception is provided for newly seeded or sodded lawns. Additional water use restrictions can be imposed under emergency conditions. A copy of the ordinance is provided in Appendix H.

As a part of the Lake Michigan water allocation process, the Lake County Public Works Department will be required to implement further water conservation measures for the Fox Lake Hills Water System. These measures will include the following components.

As a condition of receiving a Lake Michigan water allocation, the County will agree to submit to the IDNR:

- Proposals to reduce or eliminate wasteful water use, and reduce unaccounted-for flow to 8% or less. Unaccounted-for flow in the Fox Lake Hills Water System is approximately 14.7% at this time.
- Procedures to determine the efficiency of water metering or accounting.

The County will adopt conservation practices, including the following as required by the IDNR Administrative Code:

- Leakage monitoring and correction for storage, transmission and distribution systems.
- Metering of all new construction.
- Metering of existing non-metered services as a part of any major remodeling.
- Require the installation of water efficient plumbing fixtures in new construction as well as repair or replacement work in accordance with IDNR standards.
- Require closed system air conditioning in new construction and remodeling.
- Public lavatories in new construction and remodeling will include metering or self closing faucets.
- New or remodeled car washes will include water recycling.
- Restrict non-essential outside water use, including at a minimum lawn sprinkling restrictions (this ordinance is already in place).
- Develop and implement public programs to encourage reduced water use.

- Reduce water used for navigational, lockage, and leakage purposes; and pollution treatment control or abatement purposed (this item is inapplicable to the Fox lake Hills Water System).

The use of deep wells in the Fox Lake Hills Water System will be required to be phase out. There are no deep wells in the Fox Lake Hills system.

The County will be required to limit hydrant uses to 1% or less of annual pumpage. Hydrant usage in the Fox Lake Hills area is presently about 1.9%.

The IDNR encourages the County to adopt water rate structures based on metered water use which discourage excessive water use. The present rate structure charges for water used based on meter readings. The water rate structure is a charge of $3.14 for each 1,000 gallons of water, with a 3,000 gallon minimum per month. The rate structure does not include any discounts for high volume users. The present rate structure discourages excessive use.

APPENDIX A

WATER SYSTEM MAP NOT INCLUDED IN THIS COPY

APPENDIX B

Annual Water Quality Report 2009
Fox Lake Hills Service Area

Lake County, IL
Department of Public Works

Purpose and Background

This is the annual water quality report (or consumer confidence report) for the period of January 1 to December 31, 2008. Each year we will issue a report of this type to provide information about the quality of our drinking water as well as details on the source of our water and what it contains.

The reports are being issued in compliance with the requirements of the Safe Drinking Water Act and are also intended to demonstrate our commitment to providing a safe and reliable supply of drinking water.

If you have any questions about this report or your water system, please contact **Phil Perna** at (847) 377-7500 or at e-mail *pperna@lakecountyil.gov*. You may also ask about opportunities for public participation at Lake County Board meetings where decisions are made that affect drinking water quality. We always like to hear from our customers.

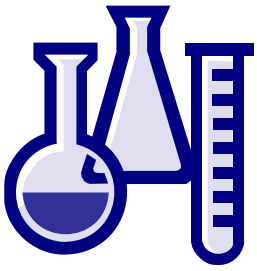
The Water Source and Delivery System

There are two wells that serve your community. They are located on Lehmann Boulevard and Lincoln Drive. Both wells are drilled into a water bearing sand and gravel formation, called an “aquifer” 130 feet below ground. The combined capacity of our wells exceeds the average daily usage in the service area by 300%.

At the Lincoln Drive well house, treatment is provided to remove most of an excessive natural iron concentration. A network of water mains interconnects the two well sites with a 150,000 gallon elevated tank to form a unified water supply and distribution system.

Water Quality

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the US Environmental Protection Agency's (USEPA) Safe Drinking Water Hotline at 1-800-426-4791.



To ensure that tap water is safe to drink, the Environmental Protection Agency prescribes limits on the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Your tap water quality is consistently monitored by the County and the Illinois Environmental Protection Agency (IEPA).

Water quality is judged by comparing your water to USEPA benchmarks for water quality. One such benchmark is called the Maximum Contaminant Level Goal (MCLG). The MCLG is the level of a contaminant in drinking water below which there is no known or expected risk to health. This goal allows for a margin of safety. Another benchmark is a Maximum Contaminant Level (MCL). An MCL is the highest level of a contaminant that is allowed in drinking water. An MCL is set as close to an MCLG as feasible using the best available treatment technology.

Contaminant Sources in Drinking Water

Both tap and bottled water come from rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of land or through the ground, it dissolves naturally occurring materials and can pick up substances resulting from the presence of animal or human activity. Contaminants that may be present in untreated water include:

- Microbial contaminants such as viruses and bacteria can be naturally occurring or may come from sewage treatment plants, septic systems and live stock operations.
- Inorganic contaminants such as salts and metals can be naturally occurring or can result from urban storm water runoff, wastewater discharges, oil or gas production, mining, or farming.
- Pesticides and herbicides come from sources such as agricultural and residential storm water runoff.
- Organic chemical contaminants including synthetic and volatile organic compounds are by-products of industrial processes and petroleum production but can also come from gas stations, urban storm water runoff and septic systems.
- Radioactive contaminants can be naturally occurring or be the result of oil and gas production and mining activities.

Health Note

Some people may be more vulnerable to contaminants in drinking water than the general population. *Immuno-compromised* persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The USEPA and Center for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the USEPA Safe Drinking Water Hotline at 1-800-426-4791.

Regulated Contaminants Detected

Compound (Units)	Highest Level Found	Range of Detection	MCLG	MCL	Violation	Probable Compound Source
Arsenic (ppb)	1.8	0 - 1.8	0	10	No	Erosion of natural deposits
Barium (ppm)	0.058	0.048 - 0.058	2	2	No	Erosion of natural deposits
Fluoride (ppm)	0.97	0.77- 0.97	4	4	No	Added for dental health
Chlorine (ppm)	1.5	0.3 - 1.5	4	4	No	Water additive to control microbes
Iron (ppb)	560	n/a	n/a	1000	No	Erosion from naturally occurring deposits
Gross Alpha (pCi/L)	1.0	n/a	0	15	No	Erosion of natural deposits
Nitrate– as N (ppm)	1.04	0.43 - 1.04	10	10	No	Erosion of natural deposits
Total Trihalomethanes-TTHM's (ppb)	12.9	n/a	n/a	80	No	By-product of drinking water chlorination
Haloacetic Acids-HAA5 (ppb)	6.6	n/a	n/a	60	No	By-product of drinking water chlorination
Sodium (ppm) *	28	23 - 28	n/a	n/a	No	Erosion of natural deposits, runoff
Combined Radium 226/228 (pCi/L)	1.35	n/a	0	5	No	Erosion of natural deposits

* There is not a state or federal MCL for sodium. Monitoring is required to provide information to consumers and health officials that are concerned about sodium intake due to dietary precautions.

Compound (Units)	90th Percentile	# Sites Over Action Level	MCLG	Action Level	Probable Compound Source
Lead (ppb)	0	0	0	15	Corrosion of household plumbing
Copper (ppm)	0.62	0	1.3	1.3	Corrosion of household plumbing

Abbreviation	Definition
AL	Action Level is the concentration of a contaminant which, if exceeded, triggers treatment or other requirements.
NTU	Nephelometric Turbidity Units is a measure of water cloudiness.
MCL	Maximum Contaminant Level is the highest level of a contaminant that is allowed in drinking water.
MCLG	Maximum Contaminant Level Goal is the contaminant level below which there is no known or expected health risk.
pCi/L	pico Curies per liter.
pos/month	The maximum number of positive samples collected in a calendar month.
ppb	Parts-per-billion is also referred to as micrograms per liter (µg/L). Equivalent to one ounce in 7,350,000 gallons of water.
ppm	Parts-per-million is also referred to as milligrams per liter (mg/L). Equivalent to one ounce in 7,350 gallons of water.

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Department of Public Works

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Lake County Public Works Department
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Fax: 847.377.7173
E-Mail: PublicWorks@lakecountyil.gov

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APPENDIX C

TABLE C-1
Capital Costs
Lake Michigan Water Supply System

ITEM	INITIAL COST	LIFE (YEARS)	SALVAGE VALUE
Pipeline, Remote Storage and Pumping			
300,000 LF of Water Transmission Mains Ranging in size from 10 to 42 inch Diameter	$112,000,000	50	$67,200,000
Jack & Bore w/Pits	$3,800,000	50	$2,280,000
Pavement Replacement	$7,500,000	20	$0
Landscaping, Etc.	$2,500,000	20	$0
Easements & Land Acquisition	$1,250,000	Infinite	$1,250,000
Remote Booster Pump Station & 1 MG Reservoir	$1,500,000	40	$750,000
Sub-Total: Pipeline, Remote Storage and Pumping	$128,550,000		$71,480,000
Main Treatment, Pumping and Storage Facilities			
Main Booster Pump Station & 3 MG Reservoir	$8,750,000	40	$4,375,000
Low Lift Pumping Station & Raw Water Transmission Main	$7,250,000	30	$2,417,000
Water Treatment Plant, 3 MG Storage, Pumping, Chemical Facilities, and Payment to LCPWD	$21,500,000	30	$7,167,000
Sub-Total: Treatment, Pumping and Storage	$37,500,000		$13,959,000
Sub-Total: Pipeline and Treatment	$166,050,000		
Undeveloped Design Details @ 10%	$16,600,000		
Construction Contingencies @ 15%	$24,910,000		
Sub-Total Estimated Construction Cost	$207,560,000		
Engineering, Legal & Administration @ 15%	$31,130,000		
TOTALS	$238,690,000		$85,439,000
Project Costs Financed by SSA Bonds	$103,690,000		$37,116,000
Project Costs Financed by Revenue Bonds	$135,000,000		$48,323,000
	$238,690,000		$85,439,000

TABLE C-2
Equalized Assessed Valuation

Communities		2006 EAV
Incorporated Municipalities:		
Antioch (V)	$	382,597,319
Fox Lake (V) Lake Co. Portion		307,016,506
Fox Lake (V) McHenry Co. Portion		17,310,204
Lake Villa (V)		234,130,851
Lake Zurich (V)		769,562,132
Long Grove (V)		640,168,736
Lindenhurst (V)		385,413,216
Old Mill Creek (V)		9,077,897
Volo (V)		47,274,757
Wauconda (V)		408,185,319
Subtotal	$	3,200,736,937
Unincorporated Areas:		
Grandwood Park	$	176,370,240
Fox Lake Hills		**53,103,277**
Subtotal	$	229,473,517
Total Estimated EAV	$	3,430,210,454

TABLE C-3
Capital Costs Financed by SSA Bonds
Breakdown by Community

Capital Cost Financed by SSA Bonds		$103,690,000
Communities	2006 EAV	SSA Bond Principal per Community
Incorporated Municipalities:		
Antioch	$ 382,597,319	$11,565,330
Fox Lake Lake Co. Portion	307,016,506	$9,280,638
Fox Lake McHenry Co. Portion	17,310,204	$523,261
Lake Villa	234,130,851	$7,077,416
Lake Zurich	769,562,132	$23,262,683
Long Grove	640,168,736	$19,351,319
Lindenhurst	385,413,216	$11,650,450
Old Mill Creek	9,077,897	$274,411
Volo	47,274,757	$1,429,043
Wauconda	408,185,319	$12,338,816
Subtotal	$ 3,200,736,937	$96,753,368
Unincorporated Areas:		
Grandwood Park	$ 176,370,240	$5,331,402
Fox Lake Hills	**53,103,277**	**$1,605,231**
Subtotal	$ 229,473,517	$6,936,632
TOTALS	$ 3,430,210,454	$103,690,000

TABLE C-4
Capital Costs Financed by Revenue Bonds
Breakdown by Community

Capital Cost Financed by Revenue Bonds				$135,000,000
Communities	2005 Average Day Water Demand (mgd)	2030 Average Day Water Demand (mgd)	2020 Average Day Water Demand (mgd)	Water Revenue Bond Principal per Community
Antioch	1.44	3.18	2.48	$23,847,248
Fox Lake	0.84	1.51	1.24	$11,923,624
Fox Lake Hills	**0.17**	**0.41**	**0.34**	**$3,264,116**
Grandwood Park	0.49	0.86	0.71	$6,835,443
Lake Villa	0.72	1.57	1.23	$11,808,420
Lake Zurich	1.99	2.23	2.13	$20,487,128
Lindenhurst	1.20	1.67	1.48	$14,227,706
Long Grove	0.62	1.00	0.85	$8,141,089
Old Mill Creek	0.02	0.45	0.28	$2,668,895
Volo	0.19	2.05	1.31	$12,538,046
Wauconda	1.28	2.49	2.01	$19,258,285
TOTALS	8.96	17.42	14.06	$135,000,000

TABLE C-5
Salvage Value Financed by SSA Bonds
Breakdown by Community

Salvage Value Financed by SSA Bonds		$37,116,000
Communities	2006 EAV	Salvage Value Financed by SSA Bonds per Community
Incorporated Municipalities:		
Antioch	$ 382,597,319	$4,139,828
Fox Lake Lake Co. Portion	307,016,506	$3,322,019
Fox Lake McHenry Co. Portion	17,310,204	$187,302
Lake Villa	234,130,851	$2,533,372
Lake Zurich	769,562,132	$8,326,914
Long Grove	640,168,736	$6,926,835
Lindenhurst	385,413,216	$4,170,297
Old Mill Creek	9,077,897	$98,226
Volo	47,274,757	$511,528
Wauconda	408,185,319	$4,416,699
Subtotal	$ 3,200,736,937	$34,633,021
Unincorporated Areas:		
Grandwood Park	$ 176,370,240	$1,908,384
Fox Lake Hills	**53,103,277**	**$574,595**
Subtotal	$ 229,473,517	$2,482,979
TOTALS	$ 3,430,210,454	$37,116,000

TABLE C-6
Salvage Value Financed by Revenue Bonds
Breakdown by Community

Salvage Value Financed by Revenue Bonds				$48,323,000
Communities	2005 Average Day Water Demand (mgd)	2030 Average Day Water Demand (mgd)	2020 Average Day Water Demand (mgd)	Salvage Value Financed by Revenue Bond per Community
Antioch	1.44	3.18	2.48	$8,536,078
Fox Lake	0.84	1.51	1.24	$4,268,039
Fox Lake Hills	**0.17**	**0.41**	**0.34**	**$1,168,384**
Grandwood Park	0.49	0.86	0.71	$2,446,734
Lake Villa	0.72	1.57	1.23	$4,226,802
Lake Zurich	1.99	2.23	2.13	$7,333,330
Lindenhurst	1.20	1.67	1.48	$5,092,781
Long Grove	0.62	1.00	0.85	$2,914,088
Old Mill Creek	0.02	0.45	0.28	$955,326
Volo	0.19	2.05	1.31	$4,487,970
Wauconda	1.28	2.49	2.01	$6,893,467
TOTALS	8.96	17.42	14.06	$48,323,000

TABLE C-7
Present Worth of O M & R Costs
YEARS 2010 TO 2030

Calendar Year	Average Water Demand (MGD)	Rate of Growth (%)	O M & R Expenses		
			OM & R ($/1,000 gal)	Annual OM & R	2010 Present Worth of OM&R @ 8%
2005	**8.92**	Actual			
2006	9.16	2.6%			
2007	9.40	2.6%			
2008	9.65	2.6%			
2009	9.90	2.6%			
2010	10.16	2.6%			$0
2011	10.43	2.6%			$0
2012	10.71	2.6%			$0
2013	10.99	2.6%			$0
2014	11.28	2.6%	1.50	$6,178,194	$4,541,157
2015	11.58	2.6%	1.50	$6,341,724	$4,316,071
2016	11.89	2.6%	1.50	$6,509,583	$4,102,142
2017	12.20	2.6%	1.50	$6,681,886	$3,898,816
2018	12.53	2.6%	1.50	$6,858,749	$3,705,568
2019	12.86	2.6%	1.50	$7,040,293	$3,521,899
2020	13.20	2.6%	1.50	$7,226,642	$3,347,334
2021	13.55	2.6%	1.50	$7,417,924	$3,181,421
2022	13.91	2.6%	1.50	$7,614,269	$3,023,731
2023	14.28	2.6%	1.50	$7,815,811	$2,873,858
2024	14.65	2.6%	1.50	$8,022,688	$2,731,413
2025	15.04	2.6%	1.50	$8,235,041	$2,596,028
2026	15.44	2.6%	1.50	$8,453,014	$2,467,354
2027	15.85	2.6%	1.50	$8,676,757	$2,345,058
2028	16.27	2.6%	1.50	$8,906,422	$2,228,823
2029	16.70	2.6%	1.50	$9,142,166	$2,118,350
2030	**17.14**	2.6%	1.50	$9,384,150	$2,013,353
TOTALS				$130,505,313	$53,012,376

TABLE C-8
Present Worth of OM&R Costs
Breakdown by Community

Present Worth of 20 years of OM&R Costs				$53,012,376
Communities	2005 Average Day Water Demand (mgd)	2030 Average Day Water Demand (mgd)	2020 Average Day Water Demand (mgd)	Present Worth of OM&R per Community
Antioch	1.44	3.18	2.48	$9,364,439
Fox Lake	0.84	1.51	1.24	$4,682,220
Fox Lake Hills	**0.17**	**0.41**	**0.34**	**$1,281,767**
Grandwood Park	0.49	0.86	0.71	$2,684,171
Lake Villa	0.72	1.57	1.23	$4,636,981
Lake Zurich	1.99	2.23	2.13	$8,044,973
Lindenhurst	1.20	1.67	1.48	$5,586,996
Long Grove	0.62	1.00	0.85	$3,196,878
Old Mill Creek	0.02	0.45	0.28	$1,048,033
Volo	0.19	2.05	1.31	$4,923,493
Wauconda	1.28	2.49	2.01	$7,562,425
TOTALS	8.96	17.42	14.06	$53,012,376

TABLE C-9
Present Worth of Connection Fees
Years 2010 to 2030

					Connection Fee Revenue			
Calendar Year	Population	Number of Customers	Average Water Demand (MGD)	Rate of Growth (%)	New Customers	Connection Fee	Annual Connection Fee Revenue	2010 Present Worth of Connection Fees @ 8%
2005	**94,018**	31,339	**8.92**	Actual				
2006	96,330	32,110	9.16	2.65%				
2007	98,698	32,899	9.40	2.65%				
2008	101,125	33,708	9.65	2.65%				
2009	103,612	34,537	9.90	2.65%				
2010	106,159	35,386	10.16	2.65%				$0
2011	108,770	36,257	10.43	2.65%				$0
2012	111,444	37,148	10.71	2.65%				$0
2013	114,184	38,061	10.99	2.65%				$0
2014	116,992	38,997	11.28	2.65%	936	$3,000	$ 2,807,620	$2,063,685
2015	119,869	39,956	11.58	2.65%	959	$3,000	$ 2,876,655	$1,957,803
2016	122,816	40,939	11.89	2.65%	982	$3,000	$ 2,947,388	$1,857,354
2017	125,836	41,945	12.20	2.65%	1,007	$3,000	$ 3,019,860	$1,762,059
2018	128,930	42,977	12.53	2.65%	1,031	$3,000	$ 3,094,113	$1,671,653
2019	132,100	44,033	12.86	2.65%	1,057	$3,000	$ 3,170,193	$1,585,886
2020	135,348	45,116	13.20	2.65%	1,083	$3,000	$ 3,248,143	$1,504,519
2021	138,676	46,225	13.55	2.65%	1,109	$3,000	$ 3,328,010	$1,427,326
2022	142,086	47,362	13.91	2.65%	1,137	$3,000	$ 3,409,841	$1,354,095
2023	145,580	48,527	14.28	2.65%	1,165	$3,000	$ 3,493,684	$1,284,620
2024	149,159	49,720	14.65	2.65%	1,193	$3,000	$ 3,579,588	$1,218,710
2025	152,827	50,942	15.04	2.65%	1,223	$3,000	$ 3,667,604	$1,156,182
2026	156,585	52,195	15.44	2.65%	1,253	$3,000	$ 3,757,785	$1,096,862
2027	160,435	53,478	15.85	2.65%	1,283	$3,000	$ 3,850,184	$1,040,585
2028	164,380	54,793	16.27	2.65%	1,315	$3,000	$ 3,944,854	$987,196
2029	168,422	56,141	16.70	2.65%	1,347	$3,000	$ 4,041,852	$936,546
2030	**172,563**	57,521	**17.14**	2.65%	1,380	$3,000	$ 4,141,235	$888,494
TOTALS					19,460		$ 58,378,608	$23,793,575

TABLE C-10
Present Worth of Connection Fees
Breakdown by Community

Present Worth of 20 years of Connection Fees				$23,793,575
Communities	2005 Average Day Water Demand (mgd)	2030 Average Day Water Demand (mgd)	2020 Average Day Water Demand (mgd)	Present Worth of Connection Fees per Community
Antioch	1.44	3.18	2.48	$4,203,047
Fox Lake	0.84	1.51	1.24	$2,101,523
Fox Lake Hills	**0.17**	**0.41**	**0.34**	**$575,296**
Grandwood Park	0.49	0.86	0.71	$1,204,738
Lake Villa	0.72	1.57	1.23	$2,081,219
Lake Zurich	1.99	2.23	2.13	$3,610,830
Lindenhurst	1.20	1.67	1.48	$2,507,615
Long Grove	0.62	1.00	0.85	$1,434,856
Old Mill Creek	0.02	0.45	0.28	$470,389
Volo	0.19	2.05	1.31	$2,209,814
Wauconda	1.28	2.49	2.01	$3,394,248
TOTALS	8.96	17.42	14.06	$23,793,575

TABLE C-11
Present Worth
Fox Lake Hills Portion of Lake Michigan Water Supply System

	Value	Present Worth Factor	Present Worth
Capital Costs			
Financed by SSA Bond	$1,605,231	1.00	$1,605,000
Financed by Revenue Bond	$3,264,116	1.00	$3,264,000
Salvage Values			
Financed by SSA Bond	$574,595	0.2145	-$123,000
Financed by Revenue Bond	$1,168,384	0.2145	-$251,000
Operations, Maintenance and Replacement			$1,282,000
Connection Fees			-$575,000
TOTAL PRESENT WORTH			$5,202,000

TABLE C-12
Capital Costs
Fox Lake Hills Water Supply Local Costs
Lake Michigan Water Source

ITEM	INITIAL COST	LIFE (YEARS)	SALVAGE VALUE
Receiving Stations and Storage:			
Storage Tank No. 2 (0.4 MG)	$500,000	40	$250,000
Booster Station No. 1	$920,000	40	$460,000
Sub-Total: Storage, Booster Stations, Distribution	$1,420,000		$710,000
Undeveloped Design Details @ 10%	$142,000		
Construction Contingencies @ 15%	$213,000		
Total Estimated Construction Cost	$1,775,000		
Engineering, Legal & Administrative Costs @ 15%	$266,000		
TOTALS	$2,041,000		$710,000

TABLE C-13
Operation, Maintenance and Replacement Costs
Fox Lake Hills Water Supply Local Costs
Lake Michigan Water Source

Item	Current Budget (2008-2009)	Proposed Change	Proposed Budget (2008-2009)	Percent Change	Proposed Budget 2030*
Salaries and Overtime	$60,000	-$6,000	$54,000	-10%	$79,071
Contract Services	$115,000	-$57,500	$57,500	-50%	$84,196
Water Meters	$16,000	$0	$16,000	0%	$23,429
Electrical Power	$93,000	-$46,500	$46,500	-50%	$68,089
Gas Heat for Well Houses	$12,000	-$9,000	$3,000	-75%	$4,393
Water System Supplies	$20,000	$0	$20,000	0%	$29,286
Chemicals	$6,000	-$4,500	$1,500	-75%	$2,196
Misc. Utilities	$5,200	$0	$5,200	0%	$7,614
Lab Testing	$7,600	-$3,800	$3,800	-50%	$5,564
Operation and Maintenance	$28,520	-$5,704	$22,816	-20%	$33,409
Wastewater Treatment	$5,000	-$5,000	$0	-100%	$0
Total	$368,320	-$138,004	$230,316	-37%	$337,248

* Includes additional costs due to increased water demand

Water Demands, mgd

2007	0.20
2009	0.28
2020	0.34
2030	0.41

TABLE C-14
Present Worth Evaluation
Fox Lake Hills Water Supply
Lake Michigan Water Source

Item	Value	Present Worth Factor	Present Worth
Local Water Distribution System Costs			
Capital Cost	$2,041,000	1.00	$2,041,000
Salvage Value	$710,000	0.2145	-$152,000
Operation, Maintenance and Replacement	$337,000	10.20	$3,437,000
Subtotal			$5,326,000
Share of Lake Michigan (Wholesale) System Costs			$5,202,000
TOTAL PRESENT WORTH			$10,528,000

APPENDIX D

TABLE D-1
Capital Costs
Fox Lake Hills Water Supply System
Ground Water Source

ITEM	INITIAL COST	LIFE (YEARS)	SALVAGE VALUE
Storage:			
Storage Tank No. 2 (0.4 MG)	$500,000	40	$250,000
Wells and Well Houses:			
2 Wells to Deep Aquifer (250 gpm each)	$800,000	40	$400,000
2 Well Pumps	$50,000	20	$0
1 Well House	$500,000	40	$250,000
New Raw Water Mains to Treatment Facility:			
1,700 LF of 10-inch Water Main from Well No. 1	$255,000	50	$153,000
4,350 LF of 10-inch Water Main from Well No. 2	$653,000	50	$392,000
2,000 LF of 10-inch Water Main from Well Nos. 3 and 4	$300,000	50	$180,000
Water Treatment Facility:			
Iron Filter	$100,000	30	$33,000
Reverse Osmosis Membrane	$150,000	30	$50,000
Chemical Feed Pumps	$25,000	20	$0
High Service Pumps	$10,000	20	$0
Treatment Facility Building	$445,000	40	$223,000
Sub-Totals, Storage, Wells, Water Mains, Treatment	$3,788,000		$1,931,000
Undeveloped Design Details @ 10%	$379,000		
Construction Contingencies @ 15%	$568,000		
Total Estimated Construction Cost	$4,735,000		
Engineering, Legal & Administrative Costs @ 15%	$710,000		
TOTALS	$5,445,000		$1,931,000

TABLE D-2
Operation, Maintenance and Replacement Costs
Fox Lake Hills Water Supply System
Ground Water Source

Item	Current Budget (2008-2009)	Proposed Change	Proposed Budget (2008-2009)	Percent Change	Proposed Budget 2030*
Salaries and Overtime	$60,000	$30,000	$90,000	50%	$131,786
Contract Services	$115,000	$0	$115,000	0%	$168,393
Water Meters	$16,000	$0	$16,000	0%	$23,429
Electrical Power	$93,000	$46,500	$139,500	50%	$204,268
Gas Heat for Well Houses	$12,000	$6,000	$18,000	50%	$26,357
Water System Supplies	$20,000	$0	$20,000	0%	$29,286
Chemicals	$6,000	$3,000	$9,000	50%	$13,179
Misc. Utilities	$5,200	$0	$5,200	0%	$7,614
Lab Testing	$7,600	$1,520	$9,120	20%	$13,354
Operation and Maintenance	$28,520	$7,300	$35,820	26%	$52,451
Wastewater Treatment	$5,000	$41,000	$46,000	820%	$67,357
Total	$368,320	$135,320	$503,640	37%	$737,473

* Includes additional costs due to increased water demand

Water Demands, mgd

2007	0.20
2009	0.28
2020	0.34
2030	0.41

TABLE D-3
Present Worth Evaluation
Fox Lake Hills Water Supply System
Ground Water Source

Item	Value	Present Worth Factor	Present Worth
Local Water Distribution System Costs			
Capital Cost	$5,445,000	1.00	$5,445,000
Salvage Value	$1,931,000	0.2145	-$414,000
Operation, Maintenance and Replacement	$737,000	10.20	$7,517,000
TOTAL PRESENT WORTH			$12,548,000

APPENDIX E

TABLE E-1
Capital Costs
Lake Michigan Water Supply

ITEM	INITIAL COST
Pipeline, Remote Storage and Pumping	
300,000 LF of Water Transmission Mains Ranging in size from 10 to 42 inch Diameter	$112,000,000
Jack & Bore w/Pits	$3,800,000
Pavement Replacement	$7,500,000
Landscaping, Etc.	$2,500,000
Easements & Land Acquisition	$1,250,000
Remote Booster Pump Station & 1 MG Reservoir	$1,500,000
Sub-Total: Piping and Remote Storage and Pumping	$128,550,000
Main Treatment, Pumping and Storage Facilities	
Main Booster Pump Station & 3 MG Reservoir	$8,750,000
Low Lift Pumping Station & Raw Water Transmission Main	$7,250,000
Water Treatment Plant, 3 MG Storage, Pumping, Chemical Facilities, and Payment to LCPWD	$21,500,000
Sub-Total: Treatment, Pumping and Storage	$37,500,000
Subtotal, Pipeline and Treatment	$166,050,000
Undeveloped Design Details @ 10%	$16,600,000
Construction Contingencies @ 15%	$24,910,000
Sub-Total Estimated Construction Cost	$207,560,000
Engineering Fees, Legal & Administration @ 15%	$31,130,000
TOTAL	$238,690,000
Project Costs Financed by SSA Bonds	$103,690,000
Project Costs Financed by Revenue Bonds	$135,000,000
	$238,690,000

TABLE E-2
Equalized Assessed Valuation

Communities		2006 EAV
Incorporated Municipalities:		
Antioch (V)	$	382,597,319
Fox Lake (V) Lake Co. Portion		307,016,506
Fox Lake (V) McHenry Co. Portion		17,310,204
Lake Villa (V)		234,130,851
Lake Zurich (V)		769,562,132
Long Grove (V)		640,168,736
Lindenhurst (V)		385,413,216
Old Mill Creek (V)		9,077,897
Volo (V)		47,274,757
Wauconda (V)		408,185,319
Subtotal	$	3,200,736,937
Unincorporated Areas:		
Grandwood Park	$	176,370,240
Fox Lake Hills		**53,103,277**
Subtotal	$	229,473,517
Total Estimated EAV	$	3,430,210,454

TABLE E-3
Capital Costs Financed by SSA Bonds
Breakdown by Community

Capital Cost Financed by SSA Bonds		$103,690,000
Communities	2006 EAV	SSA Bond Principal per Community
Incorporated Municipalities:		
Antioch	$ 382,597,319	$11,565,330
Fox Lake Lake Co. Portion	307,016,506	$9,280,638
Fox Lake McHenry Co. Portion	17,310,204	$523,261
Lake Villa	234,130,851	$7,077,416
Lake Zurich	769,562,132	$23,262,683
Long Grove	640,168,736	$19,351,319
Lindenhurst	385,413,216	$11,650,450
Old Mill Creek	9,077,897	$274,411
Volo	47,274,757	$1,429,043
Wauconda	408,185,319	$12,338,816
Subtotal	$ 3,200,736,937	$96,753,368
Unincorporated Areas:		
Grandwood Park	$ 176,370,240	$5,331,402
Fox Lake Hills	**53,103,277**	**$1,605,231**
Subtotal	$ 229,473,517	$6,936,632
TOTALS	$ 3,430,210,454	$103,690,000

TABLE E-4
Capital Costs Financed by Revenue Bonds
Breakdown by Community

Capital Cost Financed by Revenue Bonds				$135,000,000
Communities	2005 Average Day Water Demand (mgd)	2030 Average Day Water Demand (mgd)	2020 Average Day Water Demand (mgd)	Water Revenue Bond Principal per Community
Antioch	1.44	3.18	2.48	$23,847,248
Fox Lake	0.84	1.51	1.24	$11,923,624
Fox Lake Hills	**0.17**	**0.41**	**0.34**	**$3,264,116**
Grandwood Park	0.49	0.86	0.71	$6,835,443
Lake Villa	0.72	1.57	1.23	$11,808,420
Lake Zurich	1.99	2.23	2.13	$20,487,128
Lindenhurst	1.20	1.67	1.48	$14,227,706
Long Grove	0.62	1.00	0.85	$8,141,089
Old Mill Creek	0.02	0.45	0.28	$2,668,895
Volo	0.19	2.05	1.31	$12,538,046
Wauconda	1.28	2.49	2.01	$19,258,285
TOTALS	8.96	17.42	14.06	$135,000,000

TABLE E-5
Annualized Capital Costs
Breakdown by Community

Communities	Capital Cost Financed by SSA Bonds	Capital Cost Financed by Revenue Bonds	Total Capital Cost per Community	Annualized Capital Cost, 30 years, 8% Interest
Antioch	$11,565,330	$23,847,248	$35,412,578	$3,145,608
Fox Lake	$9,803,899	$11,923,624	$21,727,523	$1,930,000
Fox Lake Hills	**$1,605,231**	**$3,264,116**	**$4,869,347**	**$432,532**
Grandwood Park	$5,331,402	$6,835,443	$12,166,845	$1,080,750
Lake Villa	$7,077,416	$11,808,420	$18,885,836	$1,677,580
Lake Zurich	$23,262,683	$20,487,128	$43,749,811	$3,886,183
Lindenhurst	$11,650,450	$14,227,706	$25,878,156	$2,298,690
Long Grove	$19,351,319	$8,141,089	$27,492,408	$2,442,080
Old Mill Creek	$274,411	$2,668,895	$2,943,306	$261,446
Volo	$1,429,043	$12,538,046	$13,967,089	$1,240,661
Wauconda	$12,338,816	$19,258,285	$31,597,101	$2,806,689
TOTALS	$103,690,000	$135,000,000	$238,690,000	$21,202,220

TABLE E-6
Connection Fees

Calendar Year	Population	Number of Customers	Average Water Demand (MGD)	Connection Fee Revenue		
				New Customers	Connection Fee	Annual Connection Fee Revenue
2005	**94,018**	31,339	**8.92**			
2006	96,330	32,110	9.16			
2007	98,698	32,899	9.40			
2008	101,125	33,708	9.65			
2009	103,612	34,537	9.90			
2010	106,159	35,386	10.16			
2011	108,770	36,257	10.43			
2012	111,444	37,148	10.71			
2013	114,184	38,061	10.99			
2014	116,992	38,997	11.28	936	$3,000	$ 2,807,620
2015	119,869	39,956	11.58	959	$3,000	$ 2,876,655
2016	122,816	40,939	11.89	982	$3,000	$ 2,947,388
2017	125,836	41,945	12.20	1,007	$3,000	$ 3,019,860
2018	128,930	42,977	12.53	1,031	$3,000	$ 3,094,113
2019	132,100	44,033	12.86	1,057	$3,000	$ 3,170,193
2020	135,348	45,116	13.20	1,083	$3,000	$ 3,248,143
2021	138,676	46,225	13.55	1,109	$3,000	$ 3,328,010
2022	142,086	47,362	13.91	1,137	$3,000	$ 3,409,841
2023	145,580	48,527	14.28	1,165	$3,000	$ 3,493,684
2024	149,159	49,720	14.65	1,193	$3,000	$ 3,579,588
2025	152,827	50,942	15.04	1,223	$3,000	$ 3,667,604
2026	156,585	52,195	15.44	1,253	$3,000	$ 3,757,785
2027	160,435	53,478	15.85	1,283	$3,000	$ 3,850,184
2028	164,380	54,793	16.27	1,315	$3,000	$ 3,944,854
2029	168,422	56,141	16.70	1,347	$3,000	$ 4,041,852
2030	**172,563**	57,521	**17.14**	1,380	$3,000	$ 4,141,235
TOTALS				19,460		$ 58,378,608

Notes:
(1) Period of capitalized interest estimated to be from May 1, 2012 through May 1, 2013.

TABLE E-7
Annual Connection Fee Revenue
Breakdown per Community

Communities	2030 Average Day Water Demand (mgd)	Annual Connection Fee, 2030 $4,141,235
Antioch	3.18	$755,977
Fox Lake	1.51	$358,970
Fox Lake Hills	**0.41**	**$97,469**
Grandwood Park	0.86	$204,447
Lake Villa	1.57	$373,234
Lake Zurich	2.23	$530,135
Lindenhurst	1.67	$397,007
Long Grove	1.00	$237,729
Old Mill Creek	0.45	$106,978
Volo	2.05	$487,344
Wauconda	2.49	$591,945
TOTALS	17.42	$4,141,235

TABLE E-8
Annual OM&R Costs

Calendar Year	Average Water Demand (MGD)	Rate of Growth (%)	OM & R Costs	
			OM & R ($/1,000 gal)	Annual OM & R Cost
2005	**8.92**	Actual		
2006	9.16	2.65%		
2007	9.40	2.65%		
2008	9.65	2.65%		
2009	9.90	2.65%		
2010	10.16	2.65%		
2011	10.43	2.65%		
2012	10.71	2.65%		
2013	10.99	2.65%		
2014	11.28	2.65%	1.50	$6,178,194
2015	11.58	2.65%	1.50	$6,341,724
2016	11.89	2.65%	1.50	$6,509,583
2017	12.20	2.65%	1.50	$6,681,886
2018	12.53	2.65%	1.50	$6,858,749
2019	12.86	2.65%	1.50	$7,040,293
2020	13.20	2.65%	1.50	$7,226,642
2021	13.55	2.65%	1.50	$7,417,924
2022	13.91	2.65%	1.50	$7,614,269
2023	14.28	2.65%	1.50	$7,815,811
2024	14.65	2.65%	1.50	$8,022,688
2025	15.04	2.65%	1.50	$8,235,041
2026	15.44	2.65%	1.50	$8,453,014
2027	15.85	2.65%	1.50	$8,676,757
2028	16.27	2.65%	1.50	$8,906,422
2029	16.70	2.65%	1.50	$9,142,166
2030	**17.14**	2.65%	1.50	$9,384,150

TABLE E-9
Annual OM&R Costs
Breakdown per Community

Communities	2030 Average Day Water Demand (mgd)	Annual O M & R Cost, 2030 $9,384,150
Antioch	3.18	$1,713,065
Fox Lake	1.51	$813,437
Fox Lake Hills	**0.41**	**$220,867**
Grandwood Park	0.86	$463,282
Lake Villa	1.57	$845,759
Lake Zurich	2.23	$1,201,300
Lindenhurst	1.67	$899,629
Long Grove	1.00	$538,700
Old Mill Creek	0.45	$242,415
Volo	2.05	$1,104,335
Wauconda	2.49	$1,341,362
TOTALS	17.42	$9,384,150

TABLE E-10
Wholesale Water Rate
Lake Michigan Water Supply
Fox Lake Hills

Annualized Capital Cost, 30 years, 8%	$432,532
Annual Connection Fee, 2030 (Credit)	-$97,469
Annual OM&R Cost, 2030	$220,867
Total Annual Cost	$555,930
2030 Average Day Water Demand, mgd	0.41
Water Rate, $ per 1,000 gallons	$3.71

TABLE E-11
Capital Costs
Fox Lake Hills Water Supply Local Costs
Lake Michigan Water Source

ITEM	INITIAL COST
Receiving Stations and Storage:	
Storage Tank No. 2 (0.4 MG)	$500,000
Booster Station No. 1	$920,000
Sub-Total, Storage, Booster Stations, Distribution	$1,420,000
Undeveloped Design Details @ 10%	$142,000
Construction Contingencies @ 15%	$213,000
Total Estimated Construction Cost	$1,775,000
Engineering, Legal & Administrative Costs @ 15%	$266,000
TOTAL	$2,041,000
Annualized Capital Costs, 30 years, 8% interest	$181,297

TABLE E-12
Operation, Maintenance and Replacement Costs
Fox Lake Hills Water Supply Local Costs
Lake Michigan Water Source

Item	Current Budget (2008-2009)	Proposed Change	Proposed Budget (2008-2009)	Percent Change	Proposed Budget 2030*
Salaries and Overtime	$60,000	-$6,000	$54,000	-10%	$79,071
Contract Services	$115,000	-$57,500	$57,500	-50%	$84,196
Water Meters	$16,000	$0	$16,000	0%	$23,429
Electrical Power	$93,000	-$46,500	$46,500	-50%	$68,089
Gas Heat for Well Houses	$12,000	-$9,000	$3,000	-75%	$4,393
Water System Supplies	$20,000	$0	$20,000	0%	$29,286
Chemicals	$6,000	-$4,500	$1,500	-75%	$2,196
Misc. Utilities	$5,200	$0	$5,200	0%	$7,614
Lab Testing	$7,600	-$3,800	$3,800	-50%	$5,564
Operation and Maintenance	$28,520	-$5,704	$22,816	-20%	$33,409
Wastewater Treatment	$5,000	-$5,000	$0	-100%	$0
Total	$368,320	-$138,004	$230,316	-37%	$337,248

* Includes additional costs due to increased water demand

Water Demands, mgd

2007	0.20
2009	0.28
2020	0.34
2030	0.41

TABLE E-13
Water Rate Evaluation
Fox Lake Hills Water Supply System
Lake Michigan Water Source

Annualized Capital Costs, 30 years, 8% interest	$181,000
Annual O M & R Costs, 2030	$337,000
Total Annual Local Distribution Costs	$518,000
Average Annual Flow, 2030, mgd	0.41
Local Distribution Portion of Water Rate, $ per 1000 gallons	$3.46
System Wholesale Water Rate, $ per 1000 gallons	$3.71
Retail Water Rate, $ per 1000 gallons	$7.18

APPENDIX F

TABLE F-1
Capital Costs
Fox Lake Hills Water Supply System
Ground Water Source

ITEM	INITIAL COST
Storage:	
Storage Tank No. 2 (0.4 MG)	$500,000
Wells and Well Houses:	
2 Wells to Deep Aquifer (250 gpm each)	$800,000
2 Well Pumps	$50,000
1 Well House	$500,000
New Raw Water Mains to Treatment Facility:	
1,700 LF of 10-inch Water Main from Well No. 1	$255,000
4,350 LF of 10-inch Water Main from Well No. 2	$653,000
2,000 LF of 10-inch Water Main from Well Nos. 3 and 4	$300,000
Water Treatment Facility:	
Iron Filter	$100,000
Reverse Osmosis Membrane	$150,000
Chemical Feed Pumps	$25,000
High Service Pumps	$10,000
Treatment Facility Building	$445,000
Sub-Total, Storage, Wells, Water Mains, Treatment	$3,788,000
Undeveloped Design Details @ 10%	$379,000
Construction Contingencies @ 15%	$568,000
Total Estimated Construction Cost	$4,735,000
Engineering, Legal & Administrative Costs @ 15%	$710,000
Total Estimated Project Cost	$5,445,000
Annualized Capital Costs, 30 years, 8% interest	$483,665

TABLE F-2
Operation, Maintenance and Replacement Costs
Fox Lake Hills Water Supply System
Ground Water Source

Item	Current Budget (2008-2009)	Proposed Change	Proposed Budget (2008-2009)	Percent Change	Proposed Budget 2030*
Salaries and Overtime	$60,000	$30,000	$90,000	50%	$131,786
Contract Services	$115,000	$0	$115,000	0%	$168,393
Water Meters	$16,000	$0	$16,000	0%	$23,429
Electrical Power	$93,000	$46,500	$139,500	50%	$204,268
Gas Heat for Well Houses	$12,000	$6,000	$18,000	50%	$26,357
Water System Supplies	$20,000	$0	$20,000	0%	$29,286
Chemicals	$6,000	$3,000	$9,000	50%	$13,179
Misc. Utilities	$5,200	$0	$5,200	0%	$7,614
Lab Testing	$7,600	$1,520	$9,120	20%	$13,354
Operation and Maintenance	$28,520	$7,300	$35,820	26%	$52,451
Wastewater Treatment	$5,000	$41,000	$46,000	820%	$67,357
Total	$368,320	$135,320	$503,640	37%	$737,473

* Includes additional costs due to increased water demand

Water Demands, mgd

2007	0.20
2009	0.28
2020	0.34
2030	0.41

TABLE F-3
Water Rate Evaluation
Fox Lake Hills Water Supply System
Ground Water Source

Annualized Capital Costs, 30 years, 8% interest	$484,000
Annual O M & R Costs, 2020	$737,000
Total Annual Local Distribution Costs	$1,221,000
Average Annual Flow, 2030, mgd	0.41
Retail Water Rate, $ per 1000 gallons	$8.16

APPENDIX G

LAKE COUNTY PUBLIC WATER DISTRICT

Phone - Area Code 847 - 746-2052 Fax - 847 - 746-1852

500 - 17th STREET ZION ILLINOIS 60099

December 22, 2008

Illinois Department of Natural Resources
Division of Water Resources Management
Office of Water Resources
36 South Wabash Avenue
Suite 1415
Chicago, IL 60603

Attention: Daniel Injerd, Manager
Lake Michigan Management Section

Re: Source of Lake Michigan Drinking Water

Dear Mr. Injerd:

The Board of Trustees of the Lake County Public Water District (District), consistent with its charter, is now, and will continue to be in the future, interested in supplying communities within Lake County with their potable water requirements from Lake Michigan. This includes all of the communities and other political entities that presently make up the Northern Lake County Lake Michigan Water Planning Group (Group). The District actively endorses the efforts of all members of this group to seek and obtain Lake Michigan water allocations.

The District, by contracts, presently serves the City of Zion, the Village of Winthrop Harbor, and the Adeline Jay Geo-Karis Illinois Beach State Park (State of Illinois) with their Lake Michigan potable water requirements. The District presently owns treatment facilities which consist of a raw water intake, and treatment, piping, conveyance and storage facilities to meet the needs of the District's present customers. These facilities can be expanded, as required, on District's owned land to meet the needs of other communities that desire Lake Michigan treated drinking water.

The District has been an active participant in all of the planning meetings of the Group to date, and plan to continue to be in the future. Through its Board of Trustees and in keeping with its charter, the District has continuously indicated their interest in being this Group's source of drinking water from Lake Michigan, consistent with the signing of a mutually acceptable contract that also maintains the needs of the District's existing customers.

Please contact Jerry Topcik, Chairman of the Board of Trustees, or Al Albrecht, General Manager if you desire additional information about the District's role in this Group's overall planning activities.

Sincerely,

Gerold L. Topcik
Chairman, Board of Trustees
Lake County Public Water District

Arlyn E. Albrecht, P.E.,
General Manager
Lake County Public Water District

AEA/klj

cc: Mr. John Callan
Applied Technologies

APPENDIX H

Agenda Item # 54

DISTRIBUTION
County Board
County Clerk
County Administrator
Recorder of Deeds
Public Works

STATE OF ILLINOIS)
) SS
COUNTY OF LAKE)

COUNTY BOARD, LAKE COUNTY, ILLINOIS

ADJOURNED REGULAR SEPTEMBER, A.D. 2006 SESSION

OCTOBER 10, 2006

MADAM CHAIR AND MEMBERS OF THE COUNTY BOARD:

Your Public Works and Transportation Committee presents herewith an Amended Ordinance Restricting the Outside Use of Water in Public Water Supply Systems of the County of Lake, Illinois, and request its adoption.

Respectfully submitted,

	Aye	Nay
Diana D'Kelly, CHAIR	✓	
Paul Somerville, VICE CHAIR	✓	
Ann B. Maine	✓	
Sandy Cole	✓	
Michael A. Talbott	✓	

PUBLIC WORKS AND TRANSPORTATION COMMITTEE

VOICE VOTE

CERTIFIED TO BE A TRUE COPY OF RECORDS OF THE LAKE COUNTY BOARD MEETING OF

OCT 10 2006 APPROVED

CERTIFICATION NOT VALID UNLESS SEAL OF LAKE COUNTY, ILLINOIS IS AFFIXED

Willard R Helander County Clerk

AN AMENDED ORDINANCE RESTRICTING THE OUTSIDE USE OF WATER IN PUBLIC WATER SUPPLY SYSTEMS OF THE COUNTY OF LAKE, ILLINOIS.

WHEREAS, the County of Lake is a participant in the allocation process of Lake Michigan water and is subject to the rules and regulations of the Illinois Department of Transportation (IDOT) and/or the Illinois Department of Natural Resources (IDNR), under its permit for the withdrawal of Lake Michigan water; and

WHEREAS, IDOT/IDNR has promulgated a rule restricting non-essential water uses, with particular reference to lawn sprinkling, and has requested that permitees incorporate similar provisions within their ordinances; and

WHEREAS, the County of Lake, through its Department of Public Works, operates certain public water supply systems that utilize water drawn from public wells, which were negatively impacted in 2005 by drought weather conditions, which demonstrated the need to have effective public water restrictions on non-essential water uses in place;

NOW, THEREFORE, BE IT ORDAINED BY THE COUNTY BOARD OF THE COUNTY OF LAKE, LAKE COUNTY, ILLINOIS, as follows:

SECTION 1. RESTRICTIONS ON WATER USE.

The following mandatory water conservation regulation shall be applicable to all water service customers of the County of Lake Department of Public Works.

A. **Summer General Water Use Restriction.**

1. Excepting the use of hand-held hoses or sprinkling cans used for the watering of gardens and shrubs, the use of water from the County water system for landscape irrigation and all outside water use including, but not limited to washing cars and vehicles and filling pools, from May 15 through September 15 of each year is prohibited between the hours 10:00 AM and 6:00 PM, except that newly sodded or seeded areas of lawns may be watered at any time for a two-week period following installation of such sod or planting of such seed.

2. Occupants with even-numbered residences or structures shall be limited to water lawns and gardens and other landscape uses, wash cars and vehicles, and use water for outside use only on even-numbered days. Occupants with odd-numbered residences or structures shall be limited to water lawns and gardens and other landscape uses, wash cars and vehicles, and use water for outside use only on odd-numbered days.

B. **Landscape Water Use Restrictions.**

Definition. *Landscape.* For purposes of this Ordinance, the term "landscape" shall include shrubbery, trees, lawns, grass, ground covers, plants, vines, gardens, vegetables, or flowers.

C. **Emergency Water Shortage.**

1. The Director of the Department of Public Works is authorized, when the circumstances warrant, to issue a declaration of chronic water shortage, to ensure the maintenance of an adequate water supply of water to meet internal residential, business and firefighting requirements. Upon the declaration of a chronic water shortage situation, the following authorities or restrictions shall immediately be in force and effect.

(a) Following the initial declaration of a chronic water shortage, the Director is authorized, for all landscape water use, washing of cars and vehicles, and outside water usage, to restrict or limit water usage to specific hours or to totally prohibit such outside water usage.

2. Public Use Conservation Programs. When a chronic water shortage situation arises, the Director is authorized to order all public users to restrict activities calling for high water consumption. The high water consumption category includes, but is not limited to, the testing and clearing of fire hydrants, the cleaning of water mains, the conduct of fire drills, street washing (except in emergencies), sewer flushing, and the watering of public areas.

3. Administration. The authority to administer and enforce this Ordinance shall be in the Director of the Department of Public Works, or his or her designees. As the County provides public water services in some municipalities, the Director is authorized, by writing, to delegate enforcement of this Ordinance within municipal boundaries to officers or employees of that municipality, including court enforcement, if necessary.

4. Variances. Variances from the regulatory standards of this Ordinance may be granted in accordance with the requirements provided below. Any application for a variance shall be made to, and decided by, the Director. No variance shall be granted unless the applicant for the variance can demonstrate that:

(a) An exceptional economic or other hardship would result without the variance; and

(b) The relief granted is the minimum necessary; and

(c) There will be no additional threat to public health, safety or welfare or the creation of a nuisance; and

(d) No additional public expense will result.

5. Emergency Water Usage Plan. The Department of Public Works, through its Director, officers, and employees, shall establish, and keep on file, a current Emergency Water Use Plan for implementation and/or imposition during declared emergency water shortages.

SECTION 2. PENALTIES.

A. Any person or water customer who violates any provision or section of this Ordinance, or who violates any declaration or order of the Director under this Ordinance, shall be fined not less than $50.00, nor more than $250.00 for each violation. Each day that a violation exists or occurs shall constitute a separate offense.

B. The Director may also take any other available legal action necessary to prevent or to remedy any violation, including but not limited to appropriate equitable or injunctive relief or discontinuation of water service to the violator.

SECTION 3. VALIDITY.

A. All ordinances or parts of ordinances in conflict herewith are hereby repealed.

B. The invalidity of any section, clause, sentence, or provision of this Ordinance shall not affect the validity of any other part of this Ordinance, which can be given effect without such invalid part or parts.

SECTION 4. EFFECTIVE DATE. This amended Ordinance shall be in full force and effect from and after its passage, approval and publication as required by law.

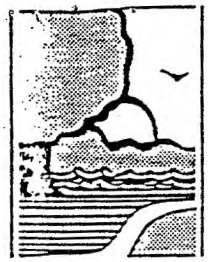
Adopted at Waukegan, Lake County, Illinois on this 10th day of October, A.D., 2006.
SECTION 7. This ordinance shall be published and take effect as provided by law.

CHAIR, COUNTY BOARD

ATTEST: (SEAL)

COUNTY CLERK

Adopted: September 11, 1990
Amended: October 10, 2006



ILLINOIS
DEPARTMENT OF
NATURAL RESOURCES
Office of Water Resources

Dept. of Natural Resources
Office of Water Resources
36 S. Wabash Ave./Suite 1415
Chicago, IL 60603

APPLICATION FOR PERMIT TO WITHDRAW LAKE MICHIGAN WATER

An application for permit to withdraw Lake Michigan Water requires that the applicant express all amounts, usage, demands, etc in units of million gallons per day (MGD) for each accounting year beginning October 1 and ending September 30. The applicant should not include any water that is sold or transferred to any other distribution system unless expressly indicated otherwise in this application. In support of the application, the applicant must complete and answer the following questions, and provide the information that is requested in each of the sections contained in this application. After completing this form, please return it to the Illinois Department of Natural Resources, Office of Water Resources, 36 S. Wabash Avenue, Suite 1415, Chicago, IL 60603.

SECTION I - GENERAL INFORMATION

Name, address and phone number of applicant:

Lake County Public Works Department Fox Lake Hills

650 Winchester Road

Libertyville, Illinois 60048

847-377-7500

Name, address and phone number of the contact person for the applicant:

Frank Tiefert, PE, Applied Technologies, Inc.

468 Park Avenue

Lake Villa, Illinois 60046

847-265-7325

Authorized Official

Name: Peter Kolb

Title: Director, Lake County Public Works

Date _____

Subscribed and sworn to before me this ____

day of _____, 19 ____.

SECTION II - PROPOSED WATER USAGE

The applicant applies for a permit to withdraw Lake Michigan water in the amounts for the years listed below:

Year	Amount (MGD)	Year	Amount (MGD)
		2020	0.339
2010	0.282	2021	0.345
2011	0.288	2022	0.352
2012	0.293	2023	0.358
2013	0.299	2024	0.364
2014	0.304	2025	0.371
2015	0.310	2026	0.378
2016	0.316	2027	0.384
2017	0.322	2028	0.391
2018	0.328	2029	0.398
2019	0.333	2030	0.406

SECTION III - HISTORIC WATER USAGE

A. HISTORIC WATER USAGE BREAKDOWN

List the total historic water usage (MGD) for at least 10 consecutive prior years, if available, from the date of the application and the contribution of each water source to that total.

Year	Total Water Usage	Lake Michigan	Deep Aquifer	Shallow Aquifer	*
1998	0.165	-0-	-0-	0.165	
1999	0.164	-0-	-0-	0.164	
2000	0.159	-0-	-0-	0.159	
2001	0.160	-0-	-0-	0.160	
2002	0.166	-0-	-0-	0.166	
2003	0.162	-0-	-0-	0.162	
2004	0.159	-0-	-0-	0.159	
2005	0.173	-0-	-0-	0.173	
2006	0.173	-0-	-0-	0.173	
2007	0.195	-0-	-0-	0.195	
2008	0.198	-0-	-0-	0.198	
2009	0.187	-0-	-0-	0.187	

* Specify any other source

B. TYPE OF HISTORIC WATER USAGE

Based on Total Historic Water Usage figures tabulated in Section III A indicate the type of historic water usage (MGD) as shown below. If the data is estimated, indicate with an asterisk (*). Population should reflect census figures when applicable. Data should be shown for a minimum of 10 years prior to the date of the application.

Year	Residential Water Usage	Commercial Water Usage	Manufacturing Water Usage	Population
1998	0.149	0.017	-0-	2,880
1999	0.148	0.016	-0-	2,898
2000	0.143	0.016	-0-	2,916
2001	0.144	0.016	-0-	2,934
2002	0.149	0.017	-0-	3,044
2003	0.146	0.016	-0-	2,971
2004	0.143	0.016	-0-	2,916
2005	0.156	0.017	-0-	3,173
2006	0.156	0.017	-0-	3,173
2007	0.174	0.019	-0-	3,540
2008	0.178	0.020	-0-	3,540*
2009	0.168*	0.019*	-0-	3,540*

SECTION IV - PROJECTED WATER DEMAND

A. PROJECTED TOTAL WATER DEMAND BREAKDOWN

List the projected water demand (MGD) and projected contribution (MGD) of each water source to the total water demand to the year 2020.

Year	Projected Total Water Demand	Projected Contribution			
		Lake Michigan	Deep Aquifer	Shallow Aquifer	*
2010	0.282	-0-	-0-	0.282	
2011	0.287	-0-	-0-	0.287	
2012	0.293	-0-	-0-	0.293	
2013	0.299	-0-	-0-	0.299	
2014	0.305	0.305	-0-	-0-	
2015	0.310	0.310	-0-	-0-	
2016	0.316	0.316	-0-	-0-	
2017	0.322	0.322	-0-	-0-	
2018	0.327	0.327	-0-	-0-	
2019	0.333	0.333	-0-	-0-	
2020	0.339	0.339	-0-	-0-	
2021	0.345	0.345	-0-	-0-	
2022	0.352	0.352	-0-	-0-	
2023	0.358	0.358	-0-	-0-	
2024	0.364	0.364	-0-	-0-	
2025	0.371	0.371	-0-	-0-	
2026	0.378	0.378	-0-	-0-	
2027	0.384	0.384	-0-	-0-	
2028	0.391	0.391	-0-	-0-	
2029	0.398	0.398	-0-	-0-	
2030	0.406	0.406	-0-	-0-	

* Specify any other source.

B. TYPE OF PROJECTED WATER DEMAND

Based on Projected Total Water Demand tabulated in Section IV A, indicate the type of projected water demand (MGD) as shown below to the year 2020.

Year	Residential Water Usage	Commercial Water Usage	Manufacturing Water Usage	Population
2010	0.254	0.028	-0-	3,756
2011	0.259	0.029	-0-	3,831
2012	0.264	0.029	-0-	3,908
2013	0.269	0.030	-0-	3,986
2014	0.274	0.030	-0-	4,066
2015	0.279	0.031	-0-	4,139
2016	0.284	0.032	-0-	4,213
2017	0.290	0.032	-0-	4,289
2018	0.295	0.033	-0-	4,366
2019	0.300	0.033	-0-	4,445
2020	0.305	0.034	-0-	4,525
2021	0.311	0.035	-0-	4,600
2022	0.317	0.035	-0-	4,693
2023	0.322	0.036	-0-	4,773
2024	0.328	0.036	-0-	4,853
2025	0.334	0.037	-0-	4,947
2026	0.340	0.038	-0-	5,040
2027	0.346	0.038	-0-	5,120
2028	0.352	0.039	-0-	5,213
2029	0.358	0.040	-0-	5,307
2030	0.365	0.041	-0-	5,413

SECTION V - BREAKDOWN OF LATEST ANNUAL WATER USES WATER YEAR 2008.

Enter the amount of water pumped and utilized for each item shown below. All amounts entered in this section must be in units of million gallons per day (MGD) rounded off to 3 decimal places to the right of the decimal. Conversion calculations are provided for your use in Section VIII to convert other commonly used units to MGD.

A. Pumpage Data

Water bought or received from the following distribution systems:

_____, _____,
_____, _____.

1.	Lake Michigan Pumpage	MGD
2.	Shallow Aquifer Pumpage	0.197 MGD
3.	Deep Aquifer Pumpage	MGD
4.	Total Pumpage (Add lines 1, 2 & 3)	0.197 MGD
5.	Water Treatment Use	0.005 MGD
6.	Gross Annual Pumpage (subtract line 5 from line 4)	0.192 MGD

Water sold or provided to any other distribution systems (enter the name of each system and the amount sold o provided to that system on lines 7 through 12). If additional lines are required, attach an additional sheet listing each system and amount.

7.	_____	MGD
8.	_____	MGD
9.	_____	MGD
10.	_____	MGD
11.	_____	MGD
12.	_____	MGD
13.	Total (add lines 7 through 12 and any additional amounts).	MGD
14.	Net Annual Pumpage (subtract line 13 from line 6)	0.192 MGD

B. Metered Uses (Water Uses Within Permittee's Distribution System)

15.	Residential	0.129 MGD
16.	Commercial and Manufacturing	0.014 MGD
17.	Municipal	MGD
18.	Construction	MGD
19.	Total Metered Uses (add lines 15 through 18)	0.143 MGD
20.	Percentage of Metered Use to Net Annual Pumpage (divide line 19 by line 14 and multiply by 100)	74.5 %

C. Unmetered Hydrant Uses (Water Uses Within Permittee's Distribution System)

21.	Firefighting and Training	MGD
22.	Water Main Flushing	0.003 MGD
23.	Sewer Cleaning	0.001 MGD
24.	Street Cleaning	MGD
25.	Construction	MGD
26.	Other (attach explanation)	MGD
27.	Total Unmetered Hydrant Use (add lines 21 through 26)	0.004 MGD
28.	Percentage of Unmetered Hydrant Use to Net Annual Pumpage (divide line 27 by line 14 and multiply by 100)	2.1 %
29.	Department Requirement for Hydrant use	10 %
30.	Excessive hydrant use (subtract line 29 from line 28) If the percentage is greater than 0.0, attach explanation (consult Rule 730.307 (e))	1.1 %

D. Unavoidable Leakage and Unaccounted For Flow

31.	Maximum Unavoidable Leakage (Do worksheet in Section VII enter amount from line 11 of the worksheet)	0.015 MGD
32.	Percentage of Maximum Unavoidable Leakage to Net Annual Pumpage (divide line 31 by line 14 and multiply by 100)	7.8 %
33.	Total Accounted for Flow (add lines 19, 27 and 31)	0.162 MGD
34.	Percentage of Total Accounted for Flow to Net Annual Pumpage (divide line 33 by line 14 and multiply by 100)	84.4 %
35.	Total Unaccounted for Flow (subtract amount on line 33 from line 14)	0.03 MGD
36.	Percentage of Total Unaccounted for Flow to Net Annual Pumpage	15.6 %

SECTION VI - ADDITIONAL INFORMATION

A. Indicate Well Data and Production for the latest 12 month period as shown below

Well No. & Location	Depth of Well	Capacity gallons/minute	Total Water Production	Quality-What wells violate State standards? If yes, include a current water quality analysis report.
Well #1 Lehmann Blvd	130	177	19,258,800	
Well #2 Lincoln Drive	126	428	54,500,200	

B. Do any of the wells interfere with each other during simultaneous pumping? If yes, please describe type/basis of interference.

No

C. What problems do you anticipate with your well supply between now and 2020?

None

D. If an allocation of Lake Michigan water is granted, what is the earliest date that Lake Michigan water could be used? 2014

E. Specify present and/or proposed point(s) of withdrawal from Lake Michigan.
Lake County Public Water District: 500 17th Street Zion, IL 60099
42-inch, prestressed concrete cylinder raw water intake pipe, extending approximately 3,000 lineal feet into Lake Michigan.

F. Provide a map of your water service area. Include any projected service areas (annexations), well locations, and Lake Michigan water supply locations.

G. Specify the location of discharge after the water is used (sewage treatment plant effluent), and describe the route the discharge will follow to reach an identifiable stream: The System discharges to the Northwest Region Water Reclamation Facility and finally to the Fox River.

H. Is the discharge after use being treated in any manner? (Describe): The facility utilizes physical, biological and chemical processes to remove impurities and achieve the required degree of treatment to protect the receiving waters of the Fox River. The processes include screening, primary settlement, activated sludge, and UV disinfection.

I. Include with this application a copy of any approved water conservation ordinance.

J. Provide additional data and/or information you may have to further justify your water allocation on a separate sheet.

SECTION VII - MAXIMUM UNAVOIDABLE LEAKAGE WORKSHEET

Complete the following calculations to determine your maximum unavoidable leakage. Enter the appropriate amounts in the spaces provided.

A. Cast Iron Pipes With Lead Joints

	Age of Pipe	Miles of Pipe	Leakage Rate*	Maximum Unavoidable Leakage**
1.	60 yrs. or greater		x 3000 g/d/mi =	g/d
2.	40-60 yrs.		x 2500 g/d/mi =	g/d
3.	20-40 yrs.		x 2000 g/d/mi =	g/d
4.	20 yrs. or less		x 1500 g/d/mi =	g/d

B. All Other Types of Pipes and Joints

	Age of Pipe	Miles of Pipe	Leakage Rate*	Maximum Unavoidable Leakage**
5.	60 yrs. or greater		x 2500 g/d/mi =	g/d
6.	40-60 yrs.		x 2000 g/d/mi =	g/d
7.	20-40 yrs.	8.80	x 1500 g/d/mi =	13,200 g/d
8.	20 yrs. or less	2.27	x 1000 g/d/mi =	2,270 g/d

9. Total Miles of Pipe (add lines 1 through 8 under "Miles of Pipe") ..... 11.07 miles
10. Total Maximum Unavoidable Leakage (sum amounts on lines 1 through 8 under "Maximum Unavoidable Leakage") ..... 15,470 g/d
11. Total Maximum Unavoidable Leakage MGD (divide line 10 by 1,000,000 ..... 0.015 MGD
    (Enter this amount on line 31 of **"Section V - Water Use Audit"**)

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* Leakage Rate expressed in gallons per day per mile (g/d/mi)
** Maximum Unavoidable Leakage expressed in gallons per day (g/d)

Section IV – Conversion Table

Below are conversion calculations to convert the most commonly used units to units of million gallons per day (MGD).

To convert cubic feet per year (cf) to (MGD) use:
cf x 7.48 ÷ 1,000,000 ÷ 365 = MGD

To convert gallons per year (g) to (MGD) use:
g ÷ 1,000,000 ÷ 365 = MGD

To convert gallons per day g/d to (MGD) use:
g/d ÷ 1,000,000 = MGD

To convert million gallons per year (mg) to (MGD) use:
mg ÷ 365 = MGD

SECTION VIII CONVERSION TABLE

Below are conversion calculations to convert the most commonly used units to units of million gallons per day (MGD).

To convert cubic feet per year (cf) to (MGD) use:

cf x 7.48 - 1,000,000 - 365 = MGD

To convert gallons per year (g) to (MGD) use:

g - 1,000,000 - 365 = MGD

To convert gallons per day (g/d) to (MGD) use:

g/d - 1,000,000 = MGD

To convert million gallons per year (mg) to (MGD) use:

mg - 365 = MGD

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