CMAP

Oak Park Water Conservation and Efficiency Plan

EPA WaterSense PARTNER

Adopted April 1, 2013

The Chicago Metropolitan Agency for Planning (CMAP) is the region's official comprehensive planning organization. Its GO TO 2040 planning campaign is helping the region's seven counties and 284 communities to implement strategies that address transportation, housing, economic development, open space, the environment, and other quality of life issues.

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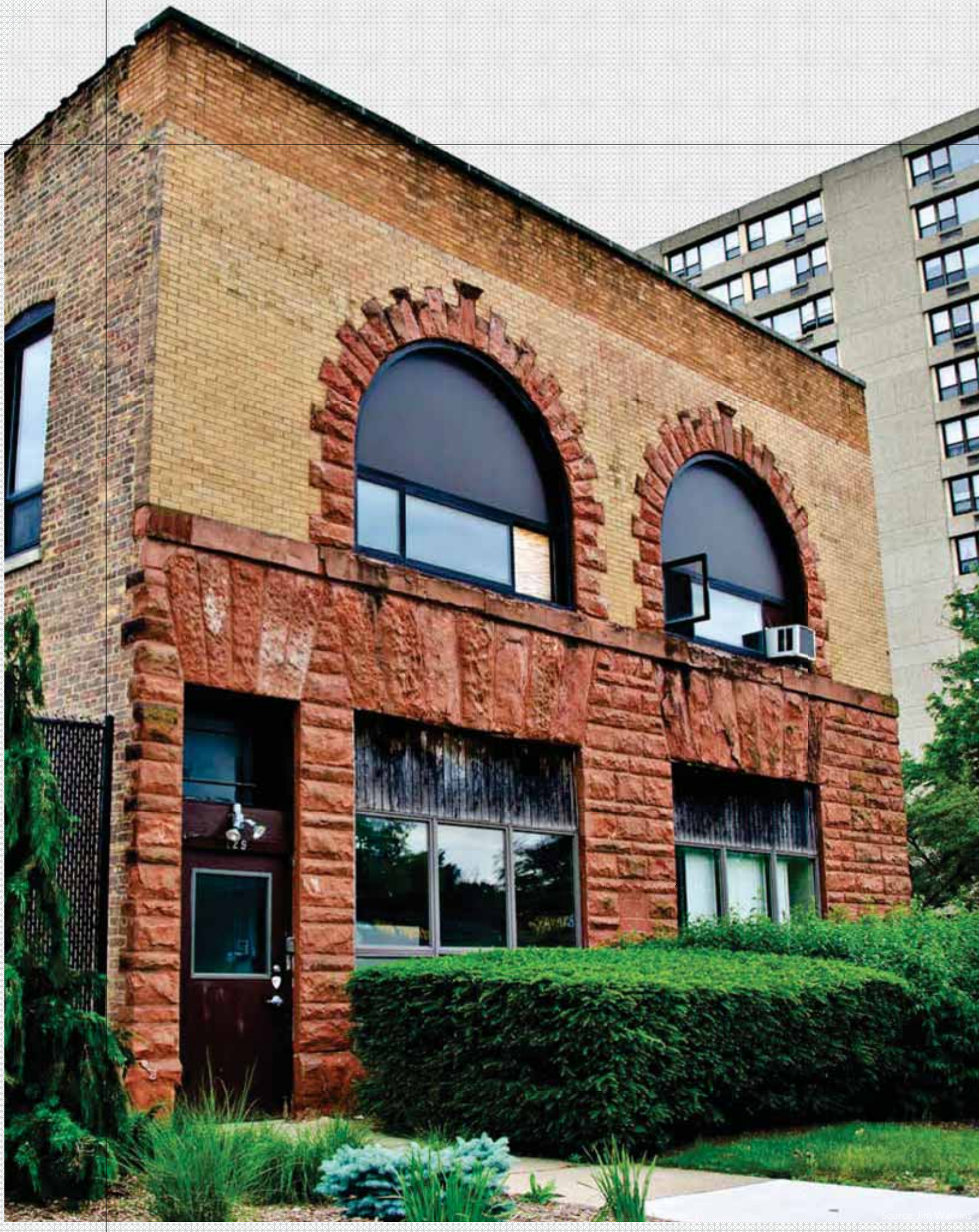


Section 1
Introduction and Background

In March 2011, the Village of Oak Park was awarded planning assistance through the Chicago Metropolitan Agency for Planning's (CMAP) Local Technical Assistance (LTA) program to create a water conservation and efficiency plan. The development and production of this document is funded through the U.S. Department of Housing and Urban Development's (HUD) Sustainable Communities Regional Planning Grant, which supports CMAP's LTA program. The purpose of Oak Park's Water Conservation and Efficiency Plan (henceforth referred to as the "Plan") is to develop an action-based framework for the Village of Oak Park to pursue conservation and efficiency measures while engaging the Village's stakeholders about the value of water.

About Water Conservation and Efficiency

The terms "water conservation" and "water efficiency" are often used interchangeably.[1] While both terms refer to reducing water use, there are slight distinctions between their respective definitions. Water conservation is defined as "any beneficial reduction in water loss, waste, or use."[2] Conservation includes both behavioral changes (turning the faucet off during teeth brushing) and hardware/process advances (leak detection). Water efficiency specifically addresses those hardware/process advances and is defined as the "accomplishment of a function, task, process, or result with the minimal amount of water feasible."[3] A high-efficiency toilet is an example of water efficiency as it performs the same task with less water without changing the quality of use. As technology continues to improve in the water industry, water efficiency opportunities both at the public water supplier level (supply side) and the customer level (demand side) continue to grow. Water conservation and efficiency are achieved from the implementation of water conservation and efficiency measures, both of which will be included in this Plan. Measures can be defined as an action, behavioral change, device, technology, or improved design or process.

1 Demand management may also be used.

2 Amy Vickers Handbook of Water Use and Conservation, Amherst, MA: WaterPlow Press, 2001.

3 Ibid.

Why Water Conservation and Efficiency are Important in Oak Park

The ethic of environmental stewardship and the continuation of previous planning effects together are the primary drivers for the development of this Plan. In the past, water conservation was often used by public water suppliers as a short-term management strategy in response to a drought or service disruption. Now, more municipalities and residents are interested in understanding and reducing the environmental impacts associated with their water use. Part of Oak Park's interest in developing the Plan arose from this forward-thinking attitude and commitment to sustainability. Additionally, water conservation and efficiency can be used as a strategy to minimize or offset the financial burden of existing and future water rates.

Furthermore, Oak Park's desire for the development of this Plan builds off of previous related efforts at the local, regional, and mega-region levels. At the local level, PlanItGreen[4] is the environmental sustainability plan for Oak Park and its neighboring community River Forest. Released in June 2011, PlanItGreen serves as the overall guiding document for Oak Park's sustainability initiatives and features goals, metrics, and strategies for a variety of water issues. Specifically, this Plan directly addresses PlanItGreen Water Goal #1, "Reduce overall community potable water consumption," and Water Goal #3, "Educate about and communicate the need for water management, water conservation, and water quality to residents, businesses, and municipalities." To address these goals, this Plan developed a detailed water reduction goal based on overall water use and outlines multiple public information and education opportunities for the Village to pursue.

At the regional level, two separate but complementary planning processes, GO TO 2040[5] and Water 2050,[6] were led by CMAP and completed in 2010. Both GO TO 2040 and Water 2050 recommend water conservation and efficiency measures at the municipal and public water supplier levels, many of which are included in this Plan.

At the mega-region level, Illinois is a party to the Great Lakes — St. Lawrence River Basin Water Resources Compact (Compact), a binding agreement between the eight Great Lakes states to protect, conserve, restore, improve, and manage the renewable but finite water resources of the Great Lakes Basin for the use, benefit, and enjoyment of all basin citizens.[7] The Compact became law on December 8, 2008. While Illinois is largely exempt from the Compact, pursuant to the U.S. Supreme Court Consent Decree that governs the Illinois diversion of Lake Michigan water, the state is obligated to comply with the Compact's "Water Conservation and Efficiency Programs" provision outlined in Section 4.2. This section obligates the Compact parties to promote "environmentally sound and economically feasible water conservation measures." This includes any measures that promote the efficient use of water, the application of sound planning principles, and demand-side and supply-side measures or incentives.[8] Oak Park's Plan, therefore, seeks to be in line with the provisions of the Compact and could serve as a model for other Illinois communities and the State of Illinois itself.

The Plan will tie together all of these previous efforts and initiatives, as well as incorporate new measures based on current research, public outreach, and feedback received during the planning period. To ensure the long-term implementation of this Plan, it will be incorporated into the Village's upcoming Comprehensive Plan, development of which began in late 2012.

4 PlanItGreen,2011. Oak Park partnered with the Oak Park-River Forest (OPRF) Community Foundation and Seven Generation Ahead for this project. For more details on PlanItGreen see: **http://sevengenerationsahead.org/index.php/programs/planitgreen**

5 CMAP. GO TO 2040, 2012. **http://www.cmap.illinois.gov/2040/main**.

6 CMAP. Water 2050, 2012. **http://www.cmap.illinois.gov/water-2050**.

7 Great Lakes — St. Lawrence River Basin Water Resources Compact. See **http://www.cglg.org/projects/water/docs/12-13-05/Great_Lakes-St_Lawrence_River_Basin_Water_Resources_Compact.pdf**.

8 Measures are defined in the Great Lakes Compact as any legislation, law, regulation, directive, requirement, guideline, program, policy, administrative practice or other procedure.

Water Conservation and Efficiency Planning

A water conservation and efficiency plan is a guiding document for a community's water conservation efforts and actions. Typically, a planning process follows well-established basic steps from its inception through to completion, such as those outlined by the American Water Works Association's (AWWA) Water Conservation Programs-A Planning Manual (M52)[9] or the U.S. Environmental Protection Agency's (U.S. EPA) Water Conservation Plan Guidelines.[10] Plans can be detailed or basic based on resources and data available. However, most plans to some degree include the following elements:

- **Planning Goals:** Desired outcomes of plan implementation, usually includes a water savings goal.
- **Public Water Supplier Profile:** Basic statistics about water use, water loss, population served, and maintenance practices.
- **Demand Forecast :** Estimate for future water demand for the service area.
- **Identification and Evaluation of Water Conservation and Efficiency Measures:** Selection of specific actions that will help achieve established goals.[11]
- **Implementation Strategy:** The creation of a timeline to implement selected measures.

As with all planning processes, public information and outreach is needed throughout the entire planning period, including during plan implementation.

The Plan's Goals

As a first step, goals were developed to guide the planning process. The goals address outreach and education, reduction in water use, tracking water use, water loss, and local regulations. Each goal has a unique role in ensuring the protection of Oak Park's water source, Lake Michigan, and the sustainability of Oak Park's water use over time. Each of these goals will be supported by a set of measures or related actions in the Plan to work toward goal accomplishment.

1. Increase stakeholder's awareness about the importance of water conservation and efficiency through public information efforts that encourage active participation.[12]
2. Decrease daily potable water consumption by 3.5 percent by 2020.[13]
3. Continuously track water use and evaluate its effect on the Village's water rate structure to maintain the long term stability of the entire water supply system.
4. Continue to work towards incorporating full cost pricing practices.[14]
5. Reduce municipal water loss and costs associated with potable water delivery.
6. Update municipal water-related ordinances to be consistent with the Plan's goals and recommendations.
7. Develop and maintain working relationships with the Village's top five customers by volume to increase water efficiency within their operations.

9 American Water Works Association, "Water Conservation Programs-A Planning Program, M52, First Edition," 2006. See **http://www.awwa.org/files/bookstore/TOC/M52ed1.pdf**.

10 United States Environmental Protection Agency, "Water Conservation Plan Guidelines." 1998. **http://www.epa.gov/watersense/pubs/guide.html**.

11 Cost effectiveness of measures should be considered.

12 Similar to PlanItGreen #3 Water Goal.

13 Builds off PlanItGreen #1 Water Goal. Target based on 2010 total Village consumption of 1,766 million gallons.

14 Full cost pricing is defined in Section 6.

Source: Jim Watkins

Section 2
Public Water Supplier Profile

As a second step, a public water supplier profile was developed. The purpose of this profile is to gain an understanding of the characteristics of the population served and the water supply system itself to ensure that locally appropriate water conservation and efficiency measures are recommended. Future water demand forecasting is also addressed in this section.

Demographics

The Village of Oak Park is located in eastern Cook County, Illinois, bordered by Chicago to the north and east, River Forest and Forest Park to the west, and Berwyn and Cicero to the south. The Village encompasses 4.5 square miles, and according to the 2010 United States Census, has a population of 51,878. A 5 percent increase to 54,424 is expected by 2040 (Table 1).[15]

Table 1. Oak Park population change, 2010-40

YEAR	POPULATION
2010	**51,878**
2020	**52,727**
2030	**53,575**
2040	**54,424**

Source: U.S. Census Bureau, 2010, and CMAP 2040 Population Forecast.

The majority of Oak Park's 24,125 housing units were built in 1939 or earlier (Table 2).[16] Older homes generally have older fixtures such as clothes washers, dishwashers, toilets, and faucets. While renovations to these units are fairly common, older fixtures may still be in place. Older fixtures use more water than newer more efficient fixtures. Furthermore, the majority of housing units in Oak Park are owner-occupied and therefore have more of an incentive to conserve water as they directly pay the water bill (Table 3).[17] This combination of these factors — older housing stock and the larger number of owner-occupied households — provides an opportunity for the Village to encourage homeowners and property owners to update their fixtures. Lastly, there are approximately 3,700 more multifamily units than single-family units in the Village (Table 4).[18] This statistic is important as it indicates the amount of outdoor space and therefore outdoor watering that is likely to occur.

15 U.S. Census Bureau, "Oak Park Demographic Profile," 2010. **http://2010.census.gov/2010census/** and CMAP Population Forecast (2040) **http://www.cmap.illinois.gov/population-forecast**.

16 U.S. Census Bureau, "2009-2011 American Community Survey," See **factfinder2.census.gov**.

17 U.S. Census Bureau, "Occupied Housing Units, Demographic Profile Data,." 2010. The total number of housing units is 24, 519. The number of occupied units represents 92.5 percent of the total number of housing units. See **http://2010.census.gov/2010census/**. It should be noted that owner-occupied condominium units may not direct pay their water bill as it may be covered through assessment or association fees.

18 U.S. Census Bureau, "2009-2011 American Community Survey," See **factfinder2.census.gov**.

Table 2. Oak Park housing units

YEAR STRUCTURE BUILT	NUMBER OF STRUCTURES	PERCENTAGE OF TOTAL STRUCTURES
2005 or later	**501**	**2.10%**
2000 to 2004	**438**	**1.80%**
1990 to 1999	**476**	**2.00%**
1980 to 1989	**819**	**3.40%**
1970 to 1979	**1,599**	**6.60%**
1960 to 1969	**1,376**	**5.70%**
1950 to 1959	**1,675**	**6.90%**
1940 to 1949	**1,567**	**6.50%**
1939 or earlier	**15,674**	**65.00%**
TOTAL	**24,241**	**100.00%**

Source: U.S. Census Bureau, 2009-11 American Community Survey.

Table 3. Oak Park housing tenure

HOUSING STATUS	NUMBER OF UNITS
Owner-occupied	**13,722**
Rented	**7,741**

Source: U.S. Census Bureau, 2009-11 American Community Survey.

Table 4. Oak Park housing type

HOUSING TYPE	NUMBER OF UNITS
Single Family	**10,195**
Multifamily	**13,887**

Source: U.S. Census Bureau, 2009-11 American Community Survey.

Oak Park Housing Stock. Source: Jim Watkins.

Oak Park Housing Stock. Source: Jim Watkins.

Water Supply

Oak Park purchases Lake Michigan water directly from the City of Chicago. All communities that use Lake Michigan as a water source are required to obtain a permit from the Illinois Department of Natural Resources, Office of Water Resources (IDNR-OWR). Each permittee receives a designated annual water allocation that is reviewed and updated periodically, with the last iteration occurring in October 2007. Table 5 contains the current annual allocation schedule for Oak Park in million of gallons per day (MGD).

Table 5. Oak Park annual allocation schedule, millions of gallons per day

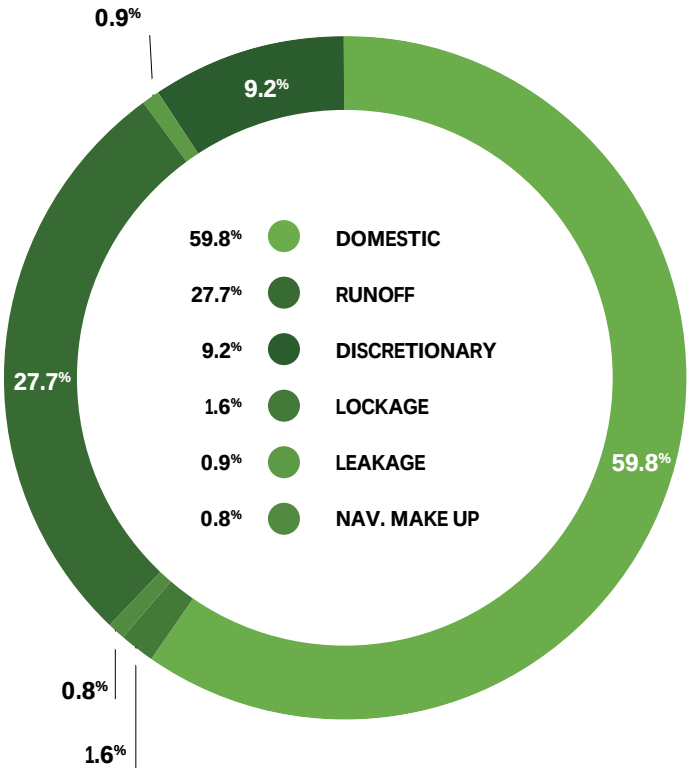
YEAR	AMOUNT	YEAR	AMOUNT
2011	**5.887**	**2021**	**5.941**
2012	**5.892**	**2022**	**5.946**
2013	**5.898**	**2023**	**5.950**
2014	**5.903**	**2024**	**5.955**
2015	**5.909**	**2025**	**5.960**
2016	**5.914**	**2026**	**5.965**
2017	**5.920**	**2027**	**5.969**
2018	**5.925**	**2028**	**5.974**
2019	**5.931**	**2029**	**5.979**
2020	**5.936**	**2030**	**5.983**

Source: Illinois Department of Natural Resources, Office of Water Resources, 2008.

Additionally, each permittee must comply with several conditions of permit. While there is no requirement for permittees to submit a conservation and efficiency plan, IDNR does require several conservation practices such as metering new construction and lawn watering restrictions.[19] Permittees also must limit water loss to eight percent or less based on net annual pumpage and must provide an annual report of water loss to IDNR, known as the LMO-2 Form.[20] Oak Park currently adheres to all of the conditions of permit, and is going beyond those conditions to develop this conservation and efficiency plan.[21]

It should be noted that the Illinois diversion of Lake Michigan water, although managed by IDNR, is governed by a U.S. Supreme Court Consent Decree.[22] The Illinois diversion is limited to 3,200 cubic feet per second as measured over a forty-year accounting period. This amount is roughly equivalent to 2.1 billion gallons of water per day.[23] In addition to Oak Park, Lake Michigan water is shared among approximately 200 other permittees including over 160 communities. Beyond potable use, Lake Michigan water use is tracked for a variety of other uses as well, including stormwater runoff, lockage, leakage, navigation-makeup water, and discretionary diversion (Figure 1).[24] In summary, Lake Michigan is a limited and shared resource in Illinois.

Figure 1. Illinois Diversion of Lake Michigan, 2005



19 Currently IDNR requires permittees to at a minimum not to allow unrestricted lawn sprinkling from May 15 to September 15 each year.

20 See **http://dnr.state.il.us/owr/Publications/LakeMichiganO-2Form_2011.pdf**.

21 For a complete list of IDNR conditions of permit see 17 ILAC Ch. 1, Subch. H, Sec. 3730; **http://www.dnr.illinois.gov/adrules/documents/17-3730.pdf**.

22 Wisconsin v. Illinois, 388 U.S. 426 (1967); 449 U.S. 48 (1980)

23 See **http://www.cmap.illinois.gov/water-2050**.

24 Stormwater leaving the Lake Michigan basin is counted against the set limit of 3,200 cubic feet per second along with the other uses.

Water Use

Oak Park's water system is managed by the Oak Park Public Works Department's Sewer and Water Division (henceforth referred to as public water supplier). For 2012, Oak Park's average daily pumpage was 5.143 MGD, representing 87 percent of their 2012 Lake Michigan allocation of 5.892 MGD. Table 6 displays the last six years of pumped (actual withdrawal) versus allocated water use.

Table 6. Withdrawal vs. allocated water use, 2007-12

YEAR	PUMPED (MGD)	ALLOCATED (MGD)	PERCENT OF ALLOCATION
2007	**5.162**	**5.864**	**88%**
2008	**5.069**	**5.870**	**86%**
2009	**4.955**	**5.876**	**84%**
2010	**5.287**	**5.881**	**89%**
2011	**5.325**	**5.887**	**90%**
2012	**5.143**	**5.892**	**87%**

Source: Village of Oak Park staff.

System capacity for the Village is 22 MGD. Currently the Village uses approximately 25 percent of this capacity. Peak days typically occur in the month of August and average between 6 MGD and 8 MGD, representing 27 percent and 36 percent of total system capacity respectively.

The Village of Oak Park has a variety of water customers that are categorized into four sectors: residential, commercial and industrial, public sector, and construction. The residential sector makes up the majority of accounts, representing 89 percent of total water accounts, followed by the commercial and industrial sector (10 percent), public sector (<1 percent), and construction sector (<1 percent) respectively (Table 7).

Table 7. Water use by sector, 2012

SECTOR	2012 TOTAL ACCOUNTS	PERCENT OF TOTAL ACCOUNTS
Residential	**11,300**	**89.5%**
Commercial/Industrial	**1,240**	**9.8%**
Public	**61**	**.5%**
Construction	**25**	**.2%**
Total	**12,626**	**100.0%**

Source: Village of Oak Park staff.

Main Pumping Station in Oak Park. Source: Jim Watkins.

The residential sector also represents the majority of the water use in the Village, followed by commercial/industrial, public, and construction respectively. Commercial and industrial accounts include businesses, restaurants, municipal buildings, and multifamily buildings.[25] The public sector includes firefighting, leakage, sewer cleaning, and hydrant flushing. Construction includes water used during building, repairing, or upgrading facilities. Table 8 displays the last six years of water use by each sector.

25 Includes multifamily accounts with water use over 100,000 per month.

Fire hydrant in Oak Park. Source: Jim Watkins.

Table 8. Water use by sector, 2007-12, millions of gallons per day

SECTOR	2007	2008	2009	2010	2011	2012
Residential	**3.25**	**3.195**	**3.065**	**3.055**	**2.819**	**3.10**
Commercial/ Industrial/ Public	**1.639**	**1.593**	**1.537**	**1.953**	**1.471**	**1.52**
Construction	**0.007**	**0.003**	**0.005**	**0.006**	**0.003**	**0.007**
Totals	**4.896**	**4.791**	**4.607**	**5.014**	**4.293**	**4.627**

Source: Village of Oak Park staff.

Table 9. Top five customers in Oak Park by volume

TOP FIVE CUSTOMERS	ANNUAL WATER USE 2010 (MGD)
Hospital 1	**.155**
Hospital 2	**.071**
High School 1	**.035**
High School 2	**.033**
Park District	**.027**
Total	**.321**

Source: Village of Oak Park staff.

All sectors combined, the per capita water use for Oak Park in 2011 was 102 gallons per capita per day (GPCD). The residential per capita water use for Oak Park in 2011 was 85 gallons per capita per day.[26] Using data gathered from 1990-2007, the population-weighted average GPCD use in the 11-county northeastern Illinois region was 90. This metric has shown a statistically significant decline of 0.7 percent per year in average gallon per capita rates during the period from 1990-2007.[27] The national average is a bit higher, around 101 GPCD.[28] These figures include both indoor and outdoor water use. Table 8 shows a continuous decrease in overall residential use in Oak Park from 2007 to 2011, with a total reduction of 13%. This trend is consistent with many other public water suppliers throughout the United States.[29] Many factors, including housing type, housing density, economy, leakage, installation of efficient fixtures, and weather contribute to changes in GPCD. However, 2012 data shows an increase in overall residential water use back to those seen in 2008.

Outside of residential water use, the top five customers by volume (typically commercial, industrial, or institutional) are listed below in Table 9. Identifying the top water customers allows the public water supplier to target water conservation efforts to maximize potential savings in this sector. Together, the top five customers used 321,000 gallons a day, or six percent of the Village's total daily use in 2011. It should be noted that the majority of the Park District usage is likely to occur outdoors and in non-winter months.

26 This average includes the residential and commercial sectors (due to multifamily accounts) but does not include top five customers, maximum unavoidable leakage, and municipal hydrant use, 2010 data.

27 Dziegielewski Benedykt, Residential Water Use in Northeastern Illinois, Estimating Water-use Effects of In-fill Growth versus Exurban Expansion, Memorandum Report, Southern Illinois University Carbondale. Prepared for the Chicago Metropolitan Agency for Planning, 233 S. Wacker Drive, Suite 800, Chicago, Illinois 60606,. August 25, 2009.

28 Wayne B. Solley, Robert R. Pierce, and Howard A. Perlman, Estimated Use of Water in the United States in 1995, p. 24.

29 Thomas D. Rockaway, Paul A. Coomes, Joshua Rivard, and Barry Kornstein, Residential Water Use Trends in North American, Journal AWWA 103:2, February 2011.

Water Loss

To monitor water loss, the Village is required by the IDNR to complete an annual water use audit form (LMO-2)[30] and maintain an 8 percent or less water loss percentage. The water loss percentage is a function of the Village's net annual pumpage,[31] total accounted for flow, and total unaccounted flow.[32] Accounted for flow includes water that is metered, billed, used for firefighting, water main flushing,[33] and maximum unavoidable leakage (MUL). Unaccounted for flow is the difference between the net annual pumpage and accounted for flow and roughly represents the Village's water loss. Water loss is the amount of water the Village pumped that is lost either through leaks or a variety of other possible avenues.

It should be noted that the MUL factor is calculated based on the age and mileage of pipes in the Village and is subtracted out of the water loss percentage. This action effectively credits the Village for older pipes by decreasing the net water loss percentage. This means the actual water loss percentage in the Village and other communities that rely on Lake Michigan is likely higher than what is reported on the LMO-2. Therefore a more accurate annual water loss estimate can be derived from the current LMO-2 form by combining these two estimates, total unaccounted for flow and MUL as shown in the far right three columns in Table 10.

Another methodology that tracks water loss is the AWWA/International Water Association's (IWA) water audit method. The AWWA/IWA audit is the methodology recommended by CMAP and therefore was applied during the planning process.[34] This method differs from the LMO-2 form in several ways, with the most obvious difference being the quantification of water loss in gallons and dollars rather than percentages. The advantage of looking at gallons and dollars is that it provides Oak Park with an estimate of how much money is being lost due to water loss. This information can then be used by the public water supplier to prioritize and justify maintenance practices. Additionally, the AWWA/IWA audit is more detailed than the LMO-2 form and does not adjust for the age of pipes. The age of a system's pipes should be fully accounted for in reporting and planning efforts. This planning process presented the first opportunity to use the AWWA/IWA audit in Oak Park. Water loss was calculated for the same years as the LMO-2 data, 2007-2011. However more research and data validation is necessary to fully understand results. Oak Park hopes to incorporate the AWWA/IWA audit form into water supplier practices in the future.

Estimating water loss can be a complex process and should be reexamined on a regular basis, at the very least annually. One of the main purposes of performing a regular water audit is to help identify areas within the system for targeted leak detection and repair. Currently Oak Park schedules leak detection and repair evaluations every two years.

Table 10. Oak Park annual water use audit, 2007-11

YEAR	TOTAL UNACCOUNTED FOR FLOW AS A PERCENT OF NET ANNUAL PUMPAGE, REPORTED TO IDNR	MAXIMUM UNAVOIDABLE LEAKAGE AS A PERCENT OF NET ANNUAL PUMPAGE	MODIFIED WATER LOSS ESTIMATE PERCENTAGE	MODIFIED WATER LOSS IN GALLONS PER DAY	MODIFIED WATER LOSS IN GALLONS PER YEAR
2007	**.45%**	**4.50%**	**4.95%**	**255,519**	**93,264,435**
2008	**1.76%**	**4.60%**	**6.36%**	**322,388**	**117,671,620**
2009	**2.16%**	**4.70%**	**6.86%**	**339,913**	**124,068,245**
2010	**.51%**	**4.40%**	**4.91%**	**259,592**	**94,751,080**
2011	**3.80%**	**5.30%**	**9.10%**	**484,575**	**176,869,875**

Source: Village of Oak Park staff.

30 It should be noted that the LMO-2 form gives credit for the age of pipes in the water loss calculation resulting in a reduced total water loss percentage. Therefore actual water loss is greater than calculations portray.

31 Net annual pumpage data found in Table 6.

32 To view the complete LMO-2 form, see **http://dnr.state.il.us/owr/Publications/LakeMichiganO-2Form_2010.pdf**.

33 Billed, metered, water used for firefighting, and hydrant flushing data found in Table 8.

34 American Water Works Association, Water Audit Method, 2011. **http://www.awwa.org/Resources/WaterLossControl.cfm?ItemNumber=48055&showLogin=N**.

Water Rates

The Village of Oak Park currently has a uniform volumetric water rate for all sectors.[35] A uniform volumetric rate charges a standard rate regardless of total water use, and often is represented as dollar per 1,000 gallons. This uniform rate is in addition to a base rate of $5.77 that is paid by all customers. All the revenue that is collected through the water rates is directly reinvested in the water system. This is important because Oak Park does not sell water to any other communities and thus its own residents, businesses, and institutions are the only source of revenue.

Oak Park's 2012 rates, displayed in Table 11, recover day to day operating and maintenance, infrastructure replacement, and wholesale water purchase costs for the public water supplier. While it may be tempting to compare rates with neighboring communities, direct comparisons can be misleading as there are a number of local variables that are taken into consideration such as population served, age and condition of pipes, water quality, water source, and current local conditions, to name a few.

Within the last decade there have been a series of water rate increases in Oak Park and also in the City of Chicago, Oak Park's wholesaler. Historically, Chicago charges the same rate to Chicago residents as it does to wholesale customers. Therefore, as system improvements and other revenue requirements warrant Chicago to approve rate increases, it is likely that the Village of Oak Park will also continue to see increases in their wholesale rate.

Table 11. Oak Park water rate by sector, 2012

SECTOR	2011 OAK PARK WATER RATE ($ PER 1,000 GALLONS)
Residential	**$6.35**
Commercial/Industrial	**$6.35**
Public	**$6.35**
Construction	**$6.35**

Source: Village of Oak Park Staff.

In 2012, the City of Chicago approved a series of water rate increases starting in 2012 and continuing to 2015.[36] During this time frame, Chicago's water rate will experience a net increase of $1.81 per 1,000 gallons, starting with the 2011 rate of $2.01 per 1,000 gallons and ending at $3.82 per 1,000 gallons in 2015. It is likely these net increases will also be applied in Oak Park. For example, Chicago's 2012 rate increase of $0.50 was "passed through" to Oak Park's customers, raising Oak Park's water rate by $0.50 as well. Table 12 displays each municipality's rate increases for residential customers from 2003-15.

Table 12. Oak Park, Chicago water rate increases for residential customers, 2003-15

YEAR	OAK PARK (% INCREASE)	CITY OF CHICAGO (% INCREASE)	OAK PARK RATE/ $1,000 GALLONS	CHICAGO/ $ 1,000 GALLONS
2003	**4%**	**4%**	**$2.79**	**$1.25**
2004	**4%**	**3%**	**$2.99**	**$1.29**
2005	**2%**	**3%**	**$3.11**	**$1.33**
2006	**0%**	**0%**	**$3.11**	**$1.33**
2007	**0%**	**5%**	**$3.27**	**$1.33**
2008	**0%**	**15%**	**$4.09**	**$1.53**
2009	**25%**	**15%**	**$4.25**	**$1.76**
2010	**14%**	**14%**	**$4.85**	**$2.01**
2011	**2.50%**	**0%**	**$4.93**	**$2.01**
2012	**16%**	**25%**	**$5.43**	**$2.51**
2013	**17%**	**15%**	**$6.35**	**$2.89**
2014	**-**	**15%**	**-**	**$3.32**
2015	**-**	**15%**	**-**	**$3.82**

Source: City of Chicago, "Know My Water & Sewer Rates," 2012, and the Village of Oak Park.

35 This was categorized as a flat rate in the Illinois Department of Natural Resources Lake Michigan Water Rate Survey in 2010.

36 City of Chicago. "Know My Water & Sewer Rates." 2012. **http://www.Villageofchicago.org/Village/en/depts/water/provdrs/cust_serv/svcs/know_my_water_sewerrates.html**.

Connection between Energy and Water Use

In addition to purchasing water from Chicago, Oak Park must also pay for energy to pump water to each customer. It takes water to produce energy (thermoelectric cooling, fuel production, etc.) and energy to produce water (pumping, etc.). This concept, known as the water-energy nexus, demonstrates that by saving water through water efficiency and conservation, energy will also be saved. Furthermore, reducing energy consumption is another goal in Oak Park's overall sustainability plan, PlanItGreen. It is for these reasons that Oak Park decided to include water-related energy use in the Plan. As Oak Park works towards higher water system efficiency, understanding the role and cost of energy from pump to faucet can be useful in short and long-term planning, assessing infrastructure needs, and projecting future revenue requirements.

In 2010, approximately two million kilowatt hours (kWhs) were used to pump and deliver Oak Park's water supply to the community, which is enough electricity to meet the needs of about 550 Oak Park residents for a year.[37] This electricity use cost Oak Park $150,000 in 2010, representing approximately 2 percent of the public water supplier's total operating budget. It takes 1,094 kilowatt hours to deliver 1 million gallons of water to Oak Park customers. In addition to electricity, natural gas is also used by the public water supplier for heating. In 2010, Oak Park used 8,500 therms with a cost of around $2,500. The public water supplier's total electricity and gas costs to deliver water to customer amounts to $77 per million gallons of water. It should be noted that these figures do not include the energy needed to pump the water from Lake Michigan to Oak Park.

Figure 2. Water-Energy Nexus

Energy for Water	Water for Energy

Energy and power production requires water:	Water production, processing, distribution, and end-use requires energy:
• Thermoelectric cooling	• Pumping
• Hydropower	• Conveyance and Transport
• Energy minerals extraction/mining	• Treatment
• Fuel production (fossil fuels, H_2, biofuels/ethanol)	• Use conditioning
• Emission controls	• Surface and Ground water

Source: Adapted from Mike Hightower, Completing the energy sustainability Puzzle, Energy and Water, Energy-Water Science & Technology Research Roadmap, Sandia National Laboratories, presentation 2005-2006. Full Report approved by U.S. Department of Energy January 12, 2007.

37 U.S. Department of Energy, Energy Efficiency & Renewable Energy, Energy Consumption in Illinois Homes, 2005. See **http://apps1.eere.energy.gov/states/residential.cfm/state=IL**.

These metrics were calculated as part of a larger statewide study of water and energy use administered by the Illinois Section American Water Works Association's (ISAWWA) Water Efficiency Committee from 2010-2012.38 Around 50 public water suppliers participated in the study, representing nearly 42 percent of the state's population. Table 14 shows Oak Park's metrics and how they compare to the survey results both by water source (Lake Michigan) and size (Medium: 5,000-15,000 service connections). This statewide survey represents the first attempt to collect this type of data and is the first step towards developing statewide benchmarks for water-related energy use. Greater participation is needed from public water suppliers to more accurately represent the state's water-related energy use.

In addition to the potential energy savings to be gained through reduced water consumption, the public water supplier has already implemented several energy savings practices in current facilities, including the following:

- All water pumps have energy capture devices to ensure no energy is lost and the energy used is a constant clean flow.
- Tinted windows were installed at the Central Pump Station to reduce radiant heat in summer and heat loss in winter.
- Automatic light switches were installed at all three pump stations.
- The roof at the Central Pump Station is currently scheduled to be replaced and will include skylights to maximize natural light instead of energy powered light.

These types of practices should continue and expand in the future.

Table 13. Oak Park water – energy metrics, 2010

OAK PARK METRICS FOR 2010	ANNUAL VALUE	AVERAGE LAKE MICHIGAN PUBLIC WATER SUPPLIER	AVERAGE MEDIUM PUBLIC WATER SUPPLIER
Total cost of electricity ($)	**$147,637**	**$254,421**	**$247,732**
Electricity cost as percent of total operating budget	**2.2%**	**8.2%**	**9.0%**
Energy intensity of water production (kwh/MG)	**1,094**	**866**	**1,560**
Water production cost from energy ($/MG)	**$77.77**	**$94**	**$140**
Unit electricity cost ($/kWh)	**$0.07**	**$0.12**	**$0.09**

Source: Illinois Section American Water Works Association, "Water Energy Nexus Survey," March 2012.

38 Illinois Section American Water Works Association, "Water Energy Nexus Survey," March 2012. See **http://www.isawwa.org/resource/collection/82A33FB3-E26F-4EA1-932D-866A9E8E264A/FY12-0077_ISAWWA_SURVEY_REPORT_final.pdf**.

Infrastructure Improvements and Maintenance

Water infrastructure is a term that describes all of the pipes, meters, pumps, treatment equipment, valves that are necessary to deliver water to customers. Often unseen and forgotten by the average person, maintaining water infrastructure is critical to providing safe clean drinking water and for ensuring the sustainable use of a community's water supply.[39] As infrastructure ages, a system is increasingly prone to water main (pipe) breaks and leaks.

Aging Infrastructure; Oak Park water main break on a 20-inch water main. Source: Oak Park.

Aging infrastructure is now becoming a national issue. In 2002, the U.S. EPA released a report titled, Clean Water and Drinking Water Gap Analysis, which describes the anticipated funding gap over the next 20 years between the infrastructure needs of public water suppliers and the current rate of funding such improvements. It is estimated that there will be a $122 billion gap for clean water (wastewater)[40] capital costs and $102 billion for drinking water (water supply) capital costs. Larger gaps were estimated for operating and maintenance needs amounting to $148 billion for clean water and $161 billion for drinking water. Overall this report identifies a $500 billion gap for water and wastewater infrastructure. To close these gaps, funding and investment will need to drastically increase over the next 20 years.[41]

Periodically the American Society of Civil Engineers (ASCE) provides report cards on our nation's water, transportation, public facilities, and energy infrastructure. In the 2009 report card, ASCE graded our drinking water infrastructure at a D — and has identified an annual shortfall of at least $11 billion that is needed to replace aging infrastructure and to fully comply with existing and future federal water regulations.[42]

In 2012, AWWA released a similar report titled, *Buried No Longer: Confronting America's Water Infrastructure Challenge*, that estimates more than $1 trillion investment in drinking water infrastructure is needed between now and 2035. The report states that this funding is likely to come from higher water bills and local fees and urges that infrastructure investment happen sooner than later to avoid additional costs and increased likelihood of water main breaks and other infrastructure failures. The effect of public water supplier size and regional location on infrastructure issues is also discussed.

Within our 11-county northeastern Illinois region, water utilities, including public water suppliers, ranked funding, aging infrastructure, and energy costs as their top three challenges (Figure 3).[43] Funding and aging infrastructure are directly related as demonstrated by the above reports. With such a magnitude of infrastructure needs facing the country, the importance of evaluating and maintaining current infrastructure at the local level is imperative. The following paragraphs provide more detail about Oak Park's infrastructure.

39 U.S. States Environmental Protection Agency,. "Water Distribution Systems," 2012. See **http://www.epa.gov/awi/distributionsys.html**.

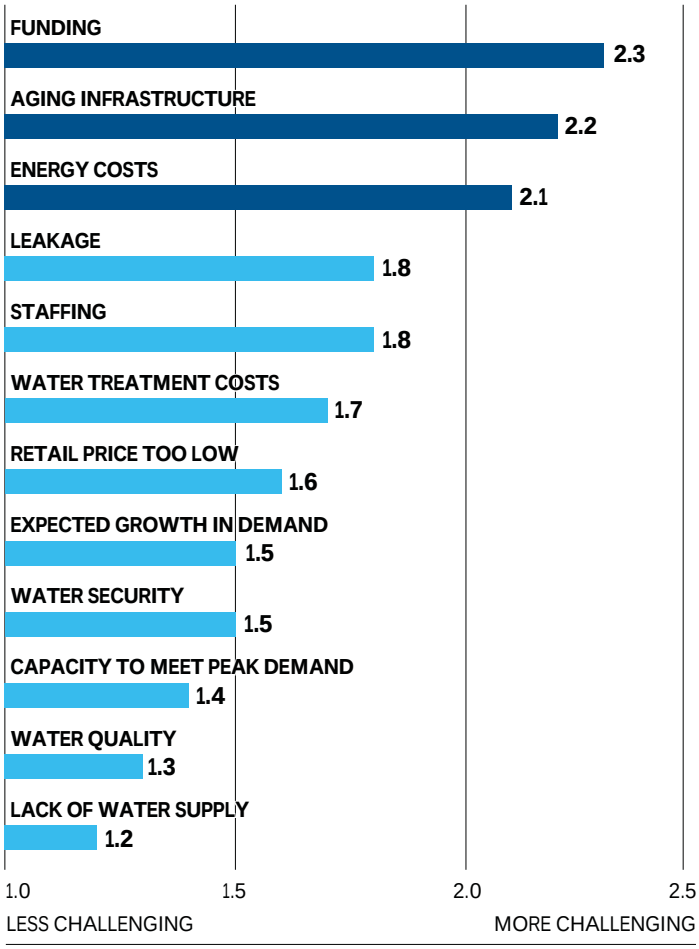
40 The Clean Water Act regulates discharges of pollutants into U.S. waters and quality standards for surface waters. Wastewater from treatment plants is most often discharged into surface waters and therefore covered under the Clean Water Act.

41 U.S. Environmental Protection Agency, "U.S. Water Infrastructure Needs & Funding Gap," See **http://water.epa.gov/infrastructure/sustain/infrastructureneeds.cfm**.

42 American Society of Civil Engineers, "Drinking Water," 2012. See **http://www.infrastructurereportcard.org/fact-sheet/drinking-water**.

43 CMAP, "2008 Survey of Water Utilities. See **http://www.cmap.illinois.gov/water-2050**.

Figure 3. Top challenges reported by water suppliers in Northeastern Illinois, 2008



Source: CMAP Survey of Water Utilities, 2008.

Pipes

Oak Park's water system contains 105 miles of water main. Oak Park replaces about one mile of water mains, or principal pipes, a year, on average. Regular repair and replacement is necessary to decrease the frequency and volume of leakage as well as decrease water main breaks. Breaks cause water loss and can cause property damage in some cases. Additionally when large water mains break, it is typically considered an emergency repair and is therefore more costly to fix. Age and composition of pipes are important to consider when replacing water mains and can influence the prioritization of repair schedules. It is not unusual to have various ages and compositions of pipe in one system due to repair schedules, pipes replacements, and system expansions. Oak Park's pipes are primarily iron. Table 14 shows the approximate amount, material, and age of pipes in the water system as of 2012.

Table 14. Oak Park water system pipe characteristics

MILES OF PIPE	AGE	MATERIAL
64.5	60 years or greater	Cast iron pipe with lead joints
6.6	41-59 years	Cast iron
14	20-40 years	Ductile Iron
19.9	19 years or less	Ductile Iron

Source: Village of Oak Park staff.

Variable Speed Pumps at the Oak Park Central Pumping Station. Source: Oak Park.

Meters

Oak Park's water system is 99 percent metered.[44] The Village is in the process of completing a meter change out program that started in 2001 and is expected to finish in 2012. When completed, this program will have replaced more than 13,000 meters in the Village with newer, more accurate smart meters.[45] Smart meters allow for automated meter reading (AMR), which means public water supplier staff can gather water usage data from customers through digital transmitters by driving by each metered property. This replaces the practice of manually reading meters on individual properties. AMR generally saves time and money while improving data accuracy.[46] A new master meter that measures the amount of water coming in from Chicago was also installed in 2011, increasing the efficiency of its reading accuracy from 84 percent to 99.3 percent.[47]

It is important for a water system to be fully metered so that water use can be tracked. Meters also need to be accurate so that the amount of water that is tracked is as close as possible to real use. Meters not only act as cash registers for a public water supplier by ensuring that the amount of water used is paid for, but also serve as an efficiency tracking tool to help identify problem areas within the system.

New smart meters are able to track 90 days of consumption and have leak detection capabilities. Source: Oak Park.

Pumps

Over the last 10-15 years, the Village upgraded their pumps from fixed to variable pumps, which allow for smoother transitions as water demand changes during the day. This upgrade has saved energy and water. Currently the public water supplier is conducting an efficiency study to determine optimal replacement and rehabilitation of pumping equipment. This type of study should continue in the future.

Variable Speed Pumps; Used for soft start and stops reducing water hammer and consistent flows and pressures. Source: Oak Park.

44 The remaining 1 percent is used by the fire department for training and firefighting.

45 Village of Oak Park, Public Water Supplier Billing Division, 2011. See **http://www.oak-park.us/finance/water_meter_reading.html**.

46 Johnson Controls, SMART METERS: AMR/AMI, 2011. See **http://www.johnsoncontrols.com/publish/us/en/products/building_efficiency/energy_efficiency/water_solutions/meters_amr.html**.

47 Village of Oak Park Staff, 2012.

Storage Capacity and Expansions

Generally Oak Park has around two and half day's water supply at any one time. This storage capacity is achieved through three underground reservoirs. It should be noted that system capacity would be less in the summer months than in the winter months due to outdoor watering. One way of extending storage capacity even in summer months is improving overall system efficiency. The ability to extend storage capacity could be critical in emergency scenarios.

Oak Park does not currently have plans for infrastructure expansion. Although population projections continue to increase, Oak Park is a land locked community with no current opportunities to expand beyond existing borders.

Oak Park's newest reservoir was built underneath the skateboard facilities at Stevenson Park in 2004. The additional 2.5 million gallon reservoir helped Oak Park meet the Illinois Environmental Protection Agency's required storage capacity. Source: Jim Watkins.

Can you spot the five million gallon reservoir? It's right under your cleats! Oak Park's reservoirs are located under Stevenson Park. Source: Jim Watkins.

Capital and Asset Management Plans

There will always be an ongoing need to maintain and upgrade water infrastructure, especially in older systems such as Oak Park's. Proper maintenance and equipment upgrades require resources, which are often limited by budget availability. Therefore the prioritization of infrastructure needs is necessary. Capital and asset management plans can assist a public water supplier in identifying infrastructure needs and prioritizing those needs.

A capital planning process can provide an understanding of the community's infrastructure, needed long-range improvements, cost estimates, and financing options. The capital plan will typically involve a master plan study which considers community population growth, land use plans, and potential service area expansions as infrastructure needs are dependent on these factors. When a master plan study is combined with proper accounting and budgeting for capital, public water suppliers can build necessary funds to address infrastructure investment needs. Estimated capital costs can also be used in rate setting to charge users the true costs of water infrastructure, thereby sending pricing signals to use water efficiently. Oak Park currently has a capital improvement plan in place that is updated on a five-year cycle. This practice should continue.

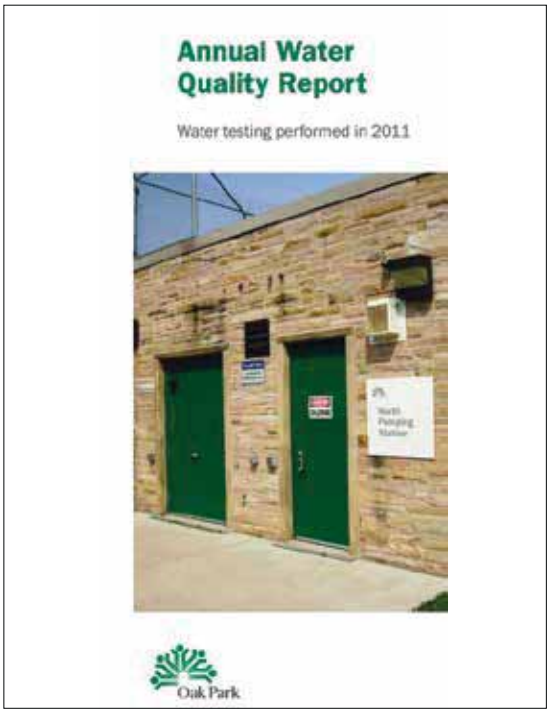
An asset management plan is a complementary tool for effective capital planning. Asset management aims to minimize the total cost of acquiring, operating, maintaining, and renewing infrastructure. In an environment of limited financial resources, asset management planning helps systems extract the most value from each asset, and ensure adequate financial resources are available to rehabilitate and replace them when necessary. Oak Park incorporates asset management practices in the evaluation of its current infrastructure.

Water Quality and Treatment

As stated above, Oak Park purchases water from the City of Chicago. This purchased water is treated at the Jardine Water Purification Plant located on the lakefront before it is pumped to Oak Park. The Village then adds minimal amounts of chlorine in an effort to maintain a consistent concentration as the water travels from the Oak Park pumping station to the Village's customers.

Recently upgraded in 2010, Oak Park's analyzing equipment measures the levels of chlorine, pH, and temperature of the incoming Chicago pretreated water as well as the water leaving the Oak Park pump station. The running sinks help keep a steady flow of water running through the equipment so that they get a true reading of the water leaving the pump station.
Source: Jim Watkins.

Water quality is tested on daily basis to ensure compliance with U.S. EPA drinking water quality standards. A summary of these testing results are included in the annual water quality report (Consumer Confidence Report) that is distributed to all customers as required by U.S. EPA. Additionally the Village is also required to notify customers of violations on contaminants found in the water supply.[48] These requirements are a result of the passage of the Safe Drinking Water Act that was approved by Congress in 1974 to "protect public health by regulating the nation's public drinking water supply and protecting sources of drinking water."[49] Oak Park's water supply currently meets all of the U.S. EPA's guidelines for water quality and a copy of the most recent water quality report can be found on the Village website.[50]



Consumer Confidence Report, Annual Water Quality Report, 2011.
Source: Oak Park.

48 Water on Tap-what you need to know, U.S. Environmental Protection Agency, Office of Water, December 2009. See **http://www.epa.gov/ogwdw/wot/pdfs/book_waterontap_full.pdf**.

49 U.S. Environmental Protection Agency, Office of Water,"Water on Tap-what you need to know,", December 2009. See **http://www.epa.gov/ogwdw/wot/pdfs/book_waterontap_full.pdf**.

50 Village of Oak Park, "Public Works, Water & Sewer Division," 2012. See **http://www.oak-park.us/Public_Works/Water_Service.html**.

In addition to regulated testing of drinking water, many public water suppliers have started testing for unregulated chemicals and compounds. Many of these unregulated chemicals and compounds have historically not been tested for and are now capable of being detected at low concentrations. These chemicals and compounds have become known as contaminants of emerging concern (CEC) or emerging contaminants because the risk to human health and the environment associated with their presence, frequency of occurrence, or source may not be known.[51] One CEC category, for example, is Pharmaceuticals and Personal Care Products (PPCPs) which include prescription drugs, fragrances, and lotions. When people ingest medicines and apply lotions, some chemicals in these products are not fully absorbed in the body but instead washed or flushed away to the local water supply source, or as is the case with Oak Park, downstream to the water supply sources of other communities. Communities can take an active role to minimize PPCPs in water and wastewater supplies by discouraging residents from flushing drugs down the toilet. For example, Oak Park hosted a "Drug Take-Back Day" in April 2012 for residents to drop off expired or unwanted prescription drugs for proper disposal.[52] Similar events should continue into the future, as this topic was identified as a concern during the outreach phase of this project.

In response to the growing interest and awareness of emerging contaminants, the City of Chicago regularly tests their water supply (which is sold to Oak Park) for many of these contaminants and publishes the resulting analysis online.[53] Testing for emerging contaminants is not federally required and is not currently regulated by the U.S. EPA. Therefore, there are no water quality standards to meet or exceed. Emerging contaminants are being detected throughout the nation's water bodies and research needs to continue to fully understand the effects on humans and the natural environment.[54]

Wastewater and Stormwater

After water has been used by businesses, residents, and the Village, it becomes wastewater. All of Oak Park's wastewater is sent to the Metropolitan Water Reclamation District (MWRD) of Greater Chicago facilities where is it treated and discharged into the Chicago Area Waterways System. The water then continues to flow to the Des Plaines, Illinois, and Mississippi Rivers where it eventually enters the Gulf of Mexico. Wastewater is included in this Plan because reductions in water use lead to reductions in wastewater as well. The successful implementation of this Plan will therefore also reduce the volume of wastewater being released into Oak Park's sewer system.

Oak Park has a combined sewer system, which means that both wastewater from residences and businesses and stormwater from precipitation events combine into one system. Combined sewer systems are vulnerable to sewer overflows, which happen when the amount of water in the system exceeds capacity. Typically when a sewer overflow occurs excess water is discharged into a nearby lake or stream.[55] However, in Oak Park, there are no accessible water bodies nearby and occasionally excess water and sewage (usually the result of a large storm event) may back up in basements. In response to some of these concerns, the Village commissioned a Combined Sewer System Review and Short-Term Improvement Projects Study provided by MWH. The Study was released on October 13, 2011, and provides a review of the Village's current sewer improvement program and identifies measures to reduce basement backups and improve the level of service of the sewer system.[56]

Ideally the Village would look at stormwater, wastewater, and water supply systems in an integrated fashion. In the future Oak Park should consider a more in-depth integrated water resource plan to address current water issues in the Village and prevent prospective issues.

Storm sewer drain in Oak Park. Source: Jim Watkins

51 U.S. Environmental Protection Agency, "Contaminants of Emerging Concern," accessed August 31, 2012 from **http://water.epa.gov/scitech/cec/**.

52 Oak Leaves, "Oak Park police host 'Drug Take-Back Day' Saturday, accessed August 31, 2012 from **http://oakpark.suntimes.com/news/12134281-418/oak-park-police-host-drug-take-back-day-saturday.html**.

53 City of Chicago, "City of Chicago Emerging Contaminant Study," 2012. See **http://www.cityofchicago.org/city/en/depts/water/supp_info/water_quality_resultsandreports/city_of_chicago_emergincontaminantstudy.html**.

54 U.S. Geological Survey, "Emerging Contaminants in the Environment," 2012. See **http://toxics.usgs.gov/regional/emc/**.

55 It should be noted that sewer backups may happen for a variety of causes including root blockages, water line breaks, and power failures; only one potential cause is discussed here. For more information, see **http://cfpub.epa.gov/npdes/home.cfm?program_id=4**.

56 MWH, "Combined Sewer System Reviews and Short-Term Improvement Projects Study." Commissioned by the Village of Oak Park, October 13, 2011. See **http://www.oak-park.us/public/pdfs/Public%20Works/flood/Oak%20Park%202011%20Sewer%20Study%2010-13-11.pdf**.

Water Demand Forecast

After considering the current conditions of Oak Park's water supply, the next step is forecasting water demand. Forecasting demand plays a vital role in developing a water conservation and efficiency plan because it shows how much water will likely be needed in the future. Future demand is then compared to current water supply capacity. The difference between future demand and water supply capacity can then be set as a demand reduction target, the amount of water that needs to be saved to match supply and future demand. A plan's recommendations then are chosen to reach the demand reduction target.

Typically communities embarking on a water conservation and efficiency plan have a system capacity issue (when current infrastructure cannot keep up with increasing demand) and/or a water supply limitation (either quality or quantity in nature) which drive the need to reduce demand and set reduction targets. In Oak Park, there are no immediate system capacity, water supply, or water quality concerns. Therefore, the Village chose to use a simple straight line demand forecasting method.

Table 15. Oak Park projected water demand

YEAR	POPULATION	DEMAND (MGD)	DEMAND (MILLIONS OF GALLONS PER YEAR)
2010	**51,878**	**5.289**	**1930.485**
2020	**52,727**	**5.378**	**1962.970**
2030	**53,575**	**5.464**	**1194.360**
2040	**54,424**	**5.551**	**2026.115**

Source: Chicago Metropolitan Agency for Planning.

Using 2010 as a baseline, total water demand was calculated for all sectors in gallons per capita use (102 gallons per capita per day) and then multiplied by the estimated increases in population at 10 year intervals (Table 15). The population is expected to increase by 2,546 people by 2040 with an associated net increase in water demand of 259,692 gallons per day amounting to five percent increase in total 2010 demand. This methodology assumes that other sectors will continue at the same consumption pace in the future. It should be noted that more in-depth demand studies consider numerous factors such as population growth, median household income, demand for electricity, future water prices, weather, demographic growth patterns, and passive and active conservation. If such a study were to be done, it could be used to supplement the demand forecasting in this Plan.

Oak Park, let's talk about water!

Oak Park Water Conservation & Efficiency Plan
Village of Oak Park Public Meeting

How much water are the residents and businesses of Oak Park consuming? What are the possibilities and issues with the Oak Park water supply?
Take this opportunity to weigh in and assist Oak Park as they create a Water Conservation & Efficiency Plan for the Village.
Refreshments provided.

All are welcome!

For more information, contact the Oak Park Sustainability Office at **sustainability@oak-park.us** or **(708) 358-5778**.

Provide additional input for the plan by completing a brief survey at **www.surveymonkey.com/s/OakParkWaterSurvey**.

Tuesday,
October 18, 2011
7:00 to 9:00 p.m.

Oak Park Village Hall
123 Madison St.
Oak Park, IL 60302

Oak Park

Chicago Metropolitan Agency for Planning

FY12-0036

Distribution of information by community groups in accordance with District 97 policy does not imply directly or indirectly that the content of the material is sanctioned, sponsored, or endorsed by the District, the Board of Education or the Superintendent.

Flyer alerting Oak Park residents of one of the public meetings associated with the Water Conservation and Efficiency Plan.

Section 3
Public Outreach

With a basic understanding of current conditions and potential future demand, Oak Park and CMAP reached out to the public and other stakeholders. The main purpose was to communicate about the Plan and to gather input about potential Plan recommendations. Outreach for the Plan was designed to gather input early in the planning process using a variety of means to engage as many stakeholders as possible. Oak Park and CMAP staff wanted not only to ensure residents' voices are heard, but also to understand their level of awareness of current conditions and individual roles in water efficiency and conservation to inform the Plan's outreach strategies.

The first outreach tool was a residential survey released in September 2011. In addition, two public meetings were held during the planning process. The meetings were intended to help residents understand current conditions, introduce the planning process and goals, and to receive general comments and concerns. Updates on the project were also included on both CMAP's and the Village's websites.

Survey Results

Residents could access the online 23-question survey instrument through electronic links provided in residents' water bills, printed meeting announcements, and the Village of Oak Park's E-News publication. The information gathered from respondents to the survey included demographic information, level of awareness of water issues, water use and conservation practices, viewpoints on issues relevant to the Plan, interest in learning more about related topics, and preference for receiving information and updates from the Village during the development of the Plan.

One hundred and seventeen residents responded to the survey between October and December 2011. The majority of respondents were White/Caucasian, slightly over half were female, and most were between the ages of 35 and 64. Three-quarters own single family homes, earned between $75,000 and $199,000 in 2010, and hold a Bachelor's or higher degree. Two-thirds have been residents of the Village for over ten years. The following points highlight the survey results:

- While nearly all residents know that their water comes from Lake Michigan, 50 percent of respondents think they only use about half of what they actually use on a typical day (85 gallons) (Figure 4).
- Eighty-five percent of respondents think they are using about the same amount or less water than other households.
- The most common water conserving or efficient features respondents' reported in their homes are low- flow showerheads (63 percent), low-flow or high-efficiency toilets (57 percent), and chemical-free lawn areas (55 percent). A little over one-third have front-loading clothes washers.
- Over one quarter of respondents were not prompted to use less water when the cost of their water increased.
- Two-thirds of the respondents think there is no likelihood of a water shortage in the future, although nearly all believe it is very important to conserve.
- Half of all respondents stated the most important reason to conserve water is to protect the environment.
- A large majority of people believe that unfiltered water from the faucet is safe to drink. In fact, only ten percent purchase bottled water several times in a given week.
- Over half of residents are interested in learning more about replacing old toilets and showerheads (66 percent), participating in a public water conservation information campaign (56 percent), installing a rain barrel (52 percent), and converting yard area to native landscaping (53 percent) (Figure 5).

Based on the survey results, there is a strong environmental ethic in the Village. However, more than half of the respondents underestimated how much water they use, when compared to the Village average residential per capita figure of 85 gallons per day. This clearly points to a need to connect the desire residents have to conserve water with an understanding of their current practices. The fact that a large majority of residents believe it safe to use rainwater for indoor uses and are willing to install native landscaping indicates that residents may be open to conducting progressive practices to conserve water.

Figure 4. Percent of gallons of water used daily, actual use is 85 GPD

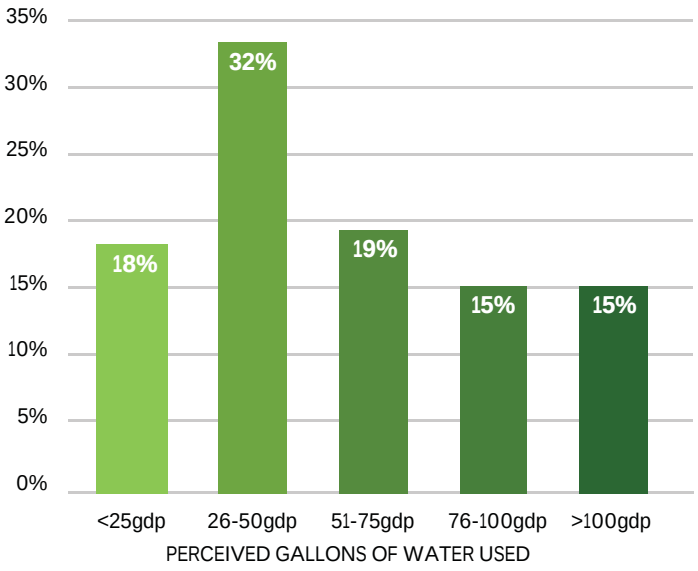
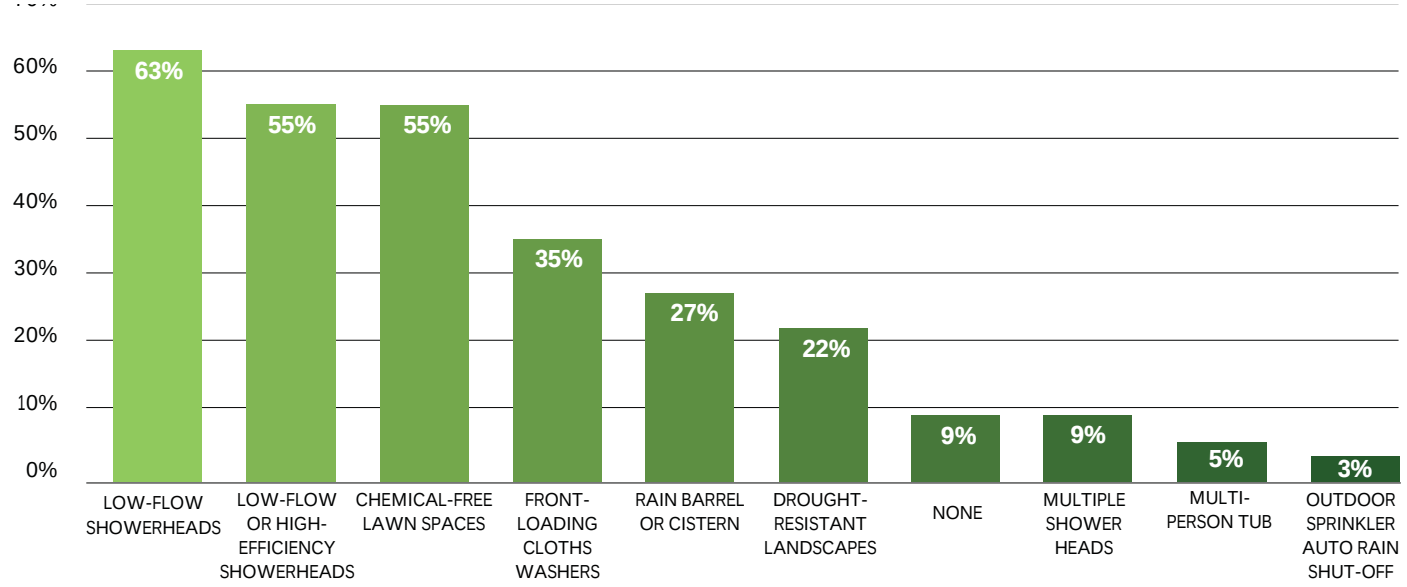


Figure 5. Percent of respondents using selected water saving features



Public Meetings

Two public meetings were held on October 18, 2011, and January 31, 2012, at the Village Hall Council Chambers. Public meeting flyers and posters were distributed throughout the Village and published electronically in the Village of Oak Park E-News. A total of 23 residents attended the meetings. During the meetings, CMAP and Village staff introduced residents to the planning process and goals before attendees were organized into groups to discuss their water supply concerns, efforts to conserve and use water efficiently, and ideas for future actions and initiatives. Residents were also invited to sample servings of water and identify the water source: bottled or tap. The results revealed that properly identifying each water source occurred about 50 percent of the time. The purpose of this activity was to promote the use of tap water by challenging existing preconceptions of taste and quality.

At the meetings, residents expressed a number of concerns about water. It is interesting to note that while cost of water was one of the concerns expressed, according to the survey results 75 percent of those noticing an increase in their water bills were not prompted to reduce use. Another concern that residents expressed was in relation to contamination, such as dumping of waste and pharmaceuticals into the water supply. Other concerns relate to fixtures that consume unnecessary amounts of water, leaks, and the age of infrastructure. Concerns for the availability of water focused on the increase in population putting pressure on Lake Michigan.

Residents discussed ways to conserve water and use it more efficiently. Education, particular of youth, figured prominently in the discussion. Other recommended actions include using stormwater best management practices such as rain barrels and native landscaping, disconnecting downspouts, and limiting lawn watering. Suggested recommendations for actions that can be taken indoors include replacing appliances, taking shorter showers, installing dual flush toilets, and grey water systems.

Residents also made the following suggestions for future Village programming from water conservation and efficiency. Many of these suggestions were incorporated into the Plan's official recommendations.

- Establish sub-metering programs for large apartment buildings.
- Include more water use information in monthly bills.
- Conduct educational initiatives, including hands-on programs in schools.
- Provide incentives and information water efficient appliances and fixtures.
- Partner with multi-family buildings for leak detection.
- Focus on discharge as well as supply considerations.
- Promote water efficient landscaping and cisterns/rain barrels.




Oak Park residents engaged in public meetings about the Water Conservation and Efficiency Plan. Source: CMAP.

Other Public Outreach Events and Methods

CMAP and Village staff also attended a number of other outreach events to promote and provide information about the Plan to a variety of other stakeholders. The following is a short list of additional events and information distribution opportunities.

- Condo Board Association Meeting, February 29, 2012, 7:00 p.m.
- Oak Park Open House, April 10, 2012, 7:00 p.m.
- Electronic distribution of information to business community, multiple dates.
- Distribution of full draft to community through Village of Oak Park E-News.

Additionally the draft plan was reviewed and commented on by several partner organizations, including the Metropolitan Planning Council (MPC), U.S. EPA Region 5, Seven Generations Ahead, and Center Neighborhood Technology (CNT).

Source: Jim Watkins

Section 4
Recommendations

The recommendations in this Plan reflect input from Oak Park and CMAP staff, information obtained during the public outreach process, and current public water supplier conditions. Ninety-five percent of the respondents to the public survey agreed that conservation is the combined responsibility of the Village, residents, and businesses. This desire is reflected below in the recommendations set forth for each lead implementer: Village, public Water Supplier, residents, and businesses. It should be noted that the public water supplier is operated by the Village, however, there are different recommendation categories for both the Village and the public water supplier because of the differing roles and responsibilities in connection with water conservation and efficiency. Implementation strategies will vary for each recommendation; some can be implemented through the development of a program such as a toilet rebate program with specific guidelines, rules, and associated water savings while others can be implemented through collaboration on policy changes such as an ordinance review and update.

Village of Oak Park

The Village's role in this Plan is to increase awareness about water use and the benefits of water conservation and efficiency and to lead by example by aligning Village practices with the Plan's goals. The following recommendations are strategies to accomplish this role.

1. Review and update ordinances to support Plan goals and recommendations

Updating ordinances is a strategy to officially support the Plan's recommendations and goals. Currently the Village has ordinances that address water saving plumbing fixtures, car wash facilities, air conditioning systems, outdoor water use, and water waste.[57] However, these ordinances are outdated and should be replaced to reflect current standards and established best management practices. During the planning process, several areas were identified as opportunities to demonstrate regional leadership through a more progressive water conservation and efficiency ordinance. It is recommended that Oak Park consider the following topics to include in an ordinance update:

57 Current ordinances are listed in Appendix B.

- Adopt alternative lawn watering and irrigation practices and schedules.
- Incorporate high efficiency fixtures (toilets, showerheads, and faucets) in all new construction (including residential and commercial) and all major renovations.
- Discourage the purchase of single-serving bottled water.[58]
- Encourage the use of McCook limestone for all Village projects to support the completion of the McCook Reservoir Main Tunnel, a main component of MWRD's Tunnel and Reservoir Program, with the goal of reducing flooding and improving water quality by minimizing overflows into waterways. The reservoirs can only be quarried as fast as the rock is purchased for use in construction projects.[59]
- Prohibit water waste.[60]
- Allow for the use of indoor grey water[61] systems.
- Allow and encourage water reuse (rain barrels and cisterns) for landscaping.

To assist in the development of such an ordinance, CMAP has published a Model Water Use Conservation Ordinance that covers the majority of the topics described above.[62] As part of the planning process, CMAP modified this model ordinance to create an Oak Park-specific model ordinance. This Oak Park model ordinance includes the bulleted items above and is located in Appendix C of the Plan. Language may be further modified to fit the needs of Oak Park, and additional ordinance topical areas may be identified and added by the Village after further investigation. As with any ordinance update, public information and outreach will be necessary to communicate the reason for and benefits of adopting the new ordinance to stakeholders.

2. Effectively communicate the importance of water conservation and efficiency

Public information messages create broad-based awareness and can be organized through the development of a public information program (PIP). The purpose of a PIP is to increase the public's awareness regarding the value of water and to promote how it can be used more efficiently through a cohesive series of messages and events. One example of a PIP is Denver's "Use Only What You Need Campaign."[63]

Oak Park should develop a PIP to help accomplish the Plan's goals and recommendations. PIPs can be multi-faceted and can feature a variety of communication media, workshops, advertising, public relations, and promotional tactics to help raise awareness. The cost of a PIP depends on the selection of tools used to carry the message and if it is short-term, to address an immediate need such as a drought, or a long-term program that aims to inform and influence behavior.

As a first step to increase awareness, Oak Park should provide more water-related information on the Village website including an explanation of what costs are covered in the water bill, current rate information, water and energy use data, current and past water quality reports, water conservation tips and information about locally available incentive and training programs. Water quality reports can also provide opportunities for outreach. For example, in the 2011 report the Village included information about water conservation and tips for customers to save water.[64] This practice should continue in the future. Finally, a link to this Plan and current water-related activities should be available through the website for interested parties.

In addition to providing general information to residents, Oak Park should target efforts to residents in multifamily homes and building owners. Many residents in multifamily homes do not receive water bills, as the cost of water is typically included in rent. Consequently, it is particularly difficult for these residents to understand how much water they use and how much it costs. To assist with the dissemination of information to this target audience, the Village should partner with multifamily building owners as they are likely to receive a financial benefit from reduced water use.[65]

To assist the development of a PIP and outreach and information efforts, there are many available resources that can be utilized. Below are a few examples that will be especially helpful for Oak Park.

Energy and Environment Commission

The Oak Park Environment & Energy Advisory Commission [66] promotes energy efficiency and energy conservation, works for a pollution-free environment in Oak Park, and develops methods to promote recycling and to reduce and manage solid waste. The Commission supports Village and community outreach and education efforts and advises the Board of Trustees on sustainability and environmental policies, issues, and programs.

58 An alternative option for providing staff and visitors with water would have to be in place to pass such an ordinance.

59 The completion of the Main Tunnel will help reduce flooding and improve water quality by minimizing overflows into waterways. However the tunnel can only be built as fast as the rock is purchased and excavated. The Village needs to further investigate the economic implications of this potential ordinance prior to adoption of this particular component.

60 Water waste is the general misuse or inefficient use of potable water and includes household leaks, watering of impervious areas, washing of impervious areas with water such as sidewalks, non-circulating water features and air cooling systems and inefficient car washing.

61 It should be noted that grey water or water that is discharged from sinks, clothes washers and showers is not allowed for indoor use under the current plumbing code. However there is current legislation to improve the Illinois Plumbing Code Standards. HB4496 has successful passed the Illinois General Assembly. The bill requires the Department of Public Health to submit amendments to the Joint Committee on Administrative Rules (JARC) by May 31, 2013, that would update existing plumbing code standards to use technologies for more efficient water use. The bill will be sent to the Governor for his signature.

62 CMAP, "Model Water Use Conservation Ordinance," 2010. See **http://www.cmap.illinois.gov/water-2050/model-ordinance**.

63 Denver Water, "Campaign Overview," 2012, accessed August 31, 2012 from **http://www.denverwater.org/Conservation/UseOnlyWhatYouNeed/CampaignOverview/**.

64 Village of Oak Park, Annual Water Quality Report, 2011. See **http://www.oak-park.us/public/pdfs/Public%20Works/2011_water_quality_report.pdf**.

65 Assuming water rates remain constant.

WaterSense

WaterSense [67] is a voluntary, nationally recognized program sponsored by the U.S. EPA that promotes water conservation and efficiency. Similar to the U.S. EPA ENERGYSTAR program, there are two main branches of the WaterSense Program. The first branch is product labeling in which products such as toilets, faucets, and showerheads are rated for compliance with WaterSense standards. If compliant, the product is then labeled as a WaterSense product. This typically means that the product uses 20 percent less water than its conventional counterpart. The second branch offers seven voluntary partnerships representing a variety of interests. Oak Park has been a WaterSense Promotional Partner since 2010. As a partner, the Village has access to a variety of water conservation and outreach materials including bill inserts, magnet designs, press releases, public service announcements, guidance on how to run a rebate program, water savings tip brochures, fact sheets, and web banners. The Village can access all these materials through the Partner website.

U.S. EPA Healthy Lawn Care Practices Video

The U.S. EPA provides informational videos for homeowners, schools, and other interested parties. One such video, *Healthy Lawn Care Practices*,[68] provides practical information and tips for homeowners to reduce pesticide and chemical use on their lawns. This video can be posted to the Village website and featured at public events and meetings.

Lawn to Lake

Lawn to Lake (L2L)[69] is a collaborative program promoting healthy lawn and landscape practices to protect water resources in the Great Lakes region. The program works with municipalities, lawn and landscape professionals, school districts, homeowners, product retailers, and turf managers to implement natural lawn care and sustainable landscaping practices. Oak Park should work with the L2L program to encourage participation in the program's workshops, teacher trainings, and partnership development initiatives with lawn care retailers. Additionally Oak Park's homeowners can participate by showcasing their property as a demonstration site and receive acknowledgement through L2L's recognition program.

What Our Water's Worth Website

The Metropolitan Planning Council and Openlands partnered to create an ongoing campaign — via interactive website, blog post, public presentations, and social media content — exploring the benefits the region receives from water resources, infrastructure and services, and the costs required to provide those benefits.[70] The campaign includes regional case studies, conservation tips, water supply information, and resources for continued learning about water resource issues in the region.

American Water Works Association's Conservation Community Website

A comprehensive list of existing outreach and education programs can be found on AWWA website [71] and can provide examples for Oak Park to draw from as the Village develops a PIP. AWWA's Only Tap Water Delivers [72] is an especially relevant outreach campaign as it outlines the importance of public water supplies.

66 Village of Oak Park, "Environmental & Energy Advisory Commission, " 2012. See **http://www.oak-park.us/Commissions/Environmental_Energy_Advisory_Commission.html**

67 United States Environmental Protection Agency, "WaterSense," 2012. See **http://www.epa.gov/WaterSense/index.html** .

68 United States Environmnetal Protection Agency, "Pesticides: Controlling Pests," 2012. See **http://www.epa.gov/pesticides/lawncare/**.

69 Lawn to Lake, 2012. See **http://www.lawntolake.org/**.

70 What Our Water's Worth, Developed by Metropolitan Planning Council and Openlands, 2012. See **http://www.chicagolandh2o.org/**.

71 American Water Works Association. Conservation Community Website, 2012. See **http://www.awwa.org/awwa/community/links.cfm?FuseAction=Links&LinkCategoryID=3**.

72 American Water Works Association, "Only Tap Water Delivers," 2012. See **http://www.awwa.org/Government/Content.cfm?ItemNumber=3846&navItemNumber=3847&showLogin=N**.

Liquid Assets
Liquid Assets [73] is a documentary on the importance of water infrastructure and the role of public water suppliers to the country's public health, economic development, and growth. The movie contains a variety of perspectives from cities across the country. The Village could host viewings of the documentary to increase awareness about the need for maintaining infrastructure and reducing water waste.

Local Promotional Video
During the planning process, volunteers with the Dominican Community Leadership Program [74] were identified and tasked with creating a water conservation education video that would be produced locally and aired locally in Oak Park and River Forest. The video was completed in July 2012.

The Village should also address school education. The purpose of a school education program is to reach the youngest water users and increase awareness about the value of water so that lifelong water conservation behavior is created. School education programs typically include working with public and private schools and school districts. Although programs can be useful at all levels, typically they are geared towards grades K-8 and aligned with school curriculum. Programs can include public water supplier facility tours as well as classroom presentations.[75]

3. Commission a water rate study

Water rate studies are useful to determine appropriate revenue requirements that will support the long-term sustainability of a public water supplier. Revenue requirements, cost allocation (based on the cost of serving different types of water use), and demand trends are used in the development of water rates. Since Oak Park's last rate study was conducted in 2002, it is recommended that Oak Park commission a new water rate study to address current and anticipated revenue requirements and cost allocations. A full review of demand trends will also be necessary. Additionally as a first step, the Village should establish a "sustainable" level of service policy.[76] This means the public water supplier needs to specify what minimum service is acceptable in terms of water quantity, water quality and reliability, and environmental standards. Although complex, water rate studies are important because properly set water rates can provide an effective financial incentive to conserve water while recovering costs from customers for each type of water usage.

Water rates are organized by a rate structure. There are a variety of water rate structures available for use by the Village and the structure may vary by type of water use.[77] There is a subset of water rate structures that specifically encourage water conservation, known collectively as conservation rate structures. Some systems may be interested in implementing conservation rate structures to decrease average daily demands, some may be looking to decrease peak demand, others in recovering new service area capacity expansion costs, and yet others in implementing conservation pricing as part of a larger community sustainability initiative. Regardless of the motivation for conservation rate structures, full cost pricing is a necessary foundation for designing a conservation rate.[78]

As part of the rate study, Oak Park should consider the following conservation rate structures if deemed appropriate: inclining rates with volumetric blocks, seasonal pricing, and water budget rate structures. Inclining rates with volumetric blocks encourage conservation by increasing the unit charge for water at higher levels of use. Seasonal pricing charges a higher rate for use during a particular time of year, usually the summer months to reduce the peak demand from outdoor water use. Water budget rate structures develop a tailored water use estimate, or budget for each customer and increase rates after the budget is exceeded.[79] Separate rates and dedicated meters for outdoor water use could also be considered.

Public information and outreach should be conducted during the entire study, and if new rates are adopted as a result of the study, after the new rates are in place as well. Involving all customer sectors will help to ensure that rates remain equitable and appropriate.

73 Liquid Assets, 2012. See **http://liquidassets.psu.edu/the_film/index.html**.

74 Dominican University, "Community Leadership Program," 2012. See **http://www.dom.edu/bsb/programs/community_leadership_program/index.html**.

75 American Water Works Association, "Education Resources," 2012. See **http://www.awwa.org/awwa/community/links.cfm?FuseAction=Links&LinkCategoryID=3**.

76 United States Environmental Protection Agency, "Asset Management," 2012. See **http://water.epa.gov/infrastructure/sustain/asset_management.cfm**.

77 Alliance for Water Efficiency Resource Library, Water Rates and Rate Structures. See **http://www.allianceforwaterefficiency.org/Water_Rates_and_Rate_Structures_Library_Content_Listing.aspx**.

78 Full cost pricing is discussed further in Section 6.

79 Water Conservation Programs, A Planning Manual. American Water Works Association. First Edition, 2006.

Public Water Supplier

The public water supplier's role in this Plan is primarily to increase system water and energy efficiency and to provide customers with water conservation-related information via the water bill. The following recommendations are strategies to accomplish this role.

4. Track water and energy use

"You can't manage what you can't measure" is a common phrase used in many industries and it applies well to water conservation and efficiency. Monthly monitoring of water and energy use will allow the public water supplier to observe trends and track potential savings from Plan implementation. Cumulative annual reports of this data should be made available on the Village website as part of outreach efforts and should be incorporated in complementary sustainability efforts the Village undertakes.

Furthermore, Oak Park should perform an annual audit of municipal water use to understand how water is used in municipal buildings and to work towards reducing water loss and water use. For example, the Village currently purchases bottled water for use in Village Hall. This practice was first instituted as an effective way to address perceived water quality issues as a result of aging pipes. During the planning process, several alternative solutions were suggested including bottling the Village's tap water and providing water filters. Additionally, an audit can serve as a conversation starter for Village and public water supplier staff members to discuss and then identify cost effective solutions to increase efficiency, conserve water, and support the Plan's goals. This process provides an opportunity to create an additional water use reduction goal for municipal use in the future.

5. Update water billing practices

The water bill provides a consistent communication outlet from the public water supplier to their customers. In addition to payment information, the bill could be used as a means to promote water conservation. Four billing strategies are listed below, some of which can be accomplished using the current billing software. It is possible however, that new billing software or a new billing system may be needed to implement all of the billing-related recommendations. The strategies are categorized as Phase I and Phase II. Phase I can be initiated as a short-term action under the current water billing software and continue throughout the Plan horizon. Phase II should be initiated in coordination with the water rate study as the results of the study will likely influence these areas.

- Modify water bill format to provide historical, comparative use data and conservation messages. (Phase I)
- The Village's current paper water bill format offers several opportunities to increase communication with customers about water use. In particular, the "Village bulletins" portion of the bill could be utilized to include comparative average water use data within each sector and historical account use. By adding these two components, a customer would know how much water an average customer in their use sector consumes and how much water they consumed that particular billing period or all billing periods from the previous year. This allows customers to self-monitor their own use and adjust accordingly. Conservation tips such as how to check for a leaking toilet can be included as well. To increase participation in conservation and efficiency, the Village could offer incentives in coordination with the distribution of the water bills.
- Encourage customers to switch to the electronic billing option. (Phase I)
- The Village currently offers an electronic billing option, which is available for all current customers. The electronic bill provides some historical water use data to customers, online payment options, and can serve as another avenue for outreach and education. Additionally electronic billing decreases the administrative staff work load, postage, and conserves paper usage in the Village.

- Explore the benefits and costs of switching all water accounts to monthly billing. (Phase II). The Village currently bills residential customers on a quarterly basis and commercial/industrial customers on a monthly basis. Increased billing frequency can allow customers to more precisely track water use, observe seasonal variations, detect leaks, and adjust water use accordingly as a result of direct and frequent water use feedback.[80] In this context, the water bill serves more as a consistent management tool than simply a means to collect revenue. Furthermore, residential customers are billed on a rotating cycle in which only a quarter of the Village's households are billed in any given month. This type of billing cycle makes it difficult for public water suppliers to compile water use data for planning and management purposes. Monthly bills can help alleviate such issues.
- Redefine customer classes to improve water use tracking. (Phase II)

As stated previously, the current customer classes within the public water supplier's billings system are not clearly defined. For example, multifamily buildings are classified as commercial, not residential accounts. It is recommended that customer classes reflect actual use to facilitate tracking demand by sector.

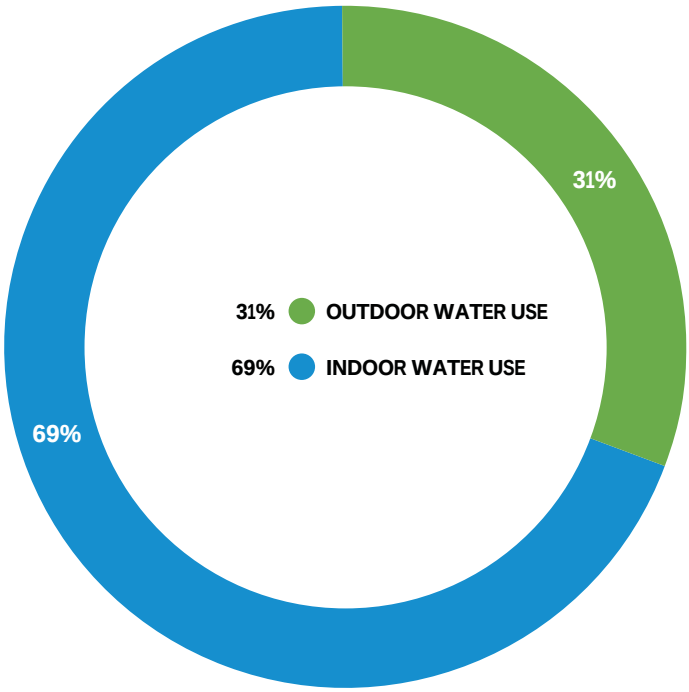
6. Meet with top five customers

In addition to more general business recommendations detailed below, the public water supplier should meet with the top five (by volume) accounts. Specifically targeting these accounts can be an efficient way to reduce water use in the class. Due to the nature of these accounts, mostly hospitals and schools, it is likely that some specialized water uses are not addressed in the Plan but could be better addressed through direct contact. To start the discussion, the public water supplier should provide a summary of historical water use data[81] to discuss significant use changes, work with the customer to identify the cause of these changes, and suggest potential water savings strategies where possible. Furthermore, identifying the flow rates of water-related building fixtures and equipment such as toilets, faucets, and ice machines can determine if more efficient cost effective options are available. Section 2 has a list of the top five customers and their water use.

Residents

The residents' role in this Plan is to become aware of how much water is used in their household and take actions to minimize this usage. The majority of Oak Park's water supply, 57 percent, is consumed by residents. A national study estimates that household water use can be divided into outdoor and indoor use with outdoor accounting for 31 percent and indoor accounted for the remaining 69 percent of total daily consumption (Figure 6).[82] Residents and Village staff identified three main areas of interest for pursing water conservation and efficiency in households: outdoor consumption, high-efficiency fixtures, and household leaks. The following recommendations are strategies to accomplish this role.

Figure 6. Residential water use



Source: Wayne B. Solley, Robery R. Pierce, and Howard A. Perlman, *Estimated Use of Water in the United States in 1995*, p. 24. (outdoor) and Mayer et al, Residential End Uses of Water, p.86. (indoor)

80 The Commonwealth of Massachusetts, Executive Office of Environmental Affairs and Water Resources Commission,"Water Conservation Standards," July 2006. See **http://www.mass.gov/Eoeea/docs/eea/water/water_conservation_standards.pdf**.

81 At least ten years of historical data, if available.

82 Amy Vickers, Handbook of Water Use and Conservation. Amherst, MA,WaterPlow Press, 2001.

Oak Park Homeowner's rain barrel. Source: Jim Watkins.

7. Reduce outdoor water consumption

It is estimated that there are three times more acres of lawns in the U.S. than irrigated crops, making lawns the most irrigated crop in the country.[83] Considering this observation, it is easy to understand why about a third of average household water consumption is used outdoors on a national scale. In Oak Park, outdoor water use is estimated to be approximately 15 percent of total water use. Substantial water savings can be gained in this area. The Plan recommends several lawn watering behavior changes, transition to native/low water use plantings, and alternative watering methods to reduce outdoor water consumption.

The WaterSense website states that up to 50 percent of water used for irrigation is wasted due to evaporation, wind, improper system design, and overwatering. Overwatering lawns results in water waste. About an inch a week is needed to maintain a healthy lawn and it is best to water all at once instead of watering multiple times throughout the week.[84] A single watering session allows the water to soak further into the root system. An inch a week includes any rainfall that has occurred. Rain gauges may be purchased to assist homeowners with reaching the one inch a week goal. Furthermore the time of day matters when watering the lawn. To reduce this waste, it's best to water in the early morning before 10:00 a.m. or after 6:00 p.m.[85] Oak Park's current ordinance states that outdoor water use from May 15 through September 15 of each year shall be limited to even numbered days of the month for even numbered street addresses and to odd numbered days of the month for odd numbered street addresses (applies Monday through Friday). [86]

In an addition to behavioral changes, landscape changes can also reduce water consumption because particular plants native to Illinois' climate naturally need less water. Replacing even a portion of a traditional lawn with native plants can reduce a household's outdoor water use. In addition to using less water, native plants do not require fertilizers, need fewer pesticides than lawns, help reduce air pollution, provide shelter and food for wildlife, promote biodiversity and stewardship of our natural heritage, and reduce water runoff.[87] Low water use plants have similar water saving benefits.

Lastly, residents can use an alternative water supply to water their lawns instead of potable water from the Village. This is typically accomplished through the use of one or more rain barrels. Rain barrels are containers that collect rainwater from a home's rooftop for use on site. The average rain barrel holds about 55 gallons. One rain barrel may be sufficient for a property; however, some homeowners may choose to have multiple rain barrels to meet their outdoor watering needs. On average, one rain barrel can save 1,300 gallons of water during peak summer months.[88] Rain barrels save potable water, save money over time, and divert water away from the stormwater system therefore reducing the probability of flooding after a large storm event. An information campaign on how to properly use, manage, and store rain barrels is needed to ensure long-term water savings and benefits. Disconnecting downspouts and installing a rain garden is another option to cultivate landscapes without the use of potable water. The practice also reduces the volume of stormwater that flows into the combined sewer system. Proper downspout and rain garden installation are necessary to ensure that potential stormwater issues such as pooling of water and localized flooding do not occur.

83 NASA Earth Observatory, "More Lawns than Irrigated Corn," 2012. See **http://earthobservatory.nasa.gov/Features/Lawn/lawn2.php**.

84 United States Environmental Protection Agency, "Water Conservation Tips for Residents," 2012. See **http://www.epa.gov/region1/eco/drinkwater/water_conservation_residents.html**.

85 CMAP, Model Water Use Conservation Ordinance, 2010. See **http://www.cmap.illinois.gov/water-2050/model-ordinance**.

86 Village of Oak Park, 2012. See **http://www.oak-park.us/index.html**.

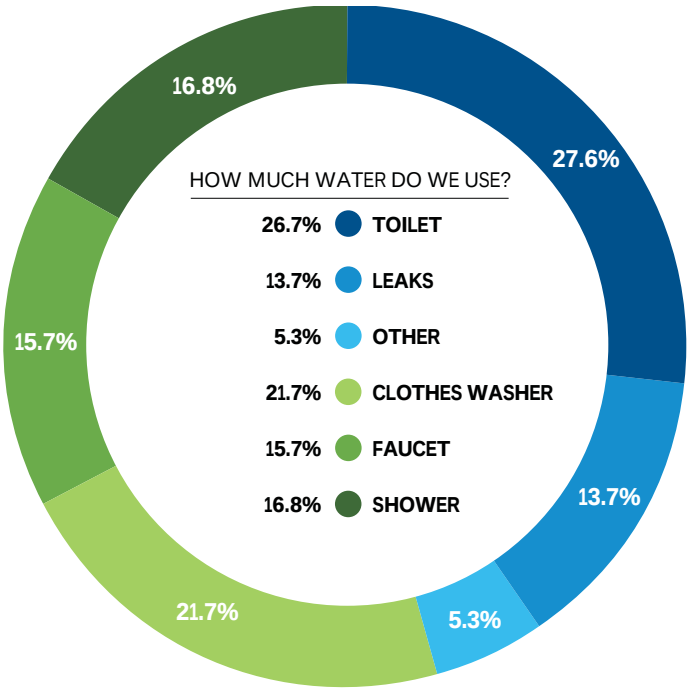
87 U.S. Environmental Protection Agency, "Green Landscaping: Greenacres," 2012. See **http://www.epa.gov/greenacres/nativeplants/factsht.html#**.

88 U.S. Environmental Protection Agency, "Rain Barrels," 2012. See **http://www.epa.gov/reg3esd1/garden/rainbarrel.html.**

8. Replace older fixtures with high efficiency models

The remaining household water consumption, nearly 70 percent, is used indoors. As shown in Figure 7, the three largest indoor household water users are toilets, showers, and faucets. These fixtures collectively represent about 60% of overall indoor use. Replacing older fixtures (installed before 1994)[89] with WaterSense labeled products can save approximately 20 percent of fixture water use. For example, replacing one toilet, one showerhead, and one faucet aerator in an older home can save 19,400 gallons a year per household, or 53 gallons a day. For a family of three in Oak Park with a total average daily use of 255 gallons, replacing these three fixtures could save 21 percent of total daily use. In addition to saving water, showerheads and faucet aerators can provide energy savings from reduced hot water use (Table 17). Another benefit of replacing fixtures is that the savings is not reliant on behavior changes, which can vary over time. For example, replacing a toilet does not change how often people use it.

Figure 7. Residential indoor water use



Source: Adapted from Mayer et al, Residential End Uses of Water, p. 86. Published in Amy Vickers, 2001. *Handbook of Water Use and Conservation*. Amherst, MA:WaterPlow Press.

Table 16. Estimated annual water and energy savings per household per day

FIXTURE	WATER SAVINGS (GALLONS)	ENERGY SAVINGS (KWHS)
Toilet	**11,500**	**N/A**
Showerhead	**2,400**	**315**
Lavatory Faucet	**5,500**	**307**
Total	**19,400**	**622**

Source: Chicago Metropolitan Agency for Planning.

As part of Plan implementation, the Village can provide incentives in the form of rebates to households to accelerate fixture replacement rates. The rebate amount is set by the public water supplier or Village and should be determined by considering the benefits of the water saved and the costs of administering the program. Typically, standalone rebates are not given to single family households for showerheads or aerators as their costs are relatively lower around $8 and $3 respectively.[90] For toilets, rebates can vary from $20-$240 per toilet. If the Village chooses to do a fixture rebate program, it is recommended the program require approved WaterSense labeled products for replacements. Partnership with local hardware stores is also recommended as a way to ensure necessary stock of WaterSense products and to support local businesses within the Village. Lastly, to facilitate implementation of rebates, the Village should consider adding water conservation rebates for both multifamily and single family buildings to their current housing programs to take advantage of internal program synergies.[91]

Another aspect of a rebate program to consider is the disposal of the outdated fixtures. With a toilet rebate program, some communities offer free or discounted pick up and disposal to participating residents. Furthermore some communities are turning the old toilets into a new resource. Since toilets are typically made of porcelain, the material can be reused for road aggregate. For example Colorado Springs Utilities announced a toilet recycling program in March 2012 in which crews crush the collected toilets for use as aggregate in local roads.[92] Oak Park could partner with Recycle Bank, a local non-profit that diverts reusable deconstruction material from landfills, to create a toilet disposal program. Cost effectiveness of such a program will need to be explored.

89 The Energy Policy Act of 1992 established the first uniform plumbing standard for fixtures and fixture fittings sold, installed, and imported to the U.S. These standards came into effect in Illinois in 1994. The standards established with the Energy Policy Act of 1992 are not the most efficient flow rates available on the market (WaterSense Products are more efficient). Replacing fixtures installed after 1994 will yield less water savings than replacing fixtures installed before 1994. Therefore, households with fixtures installed before 1994 are the targets for this recommendation. It should be noted that replacing fixtures in older households may require additional updates should pipes need replacement. It will be at the discretion of the individual homeowner/landlord to determine if fixture replacement is beneficial considering location specific circumstances.

90 Amy Vickers, Handbook of Water Use and Conservation, Amherst, MA: WaterPlow Press, 2001.

91 Village of Oak Park, Community Planning & Development, Housing programs,2012. See **http://www.oak-park.us/Community_Services/Home_Buyers_Assistance.html**.

92 The Gazette, "Toilet recycling means no more dump," March 14, 2012. See **http://citydesk.freedomblogging.com/2012/03/14/toilet-recycling-means-no-more-dump/15304/**.

9. Check for leaks

The average household can waste 10,000 gallons of water a year through leaks, enough to fill a backyard swimming pool.[93] Common locations to identify leaks are toilets, faucets, and other leaking valves. By fixing leaks, a homeowner can save 10% of their water bills.[94] Some leaks are visible while others may go unnoticed for some time. For example a small leak in a toilet's flapper (the rubber piece that seals water in the tank until it is released into the bowl from flushing) could waste up to 200 gallons of water or more each day. Simply replacing a flapper costs between $2 and $10 dollars and can save a family water and money on their bill. Additional tips for checking for leaks can be found on the WaterSense website.[95]

To supplement public information and outreach efforts and promote the Plan's recommendations in this section, the Village could also provide give-a-ways to solicit action from residents. Typical give-a-ways include leak detection tablets to test for leaky toilets, rain gauges, and faucet aerators to retrofit existing faucets.

Household leak. Image courtesy of iStockphoto.com.

Businesses

The role of business customers in this Plan is to increase efficiency in their operations through cost effective practices and promote water conservation to their customers. Partnering with the Oak Park Development Corporation is encouraged.

10. Replace older pre-rinse spray valves

In commercial food operations such as restaurants, pre-rinse spray valves (PRSV) are used to remove food waste from dishes prior to dishwashing. The Alliance for Water Efficiency states that "the water used in the pre-rinsing operation is often twice the volume of water used by dishwashing equipment."[96] Traditional pre-rinse spray valves use two to five gallons a minute. In 2006 a national standard took effect setting the maximum flow rate of 1.6 gallons a minute and new high efficiency pre-rinse spray valves use less than 1.3 gallons per minute.[97] However in older commercial food operations built before 2006, older less efficient spray valve are likely still in place. Oak Park has an estimated 4,003 businesses and about 137 of them are food service related.[98] Replacing PRSVs in even a portion of these older restaurants could provide water and energy savings because of the hot water use. The typical cost of a PRSV is about $60 per unit.[99] Rebates could be provided by the Village to accelerate installation. Additional rebates to install high efficiency toilets (toilets that use 1.28 gallons per flush or less) could also be appropriate for some commercial buildings.

Pre-rinse spray valve. Image source: CMAP staff.

93 U.S. Environmental Protection Agency, "Fix a Leak Week," 2012. See **http://www.epa.gov/WaterSense/pubs/fixleak.html**.

94 Assuming water rates are constant.

95 U.S. Environmental Protection Agency, "Fix a Leak Week," 2012. See **http://www.epa.gov/WaterSense/pubs/fixleak.html**.

96 Alliance for Water Efficiency, "Commercial Dishwashing Introduction,"2012. See **http://www.allianceforwaterefficiency.org/commercial_dishwash_intro.aspx?terms=pre+rinse+spray+valve**.

97 Ibid.

98 Dun and Bradstreet, April 2011.

99 CDM, "Water Conservation Plan for Valparaiso City Utilities," September 2009. See **http://www.ci.valparaiso.in.us/DocumentView.aspx?DID=740**.

11. Utilize informational cards to promote water conservation practices to customers

This recommendation is aimed at lodging facilities (hotels, motels and bed and breakfast inns) and food and beverage-related businesses. Providing informational cards to customers and guests with specific water savings actions can help promote various water conservation practices. Many lodging facilities now provide a card that gives multi-night guests the option to reuse towels and linens in order to save water and energy. It is estimated that one set of bed sheets requires 6 to 8 gallons to launder, and one towel set (bath, hand, and face) requires the same amount. Reducing guest use of linens is the most effective strategy to reduce laundry water use with an expected savings of 50 percent. Comparatively improving efficiency of on-site clothes washers is more costly and is estimated to save 25 percent or less on water savings.[100] Reducing linen use requires a cooperative effort between guests and lodging staff. Guest must be willing to participate and staff must accommodate their requests. Hotels, motels, and bed and breakfast inns also benefit from this practice because it saves energy, cleaning, and labor costs. Oak Park's lodging facilities could consider offering an incentive to guests that reuse linens.

For food and beverage related businesses, informational cards on table tops can inform customers that water is only served on request. By not providing full glasses of drinking water that will go unused, a business can save not only the water in the glass but also the water saved from decreased dishwashing loads. Oak Park should create local versions of these informational cards and make them available to participating businesses. Participating businesses could also be recognized by the Village on the municipal website. Oak Park currently has five hotels and motels, four bed and breakfast inns, and 137 food related businesses.

12. Encourage landscape irrigation professionals to become WaterSense Irrigation Partners

WaterSense provides certification for landscape irrigators that are skilled in water-efficient irrigation technology and techniques. Hiring a WaterSense irrigation partner to perform regular maintenance on a household's irrigation system can save 15 percent of water used for irrigation or about 9,000 gallons annually.[101] The Village should partner with irrigation professionals that are located or do business in Oak Park to become certified and should provide an incentive to do so.

A summary of the Plan's recommendations can be found in Appendix A.

WaterSense Irrigation partners can help avoid unnecessary water use like this sidewalk example. Image courtesy of iStockphoto.com.

100 Alliance for Water Efficiency, "Hotels and Motels Introduction," 2012. See **http://www.allianceforwaterefficiency.org/hotels_and_motels.aspx**.

101 U.S. Environmental Protection Agency, "Professional Certification Programs, 2012. See **http://www.epa.gov/watersense/outdoor/cert_programs.html**.

102 The Energy Policy Act of 1992 took effect in Illinois January 1, 1994. A household built after this date has updated efficient fixtures. Ideally the conservation calculations would only include households built before January 1, 1994. However, Census household-built data is attainable only in predetermined block time periods. Therefore household-built data used for these calculations includes households built in 1989 and prior.

103 Water Conservation Implementation Task Force, Texas Water Development Board, "Water Conservation Best Management Practices Guide, Report 362," November 2004. See **http://www.twdb.state.tx.us/conservation/municipal/plans/Doc/WCITFBMPGuide.pdf**.

Water and Energy Reduction Goals

The Plan's water reduction target is to reduce use by 3.5 percent of 2010's total metered use, or 62 million gallons by 2020. The reduction goal is a combination of four calculations shown in Table 17. Please note that water savings estimates were not calculated for all recommendations either due to unavailability of data or the nature of the recommendation.

Table 17. Water reduction targets

STRATEGY	ESTIMATED SAVINGS IN GALLONS	ESTIMATED SAVINGS IN GALLONS PER CAPITA PER DAY
Top 5 customers	**11,716,500**	**226**
Residential fixture upgrades	**23,953,200**	**462**
Residential outdoor water use reduction	**26,062,991**	**502**
Commercial pre-rinse spray valve upgrades	**356,400**	**7**
Total	**62,089,091**	**1,197**

Source: Chicago Metropolitan Agency for Planning, 2012.

The first calculation is derived from the Village's top five water customers by volume: two hospitals, two high schools, and the Village Park District. The total 2010 usage of these top five customers was 117.2 million gallons. The Plan estimates that a 10 percent savings of this usage is possible by 2020. More information on the strategies to achieve this goal are found in the Water supplier Recommendations section.

The second calculation is aimed at reducing indoor water use from toilets, faucets, and showerheads. The Plan estimates that 23.9 million gallons can be saved by replacing 10 percent of the Village's older less efficient fixtures. Census data was used to determine that the number of housing units built in 1994 and prior, is approximately 23,000.[102] The Plan assumes a household average fixture replacement of two percent a year from 1994-2011, meaning a certain portion of households have likely already upgraded their fixtures.[103] Therefore around 8,000 households are subtracted out to produce the adjusted eligible households, 15,000. A daily per capita water savings (Table 18) of 19.2 gallons was estimated and multiplied by Oak Park's average of 2.33 persons per household to get a household savings per day of 44.7 gallons.[104] It is assumed that only one toilet, faucet, and showerhead will be replaced per household. Lastly, 10 percent of the eligible households (1,500) is calculated and multiplied by household water savings for a total savings of 23.9 million gallons.

Table 18. Estimated water savings per capita per day

STRATEGY	ESTIMATED SAVINGS IN GALLONS PER CAPITA PER DAY
Upgrade to high efficiency toilet[105]	**11.4**
Upgrade to high efficiency showerhead[106]	**2.5**
Upgrade to a high efficiency lavatory faucet or aerator[107]	**5.3**
Total	**19.2**

Source: Chicago Metropolitan Agency for Planning.

The third calculation is based on reducing outdoor water use (Table 19). Outdoor water use is estimated by using 2010 monthly total water usage (Column B) and applying the minimum monthly method.[108] December has the lowest average per capita per day 2010 usage at around 127 million gallons. December usage will represent indoor water use for comparison with the remaining months. Each month's usage is displayed in gallons per capita (Column C) and then divided by the number of respective days of each month (column D) to arrive at average gallons per capita per day for each month (column E). The difference between Column E and December's average gallons per capita per day are calculated and represent per capita outdoor water use (Column F). Monthly per capita outdoor use is represented in Column G. The total is multiplied by Oak Park's 2010 population of 51,878 to arrive at the total estimated outdoor water use of 26.1 million gallons or 15 percent of total 2010 use. The plan estimates that a 10 percent savings of this usage is possible by 2020. More information on the strategies to achieve this goal are found in the Resident Recommendations section.

104 Amy Vickers, 2001. Handbook of Water Use and Conservation,Amherst, MA, WaterPlow Press and United States Census Bureau,. 2010.

105 Upgrade to a 1.28 gallons per flush toilet from a 3.5 gallons per flush toilet.

106 Upgrade to a 2.0 gallons per minute showerhead from a 2.5 gallons per minute showerhead.

107 Upgrade to a 1.5 gallons per minute faucet or aerator from a 2.2 gallons per minute faucet or aerator.

108 Pacific Institute,"Waste Not, Want Not: The Potential for Urban Water Conservation in California," Appendix B, November 2003. See **http://www.pacinst.org/reports/urban_usage/appendix_b.pdf**.

Table 19. Estimated outdoor water use reductions, 2010

A	B	C	D	E	F	G
MONTH	TOTAL USE, GALLONS PER MONTH	GALLONS OF WATER USE PER CAPITA PER MONTH	DAYS PER MONTH	AVERAGE GALLONS PER CAPITA PER DAY	DIFFERENCE BETWEEN DECEMBER GALLONS PER CAPITA PER DAY	ESTIMATED OUTDOOR USE PER CAPITA PER MONTH IN GALLONS
10-Jan	**152,014,544**	**2,930**	**31**	**95**	**15**	**464**
10-Feb	**127,674,624**	**2,461**	**28**	**88**	**8**	**234**
10-Mar	**131,288,212**	**2,531**	**31**	**82**	**2**	**65**
10-Apr	**136,133,008**	**2,624**	**30**	**87**	**8**	**238**
10-May	**154,409,640**	**2,976**	**31**	**96**	**16**	**510**
10-Jun	**145,085,072**	**2,797**	**30**	**93**	**14**	**410**
10-Jul	**171,123,700**	**3,299**	**31**	**106**	**27**	**832**
10-Aug	**183,196,420**	**3,531**	**31**	**114**	**34**	**1,065**
10-Sep	**148,368,044**	**2,860**	**30**	**95**	**16**	**473**
10-Oct	**160,086,960**	**3,086**	**31**	**100**	**20**	**620**
10-Nov	**129,669,540**	**2,500**	**30**	**83**	**4**	**113**
10-Dec	**127,937,172**	**2,466**	**31**	**80**	**0**	**0**
Total					**164**	**5,024**
Estimated annual outdoor use, gallons						**260,629,911**
10% savings, gallons						**26,062,991**

Source: Chicago Metropolitan Agency for Planning.

The fourth calculation is based on reducing water use from PRSVs. PRSVs are typically used in food and beverage related businesses to rinse dishes before being put in the dishwasher. Many older establishments have high volume PRSVs. The U.S. EPA WaterSense website estimates that upgrading to a higher efficiency PRSV can save been 6,400 and 20,000 gallons of water per spray valve per year. The average of these two numbers, 13,200, is used to calculated water savings. Of the 137 businesses in Oak Park that likely have pre-rinse spray valves, the Plan estimates that 20 percent, or 27 businesses, will upgrade to higher efficiency PRSVs. The resulting water savings is 356,400 gallons per year.

Based on the estimated water savings, water-related energy savings at the public water supplier level can also be estimated. There is a direct relationship between reduced water demand and reduced pumping. By reducing water demand by 62 million gallons, the public water supplier can save around 70,000 kilowatts, which is the equivalent of supplying 18 Oak Park residents with electricity for a year.[109] This reduction will also save the public water supplier $5,000 in associated energy costs. Lastly this Plan's energy use reduction should be included as a strategy that works toward Oak Park's PlanItGreen energy consumption reduction goal for buildings and homes.[110]

In addition to public water supplier savings, businesses can also save energy from upgrading to higher efficiency pre-rinse spray valves by decreasing hot water use. By choosing to replace a less efficient pre-rinse spray valve, a food and beverage-related business owner could save between 1,100 and 3,500 kilowatt hours per year per pre-rinse spray valve. For the Plan, we estimate that if 27 businesses participate, a total of 63,020 kilowatt hours and $4,411 in energy costs could be saved or $160 per participating business per PRSV per year.[111]

109 U.S. Department of Energy, "Energy Consumption in Illinois Homes," 2012. See **http://apps1.eere.energy.gov/states/residential.cfm/state=IL**.

110 PlanItGreen Energy Goal #1 –Increase energy efficiency to reduce energy consumption in all buildings and homes in the community an average of 3% per year for a total of 30% over 10 years, and Goal #3-Reduce greenhouse gas emissions due to energy use in buildings and homes an average of 3% per year for a total of 30% over 10 years. See **http://www.sevengenerationsahead.org/index.php/programs/planitgreen/**.

111 Calculated by taking the median of 1,100 and 3,500 equaling 2,300 kilowatt hours and multiplying by 27 participating businesses.

Source: Jim Watkins

Section 5
Plan Implementation and Schedule

Public outreach and information is necessary not only during the planning process but also during Plan implementation. As the recommendations in this Plan turn into actions, it is important to communicate the Village's progress with stakeholders. This will be ongoing effort. Available current resources to assist with outreach and information were identified under Recommendation #2. Additionally the Village should include implementation updates in the annual water quality report. During Plan implementation, Oak Park has committed to partner with River Forest on all outreach efforts in the areas of water conservation and efficiency. Their proximity in location and similar goals toward water conservation and efficiency make this a natural partnership that will benefit both municipalities as resources can be shared toward a common purpose.

This Plan has an eight year implementation schedule from 2012-2020 to coincide with PlanItGreen's time frames.[112] Ideally all of the recommendations would include information on the costs and benefits of implementing each measure. At the time of Plan adoption, a cost benefit analysis was not completed. Knowing the costs and benefits of each measure can help the Village prioritize recommendations accordingly and coordinate available resources. It is recommended that Oak Park complete a cost benefit analysis of these recommendations. There are several tools and services available to perform this task. For example, the Alliance for Water Efficiency offers an excel-based tracking tool to evaluate the costs and benefits of implementing a water conservation and efficiency plan.[113] In-house estimates could also be made with the combined effort of Village departments.

112 Seven Generations Ahead, PlanItGreen, 2012.
See **http://www.sevengenerationsahead.org/index.php/programs/planitgreen/**.

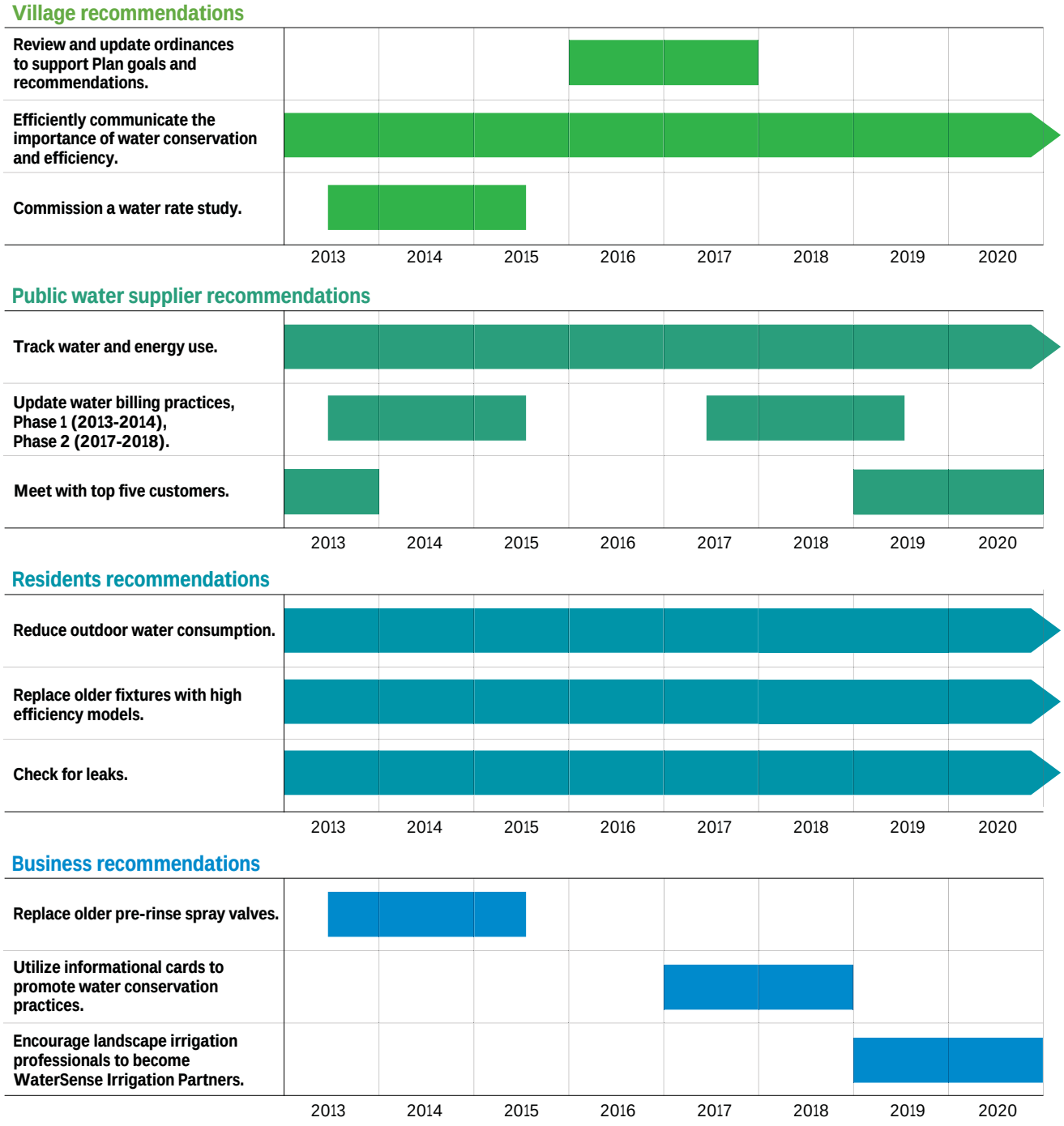
113 Alliance for Water Efficiency. "AWE Water Conservation Tracking Tool." 2012.
See **http://www.allianceforwaterefficiency.org/Tracking-Tool.aspx**.

Using current knowledge and in coordination with the Village, CMAP developed a schedule for the remainder of 2012 and the first full three years of implementation (Table 21). This schedule contains priority recommendations as identified in a joint CMAP and Village staff workshop in July 2012. It should be noted that not all of the recommendations have been scheduled for implementation in the first three full years. This is due to the financial requirements of several of the recommendations including the water rate study, phase two of updating billing practices, and any potential rebates programs associated with the business and residential recommendations.

Priorities may change as costs and benefits are established and as the level of available resources increase or decrease. Evaluating Village water consumption, tracking water and energy use of the public water supplier, and outreach to stakeholders should be done every year. At a minimum, the Village should reevaluate this schedule and the progress of Plan implementation in 2015. The degree of implementation will depend on financial and staff resources.

Partnerships will also be integral to successful Plan implementation as they can leverage resources like funding, staff time, and outreach efforts to accomplish a common goal. Local partnerships with businesses, environmental groups, nonprofits, universities, or other Village departments can be considered. Regional partnerships can also provide value to Plan implementation. Several organizations that should be considered for future partnerships include MPC, CNT, and U.S. EPA Region 5 among others. Furthermore, CMAP has a continued interest in partnering with Oak Park when appropriate.

Figure 8. Implementation chart



Source: Chicago Metropolitan Agency for Planning.

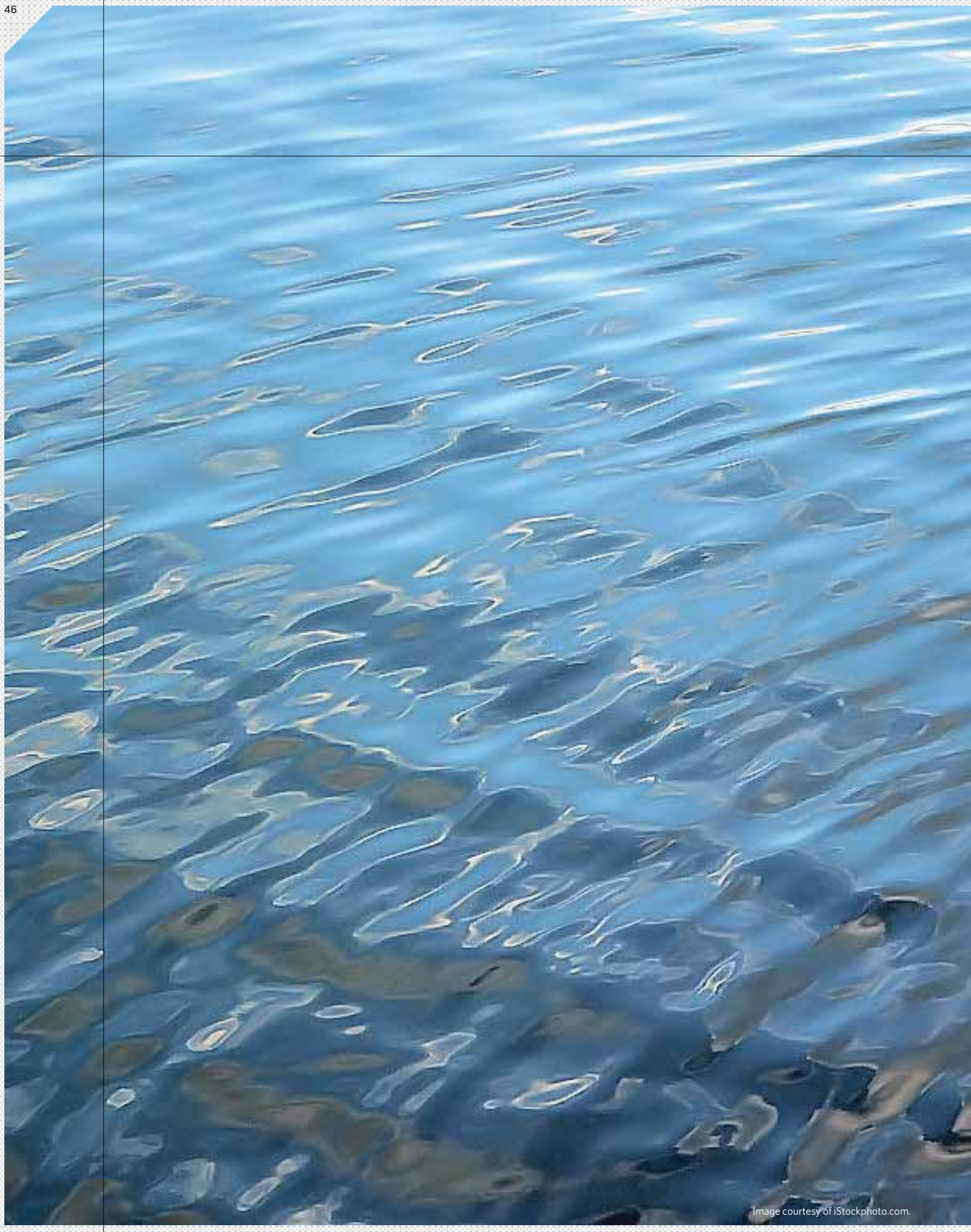


Image courtesy of iStockphoto.com.

Section 6
Public Water Supplier Revenue and Funding Implementation

Conservation and Public Water Supplier Revenue

If effectively implemented, this Plan can save water and energy for the Village. However this desired result can have some unintended consequences. Assuming no change in water rates, revenue used for operating and maintaining the distribution system declines in proportion to reduced water consumption.[114] Revenue is used to maintain the water system, pay for electricity costs, purchase water from Chicago, and fund public water supplier staff and other necessary costs that are essential to operation. For the public water supplier management, one concern is that reduced revenues will decrease the availability of resources needed to effectively operate the facilities. However there are several potential benefits to consider when water use is reduced that can in some cases help minimize revenue impacts from decreased water demand.

For example, reduced water demand can reduce the amount of water Oak Park purchases from Chicago and can reduce energy use from pumping. There can also be long term maintenance benefits such as reduced use of pumps, pipes, and other infrastructure that may extend the life cycle of such equipment and delay replacement.[115] Reduced water use also produces less wastewater and can extend the life cycle of wastewater equipment as well as reduce energy use from pumping and treating wastewater. These savings could be negligible or substantial depending on many interconnected factors including current and future increases in per unit cost of chemicals and energy. More study is needed to determine whether these cost and resource savings will apply to Oak Park. When implementing a water conservation and efficiency plan, a public water supplier will need to evaluate demand reductions and impacts on revenue on a regular basis, and may need to allow for incremental price adjustments along the way.

Another benefit of actively promoting water conservation is improving the public's perception of the public water supplier. By supporting participation in the Plan's recommendations while simultaneously implementing supply side efficiency practices, a public water supplier can become a leader in the community in sustainable practices. Developing such a relationship with customers can be helpful if emergency situations arise or support is needed to continue conservation and efficiency efforts.

114 Assuming the rate structure remains the same during plan implementation.

115 American Water Works Association,"Water Conservation Programs-A Planning Program, M52, First Edition," 2006.

Funding a Conservation and Efficiency Plan

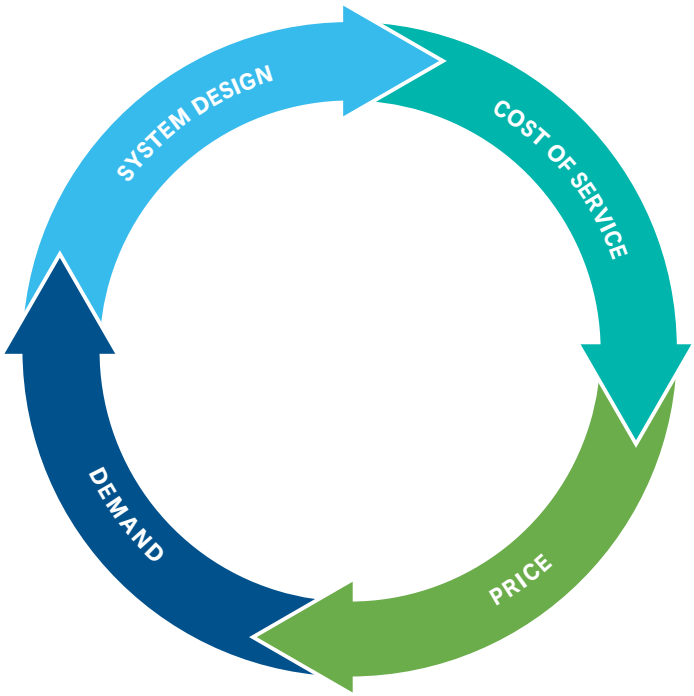
The implementation of water conservation and efficiency measures often require both money and time upfront. Funding for water conservation is most often generated at the local level. Local funding allows for the most flexibility and creativity in implementing a plan. Therefore it is best that the public water supplier pursue those activities that will be cost effective in the long-term. The public water supplier should consider implementation costs (staff time, hardware, informational materials, and rebates), the cost to the public water supplier from reduced revenues, and other costs to customers or partners to maintain the conservation measures (native landscaping, irrigation improvements).[116] Opportunity costs of using municipal funds for conservation and efficiency instead of another initiative such as stormwater management should also be considered.

Currently the Village of Oak Park does not have funding specifically budgeted toward water conservation and efficiency similar to those found in the Plan. The level of resources available directly affects the degree to which this Plan can be implemented. The following text provides information on full cost pricing, conservation fees, partnerships, discretionary monies, and grant opportunities as possible funding options.

Full Cost Pricing

The pricing of water plays an important role in how a community's water service functions. As shown in Figure 8, there is a circular relationship between price, demand, system management, and costs. According to the law of demand, when price increases, the amount of water demanded decreases (and vice versa).[117]
Just like electric systems, water systems are designed and managed according to their demand loads, how the system serves the demand affects the costs of service.[118] The costs of providing service are recovered though charging for water.

Figure 9 . Role of price in system sustainability



Source: Adapted from Wisconsin Public Utilty Commission.

116 American Water Works Association,. "Water Conservation Programs-A Planning Program, M52, First Edition," 2006.

117 According to the economic "law of demand," when price decreases, customers buy more (and vice versa), and water is no exception to this law. The effect of a change in water price on water use can be measured with the price elasticity of demand. Price elasticity of demand is calculated by taking the ratio of the percent change in quantity demanded to the percent change in price – for example, if water price increased 10 percent and the quantity of water use falls by 4 percent, then the price elasticity of demand is equal to 4 percent divided by 10 percent , or 0.4. The price elasticity of demand for urban water has been estimated to generally fall within the range of 0.3 to 0.4, meaning for every 10 percent increase in price, there is a reduction in the quantity of water demanded ranging from 3 percent to 4 percent.

118 Designing the system to meet demand load requires investment (in treatment plants, water storage, transmission lines, distribution mains, pumping stations, etc.) and also covering costs of repair, replace, and rehabilitate existing infrastructure investment. Decisions regarding the system design therefore affect the costs of service though the type and timing of infrastructure investment undertaken.

This circular relationship between price, demand, system design, and costs may disguise the actual cost of water. A price set "too low," that undercharges for water, sends an incorrect message to consumers. A low price may cause consumers to demand "too much" water, resulting in inefficient water use and water waste. Underpricing will also fail to provide adequate revenue to build adequate reserves and keep up the system. Ultimately, continuing to charge a price that is "too low" over sustained periods of time may threaten the ability to meet the communities level of service, health and safety standards, and potentially create supply and demand imbalances.[119]

Every municipality is unique and will therefore set its own water rate objectives suitable to local conditions. Goals for water rates can include full cost recovery, affordability, equitability, and more. Since revenues generated by water rates are, and will continue to be, the primary source of revenue for most community water systems, charging water rates that recover full costs comprise part of a larger strategy for ensuring adequate revenue. Full cost water rates can support necessary revenue generation to sustain necessary investments in water infrastructure and encourage efficient water use.

Full-cost recovery involves "recouping the entire cost of water provision through rates, fees, charges, and other revenue derived from water sales."[120] Cost recovery refers to the ability of the public water supplier to raise revenues sufficient to pay the cost of water and sewage services, including costs of operations, maintenance, repair, and ultimate replacement of the infrastructure. The term 'full cost pricing' has also been used to include all resource costs occurring as a result of producing and consuming a product, including production costs.[121]

AWWA issued a policy statement defining and supporting full cost pricing policies including:

- Water service rates covering operation and maintenance, capital costs, working capital, and required reserves.
- Maintenance of water supplier accounts separate from other municipal functions.
- Use of a uniform system of accounts based on generally accepted accounting principles, such as accounting procedures outlined in the AWWA accounting text.
- Fair and equitable cost allocation of water service costs across customer classes.
- Asset record maintenance, both for the utilities' use in infrastructure management as well as a means of communicating with the public about needed system improvements and their costs.[122]

Going forward, the Village should assess their need and status regarding full cost pricing policies as part of a larger strategy to promote water efficiency. Resources for conservation and efficiency are presently not embedded as a consistent cost consideration in Oak Park's rates. Including the cost and impact of conservation and efficiency in current rates is the preferred funding option as it institutionalizes water conservation and efficiency as a legitimate priority. This strategy offers long-term stability when compared to other options.

119 Note that this logic can be reversed for a price that is set "too high," with potential harm to consumer welfare and economic development, and revenue over-recovery.

120 United States Environmental Protection Agency, Office of Water, "Case Studies of Sustainable Water and Wastewater Pricing," 2007.

121 Rogers, Bhatia, and Huber,1998.

122 American Water Works Association, Statement of Policy On Public Water Supply Matters–Financing, Accounting and Rates. Revised January 16, 2005. See **http://www.awwa.org/about-us/policy-statements/policy-statement/articleid/201/financing-accounting-and-rates.aspx**

Conservation Fee

Oak Park could choose to establish a fee to fund Plan implementation. The fee is usually directly added to the existing water bill and can range from a few cents upwards to several dollars or more depending on the needs of the community. The revenue collected from the fee funds conservation measures (rebates, outreach, etc.) and staff. Conservation surcharges, water fees, conservation fees are a few examples of variations of this user fee. In Albuquerque, New Mexico, a water bill surcharge created a $2.4 million dollar budget for water conservation. The Village returned over 50 percent of the revenue to its customers in the form of residential and commercial rebates and implemented several public education workshops and demonstration gardens.[123] Furthermore, user fees can be targeted to specific water users to fund related programs. Such was the case in Pleasanton, California where a $0.05 per cubic feet surcharge was applied to irrigation accounts to create irrigation equipment upgrade sponsorships to improve efficiency.[124] In some cases, a water conservation fee ordinance can be passed to define fees and direct revenue as was implemented in Santa Fe, New Mexico.[125]

Another option for funding water conservation is to charge conservation fees associated with connecting new developments and major renovations to water service or expanded water service. The fee can be calculated by number of connections or by total square footage. In Lincoln, Massachusetts, a water conservation fee is calculated based on the total new or renovated built square footage ranging between $0.50 and $2.00 per square foot.[126]

Partnerships

In order to share the benefits and costs of water conservation, local businesses, non-profits, electricity utilities, and other interested entities may partner with the public water supplier to offer rebates, outreach, or appliances. For example, in 2009, Austin, Texas offered residents a $150 rebate for purchasing a high-efficiency clothes washer. Austin Water provided $100 and local energy companies, Austin Energy (electric water heaters) and Texas Gas Service (gas water heaters) provided the remaining $50 to complete the full rebate amount.[127]

A similar partnership could be developed for pre-rinse spray valves.

123 American Water Works Association, "Water Conservation Programs-A Planning Program,M52, First Edition," 2006, page 111.

124 Pleasanton, CA. Commercial Irrigation System Rebate Program. See **http://www.ci.pleasanton.ca.us/pdf/wcp-rebateprogram.pdf**.

125 Santa Fe, New Mexico. Water Conservation Program Charge, January 9, 2008. See **http://www.santafenm.gov/**.

126 Town of Lincoln Massachusetts," Annual Water Quality Report," 2006. See **http://www.lincolntown.org/CCR%202006.pdf**.

127 City of Austin. 2009. **http://www.austintexas.gov/**.

Discretionary Funds

When permanent funding for water conservation is not available and the needs of a community are apparent, officials can choose to utilize discretionary funds for water conservation programs. This source of funding could be a short-term solution but ideally the Village would establish a permanent funding source for water conservation and efficiency programs.

Grant Opportunities

Grants provide temporary funding during a specific time period and are not to be considered as long-term funding sources for water conservation and efficiency in Oak Park. Grants can be effectively used to implement specific recommendations in the Plan, such as a toilet rebate program, for a predetermined period of time. Government agencies such as the U.S. EPA, private foundations, and nonprofits may be sources for grant opportunities. Furthermore, the connection between water and energy savings, i.e., conserving water reduces energy use, established in this Plan could support the pursuit of energy-related grants.

The Village could also provide grants to residents and businesses. These grants would incentivize saving water and could be used to fund toilet replacements, provide pre-rinse spray valves for businesses, or provide rain barrels to homeowners.

Source: Village of Westmont

Appendix A
Summary Recommendations

The following tables outline the Plan recommendations, strategies, and supporting goals for each lead implementer: Village of Oak Park, Public Water Supplier, residents, and businesses.

Implementer: Village

RECOMMENDATIONS	STRATEGIES	SUPPORTING GOALS
1. Review and update ordinances to support Plan goals and recommendations.	• **Review current water related ordinances.** • **Adopt appropriate ordinance updates.**	**6. Update municipal water-related ordinances to be consistent with the Plan's goals and recommendations.**
2. Effectively communicate the importance of water conservation and efficiency.	• **Develop a public information campaign.** • **Provide more water related information on Village website including link to Plan.** • **Coordinate with schools to provide water education materials.**	**1. Increase stakeholder's awareness about the importance of water conservation and efficiency through both outreach and active participation.[128]**
3. Commission a water rate study.	• **Secure entity to execute a water rate study that includes evaluating revenue requirements, cost allocation demand trends and level of service.** • **Consider alternative rate structures.**	**3. Continuously track water use and evaluate its effect on the Village's water rate structure to maintain the long term stability of the entire water supply system.** **4. Continue to work towards incorporating full cost pricing practices.**

Implementer: Public water supplier

RECOMMENDATIONS	STRATEGIES	SUPPORTING GOALS
4. Track water and energy use.	• **Track and record monthly water and energy use.** • **Coordinate with Village to perform annual water use audits of municipal buildings to determine possible water savings strategies.**	**3. Continuously track water use and evaluate its effect on the Village's water rate structure to maintain the long term stability of the entire water supply system.** **4. Continue to work towards incorporating full cost pricing practices.** **5. Reduce municipal water loss and costs associated with potable water delivery.**
5. Update water billing practices.	• **Include historical and comparative water use data and conservation tips in water bills.** • **Explore the benefits and costs of switching to monthly billing.** • **Encourage customers to switch to the electronic billing option.** • **Redefine customer classes to improve water use tracking.**	**3. Continuously track water use and evaluate its effect on the Village's water rate structure to maintain the long term stability of the entire water supply system.** **4. Continue to work towards incorporating full cost pricing practices.** **5. Reduce municipal water loss and costs associated with potable water delivery.**
6. Meet with top five customers.	• **Contact top five water users by volume to initiate discussion on reducing water use. Public Water Suppliers should provide historical account data to identify changes in demand.**	**1. Increase stakeholder's awareness about the importance of water conservation and efficiency through both outreach and active participation.** **2. Decrease daily potable water consumption by 3.5 percent by 2020.[129]** **7. Develop and maintain working relationships with the Village's top five customers by volume to increase water efficiency within their operations.**

128 Similar to PlanItGreen #3 Water Goal.

129 Builds off PlanItGreen #1 Water Goal.

Implementer: Residents

RECOMMENDATIONS	STRATEGIES	SUPPORTING GOALS
7. Reduce outdoor water consumption.	• Modify lawn watering behaviors with a goal of only watering an inch a week. • Utilize native and low water use plants in landscaping. • Utilize alternative watering sources such as rainwater through the use of rain barrels.	1. Increase stakeholder's awareness about the importance of water conservation and efficiency through both outreach and active participation. 2. Decrease daily potable water consumption by 3.5 percent by 2020.
8. Replace older fixtures with high efficiency models.	• Replace toilets, faucets (or faucet aerator) and showerheads purchased before 1994 with WaterSense high-efficiency models.	1. Increase stakeholders' awareness about the importance of water conservation and efficiency through both outreach and active participation. 2. Decrease daily potable water consumption by 3.5 percent by 2020.
9. Check for leaks.	• Check for household leaks from toilets, faucets and other leaking valves. • Utilize established leak detection techniques such as found on the WaterSense website.	1. Increase stakeholder's awareness about the importance of water conservation and efficiency through both outreach and active participation. 2. Decrease daily potable water consumption by 3.5 percent by 2020.

Implementer: Business

RECOMMENDATIONS	STRATEGIES	SUPPORTING GOALS
10. Replace older pre-rinse spray valves.	• Replace pre-rinse spray valves that were installed before 1996.	1. Increase stakeholders' awareness about the importance of water conservation and efficiency through both outreach and active participation. 2. Decrease daily potable water consumption by 3.5 percent by 2020.
11. Utilize informational cards to promote water conservation practices.	• For food and beverage related businesses and lodging facilities, provide water conservation messages to customers in coordination with the Village.	1. Increase stakeholders' awareness about the importance of water conservation and efficiency through both outreach and active participation.
12. Encourage landscape irrigation professionals to become WaterSense Irrigation Partners.	• Professionals coordinate with Village to become WaterSense Irrigation Partners.	1. Increase stakeholders' awareness about the importance of water conservation and efficiency through both outreach and active participation.

Source: Jim Watkins

Appendix B
Current Oak Park Water-Related Ordinances

Current Oak Park Village Code as of June 18, 2012

26-5-1: Meters Required

All water consumers supplied by the waterworks system of the Village shall be supplied water through water meters only. Such meters shall be as required by the Village, and shall be kept in proper operating condition at all times, and it shall be unlawful to tamper with such water meters or damage the same in any manner. (1981 Code)

26-5-2: Water Saving Plumbing Fixtures

The following water saving plumbing fixtures shall be required in all new construction and in all repairs and/or replacement of fixtures or trim; only fixtures and trim not exceeding the following flow rates and/or water usage shall be installed (ratings are based on a pressure at the fixture of 40 to 50 pounds per square inch):

Water closets, tank type: **3.5 gallons per flush**
Water closets, flushometer type: **3.0 gallons per flush**
Urinals, tank type: **3.0 gallons per flush**
Urinals, flushometer type: **3.0 gallons per flush**
Showerheads: **3.0 gallons per minute**
Lavatory, sink faucets: **3.0 gallons per minute**

26-5-3: Fixtures for Public Use

In addition to the requirements in Section 26-5-2 of this Article, in all new construction and in all repairs and/or replacement of fixtures in lavatories intended for public use, the faucets of such lavatories located in restrooms intended for public use shall be of metering or self-closing type. (1981 Code)

26-5-4: Car Wash Facilities

In all new construction and/or replacement of fixtures in carwash facilities, car wash installations shall be equipped with a water recycling system. (1981 Code)

26-5-5: Air-Conditioning Systems

All water-cooled air-conditioning systems which are installed in new construction and/or remodeling shall be closed air-conditioning systems. (Ord. 1983-0-14, 11-7-83)

26-5-6: Outdoor Water Use

A. The outdoor use of water from and after May 15 of each year to and including September 15 of each year shall be limited on Monday through Friday of each week to real property with even-numbered street addresses on even-numbered days of the month and to real property with odd-numbered street addresses on odd-numbered days of the month. In instances where a corner property possesses a street address for both the north-south street and the east-west street adjacent to the property, the address for the north-south street shall determine the property's even or odd street address designation for purposes of this Section. Any parcel of property not possessing a street address shall be designated as odd or even in accordance with the street addresses of other Village properties fronting on the same side of the same street as the parcel without a designated street address. "Outdoor use" shall include, but not be limited to, the water sprinkling of lawns, gardens, trees, shrubs and plants and the washing of vehicles by means of a direct water hose connection to the Village water supply, but shall specifically exclude water sprinkling by means of sprinkling cans and other hand held water containers not directly connected to the Village water supply; the use of water by means of a direct hose connection to the Village water supply for the sprinkling of new grass seed, sod, trees and shrubs for the first thirty (30) days after planting; the use of water for authorized building construction; and the recycling of water in pools and fountains.

This Section shall in no way limit the Village Manager and/or Director of Public Works from further restricting the use of the Village's water supply at such time as the State or the Village may declare an emergency with regard to the water supply.

B. No person shall use or permit the use of any Village water in violation of subsection 26-5-6A of this Section on any premises of which such person is the legal or beneficial owner, tenant, custodian, manager or for which such person is the registered applicant for the Village water meter or service. Any person convicted of violating this Section shall be fined in accordance with the general penalty provisions set forth in Section 1-1-5 of the Village Code. The continued or repeated violation of this Section following the issuance of a complaint of violation by the Village shall constitute a separate offense. The repeated violation of this Section shall constitute a nuisance and the Village may seek abatement of said nuisance in accordance with the provisions set forth in Chapter 16 of the Village Code.

C. The Director of Public Works and Chief of Police shall be responsible for the enforcement of the provisions of this Section. The Village Manager may, however, assign the enforcement responsibility for this Section to such other Village employees as the Manager, in his discretion, may from time to time determine to be appropriate. (Ord. 1990-0-20, 5-7-90)

Source: Oak Park

Appendix C
Oak Park Model Water Use Conservation Ordinance

Definitions

Automatic shutoff
A mechanism that must be pressed to start or stop the flow of water.

Commercial
Local definitions apply. Otherwise, refers to property with five or more dwelling units or any commercial-use building and associated landscape that provides or distributes a product or service, such as hotels, restaurants, office buildings, commercial businesses or other places of commerce.

Dual Flush Toilet
A high efficiency toilet that is designed with two flush volumes, a reduced flush (0.8 gallons per day) for liquid waste and a full flush (1.6-1.28 gallons per flush) for solid waste.

Electro-Hydraulic toilet
A toilet fixture of siphonic or washdown design that uses a motor, pump, and controller to assist flushing action.

Energy Policy Act of 1992 (EPAct)
A federal Act that defined national uniform plumbing standards among other provisions.

ENERGY STAR
A national joint energy efficiency program of the U. S. Environmental Protection Agency and the U. S. Department of Energy.
www.energystar.gov

Fixture
A receptacle, device, or appliance that is supplied with water or that receives liquid or liquid-borne wastes and discharges such wastes into the drainage system to which it may be directly or indirectly connected (e.g. toilet, clothes washer, etc)

Fixture Fitting
A terminal device designed to control and guide the flow of water (e.g. faucet aerators, pre-rinse spray valves).

Flushometer-Valve Activated Toilet
A toilet that flushes by a valve that discharges a predetermined quantity of water to the fixture and is actuated by direct water pressure.

Gravity Tank-type Toilet
A toilet with a tank that is located above or integral with the toilet for the purposes of flushing the fixture by the force of gravity.

Industrial
Local definitions apply. Otherwise, refers to any industrial-use building with associated landscape. Water users that are primarily manufacturers or processors of materials as defined by the Standard Industrial Classifications (SIC) Code numbers 2000 through 3999 i.e. manufacturing/industrial; including food production, apparel, lumber & wood products (not furniture), furniture & fixtures, paper & allied products, printing & publishing, chemicals (plastics, drugs, cleaners, paint, etc.), petroleum refining, rubber & misc. plastic products.

Institutional
Local definitions apply. Otherwise, refers to any civic building with associated landscape, water-using establishment dedicated to public service. This includes schools, courts, churches, hospitals, and government facilities. All facilities serving these functions are to be considered institutions regardless of ownership.

Light Commercial
Refers to the U.S. EPA definition i.e. restaurants and hotels. See Section 8.0.1.1

Local Unit of Government (Local Government)
Any county or municipality having the ability to promulgate ordinances including those having enforceable penalties related to water use.

Low Water Use Plants
Plants that, generally, once established can survive on 2 irrigations per month during the summer months. (Local Units of Governments may wish to supplement this with a Plant List)

Manual Faucet
A faucet that is actuated and closed through manual operation.

Metering Faucet
A faucet that after actuation dispenses water of a predetermined volume or for a predetermined period of time. Note: The volume or cycle duration can be fixed or adjustable.

Noncompliant plumbing fixtures and fixture fittings
Fixtures and fittings that use more water than the Energy Policy Act of 1992 standards.

Outdoor water use
"Outdoor use" shall include, but not be limited to, the water sprinkling of lawns, gardens, trees, shrubs and plants and the washing of vehicles by means of a direct water hose connection to the Village water supply, but shall specifically exclude water sprinkling by means of sprinkling cans and other hand held water containers not directly connected to the Village water supply; the use of water by means of a direct hose connection to the Village water supply for the sprinkling of new grass seed, sod, trees and shrubs for the first 30 days after planting; the use of water for authorized building construction; and the recycling of water in pools and fountains.

Pressure-Assist Toilet
A Flushometer tank toilet as defined in ASME A112.19.2.

Private or Private Use
Applies to fixtures and fixture fittings located within a single family residence, apartment, condo, townhome, or duplex unit; private bathrooms in hotels or hospitals; and to restrooms in commercial establishments where the fixtures are intended for the use of a family or an individual. These terms are used interchangeable throughout the document.

Public or Public Use
All buildings or structures that are not defined as private or private use such as multifamily residences (apartments, condos, duplexes) with shared laundry facilities, dorms, salons, etc. These terms are used interchangeable throughout the document.

Recycling System
A system that reuses or recirculates water for multiple uses instead of a non-recycling system that uses water once and then discards it. A recycling system often is embedded with a cleansing mechanism to allow for multiple uses with comparable water quality.

Remodel
construction in which fixtures, fittings, appliances, and/or systems outlined in this ordinance are replaced.

Residential
property with 4 or fewer dwelling units or any unit with private use fixtures and appliances and associated landscape. (Local government may choose to modify definition to reflect local conditions)

Self-Closing Faucet
A faucet that is designed to close itself as soon as the activating mechanism is released.

Semi-Public
private clubs and fraternal organizations.

Tank-type Toilet
Same as gravity tank-type toilet.

Water closet
A fixture with a water containing receptor that receives liquid and solid body waste and on actuation conveys the waste through an exposed integral trap into a drainage system, also referred to as a toilet.

WaterSense
A national water efficiency and partnership program of the U.S. Environmental Protection Agency. See **www.epa.gov/watersense**.

Acroynms

AMR Automated meter reading

ASCE American Society of Civil Engineers **www.asce.org**

ASME American Society of Mechanical Engineers **www.asme.org**

ASSE American Society of Safety Engineers **www.asse.org**

AWWA American Water Works Association **www.awwa.org**

CEC Contaminants of Emerging Concern

CMAP Chicago Metropolitan Agency for Planning **www.cmap.illinois.gov**

CNT Center for Neighborhood Technology **www.cnt.org**

CSA Canadian Standards Association **www.csa.org**

EPAct Energy Policy Act of 1992

GPCD Gallons Per Capita Per Day

HEU High Efficiency Urinal — using 0.5 gallons per flush or less

HUD U.S. Department of Housing and Urban Development **www.hud.gov**

IAPMO International Association of Plumbing and Mechanical Officials **www.iapmo.org**

IDNR-OWR Illinois Department of Natural Resources, Office of Water Resources **www.dnr.illinois.gov/wateresources/pages/default.aspx**

ISAWWA Illinois Section American Water Works Association **www.isawwa.org**

IWA International Water Association **www.iwahq.org**

JCAR Joint Committee on Administrative Rules **www.ilga.gov/commission/jcar**

KWHS Kilowatt Hours

L2L Lawn to Lake **www.cmap.illinois.gov/lawn-to-lake**

LTA Local Technical Assistance **www.cmap.illinois.gov/lta**

MGD Millions of Gallons Per Day

MPC Metropolitan Planning Council **www.metroplanning.org**

MUL Maximum Unavoidable Leakage

MWRD Metropolitan Water Reclamation District **www.mwrd.org**

OPRF Oak Park-River Forest

PIP Public Information Program

PPCP Pharmaceuticals and Personal Care Products

PRSV Pre-Rinse Spray Valve

PSI Pounds Per Square Inch

SIC Standard Industrial Classifications

U.S. EPA U.S. Environmental Protection Agency **www.epa.gov**

Residential – Indoor

1.0 Plumbing Fixtures and Fixture Fittings

Plumbing fixtures and fittings in all new and remodeled construction shall not exceed the following flow rates and must be a labeled WaterSense product, if available. The following flow rates shall at a minimum maintain alignment with the most current U.S. EPA WaterSense product specification standards, where applicable, for all items listed below.

1.1 Toilets (water closets)

No toilet shall have a flush volume greater than 1.6 gallons per flush.

1.11 Gravity, Pressure Assist and Electro-Hydraulic Tank-type Toilets

All gravity, pressure assist and electro-hydraulic tank type toilets shall have a maximum effective flush volume of not more than 1.28 gallons of water per flush in accordance with ASME A112.19.2/CSA B45.1 or ASME A112.19.14 and shall comply with the U.S. EPA WaterSense Specification for Tank-Type Toilets. Note: The effective flush volume for dual flush toilets is defined as the composite average flush volume of two reduced flushes and one full flush.

1.12 Flushometer-Valve Activated Toilets

All flushometer-valve activated toilets shall have a maximum flush volume of not more than 1.6 gallons per flush in accordance with ASME A112.19.2/CSA B45.1.

1.2 Faucets

No faucet shall have a flow volume greater than 2.2 gallons per minutes at 60 psi.

1.21 Lavatory Faucets

The maximum flow rate for lavatory faucets shall be 1.5 gallons per minute at 60 psi in accordance with ASME A112.18.1/CSAB125.1 and shall comply with the U.S. EPA WaterSense High Efficiency Lavatory Faucet Specification.

1.22 Kitchen Faucets

The maximum flow rate for kitchen faucets shall be 2.2 gallons per minute at 60 psi.

1.3 Showerheads

The maximum flow rate for showerheads shall be 2.0 gallons per minute at 80 psi in accordance with ASME A112.18.1/CSA B125.1. The showerhead shall be supplied by an automatic compensating valve that complies with ASSE 1016 or ASME A112.18.1/CSA B125.1 and specifically designed for the flow rate of the showerhead being used. Showerhead shall comply with the U.S. EPA WaterSense Specification for Showerheads.

2.0 Water Reuse for Toilet and Urinal Flushing

Local government may allow the installation of a rainwater harvesting or greywater system to be used for indoor non-potable uses such as toilet and urinal flushing provided that the system is designed by a licensed professional using accepted design standards and is in compliance with the requirements of the local and state government's plumbing code.

3.0 Appliances

This section applies to all new and remodeled construction.

3.1 Dishwashers

Dishwashers shall comply with U.S. EPA ENERGY STAR Program Requirements.

3.2 Clothes Washers

Clothes washers shall comply with the U.S. EPA ENERGY STAR program requirements.

4.0 Variances

Local government may waive the requirements in Section 3.0 based on certain household characteristics such as extreme economic hardship, historical landmark designation, transfers within a family, foreclosures, eminent domain, teardowns, etc.

Noncompliant faucets may be fitted with aerators to achieve reduced flow rate in lieu of full fixture replacement. Note: there may be longer wait times for hot water due to reduced flow in older homes where original piping was installed for higher flow rate fixture fittings. Increased insulation and recirculation systems can be used to help neutralize any discrepancies

Residential – Landscape

5.0 Vegetation

Residents are encouraged to use native plants and/or low water use plants.

6.0 Landscape Irrigation

6.1 Landscape Irrigation Days

At even numbered addresses, outdoor water use may occur only on Wednesdays and Saturdays. Odd numbered addresses may irrigate only on Thursdays and Sundays. In instances where a corner property possesses a street address for both the north-south street and the east-west street adjacent to the property, the address for the north-south street shall determine the property's even or odd street address designation for purposes of this Section. Any parcel of property not possessing a street address shall be designated as odd or even in accordance with the street addresses of other Village properties fronting on the same side of the same street as the parcel without a designated street address.

6.2 Landscape Irrigation Schedules

Between the months of April through October, outdoor water use shall not occur between 10:00 AM and 6:00 PM. Irrigation shall not continue beyond 2 hours per irrigation day nor more than 3/4 inch during the allocated schedule.

This Section shall in no way limit the Village Manager and/or Director of Public Works from further restricting the use of the Village's water supply at such time as the State or the Village may declare an emergency with regard to the water supply.

6.3 Irrigation Permits

Residents may receive permits for the irrigation of new landscape to allow watering at any time of day on any day for the initial 30 days and every other day for the next 30 days for a total of one 60-day period.

6.4 Rainwater Harvesting

Local governments may allow the installation of a rainwater harvesting system to be used for landscape irrigation provided it conforms to all requirements of the local government's plumbing code. This includes the use of rain barrels and cisterns.

7.0 Variances

The local government may waive the above requirements if presented with compelling evidence that the site is not suitable for the recommended plantings.

The use of water for irrigation from a recycled water system is allowed with no constraints on irrigation schedules. Recycled system components shall be identified as non-potable water sources. Water sprinkling by means of sprinkling cans and other hand held water containers not directly connected to the Village water supply is allowed anytime.

The use of discharge water from a water-to-air air-conditioning unit or other water-dependent cooling system is not limited under the requirements of this ordinance.

Commercial – Indoors

8.0 Plumbing Fixtures and Fittings
Plumbing fixtures and fittings in all new and remodeled construction shall not exceed the following flow rates and must be a labeled U.S. EPA WaterSense product, if available. The following flow rates shall at a minimum maintain alignment with the most current U.S. EPA WaterSense product specification standards, where applicable, for all items listed below.

8.1 Toilets (water closets)
No toilet shall have a flush volume greater than 1.6 gallons per flush.

8.11 Gravity, Pressure Assist and Electro-Hydraulic Tank-type Toilets
All gravity, pressure assist and electro-hydraulic tank type toilets in light commercial locations shall have a maximum effective flush volume of not more than 1.28 gallons of water per flush in accordance with ASME A112.19.2/CSA B45.1 or ASME A112.19.14. Note: The effective flush volume for dual flush toilets is defined as the composite average flush volume of two reduced flushes and one full flush.

8.12 Flushometer-Valve Activated Toilets
All flushometer-valve activated toilets shall have a maximum flush volume of not more than 1.6 gallons per flush in accordance with ASME A112.19.2/CSA B45.1.

8.2 Urinals
Urinals shall have a maximum flush volume of not more than 0.5 gallons of water per flush (e.g. High Efficiency Urinals, HEUs) in accordance with ASME A112.19.2/CSA B45.1 or IAPMO Z124.9.

8.3 Public or Public Use Lavatory Faucets
Lavatory faucets installed in bathrooms of buildings or occupancies other than for residential or private use shall be self-closing, metering faucets or manual faucets and must comply with the flow rates below. Private bathroom faucets in hotels and hospitals are an exception and shall have a maximum flow rate of 1.5 gallons per minute at 60 psi in accordance with ASME A112.18.1/CSA B125.1.

8.31 Self-Closing and Manual Faucets
The maximum flow rate shall be 0.5 gallons per minute at 60 psi in accordance with ASME A112.18.1/CSA B125.1.

8.32 Metering Faucets
Metering faucets shall deliver not more than 0.25 gallons of water per cycle.

8.4 Showerheads
The maximum flow rate for showerheads shall be 2.0 gallons per minute at 80 psi in accordance with ASME A112.18.1/CSA B125.1. The showerhead shall be supplied by an automatic compensating valve that complies with ASSE 1016 or ASME A112.18.1/CSA B125.1 and specifically designed for the flow rate of the showerhead being used. This does not apply to emergency safety showers and emergency eye wash stations.

9.0 Eating and Drinking Establishments

9.1 Pre-rinse Spray Valves
The maximum flow rate for a pre-rinse spray valve installed in a commercial/institutional kitchen to remove food waste from cookware and dishes prior to cleaning shall be 1.6 gallons per minute at 60 psi. Where pre-rinse spray valves with maximum flow rates of 1.3 gallons or less are installed, the minimum static pressure shall be 30 psi. Commercial/institutional kitchen pre-rinse spray valves shall be equipped with an integral automatic shut off. All new and existing establishments that serve food must install a pre-rinse spray value in accordance with this section.

9.2 Drinking water
Drinking water shall be served only upon request in public and private eating and drinking establishments including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink is served and/or purchased. Establishments shall clearly communicate this ordinance requirement to customers through table tents, noted in the menu or other form of clearly visible signage within the establishment.

10.0 Ice Machines
For new and remodeled construction, ice machines shall be air cooled and shall comply with the U.S. EPA ENERGY STAR for Commercial Ice Machines.

11.0 Appliances
Applies to all new and remodeled construction.

11.1 Dishwashers
Commercial dishwashers shall comply with the U.S. EPA ENERGY STAR Program requirements.

11.2 Clothes Washers
Public use clothes washers shall comply with the U.S. EPA ENERGY STAR Program requirements.

11.3 Drinking Fountains
Drinking fountains shall be self-closing.

12.0 Variances

Local Governments may waive the above requirements based on certain property characteristics such as historical landmark designation, foreclosures, eminent domain, teardowns, etc.

Noncompliant faucets may be fitted with aerators to achieve reduced flow rate in lieu of full fixture replacement. Note: there may be longer wait times for hot water due to reduced flow where piping was originally installed for higher flow rate fixture fittings. This generally applies to residential properties but in certain cases may apply to commercial, industrial, and institutional properties. Increased insulation and recirculation systems can be used to help neutralize any discrepancies.

Water Waste

13.0 Impervious Areas

13.1 Impervious Watering
No person shall knowingly permit the irrigation of a landscape on premises owned, leased, or managed by the person in a manner that causes a substantial amount of water to fall upon impervious areas (sidewalks, driveways, streets, gutters or ditches).

13.2 Impervious Washing
No person shall wash impervious areas (sidewalks, driveways, streets, etc.) with water except in emergencies to remove spills of hazardous materials or eliminate dangerous conditions.

14.0 Car Washing
Vehicles must be washed with a hose that has an automatic shut-off valve.

15.0 Leakages
Leaks for private water lines must be fixed within 30 days of notification by the public water supplier/or discovery of the leak. Leaks include but are not limited to a broken sprinkler head, a leaking valve, leaking or broken pipes or a leaking faucet.

16.0 Audits
The public works department shall perform an annual water audit of Oak Park's water supply system following the International Water Association and American Water Works Association's Water Audit Method.

Information and Outreach

17.0 Information and Outreach
The governmental department responsible for water supply and treatment shall make available educational materials that aim to increase awareness of the value of water and promote water conservation measures. The department shall also inform the public and maintain a public information program about the water conservation measures outlined in this ordinance.

18.0 Water Conservation Signage

18.1 Hotels, Motels and other Lodging Facilities
These facilities shall display a minimum of one water conservation informational card or brochure in a visible location per guest room. Card or brochure may be local government-provided or developed using such text.

18.2 Public, Semi-Public and Government Restroom and Shower facilities
These facilities shall post no less than one water conservation sign in each restroom and shower facility. Each sign shall not be less than 8.5 by 11 inches in size and may either be a local government-provided sign or a sign developed using local government-provided text. Either format must cite this ordinance. Signage must be posted in a visible location within the facility.

19.0 Water Conservation Literature Distribution

19.1 Governing Body
The local unit of government shall provide relevant indoor and outdoor water conservation literature to: 1) all persons applying for a building permit, and 2) all customers initiating new water service from a local government-operated public water supplier.

19.2 Retail Plant Nurseries
Retail plant nurseries shall provide customers who purchase outdoor plants with local government-provided low water use landscape literature at the time of sale. Labeling of low water use plants is also encouraged.

19.3 Landscape Contractors and Architects
Landscape contractors and architects shall provide prospective clients with municipal-provided low water use landscape literature and water efficient irrigation guidelines before presenting a service contract. Literature shall include but not limited to information on rain sensors, freeze gauges and cisterns.

Miscellaneous

20.0 Bottled Water Use

The Village discourages the purchase of single-serving bottled water and encourages the use of the municipal water system water supply for drinking water purposes.

Violations/Enforcement

21.0 Violations/Enforcement

Consult with Oak Park Staff to develop enforcement metrics.

22.0 Severability

In the event that any section, clause, provision or part of this Ordinance shall be found and determined to be invalid by a court of competent jurisdiction, all remaining valid parts that are severable from the invalid parts shall remain in full force and effect. If any part of this Ordinance is found to be invalid in any one or more of its several applications, all-valid applications that are severable from the invalid application shall remain in effect.

23.0 Ordinance/Code Conflict

All ordinances/codes or parts of ordinances/codes in conflict with this ordinance are hereby repealed only to the extent necessary to give this Ordinance full force and effect.

Chicago Metropolitan
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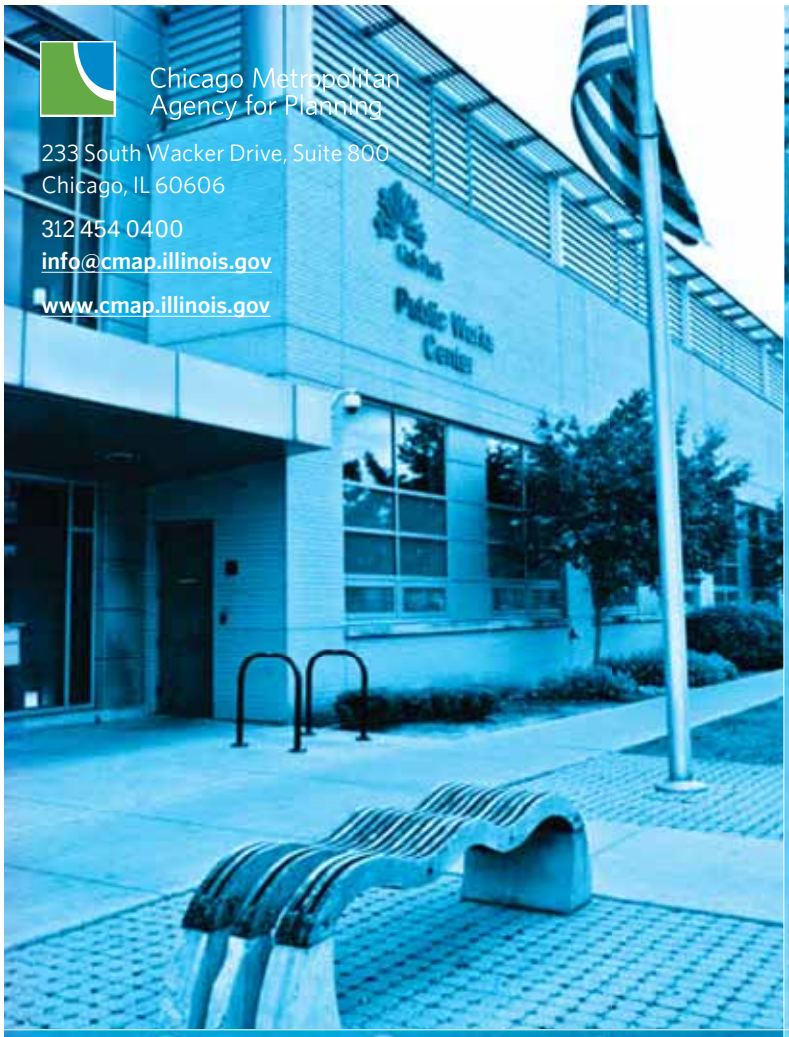

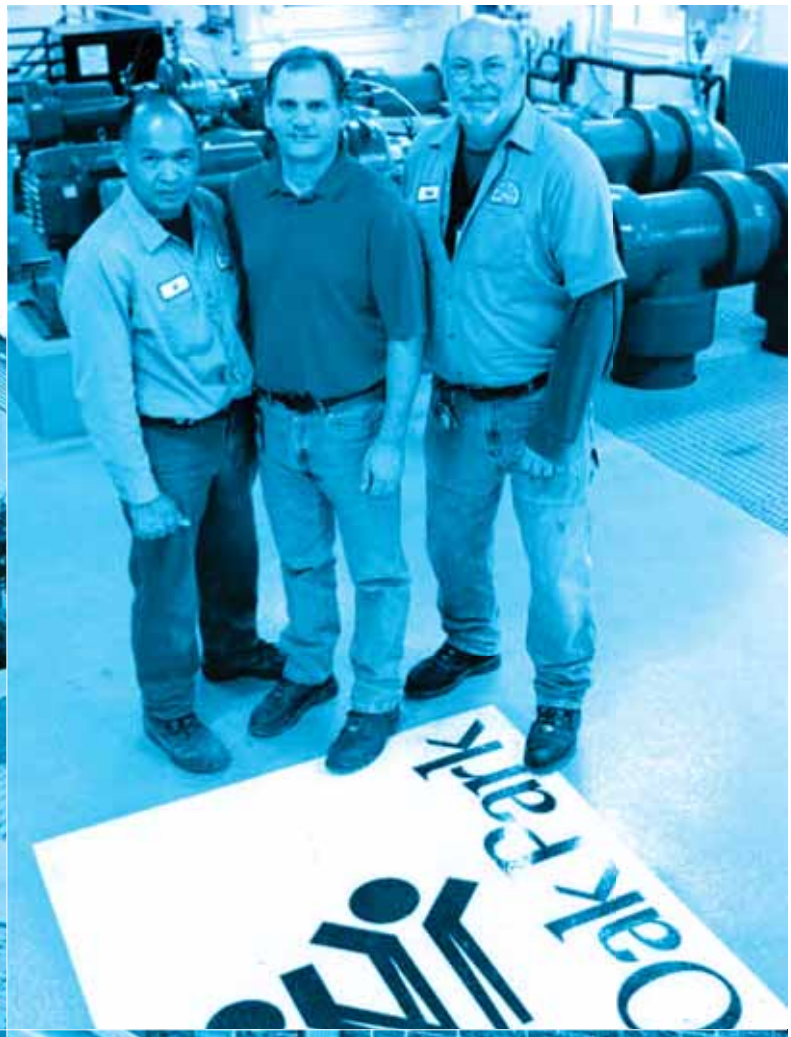

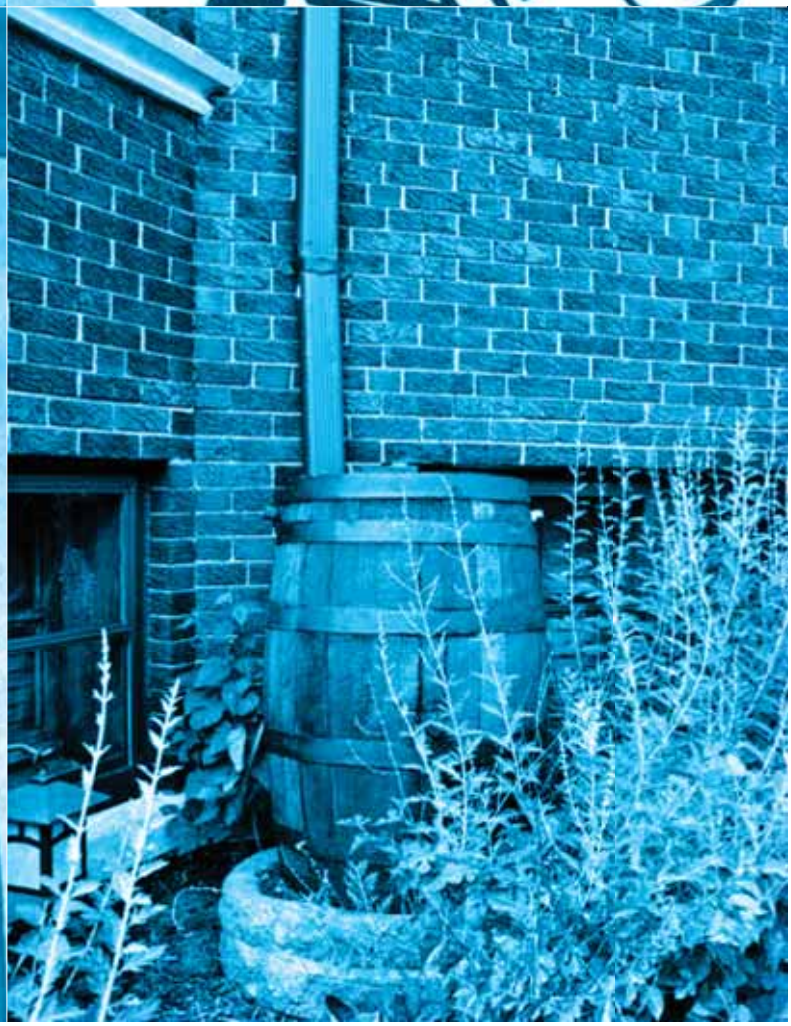

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