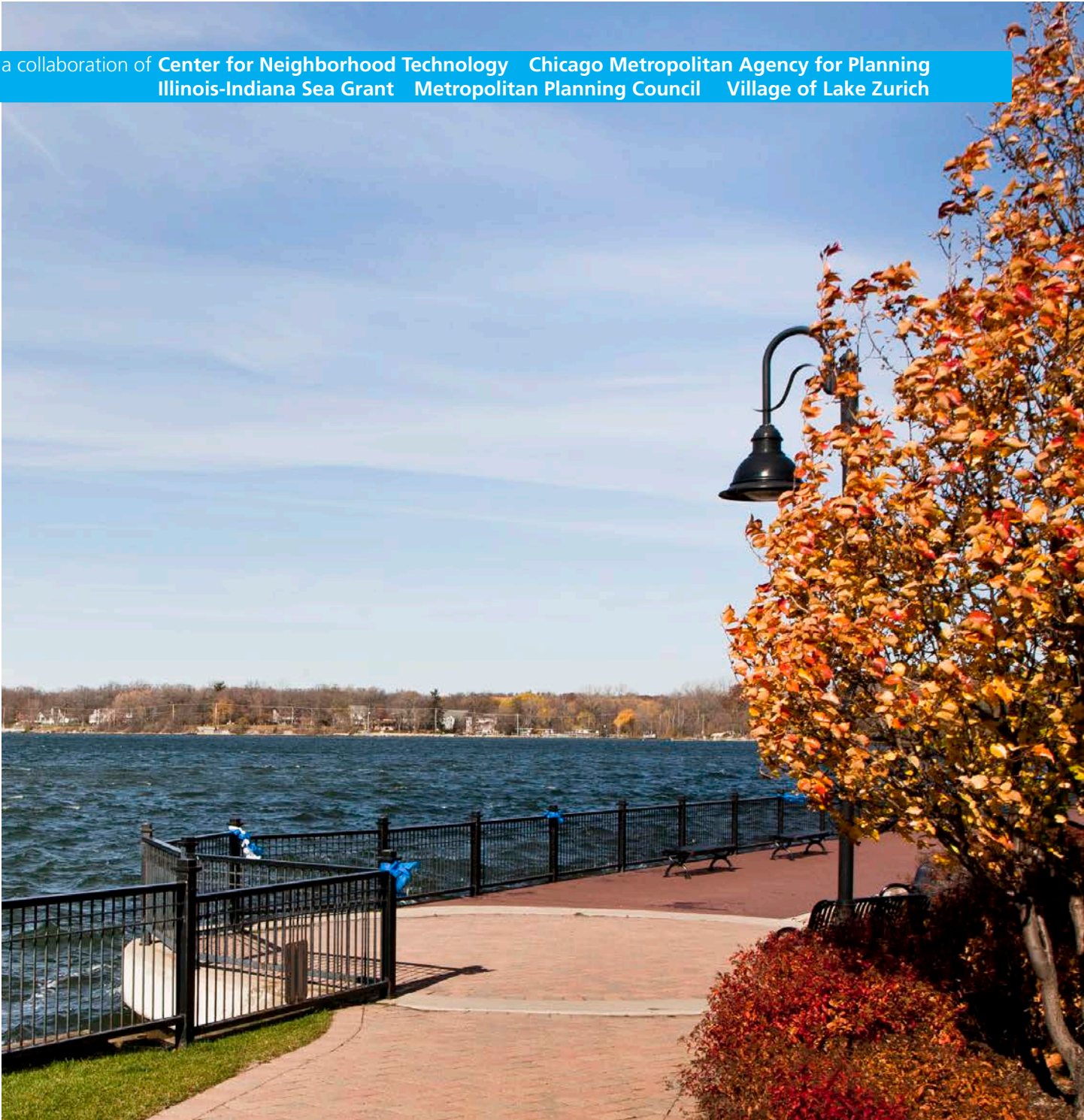


a collaboration of **Center for Neighborhood Technology** **Chicago Metropolitan Agency for Planning**  
**Illinois-Indiana Sea Grant** **Metropolitan Planning Council** **Village of Lake Zurich**



# Recommendations for Integrated Water Resources Planning in **Lake Zurich**



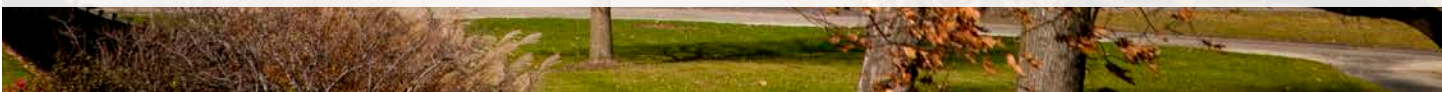
  
Metropolitan **Planning Council**

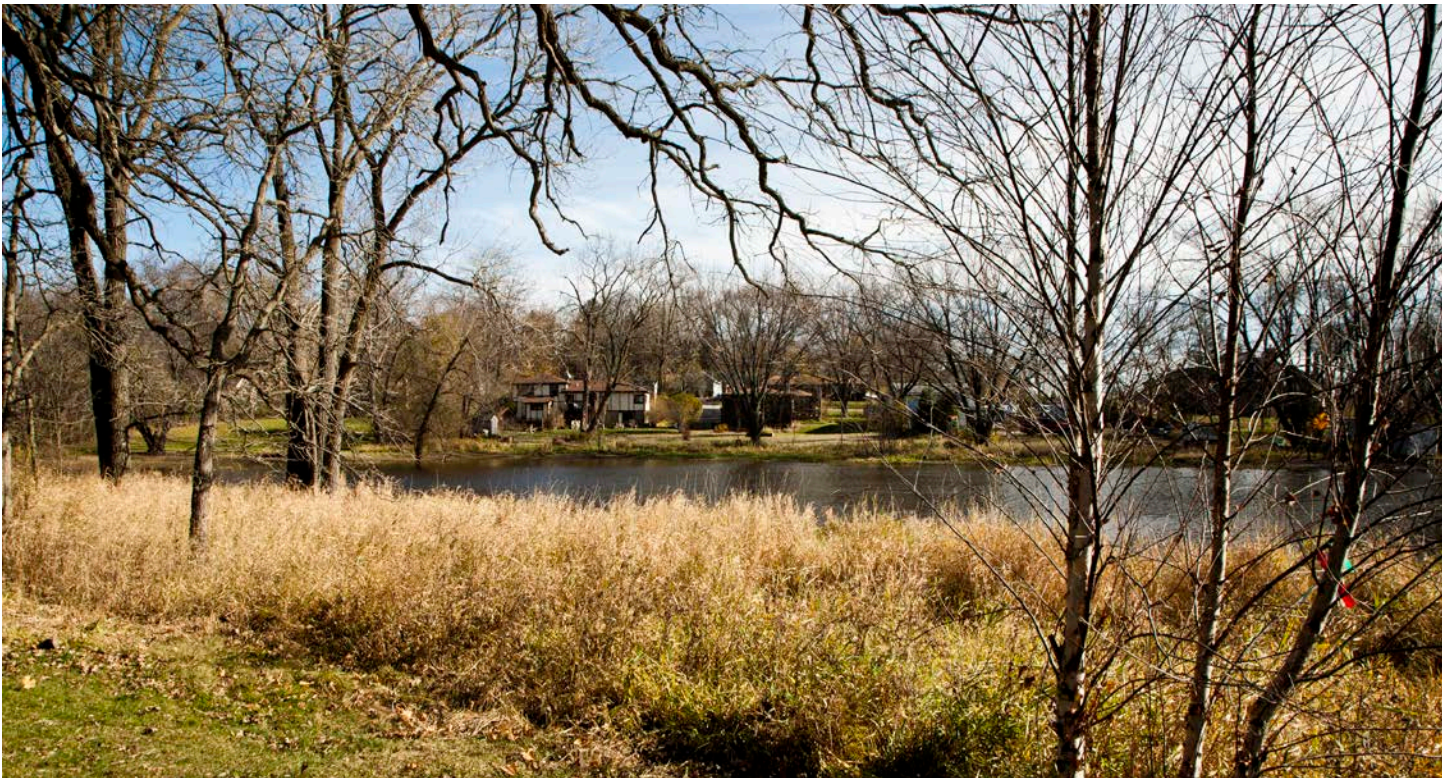


## **Table of Contents**

Executive Summary	1
Introduction	5
Current Conditions	8
SWOT Analysis	15
Strategic Goals and Prioritization	23
Appendices	29

All photos by Emily Cikanek unless otherwise noted.





## Executive Summary

**Water itself knows no political boundaries. Rivers flow from one community to another, aquifers span entire regions, rain falls where it will. Yet water resources management is inherently political.**

Northeastern Illinois' 284 municipalities plan and implement many facets of water supply, stormwater, and wastewater management at the local level. Factors such as changes in municipal leadership, water's rank among local priorities, and municipal finances determine whether water resources are managed well. At the same time, external factors such as compliance with federal, state or county regulations, competitiveness for loans or grants, and the real estate development market can affect local decisions.

A further complication is that while water resources are often dealt with in separate buckets – water supply, stormwater and wastewater – the water itself rarely obeys those distinctions. The output of potable water consumption is the input for wastewater management, so water supply conservation and efficiency can reduce demand for sewage treatment infrastructure and services. Leaky pipes and unknown cross-connections between pipe systems designed to be separate from each other allow for potable water and stormwater runoff to enter wastewater flows, straining designed capacity, and adding unnecessary costs. Stormwater can recharge shallow groundwater or be harvested on site for reuse, but it also can damage property through flooding and overwhelm wastewater systems, leading to contaminated overflows into area waterways.

Despite the widespread practice of managing water supply, stormwater and wastewater separately – an approach often ingrained in federal, state and county regulations and funding criteria by which municipalities are bound – communities would be better served by integrating planning and management. New and stronger regulations across all water resources increase the need for integrated planning, partially to satisfy the demands of regulatory agencies, but also to avoid unintentional consequences. For instance, a water supply decision can have significant ramifications on wastewater management.

This combination of external and internal influences on water resources decisions can be overwhelming for even the most attentive and experienced elected official, staff member, or voter. However, without a well-reasoned and consensus-based set of water resources management goals, and a step-by-step strategic implementation plan for achieving them, many important water-related decisions are made disjointedly, or not made at all. Unfortunately, very few communities in northeastern Illinois have such a plan.

In contrast, communities with an integrated water resources plan embedded within their broader strategic plan will have an agreed-upon and transparent guide for officials,



staff and residents as they make decisions about targeting growth modes, complying with external regulations, cooperating across borders, investing in infrastructure, and managing revenues and costs. Once a plan is in place, the community must consistently update stakeholders on implementation, progress, and areas for improvement.

The Village of Lake Zurich, in southwestern Lake County, Ill., has a long history of progressive water resources management – from watershed partnerships to success in securing federal and state grants – and this collaboration is a logical next step in that process. The current village administration has inherited a host of complicated water resources management issues, but also brings a fresh perspective and a willingness to reconsider historical norms, set new goals, and implement appropriate practices. While none of Lake Zurich's water management issues are particularly out of the ordinary, the village does face a unique combination of inter-related water supply, stormwater and wastewater challenges.

Water supply is managed municipally, and there are concerns about the long-term availability, quality and rising costs of deep aquifer water. The Village has worked within Ill. Dept. of Natural Resources guidelines to obtain a Lake Michigan allocation as an alternate supply. The ultimate decision as to whether to begin using that allocation will be made by public referendum, possibly as early as November 2012.

While the village is free of systemic flooding, in isolated areas of the community extreme precipitation leads to repeated flooding problems. New stormwater quality regulations on allowable limits of suspended solids create new management responsibilities and costs. Lake Zurich has separate stormwater and wastewater systems, but a variety of infiltration and inflow problems common to most municipal systems create undue stress on wastewater networks during large storms by overloading the pipes with substantial amounts of stormwater runoff. The wastewater system has operated at capacity for short durations during a small number of particularly severe storms. Downstream, Lake County treatment facilities have experienced overflows, which could lead to increased treatment costs. In sum, these conditions call for creation of an integrated water resources plan that comprehensively and simultaneously addresses water supply, wastewater and stormwater management.

### **What is integrated water resources planning?**

Integrated resource planning, or IRP, is a comprehensive form of water planning that considers all aspects of water resources planning – water supply, wastewater, stormwater, and water quality – and the interrelationship between them. Its ultimate objective is to establish long-term, least-cost goals that sustainably support a community's needs and ensure water resources protection. IRP emphasizes scenario planning and develops a portfolio of options for water services through an open, coordinated, and participatory decision-making process.

Some of the key components in an IRP process include setting clear, community driven water resources goals and objectives that will apply now and into the future, including a range of policy implications and goals beyond basic engineering plans, leveling the playing field between supply and demand management, and weighing future uncertainty and risk.



## Team

This report is the culmination of one year of cooperative work, from March 2011 through March 2012, between the Village of Lake Zurich and a project team led by Metropolitan Planning Council (MPC) in partnership with the Center for Neighborhood Technology (CNT), Chicago Metropolitan Agency for Planning (CMAP), and Illinois-Indiana Sea Grant (IISG). Through MPC's Community Building Initiative, the team also convened a 13-member task force consisting of volunteer members with expertise in ecology, economics, engineering, law, planning, and utility management, to assist and advise the project team (see page six).

## Terms

*Water supply*—Source water for domestic and economic activities, whether it be drinking or producing textiles. Common sources include subsurface aquifers, rivers, and in the Chicago region, Lake Michigan. This water must be extracted from its source, treated to meet regulatory standards, and then distributed to users.

*Stormwater*—Runoff from rain or snow melt. Some will soak into the ground, be absorbed by plants, or evaporate. The rest will generally flow into a sewer system or directly into a waterway. Water resources managers have to worry about the quality of the stormwater and the volume of it.

*Wastewater*—Water that has been consumed in some way and is destined for a treatment plant. Once treated, it will be released into a waterway.

## Goals

The project team's goals were:

1. to assist Village officials, staff and residents to integrate water supply, stormwater, and wastewater resources management; and
2. to embed that work in the Village's broader strategic plan.

## Process

To provide recommendations on how the Village can meet its water-related goals through supply and demand-side water management strategies, green infrastructure, conservation initiatives, financial capacity building, and public education, both the project team and volunteer task force:

- analyzed reams of water-related data and information supplied by the Village;
- surveyed the community to ascertain their top concerns about water in Lake Zurich, as well as their willingness to be a part of local solutions;
- interviewed stakeholders, including homeowners, business owners, current and past Village leaders, environmentalists, and external partners;
- conducted a SWOT (strengths, weaknesses, opportunities and threats) analysis to explore the internal strengths and weaknesses of Lake Zurich's water resources management, as well as external opportunities and threats facing the Village; and
- hosted a community forum to present results from the survey and hear additional concerns from community members who had not completed the survey.

## Outcomes

As Lake Zurich moves ahead with developing its strategic plan for water resources, this report will help village officials and staff set priorities; clearly articulate the advantages, disadvantages and uncertainties of any given decision to residents and other stakeholders; and choose and implement optimal practices to meet the community's goals. The report also will help such external partners as Lake County, the Ill. Environmental Protection Agency (Ill. EPA), and neighboring municipalities better understand the direction and goals of Lake Zurich.

This report:

- **Prioritizes water-related issues of major concern in Lake Zurich**, including the pressing need to repair and upgrade key water infrastructure, the Village's ongoing responsibility to address some residents' concerns about water quality and flooding, and the collective community's pending decision as to whether to remain on groundwater or switch to Lake Michigan water. While this report presents the advantages disadvantages and uncertainties related to each of these concerns, the project team refrains from suggesting decisions, and urges the community to make these decisions together.
- **Defines four Strategic Water Resources Goals and related objectives for Lake Zurich**, building off the community's four 2011-2013 Strategic Goals and Objectives. The goals and objectives address the community's priority issues, including maintaining and upgrading the village's water-related infrastructure (i.e., developing a screening process to vet potential investments, and creating a stormwater fee to fund stormwater-related services and capital investment); addressing residents' concerns about flooding and water quality (i.e., including quality and customer service as one of the Village's operational goals, and providing regular updates to residents and businesses on progress toward meeting Water Strategic Resources Goals); and the community's pending decision as to whether to remain on groundwater or switch to Lake Michigan water (i.e., providing comprehensive information to voters for and against moving to Lake Michigan water and possibly delaying the vote so that voters can make an informed choice).
- **Creates a template for other communities interested in developing their own integrated water resources management plan.** While the analysis and recommendations will be most relevant to Lake Zurich stakeholders and partners, it also can inform the work of nearby communities in the Fox River and Des Plaines River watersheds, as well as members of the Northwest Water Planning Alliance and, more broadly, communities in the Great Lakes region.



# Introduction

To better understand the full scope and complexity of these challenges, in early 2011 the Village of Lake Zurich contacted MPC for technical assistance through its Community Building Initiative, which works with community partners throughout the Chicago region to tackle local issues related to natural resources management, transportation, housing, and economic development. MPC's technical assistance task force draws on an extensive network of volunteer experts to provide objective analysis and guidance on complex land use and development challenges. That task force (described in greater detail below) brought a diverse and essential set of skills to perform a needs assessment and provide recommendations as to how the Village can further deploy supply and demand-side management strategies, green infrastructure, conservation programs, financial capacity building, and public education projects to meet its own water-related goals.

## Team and Goals

Metropolitan Planning Council partnered with Center for Neighborhood Technology, Chicago Metropolitan Agency for Planning, and Illinois-Indiana Sea Grant. In March 2011, the team met with Lake Zurich's Village Board and staff to develop and enter into a Memorandum of Understanding (see Appendix) outlining the process and goals for the partnership. This report is the result of that partnership, and provides objective, external analysis and recommendations to "advise the Village of Lake Zurich as it develops an integrated water resources plan." Specifically the report:

- Prioritizes issues of concern and outlines the advantages, disadvantages and uncertainties within high-priority issues;
- Defines the community's water goals and objectives, their impact on water management decisions within the context of water supply, wastewater, and stormwater issues, and embeds those goals within the existing framework of the Village's 2011-2013 Strategic Plan;
- Analyzes data and available documentation of current water resources management, fiscal policy, and economic development practices to identify existing strengths and weakness of Village operations, as well as external opportunities and threats;
- Reports on a survey of community residents that gauged their perception of current water-related challenges and assessed their willingness to be part of solutions going forward;
- Recommends short, medium, and long-term strategies to accomplish the Village's water-related goals; and,
- Describes public education and communications strategies to support implementation of the recommendations.

The analysis and recommendations will be most relevant to Lake Zurich's elected officials, staff and residents, but also can inform the work of nearby communities in the Fox River and Des Plaines River watersheds, as well as members of the Northwest Water Planning Alliance. Moreover, the process and results – the beginning of a strategic integrated water resources management plan – will be of interest throughout northeastern Illinois and the broader Great Lakes region, which contains many communities facing a similar range of challenges.

### Metropolitan Planning Council

Since 1934, the Metropolitan Planning Council (MPC) has been connecting the dots – between regional needs, challenges, and solutions, and among the individuals and organizations with the ability to guide the growth of the ever-changing Chicago metropolitan region. As the region continues to grow and prosper, MPC's mission is going beyond Illinois to work with partners and communities throughout the tri-state region.

MPC's work spans policy research, advocacy, and implementation. Lake Zurich is a unique opportunity to apply all three: research through this needs assessment; advocacy through the What Our Water's Worth campaign and such regional groups as the Northwest Water Planning Alliance; and implementation through ongoing work with Lake Zurich to put the recommendations in this report into action and measure the results.

### Center for Neighborhood Technology

Since 1978, the Center for Neighborhood Technology (CNT) has been a leader in promoting urban sustainability – the more effective use of existing resources and community assets to improve the health of natural systems and the wealth of people, today and in the future. CNT's Water division is a national program, which helps hundreds of communities across the United States find smart, practical solutions to reduce long-term costs associated with water services,

improve quality of life for citizens and communities, and protect natural environments.

CNT Water is committed to working with communities such as Lake Zurich to ensure they are served by safe, economically efficient, and environmentally friendly water use, management, and infrastructure now and into the future.

CNT's work spans across all water services: water supply, wastewater and stormwater. Program expertise involves the following four disciplines: research and information, demonstration and piloting, tools and support, and policy development. Our solutions to today's complex water issues are creative and effective.

CNT's role was generously funded by The Joyce Foundation.

### Chicago Metropolitan Agency for Planning

The Chicago Metropolitan Agency for Planning (CMAP) is the official regional planning organization for northeastern Illinois. CMAP developed and now guides the implementation of *GO TO 2040*, metropolitan Chicago's first comprehensive regional plan in more than 100 years. *GO TO 2040* establishes coordinated strategies that help the region's 284 communities address transportation, housing, economic development, open space, the environment, and other quality-of-life issues.

CMAP's Local Technical Assistance (LTA) initiative is meant to help communities implement *GO TO 2040*. Funded by the U.S. Dept. of Housing and Urban Development (HUD) Sustainable Communities Regional Planning Grant program, LTA is helping 70 local governments – including Lake Zurich – nonprofits, and intergovernmental organizations to address local issues at the intersection of transportation, land use, and housing, including the natural environment, economic growth, and community development.

## Water 2050

*Water 2050: Northeastern Illinois Regional Water Supply/Demand Plan* is the result of a three-year, 11-county planning process called for in Executive Order 2006-1 and facilitated by CMAP. The plan's primary strategy is to improve how water demand is managed by emphasizing conservation, pricing, wastewater reuse, and the connection between land use choices and water resources impacts. Water 2050 features over 240 recommendations aimed at state, regional, and local levels. Most importantly Lake Zurich provides an opportunity to implement plan recommendations at the local level and creates an example for other communities in the region to follow.

GO TO 2040's water-related recommendations complement Water 2050 by focusing on the management and conservation of the region's water resources. It is through CMAP's Local Technical Assistance (LTA) initiative funded by the U.S. Dept. of Housing and Urban Development (HUD)'s Sustainable Communities Regional Planning grant, as well as CMAP's partnership with Illinois Indiana Sea Grant (IISG) that CMAP staff have the opportunity to be a partner on this project.

## Illinois-Indiana Sea Grant

Illinois-Indiana Sea Grant (IISG) is dedicated to conducting research, education and outreach to serve Lake Michigan's southern coast. With its mandate to bring the latest university-based science to those who need it, IISG brings together scientists, educators, policy-makers, community decision-makers, outreach specialists, business leaders, and the general public to work toward a sustainable environment and economy. Sea Grant addresses real issues facing our coasts, including: developing ecosystem-based approaches to resource management; supporting sustainable development; ensuring adequate, safe, and sustainable seafood supplies; and preparing communities for the effects of climate change.

IISG has partnered with CMAP to help communities, such as Lake Zurich, implement recommendations contained in CMAP's *Water 2050: Northeastern Illinois Water Supply/Demand Plan*. The Lake Zurich Project presented an opportunity for IISG to lend outreach support and technical expertise toward local water resources planning efforts.

## Task Force

The unique advantage of technical assistance through MPC's Community Building Initiative is the participation of its task force

**FIG. 1. TASK FORCE MEMBERS**

Member	Organization	Role/Expertise
Ed Glatfelter	Retired from Alliance for the Great Lakes, retired from Ill. State Water Survey, retired from Central Lake County Joint Action Water Agency	Utility management, water resources planning
Mark Emory	Christopher B. Burke Engineering, Ltd.	Wastewater and stormwater engineering
Paula Worthington	University of Chicago, Harris School of Public Policy	Local public finance and cost-benefit analysis
Cary McElhinney	U.S. Environmental Protection Agency, Region 5	WaterSense, water efficiency, asset management, liaison to U.S. EPA
Jeff Edstrom	Environmental Consulting & Technology	Water/energy nexus, member of Illinois Section of the American Water Works Association Water Efficiency Committee
Jeff Mengler	Cardno Entrix	Conjunctive water use, ecosystem protection
Marty Jaffe	University of Illinois-Chicago, College of Urban Planning and Public Administration	Urban planning, local government management, regional water supply planning, land use law
Jim Mann	Retired director of Illinois Clean Energy Foundation	Former lawyer for Lake Michigan allocation requests
Peter Wallers	Engineering Enterprises, Inc.	Water systems management, Northwest Water Planning Alliance
Caitlin Feehan	MWH Global	Wastewater projects, sustainable water planning, green infrastructure
Killian Tobin	Innovyze	Data tracking, modeling, asset management
Owen Keenan	M.E. Simpson	Infrastructure performance
Robert Miller	AREA, Inc.	Real estate development

members, all of whom donate their time and expertise to tackle a unique development challenge. In the case of Lake Zurich, the task force was comprised of experts with backgrounds in ecology, economics, engineering, law, planning, and utility management (fig. 1).

## Data Analysis

The project team and Task force prepared an initial request for information from the Village, which was followed by a second, supplementary request. The purpose of this request was to compile enough information to understand sufficiently the current condition of the village's water-related infrastructure and standard practices for developing policy on water resources management. The team also reviewed data from sources such as Ill. EPA, the U.S. Census Bureau, and the U.S. EPA, all of which informed the "Current Conditions" section of this report. Examples include:

- Current and projected customer population of Lake Zurich, as well as

communities the Village provides water/wastewater/stormwater services to;

- Breakdown of current and projected largest volume water users and wastewater producers (e.g. schools, hospitals, large businesses, municipal government, other);
- Copy of most recent rate study, including documentation on test year used, revenue requirements, capital construction budget, cost allocation study, billing analysis, and demand forecasts;
- Accounting system data and financials, and Village budget(s) for water services (balance sheet, income accounts, operating revenue, O&M expenses, income statement, etc.);
- City ordinances that relate to water service and usage including, but not limited to, outdoor irrigation restrictions, plumbing, building codes, drought management, Leadership in Energy and Environmental Design (LEED) or LEED-ND (LEED for Neighborhood



Development) and other environmental construction certifications, water reuse, etc.;

- Open space or conservation plans, including information on sensitive habitats, recreation uses, and aquifer recharge;
- Agreements with surrounding communities; and
- Past studies and projects related to water resources management.

## Community Survey

The next step was to develop an online community survey for Lake Zurich residents to share their opinions on water management issues, the degree to which they currently conserve water or manage stormwater on their property, and their willingness to participate in those activities in the future. The community was notified of the survey through the Village Newline and monthly water bills, and a short description was placed on the Village's web site. Externally, several media outlets ran a story on the survey, including a hyperlink. The project team also contacted every homeowners association in the village with the survey information, as well as the Lake Zurich Area Chamber of Commerce, to request they forward the information to their members. Between March 15 and September 15, 2011, a total of 266 respondents completed the survey (see Appendix).

## Stakeholder Interviews

On July 12, 2011, the entire Lake Zurich project team and task force spent a full day interviewing about three dozen individuals with unique perspectives on the village's water resources challenges. These stakeholders represented homeowners associations, business owners, and environmental organizations within Lake Zurich, former village leadership, and external partners. A list of interviewed stakeholders is included in the Appendix.

The team and task force also had separate, in-depth discussions with Village staff from the finance and public works departments, to glean more information about their respective operations. Finally, task force members had one-on-one phone interviews with Village President Suzanne Branding and each of the trustees.

## Analysis and Draft Recommendations

The team and task force convened again for a full day on July 28, 2011, to discuss findings from the data analysis and stakeholder interviews, as well as preliminary results from the online community survey. The group performed a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis, exploring the internal strengths and weaknesses, as well as external opportunities and threats facing the village's water resources management (see page 15). The group discussed several issues Village elected officials and staff had requested further guidance on: the option of Lake Michigan water to meet supply needs, resuming wastewater treatment in Lake Zurich, developing informational initiatives, and prospects for integrating improved stormwater management into downtown redevelopment efforts.



## Community Forum

On Oct. 26, 2011, the Village hosted a community forum for residents to receive an update on the project team's work and discuss their concerns about Lake Zurich's water resources. Several local media outlets and the Village's web site promoted the meeting. Additionally, the project team contacted each of the homeowners associations to encourage attendance and participation. A local cable station broadcast the meeting, and the Village provided notes and materials on its web site after the event. Approximately 35 community residents attended (the Village's 2010 population was 19,631). While the formal presentation was only scheduled for 90 minutes, attendees were so engaged and intent on being part of solutions that the meeting lasted just short of three hours. The results of this community forum are

embedded within the "Current Conditions" and "Analysis" sections of this report, but four pertinent takeaways for the project team bear mentioning here as well:

- The most vocal concern about stormwater management came from residents experiencing property damage from localized flooding.
- Many people want a clear articulation of the advantages and disadvantages of Lake Michigan water and groundwater, respectively, and enough objective information to make an informed decision when the source water public referendum is put before voters.
- Residents want a clearly articulated strategy for management of water resources, and the information and data to support that strategy, so that they can make informed decisions.
- There is lingering confusion and uncertainty on the part of some residents about the Village's solution to remove radium from the groundwater, despite the fact that Lake Zurich's water meets all public health requirements and has done so for many years.

## Presentation to Village Board

On April 2, 2012, the project team presented the final report to the Village Board of Trustees. Task force member Peter Wallers explained that while many of the water resources decisions Lake Zurich faces are not in themselves unique, the community's work to develop integrated management strategies is, and will position Lake Zurich well as U.S. EPA begins increasing incentives and requirements for integrated planning. Wallers encouraged Lake Zurich to share its integrated management strategies with neighboring communities, particularly those in the Northwest Water Planning Alliance, a group of five counties (including Lake) and approximately 80 municipalities (including Lake Zurich). Margaret Schneemann of CMAP, Illinois-Indiana Sea Grant, and the University of Illinois-Extension explained the final report's financial management recommendations, and Josh Ellis discussed the rest of the team's recommendations. Village President Branding and the Board agreed to spend the first quarter of 2012 reviewing the final recommendations and determining which action items to begin implementing.

# Current Conditions

Lake Zurich is nestled in the southwestern corner of Lake County, Ill., approximately 35 miles northwest of Chicago and 15 miles west of the Lake Michigan shore. The village grew quickly in the 1950s, 1980s and 1990s, with slower growth in the past decade, to reach its 2010 U.S. Census population of 19,631 (fig. 2). The housing stock is primarily single-family and owner-occupied; many of those homes are within traditional suburban subdivisions, and there is a strong culture of neighborhood homeowners associations. Lake Zurich is a commercial hub of southwestern Lake County, with several large retail complexes on Routes 12 and 22. The downtown, which is currently the focal point of a redevelopment plan, hosts several smaller businesses, Village Hall, and some newer townhouses. The lake of Lake Zurich demarcates the west end of downtown. The lake is one of the cleanest bodies of water in Illinois, and is privately owned with limited public access.

## History

Over the past century, Lake Zurich has faced many water resources challenges. In 1912 the Village began providing public water supply by installing shallow wells and its first local distribution system. Over time the Village moved to deep wells to provide a more dependable water supply (deeper wells are less susceptible to drought), and added ion-exchange treatment solutions for naturally occurring radium and barium to meet required public health standards. While Lake Zurich has considered a move to Lake Michigan water in the past, when the ion-exchange facilities were built, no allocation of Lake Michigan water was available from the State of Illinois.

Shortly after 1912, the Village built its first wastewater treatment plant. The original wastewater treatment plant was closed in the early 1940s; two other plants were built and later decommissioned when the Village began using Lake County's regional treatment facilities.

Over the past two decades, Lake Zurich has implemented many proactive stormwater management initiatives – e.g. detention pond retrofits, stream bank restoration, demonstration rain gardens and permeable paving, and a shift away from chloride-heavy road salting techniques – often before these practices became the norm elsewhere. The Village sits on the Technical Advisory Board for the Lake County Stormwater Commission and works with adjacent watershed planning groups; many of the stormwater management projects above were in fact recommendations from those watershed plans. However, the Village's ability to implement many of these projects has always been contingent on funding. Many of these strategies were funded through federal, state or regional grants, rather than through water, sewer or stormwater rates or fees.

Lake Zurich's practice has been to review and plan for these water systems individually as the needs of each system changed. These decisions were not made lightly, and Lake Zurich officials and staff generally looked to address the needs of the community before crisis situations arose. However, in the face of stronger external regulation, rising operating costs, diminishing natural resources, and tighter municipal budgets, Lake Zurich officials and staff recognized the need to consider its water supply, wastewater and stormwater systems simultaneously and in an integrated fashion, as each system can have significant impacts on the others.

## Current Policies and Goals

At present, Lake Zurich does not have an explicitly written water management vision or strategy to guide policy and investment decisions. The Village Code simply states:

*7-5-1(a) Policy: The board of trustees hereby finds that the protection of the public health, safety, and general welfare requires a continuous source of safe, potable water, and proper sanitary service.*

While this policy addresses the Village's concern of moving all properties to the centralized water management system, it is insufficient to guide other policy choices. Additionally, it does not define a community-driven level of service for water, stormwater or wastewater services. A defined level of service gives elected officials, staff, and residents the same understanding of what to expect from utility management, and provides answers to such questions as what level of water loss is acceptable, appropriate emergency uses of water, optimal response time for water-related emergencies, a schedule for replacing water meters, etc. Once a level of service is established, repair needs,

**FIG. 2. LAKE ZURICH POPULATION**

	Population	Growth	Growth Rate
<b>1990</b>	14,947	6,722	81.7%
<b>2000</b>	18,104	3,137	21.1%
<b>2010</b>	19,631	1,527	8.4%

Growth figures represent previous decade.

maintenance plans, costs, and appropriate rates and fees become much more straightforward to assess.

For most municipalities, levels of service generally have been driven by federal and state regulation. The U.S. EPA has a defined set of standards for the quality of drinking water, effluent released from wastewater treatment facilities, and – with the advent of the National Pollutant Discharge Elimination System – stormwater runoff. The Ill. State Water Survey and Ill. Dept. of Natural Resources have water use reporting requirements, and standards for emergency use of water are driven by the Village's Insurance Service Office rating. Lake Zurich must meet these requirements. While these standards provide technical guidelines for the system operator, they are not directly informed by the desires of utility customers – e.g. the actual residents and businesses in Lake Zurich – nor do they convey much about the sustainability of the system.

The project team found a few other official Village documents with snippets of goals, objectives and strategies that could drive water-related decisions. A 2010 report on water and sewer rates and connection fees included three potentially relevant goals for revenue collection:

- “Develop rate structures for both utilities that ensure revenues are adequate to meet operating, maintenance and capital expenditures for the next five fiscal years;”
- “Develop rate structures that have a fair allocation of costs for all user groups, and are defensible against challenge;”
- “Develop connection fees to recover the proportionate share of capital costs necessitated by new development with the intention of shielding existing customers from the burden of paying

for capital costs related to new development.”

However, neither the 2010 study's proposed rates nor its suggested goals were adopted. The Village does have a three-year Strategic Plan articulating the community's mission, goals and objectives, though the plan does not explicitly reference water resources management. The task force used the Strategic Plan to structure its recommendations, which are found at the conclusion of this report (see page 23).

## Provision and Consumption

Lake Zurich manages its own water supply infrastructure, operated by the Public Works Dept. Lake Zurich originally sourced its water from shallow aquifers, but transitioned to deep bedrock wells of the Cambrian-Ordovician sandstone aquifer system as its population increased in the 1970s and 1980s. Most adjacent communities continue to rely on shallow aquifers. While the Illinois State Water Survey, as part of the *Water 2050* planning process, has determined that deep aquifers throughout northeastern Illinois may not be able to meet anticipated needs within the next 30 to 40 years, a more detailed local analysis is needed to understand the specific circumstances of Lake Zurich's wells. The firm Baxter and Woodman provided a white paper to Lake Zurich in December 2011, assessing the current condition of groundwater levels in western Lake County. Consistent with the previous work done for *Water 2050*, the concluding statement of that report is that “future groundwater supply available to Lake Zurich is not sustainable over the long term and will be expensive to maintain in the meantime.” These studies will help inform the village's decisions on such issues as conservation and efficiency initiatives, water re-use, and the Lake Michigan water source question.

The Village owns and operates six deep wells; five are in regular use, the other is maintained as an emergency back-up. The wells' pumping capacity is more than ample to provide for the Village's needs, even during summer peaks in demand. In 2008, average daily pumpage was 1.7 million gallons a day, while the wells are capable of pumping five times that amount. For the period 2008 to 2010, the “highest peaking factor” (a ratio of the highest single pumpage day to the average) was never above 1.75. All told, pumping capability does not constrain Lake Zurich's water use. Lake Zurich provides

water services to a small portion of Deer Park, Ill.

In the early 2000s it became evident that the presence of naturally-occurring radium, barium, and other compounds in the deep aquifer water were exceeding standard limits. At that time, Lake Michigan water was not available, and the Village faced a compliance commitment with the Ill. EPA and U.S. EPA. Between 2004 and 2008 the Village invested in five ion-exchange plants to remove these contaminants. The Village borrowed from the Ill. EPA's state revolving loan funds to build two of the five ion-exchange treatment plants. The remaining three plants were paid for using connection fees and existing cash reserves. Regardless of the village's future water source, the village must repay approximately \$4 million in debt related to the project by 2029. Debt service comprises 21 percent of the village's current water rate. What's more, it costs approximately \$800,000 each year to operate the ion-exchange system. The village sends the radioactive backwash resulting from the water treatment process to Lake County via the wastewater system, and the cost of handling it is included in the county's portion of the sewer bill. Should this arrangement change – because of stricter regulations, different handling procedures, etc. – those costs would be passed onto Lake Zurich, increasing the cost of procuring and treating its current groundwater supply.

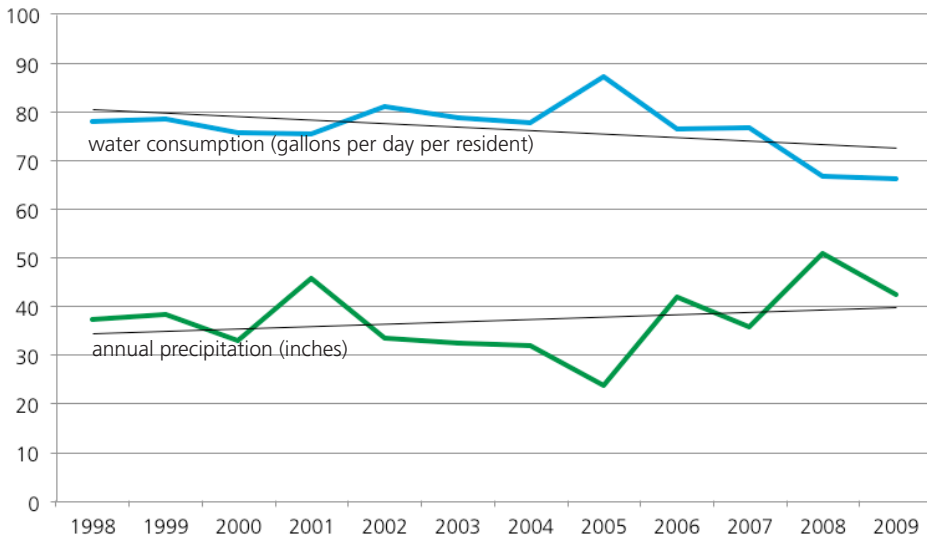
Since December 2008 Lake Zurich has met all water quality requirements for ensuring public health. Despite that, stakeholder interviews, survey results, and anecdotal evidence from the Oct. 26 community meeting all suggest that there is lingering distrust by some residents of the Village's treatment systems and water quality. In addition to the deep wells and ion-exchange system, Lake Zurich's Public Works Dept. manages all other aspects of water quality treatment and distribution. The Village maintains approximately 112 miles of distribution pipes, many of which were installed as the community expanded in the 1970s and 1980s. Most of the water supply infrastructure is less than 40 years old. A 2009 report from the Ill. State Water Survey estimated unaccounted-for-flow at 3.2 percent of net annual pumpage, while Public Works Dept. staff sets the figure at closer to 4 to 5 percent a year. This is water that is treated and pumped by the Village, but never appears on water bills, due to a combination of leaks, meter errors, and other causes. In either case, such low loss figures would set Lake Zurich well ahead of many communities in the region. Some leaks are the result of aging pipes, but

other leaks and line breaks are the result of contractor errors at the time of installation, rather than age, wear-and-tear, or strained capacity, according to Public Works Dept. A regular leak detection program was eliminated in 2004 due to inconsistent results. Staff now investigates pumpage data on a regular basis, but does not physically look and listen for leaks. Task force member Owen Keenan stressed that the community “still needs a regular cycle of actual leak detection. It's always one of the first programs to get cut. The technology has improved a lot since 2004, and regular leak detection is an essential part of a high level of service.” The Village has not had an active capital improvement plan (which would include water main replacement) since 2004, but has recently begun reviving it. While water loss is minimal now, as the system ages over the next 20 to 30 years, loss could increase without adequate detection and replacement initiatives.

The Village is fully metered, and due to replacement from 1991 to 1996, even the oldest meters are no more than two decades old. However, many meters must be manually read, which takes approximately 30 days, resulting in high labor costs. Public Works has allocated \$750,000 to implement an automated reading system, which would reduce the meter reading period to one or two days, substantially cutting labor costs and making monthly billing more cost-effective. Bills are issued monthly, a best practice noted by several task force members. Monthly billing can be advantageous in that the utility has working capital on hand more frequently, and can detect unaccounted-for-flow or atypical usage patterns more readily. Meanwhile, customers receive more timely information about their consumption patterns.

From 1998 to 2009, per capita water consumption declined substantially, from approximately 80 gallons per person per day to approximately 65. Marked increases occurred in drought years, such as 2005, when more water would be demanded for outdoor irrigation. In general, per capita usage trends are inversely related to annual precipitation levels, as seen in the chart (fig. 3, next page). Starting in 2008, the economic downturn also contributed; some businesses closed, and water uses in construction (e.g. irrigating new sod, flushing new water mains) also declined. Foreclosures hit the community hard; at its worst, staff estimated 8 percent of homes in Lake Zurich were unoccupied, and 15 percent of commercial and industrial storefronts. Other factors may contribute to the downward

**FIG. 3. PER CAPITA WATER CONSUMPTION VS. ANNUAL PRECIPITATION**



trends in per capita usage, including higher wastewater charges for Lake County, high levels of bottled water consumption, installation of more efficient plumbing fixtures, and a greater personal ethic of conservation. For instance, approximately 25 percent of community survey respondents stated they always use bottled water for their drinking water uses, whereas 67 percent of respondents indicated that they already use water-efficient plumbing fixtures, such as low flow toilets or shower heads. Lake Zurich also sets restrictions on summertime lawn watering between June 1 and September 15.

A switch to Lake Michigan water may eliminate some residents' qualms about water quality, leading to an increase in tap water consumption. However, Lake Michigan water will almost certainly require higher water rates, which could result in a deeper commitment to conservation and efficiency, and thus reduced water sales.

outer concrete pipe. This could be the result of any of a number of factors – the chemical composition of the water being transported, silt accumulations, faulty construction, or even proximity to other utility systems. No information was available to the task force to ascertain the extent of causes, but understanding why the interceptor is deteriorating is the first step in avoiding the same problems in the future.

Second, the capacity of the entire system, not just the large interceptor, is severely stressed during wet weather. Although Lake Zurich has separate wastewater and stormwater systems – which means the wastewater interceptor pipe should be largely unaffected by precipitation – stormwater is finding its way into the system during storms. According to Village Trustee

Richard Sustich and a Baxter and Woodman estimate, in 2009, average daily flow was 1.89 million gallons a day (MGD), maximum daily flow was 8.04 MGD (a peaking factor of 4.26), and peak hourly flow was calculated at 21.6 MGD (a peaking factor of 11.43). Unless steps are taken to reduce wet weather impacts, projected future hourly peak flows are even higher. While not as high as many other communities', these peak wet weather flow conditions are considered excessive and their reduction should be part of evaluating the Village's sewer capacity needs.

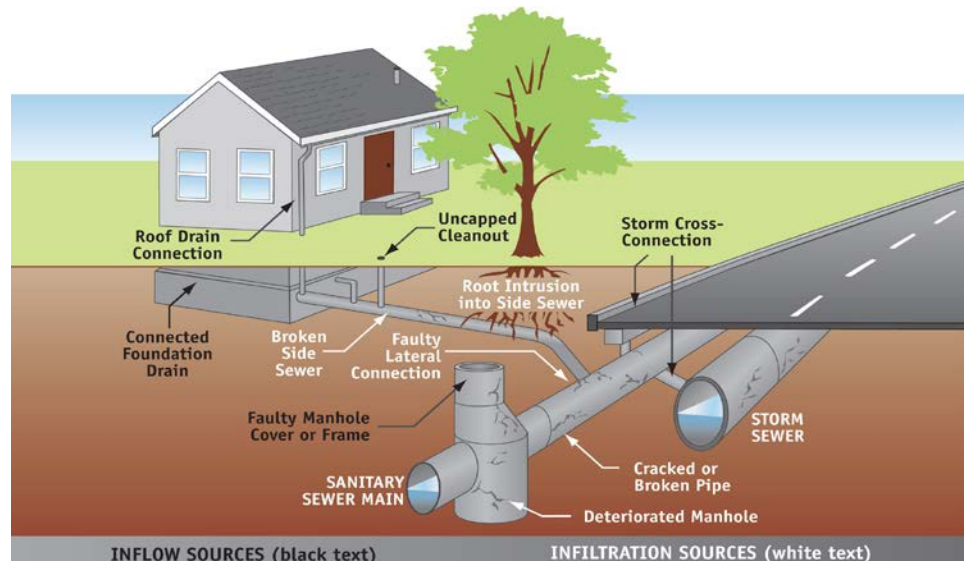
One common problem associated with separate stormwater systems is the possibility of stormwater entering the wastewater system, called infiltration and inflow, or I&I. The most recent comprehensive study of Lake Zurich's infiltration and inflow was performed in 1992; the village has since added approximately 5,000 residents and experienced substantial retail real estate development. That report identified improper sump pump connections, defective service laterals, and unplanned-for direct stormwater connections to the wastewater systems as leading causes of I&I (fig. 4). According to the community survey, 79 percent of respondents use sump pumps on their property (fig. 5), an indication of the scale of the issue. Not all of those sumps pumps are illegally connected, but many likely are, according to village staff and comments from attendees at the community forum.

From the mid-1990s to the early 2000s, the village implemented various insituform (e.g., installation of a pipe liner to restore pipe integrity in lieu of replacement) projects on public pipes in the areas identified in the

## Wastewater-related Capital Stock

Wastewater from properties in the village flows to a central wastewater interceptor that conveys waste to Lake County's treatment facility. The present condition of Lake Zurich's wastewater interceptor system is a major concern for two interrelated reasons. First, the pipe was installed in the mid-1990s when the village connected to Lake County treatment facilities, and according to village staff was anticipated to last 80 years. However, according to village staff, premature deterioration has been discovered in the epoxy lining, exposing parts of the

**FIG. 4. INFILTRATION AND INFLOW SOURCES**



study. After investing hundreds of thousands of dollars, no significant reduction in I&I was found. These results indicated that the most severe I&I was located on private property, rather than in the public pipes. The Village has not taken any action to address the private property issue.

More recently, Lake Zurich staff performed in-house analysis of I&I issues and believe that many lateral lines from private properties to the public system may, at times, be below the groundwater table in some areas of the village. After rain events when the shallow water table rises, these pipes are essentially submerged in water. Most are made of clay and are deteriorating, leaving them very susceptible to infiltration. Faulty manhole covers also may be allowing some stormwater runoff from the public-right-of-way to flow directly into the wastewater system.

The effects of these wet weather peak flows are felt downstream at Lake County facilities, which receive surges from Lake Zurich and several other communities. Lake County's facilities have experienced overflows during wet weather, resulting in discharges of untreated water into waterways. As such, Lake County and the U.S. EPA are exploring options for reducing the frequency and severity of those overflow events. There is a possibility that communities served by Lake County will face stricter regulations to control peak flows, resulting in higher costs.

The combination of the interceptor system's deterioration and capacity constraints has compelled Lake Zurich to explore rehabilitation or replacement. According to Village Trustee Richard Sustich, the 2009 Baxter and Woodman assessment identified a capital investment of \$5,500,000 to meet projected future peak hourly flows of 26.25 MGD. That cost could increase to \$9,300,000 depending on the outcome of wastewater service negotiations with a nearby development outside the Village limits. Neither estimate accounts for the capital cost (and potential eventual savings) or possible load reduction from systemically addressing I&I or otherwise reducing wet weather surges through strategic use of sewer rehabilitation, green infrastructure, rehabilitation of detention ponds, or other means. Other ideas considered by various members of the Village staff—i.e. building a large storage facility to temporarily hold wet weather flows, or the construction of a "peaker" wastewater treatment plant to process extreme wet weather flows for industrial and/or irrigation reuse—are not developed beyond a conceptual phase and are not accounted for here either.

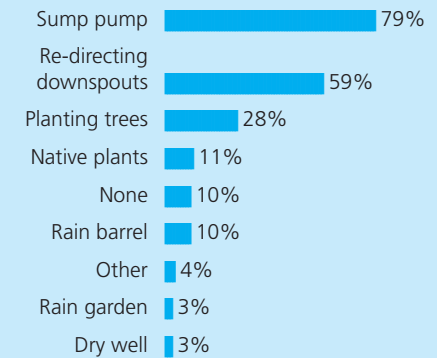
## Stormwater Management

The village lies on a major watershed divide: The western half drains to Flint Creek and eventually to the Fox River, while the north-eastern and southeastern portions drain to Indian Creek and Buffalo Creek, respectively, both of which flow to the Des Plaines River. Lake Zurich's terrain is largely composed of hills and valleys, leading to relatively predictable surface stormwater runoff patterns, including highly localized flooding that has repeatedly damaged some properties in low-lying areas. These local flood events are traumatic for affected property owners, several of whom attended the community forum held in conjunction with this project. They conveyed 2 primary concerns – the speed and tenor of the Village's emergency response could be improved, and they would like the Village to present a solution soon. While these floods are highly localized, they are high-profile events, which may contribute to a public perception that flooding in the village is more widespread and common than it actually is. Of survey respondents, 48.1 percent indicated they had heard of flooding on other people's property, but 78.5 percent indicated their own property never floods.

Another consequence of Lake Zurich's terrain and abundance of ponds, wetlands and streams is a consistent risk of water quality problems in receiving waterways. The privately-owned Lake Zurich is one of the state's cleanest bodies of water, but Echo Lake, which is adjacent to the village in unincorporated Lake County, is one of the dirtiest. Most of Lake Zurich's potential discharges to Echo Lake actually are bypassed underneath it, but there are some minor discharges from Lake Zurich during heavy rain storms. Lake Zurich is a challenge, as it plays a major role in the village's stormwater management, but is controlled by the property owners surrounding it. The biggest culprits for Echo Lake are chlorides, which most likely come from road salt (see text box, next page). Moreover, a lot of the development around Echo Lake relies on septic systems, rather than tying into the centralized sewage collection and treatment system. Echo Lake discharges to Flint Creek, which discharges to Grassy Lake in North Barrington, Ill. There is a separate tributary that originates from the large commercial district north of the Braemar community; it flows through Cuba Marsh, part of the Lake County Forest Preserve, and eventually into another section of Flint Creek in Barrington,

**FIG 5. ON-SITE STORMWATER MANAGEMENT**

*Have you ever used any of the following to manage stormwater on your property?*



Source: community survey

Ill.. Lake County Forest Preserve District has raised concerns about poor water quality entering the preserve and hampering restoration efforts.

The State of Illinois' new National Pollutant Discharge Elimination System rules require every community with an MS4 permit (Municipal Separate Storm Sewer System, which includes Lake Zurich) to monitor water quality from upstream inflows and downstream outflows. The Village has done this as part of its permit obligations in 2012 and will continue to monitor water quality annually. This is an example of a stormwater-related cost of service with no dedicated revenue stream. Should stormwater outflow from Lake Zurich exceed required water quality levels, the rules could drive investment in further methods to slow the movement of stormwater and encourage more infiltration into the ground, which also would improve water quality. Because Lake Zurich itself is as clean as it is, any new development in the area poses the risk of contamination from stormwater runoff under non-degradation standards. The most notable recent example of that situation occurred in 2006. The U.S. EPA brought an enforcement action against the Village and the Ill. Dept. of Transportation for failing to prevent major water quality problems in the lake resulting from construction-related stormwater discharges and an insufficient detention pond associated with the Route 22 bypass project. Many communities in Illinois face a similar regulatory environment.

For the most part, Lake Zurich employs the stormwater, floodplain and wetlands regulations from the 2008 Lake County Watershed Management Ordinance and subsequent amendments, the guiding principle of which is to encourage as much infiltration into the



### Alternative Road Winterization Strategies

#### *Description, Costs and Benefits*

To maintain safe driving conditions for residents during cold, snowy winter months, municipalities in our region are responsible for plowing snow and applying road salts to their roadways. While such precautions and road treatments are necessary to ensure public safety, standard deicing practices (which often use unrefined rock salt and brine that can contain impurities and additives like sodium ferrocyanide to reduce clumping), result in elevated sodium chloride levels in stormwater runoff when temperatures rise and melting snow and ice mixes with road salts.

By replacing traditional road salts with alternative, less harmful de-icing applications, such as beet juice or calcium magnesium acetate, municipalities are able to decrease the concentration of corrosive contaminants (particularly sodium and calcium chlorides) found in local shallow aquifers and stormwater runoff. This not only benefits the community by reducing wear and tear on stormwater infrastructure, but also the surrounding ecosystems and communities that rely on surface and shallow aquifer water.

Communities across the U.S. use millions of tons of road salt annually, and while the price has been about \$30 per ton in recent history, sodium and calcium chloride (two of the main ingredients in traditional road salts) are becoming less readily available, meaning the price of traditional road salt is projected to rise in the future. In 2011 road salt cost approximately \$60 per ton, and in 2008 it hit \$150. The generally rising cost of traditional road salts has made alternative de-icing techniques more competitive from a price standpoint – and more attractive to communities looking to reduce the impact of de-icing practices on their water resources and infrastructure.

#### *Implementation and Barriers*

Lake Zurich already had introduced beet juice extract into its portfolio of road-winterization practices, and is considering a switch to calcium magnesium acetate, which is more expensive but also has fewer harmful water quality impacts. The Village and the Public Works Dept. should look closely at its current road-winterization practices and budget, in order to judge and evaluate the costs of switching to calcium magnesium acetate as an alternative to liquid calcium chloride in the de-icing mixture. During this evaluation, the Village should bear in mind (and if possible, quantify) the benefits of switching to a less corrosive salt-mixture in terms of reducing surface water contamination and corrosion on village stormwater infrastructure.

Several communities in the area have begun to test and implement alternative road-winterization methods. Like Lake Zurich, the City of Elgin, Ill. used a modified “GeoMelt” compound that is a special blend of beet juice, calcium chloride, and salt brine (pictured above). While Lake Zurich will have to take its own priorities and winterization practices into account, it would be helpful to assess how other communities have taken steps toward implementing more sustainable road-winterization strategies, tracking the benefits of the new strategies, and communicating benefits of the switch to stakeholders.

ground as possible. Lake Zurich does require more on-site detention than the county, and is generally regarded as a model for surrounding communities. Flood prevention measures are designed to an aggressive 24-hour 200-year flood standard. Again, some localized flooding does occur, but it is the exception, rather than the norm, despite perceptions to the contrary. Lake County is in the process of adopting a Runoff Volume Reduction Ordinance for all new development and since the Village follows the Lake County Watershed Management Ordinance, it will be subject to this as well.

Residential areas are primarily zoned for single-family housing with ample landscaped space requirements, which does enable some stormwater infiltration. As noted above, many of these homes are in traditional suburban subdivisions, many of which feature detention basins. Some of these basins are the responsibility of homeowners associations. Others are maintained by the Village, as past developers donated the lands as open space. More recently the Village as established Special Service Areas (SSA) for the ongoing maintenance of these detention basins, and the Village does have ordinance language requiring ongoing maintenance. However, Village staff and elected officials, as well as several people interviewed for this project, noted that actual upkeep of these detention basins is spotty at best, with great inconsistency between homeowners associations. If basins are not maintained, they fill up with sediment and vegetation, reducing their stormwater storage capacity. Homeowners associations are often uninformed about proper maintenance. There is no effective enforcement mechanism for the ordinance, and maintenance often falls to the Public Works Dept., though this is one of the first services to be cut when the Village faces budget constraints. SSAs have been created in some areas to help generate sufficient revenue for stormwater management, including detention basin maintenance, but the Village Board has discussed eliminating these SSAs from tax bills assessed to residents.

For all intents and purposes, the Village Public Works Dept. operates a stormwater department; the frequent but sporadic maintenance of detention basins is but one example of the services provided. However, residents and businesses never see a stormwater-related charge on water and sewer bills. The Village has a strong record of securing federal, state and regional grants, but these funds are neither sufficient nor sustainable. As a result, the Village has

no consistent stream of revenue dedicated to stormwater management.

Despite this, the Village has been able to implement several detention pond retrofits, complete the Old Mill Grove wetlands development, make stream bank improvements, encourage one commercial property to install permeable paving, and build a demonstration rain garden at Paulus Park. To date, the Village has made no substantial investment in green infrastructure projects such as green roofs, rain barrels, downspout disconnections, etc., though in 2010 and 2011 the Public Works Dept. staff did submit an application to the Ill. EPA's Green Infrastructure Grant initiative to secure funding to create a rain barrel cost-share program. The Village web site and newsletters historically have included information on proper sump pump and lateral line management, but there have been no direct assistance incentives to encourage property owners to heed those recommendations. Despite the reality of budgetary limitations, Public Works staff works directly with residents to alleviate drainage concerns whenever possible.

The *Flint Creek Watershed-Based Plan* identified several parcels in Lake Zurich that could be protected for stormwater management, water quality improvement, and natural resources protection, and the Village has retrofitted several of those parcels. The Village's Engineering Dept. manages several village-owned tracts of wetlands that are not utilized for recreational purposes – Old Mill Grove Park is a notable exception – and many might be best used as stormwater management assets if funding were available.

## Financial Management

Absent any stormwater-related revenue, water and sewer service charges are the principal sources of the Village's Water and Sewer Fund; from 2008 to 2009 they generated 97.6 percent of revenues. Connection fees for new real estate developments are an additional, though inconsistent, revenue generator. Aside from an increase in Lake County's portion of the sewer bill, there were no changes to existing water and sewer rates since 2005, when there were significant increases to account for the capital costs for a portion of the ion-exchange water treatment system and the relocation of utilities associated with the Route 22 bypass. As noted above, in 2010 the Village Board rejected a proposed rate increase to cover increasing capital and operations costs.

As of June 2011, Lake Zurich's water rate per thousand gallons was \$3.58, comprised of separate charges for operation, maintenance, and replacement (OMR) costs and debt service costs (interest, principal, and coverage of outstanding bonds and loans). Sewer rates are a more substantial component of the overall volumetric rate, at \$6.46 per thousand gallons, a full \$4.00 of which is attributable to Lake County. There is no explicit, dedicated portion of the bill associated with stormwater management, despite the considerable services the Village provides toward that end. By the end of 2011, due to a combination of prior raids on the water budget, predicted sales shortfalls, and other issues, Lake Zurich's coffers for funding its water and sewer systems were empty. An emergency rate increase was enacted, but the driving force behind that was the immediate need to maintain operational solvency. The increase was necessary, but not driven by needed capital expenses or any set of strategic goals on the part of the Village.

Lake Zurich collects and transports wastewater, including the contaminated waste from its ion-exchange facilities, to Lake County's Buffalo Grove treatment facility; the resulting effluent is discharged into the Des Plaines River. The Village also provides wholesale sanitary sewer service to portions of Kildeer, Hawthorn Woods, and North Barrington; this service is priced at \$7.08 per thousand gallons, which includes the same \$4.00 "pass through" charge for Lake County sewage treatment services. While Lake Zurich operates and maintains the interceptor pipe that transports the wastewater to Lake County's facility – a responsibility not shared by many communities served in a similar fashion by the county – it is charged the same volumetric rate as those communities. During the interview process, representatives from Lake County said they were giving this matter consideration as part of a current rate study. An argument could be made that by covering the operating and maintenance expenses of the interceptor pipe, and paying the same wastewater rate as communities that do not, wastewater customers in Lake Zurich are effectively subsidizing costs elsewhere in the county. At the same time, Lake County also handles and disposes of Lake Zurich's radium-laden backwash, relieving the Village of that burden. The other communities feeding into the Buffalo Grove treatment facility do not require that additional service.

After a thorough review of budgeting materials and interviews with the Village's finance office, the task force concluded that the current rate structure is insufficient to

account for the full range of costs associated with providing water, stormwater and wastewater infrastructure and services. As a result, the Village's working capital reserves are weak and volatile from year to year. When revenues fluctuate, long-term capital planning is also a challenge. In the past, the Board has reappropriated proprietary funds for water and wastewater expenses to general revenues, and has used utility reserves to help meet immediate financial obligations. Moreover, in recent years the Village has over-predicted revenue from water and sewer services, meaning that budgeted expenditures tend to be higher than the revenue income the Village actually receives. This is partially the fault of the model, which is relatively accurate on a month-to-month basis, but misses on annual totals. However, wet summers (less demand for irrigation), foreclosures and the overall economic downturn, Lake County's increased portion of the sewer bill, relocations of some large industrial users, and residents' heavy use of bottled water also contribute to decreased demand for water and sewer services, and thus these over-estimates. Lake Zurich has no true asset management plan for its water resources; as described by the U.S. EPA, "a high-performing asset management program incorporates detailed asset inventories,

### Financing Sustainable Water Infrastructure Report

*Financing Sustainable Water Infrastructure* is the convening report for Charting New Waters, a set of meetings held in the summer of 2011, led by the Johnson Foundation, American Rivers, and Ceres. This event gathered experts from utilities, nonprofits, consulting groups, investment banks, research organizations, professional associations, unions, and foundations, to attempt to address the problem of water infrastructure financing in the 21st century.

The report finds that water system financing is often inflexible, expensive and siloed and makes arguments for why water resources planning needs to be thought of in more integrated and innovative ways. It provides compelling evidence for why water utilities, local governments, and potential investors should be concerned about the sustainability of water infrastructure financing. It lays out opportunities to work toward sustainable systems, including full-cost pricing, closed-loop water systems, consolidation of water operations within or between municipalities, ecosystem service pricing, low-impact development, and encouraging partnerships. It is a useful and timely resource for anyone looking to learn more about financing water infrastructure.

The report is available at:  
[www.johnsonfdn.org/resources/reports](http://www.johnsonfdn.org/resources/reports)

operation and maintenance tasks, and long-range financial planning to build system capacity, and it puts systems on the road to sustainability.”

Asset management is important in recovering full-costs, as it provides a process for maintaining a desired level of service at the lowest appropriate cost – ensuring both that the desired level of service is maintained and that sufficient funds are available for timely rehabilitation and replacement of infrastructure. An asset management plan, when communicated effectively to the public, can also garner support for necessary rate increases to sustain the system’s infrastructure.

In addition to decreased revenues, several other negative trends exist. In recent years capital project costs, ion-exchange operating costs, commodities, and administrative expenses all came in higher than forecast. Newly established fund transfers to the Village’s general revenue fund depleted funding dedicated for water-related expenses. Additionally, a water rate discount for senior citizens and an unintended discount on summer water use (the sewer rate is based

on wintertime consumption patterns) may negatively impact the Village’s financial situation.

On the revenue side, there were two positive notes. A one-time connection fee generated \$860,000 from the Wynstone subdivision in North Barrington, partially masking what is otherwise a negative picture. Also, debt service costs were lower than expected.

## Other Considerations

The dominant residential density in the village (and around the Lake) seems to be the R-5 zone (one dwelling unit per 10,000 sq. ft., with a landscaped surface area of 60 percent). Some residential zones require up to 75 percent landscaped surface area. This standard provides plenty of porous surfaces on residential lots for stormwater management and groundwater/lake recharge purposes, though the impervious on-site parking requirement (three spaces per single family dwelling) might warrant a reduction. On-site landscaping requirements are flexible and directed toward promoting the planting of canopy (shade) trees and shrubbery for aesthetic purposes. Although mature trees are a significant asset for stormwater management, rain gardens, vegetated swales, and other green infrastructure strategies also should be promoted by the landscaping standards. The Lake County Watershed Development Ordinance regulates development in floodplains and wetlands, as well as established requirements for impervious surface.

The Village’s primary water conservation policy is a seasonal restriction on outdoor water use from June 1 through September 15 of each year. These restrictions indicate that outdoor water use and irrigation may only be permitted between the hours of 5 to 10 a.m. and 5 to 10 p.m. These restrictions apply to all commercial, industrial and residential properties, with some exemptions for use of watering cans, filling wading pools, using hoses with shut-off valves, and using water as a critical element of ongoing business operation. This lawn watering restriction gives property owners a possible 70 hours a week in which to water. Comparable communities in the region, such as Barrington and Batavia, further restrict the available hours to as few as 21 per week, and have experienced reduced peak demand in summer as a result. The Village also has sod installation requirements with corresponding fines and penalties for violation; Lake Zurich’s standards in this regard are

comparable to many neighboring communities.

Lake Zurich has many ambitious projects it hopes to undertake during its downtown redevelopment. One of the major issues regarding downtown redevelopment is whether or not there is a market for it. The other is whether the downtown can be developed in a way that will not negatively impact downstream water quality. The Strategic Goals and Prioritization section of this report addresses this issue in greater detail (see page 23).

At present Lake Zurich does not provide much public outreach or education to its residents and businesses about water management and goals, whether through bill inserts, brochures, events, web site messaging, or school classroom opportunities. This is partially the consequence of budget cuts and a shift from a monthly Village newsletter to a quarterly one, as well as a change in bill format. During the course of the project, Lake Zurich became a U.S. EPA WaterSense partner; this provides a strong signal that Lake Zurich is serious about improving its water resources management and communicating what actions residents and businesses can take to be a part of that.

## Summary

In sum, Lake Zurich faces some significant water resources management challenges, and is working to solve them absent any sort of clearly articulated set of goals or objectives, though its 2011-2013 Strategic Plan offers a blueprint for goals and objectives. These water challenges are inherently connected, and thus require integrated solutions. The by-product of water supply treatment – radioactive backwash – also drives wastewater costs, and the risk of stronger regulations may lead to even higher costs still. The county’s increased wastewater service charges are likely partially responsible for unforeseen reductions in water consumption. The wastewater system is severely challenged by the increased amount of stormwater entering the wastewater system during very heavy rain events. Current accounting practices do not capture the full range of the village’s costs. All told, the complexity and interrelated nature of these issues calls for a unifying vision for water resources management, a set of goals informed by that vision, and actionable objectives to drive future decisions.

### Asset Management

An “asset” is part of a water and wastewater facility (e.g., pump, motor, sedimentation tank, main). The repair and replacement of water infrastructure assets is a constant and ongoing task. To efficiently manage this important part of a utility’s business, many have turned to asset management.

Asset management is maintaining a desired level of service at the lowest appropriate life-cycle cost for rehabilitating, repairing, or replacing an asset. Asset management programs involve undertaking detailed asset inventories, operation and maintenance tasks, and long-range financial planning to build system capacity.

Benefits of an asset management program include: prolonged asset life, reducing overall costs for both operations and capital expenditures, setting rates based on sound operational and financial planning, and more. Each utility is responsible for ensuring its system operates well, regardless of the age of components or the availability of additional funds. Asset management programs can be the most efficient method of meeting this challenge.

For a detailed guide to asset management, consult U.S. EPA’s *Asset Management: A Best Practices Guide*. This short guidebook is intended for owners, managers and operators of public water systems, local officials, technical assistance providers, and state personnel, and is available at:

[http://water.epa.gov/infrastructure/sustain/asset\\_management.cfm](http://water.epa.gov/infrastructure/sustain/asset_management.cfm)



# SWOT Analysis

On July 18, 2011, the task force conducted a strengths, weaknesses, opportunities and threats (SWOT) analysis and recommended action steps the Village should take to achieve the following goals. They considered the internal strengths and weaknesses of the Village's own practices and policies concerning water resources management, as well as ways to build upon the former and mitigate the latter. These are issues that are wholly within the purview of the Village, such as how well informed residents are of the condition of water infrastructure or zoning codes. The task force then explored external opportunities and threats, as well as ways to take advantage of the former and account for the latter in decision-making. These are issues that may be beyond Village's control – such as Lake County's wastewater rates or U.S. EPA regulations on waterborne contaminants – but which must be accounted for as the Village makes choices.

Having analyzed the various informational sources, conducted interviews with a variety of stakeholders, reviewed survey results, and toured relevant sites in the heart of Lake Zurich, the task force developed a solid understanding of the current condition of the Village's infrastructure systems, budgeting and financial mechanisms, land use and economic development strategies, and communications and informational programming related to water resources management. The purpose of gathering all this information was to ascertain, with as much certainty as possible, the gap between the current state of the Village's water resources management and its ideal conditions.

## Strengths

*Strengths are internal characteristics to build upon.*

### Infrastructure Performance and Natural Resource Integrity

In the vast majority of storm events, the village has **no systemic flooding problems**, largely due to its terrain and the ample open spaces ensured by its zoning code. Lake Zurich also requires more onsite detention of stormwater than the Lake County ordinance, which helps mitigate localized flooding. This is not to say that the village has no stormwater-related problems, but in general, flooding and associated property damage throughout the community is not a prevailing concern. It would behoove the Village to develop means to communicate this strength after large storms, with appropriate recognition of the isolated pockets within the community where localized flooding does occur, and progress made to resolve those incidents.

A significant portion of the **Village's water supply infrastructure was built within the past 40 years, and as a result, it is in generally good condition**. Unaccounted-for-flow rates are estimated to be 4 to 5 percent, which is lower than in many comparable communities. However, no systemic leak detection initiative has been in place for several years, so the accuracy of this figure is questionable.

Additionally, several water main reinforcement projects have improved circulation, pumping efficiency, and flow capacities necessary for fire protection. This has reduced the Insurance Service Office rating, and thus fire insurance premiums for residential and commercial properties. Additionally, analysis

of these circulation improvements has demonstrated that if the Village were to move to Lake Michigan water (meaning that all water would enter the distribution system from one point, rather than the five operational wells that currently provide water from multiple locations) no significant circulation improvements would be required in order to move water throughout the community.

As a result of installing its state-of-the-art ion-exchange system, **since December 2008 Lake Zurich has met all required water quality standards**. Yet community survey responses and input at the public forum reveal some residents remain skeptical as to the safety of the drinking water. A more concerted effort to communicate the success of the ion-exchange system might build confidence among residents and encourage more public participation in water-related policy issues.

The village's existing water supply – deep aquifer wells – is sufficient for the immediate future, and its wells have sufficient capacity to meet current and anticipated demand. The fact that there is **no short-term risk of a water supply shortage** – which is not the case in some neighboring communities that rely on shallower aquifers more susceptible to drought – gives the Village and its residents some time to assess the best long-term option for providing a sustainable, cost-effective water supply.

### Budgeting and Financial Mechanisms

The current water supply and wastewater **billing cycle is monthly, a laudable practice more communities should emulate**. By receiving timely, current information on their water consumption, customers can make informed decisions about managing their usage. The village is fully metered and is already investing in an automatic meter

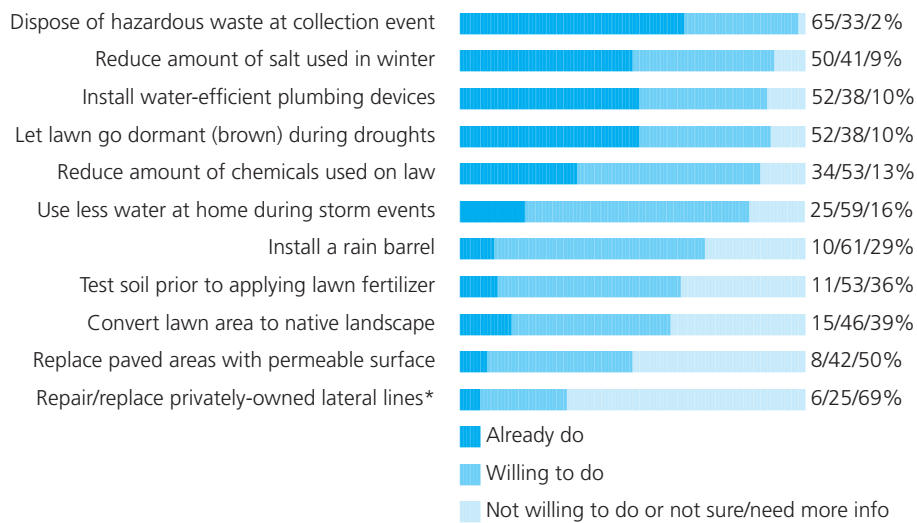
reading system, which should reduce the labor costs associated with manually checking meters. The Village should continue to build upon both practices. With moderate additional investment, the new metering system has the capability to perform remote, instantaneous meter readings, which would allow staff to monitor water usage even more rigorously and contact users when aberrations in normal usage (a leak, a hose that got left on) occur.

The Village's current **public works staff has demonstrated an ability to meet most regulatory requirements, maintain the water supply system, and respond to immediate needs** in the face of constrained and uncertain financial resources and the absence of a true asset management plan. This is largely a testament to the aptitude and commitment of current staff members, but relying on those individuals is not a sustainable option for the village, as personnel can come and go.

### Land Use and Economic Development Policy

Lake Zurich's zoning codes are designed to encourage single-family housing with relatively **large lawns, which provide substantial onsite stormwater management**. Stormwater that infiltrates into the soil contributes to recharging shallow aquifers – the current water supply source for many of Lake Zurich's neighbors. At the same time, large lawns generally correspond to higher consumption of fertilizers, pesticides, and herbicides for the plant material itself (as well as energy for the lawn care equipment), which can impair downstream water quality. While at present summer lawn watering may not be a major issue for Lake Zurich, it may become one in the future as groundwater resources dwindle or the cost of purchasing Lake Michigan water increas-

**FIG. 6. RESIDENT WILLINGNESS TO UNDERTAKE WATER RESOURCES SOLUTIONS**



\*A lateral line is the pipe that connects a home to the main water supply.

es. The Village could proactively partner with the IISG’s Lawn to Lakes to offer workshops on sustainable lawn care to residents and businesses.

Lake Zurich is also a retail center in south-western Lake County, resulting in large parking facilities and rooftops. These produce a substantial amount of stormwater runoff, presenting an opportunity for additional shallow aquifer recharge and improved stormwater management. The Village ought to develop policies or incentives to encourage new construction and retrofits to employ green infrastructure strategies to direct as much stormwater as possible back into the ground.

As a result of past land acquisition, the Village now controls a substantial portion of redevelopable downtown properties and has Tax Increment Financing (TIF) in place. The stormwater runoff from these properties is a potential water quality threat to the lake of Lake Zurich; **control of the land and financial resources to provide development incentives put the Village in a good position to require and/or incentivize state-of-the-art stormwater management in any downtown redevelopment efforts.** While the real estate development market is presently constrained, the LEED and LEED-ND market has fared relatively well in recent years. If Lake Zurich can identify the appropriate use and market for its downtown holdings, it is in a position to court an experienced “green” builder and achieve substantial onsite stormwater management. This presents a unique marketing opportunity as well: Because any downtown redevelopment must be very environmentally progressive to protect downstream water

quality, the village and a savvy developer could take advantage of that to brand the development.

### Water Ethics

As evidenced by the responses to the community survey, as well as the robust discussion at the well-attended public forum, Lake Zurich has a **base of concerned residents eager to be part of water resources solutions.** The community survey (fig. 6) revealed strong support for and interest in such practices as installing rain barrels and permeable paving, and conserving water at home during storm events. The Village should engage and build on this core group.

The Village’s **current water bill format includes space for a short message,** which can be added to the monthly bills at no additional cost. These could be messages about pending meetings or policy decisions, tips on sustainable water use at home, or a link to a longer survey, such as was used for this project. This is a small, but immediately available asset the Village should use strategically. The Village’s Newline (a subscriber-based e-news service) can be used to provide more detailed information regarding water resources.

By even commissioning this study by MPC, CMAP, IISG and CNT, **Village leadership and the Public Works Dept. demonstrated their commitment to sustainable water resources management.** Inviting open, critical, external review is a sign of a true desire for transparency and objective input to assist in future decisions.

## Weaknesses

*Weaknesses are internal flaws to improve upon.*

### Infrastructure Performance and Natural Resource Integrity

The task force stressed that the **large level of stormwater infiltration and inflow (I&I) into the wastewater system is an immediate concern for Lake Zurich.** The wastewater system should be unaffected by wet weather, but when it rains, stormwater is finding its way into the sewer. The peak ratio of wet weather to dry weather flows in the wastewater system is approximately 4:1, straining the capacity of the existing wastewater system (it is worth noting that many other Chicago suburbs have much worse I&I problems). As the Village explores potential rehabilitation or total replacement of the wastewater interceptor that takes sewage to Lake County’s treatment facility – as well as the possibility of serving additional surrounding communities with wastewater transfer service – the wet weather peaking factor will drive the design capacity and cost of that project.

Lake County is experiencing overflow issues downstream at the treatment facility, and the U.S. EPA has begun investigating the root causes of those overflows, including upstream I&I contributions from the communities it serves. Lake Zurich’s agreement with Lake County allows the Village to discharge a maximum of 18 million gallons a day, and the village’s lift station that conveys water into the interceptor only has the capacity to move 18 million gallons a day. Regulatory or punitive actions brought against Lake County will almost certainly be passed on to its customers through additional rate increases for any improvements needed to the county facility.

There has been no comprehensive assessment of Lake Zurich’s I&I problem in approximately 20 years. The Public Works Dept. has done some investigation on its own, and believes direct inflow from sump pump discharge connections into the wastewater systems is a major factor, as was previously identified in the 1990s study. Failing service laterals are also likely a cause of infiltration. Until the sources of I&I are understood, no comprehensive repair plan can be implemented. Given that some of the problem is almost certainly occurring on private property, the Village would need to develop a program to either require or incentivize repairs by property owners. This may be

challenge, as approximately half of survey respondents indicated an unwillingness to make these repairs on their property. A comprehensive I&I assessment is a necessary first step to understanding the scale and details of the problem.

The Village's water supply source – existing deep aquifer wells or potential Lake Michigan connection – makes no difference to the I&I problems. The I&I issue should be resolved regardless of that decision, but in all likelihood, the cost of fixing I&I will be considerable. The Village will need to decide whether it is better to truly fix the problem by reducing the actual amount of water entering its sewer system, or whether it wishes to develop new infrastructure to prevent wet weather surges from traveling downstream to Lake County. The former scenario would require substantial investment on private property, but minimal upkeep and operating costs; it also would reduce some strain on the wastewater interceptor system. In the latter case, building a large storage facility or a zero discharge graywater reuse wastewater treatment plant would entail ongoing operating costs, and might face regulatory challenges in addition to the up-front capital cost. However, North Barrington has such a plant and uses it in wet weather to capture excessive flows for later use in irrigation at a golf course.

Fortunately, one of CNT's major new initiatives is researching "best-in-class" strategies used by water agencies across the country to maintain, repair and replace sanitary and storm sewer pipes located on private properties. Lake Zurich is uniquely positioned to be a partner in that effort, and perhaps develop a best practice others may emulate.

**Lake Zurich's wastewater interceptor, which conveys flow to the Lake County system, may need maintenance and upgrades.** This is based on statements made by staff and Board members, not on documentation provided to the task force. While a relatively new system, the lining has deteriorated more rapidly than expected. This is a problem in and of itself, but on rare occasions the interceptor is also operating at near maximum capacity for peak hourly flow, largely due to the I&I problems addressed above. If the Village continues to serve neighboring communities, or adds new ones, by conveying their wastewater to Lake County facilities, the capacity constraints will worsen.

At a minimum the interceptor needs to be repaired, at significant cost. If part of the cause of deterioration is an abundance of

hydrosulfides, then using chemicals (oxidizers), biological products, or supersaturating the wastewater with oxygen could be alternatives the community can explore.

However, if peak hourly flows from excessive I&I are not reduced, and/or if additional service is provided to adjacent communities, the system may need to be replaced anyway, likely at even greater cost. The Village completed a study in 2008 to identify possible upgrades to the system to provide Lake County with additional conveyance capacity. While the upgrades were never made, the study demonstrated that simply repairing or replacing the interceptor will do nothing to change the I&I problem, but mitigating the amount of excessive I&I could change the dynamics of the wastewater discussion. If by reducing peak hourly flows the existing capacity of the interceptor becomes sufficient to meet current and expected demand, then repair could be the more feasible option than replacement. If I&I continues to worsen, then replacement with increased capacity may be the only feasible – and costlier – option.

As noted above, the majority of the village is not flood-prone, but there are **isolated pockets of repeated, serious flooding that has damaged property and drawn significant community and local media attention.** For the property owners in question, this is an emotionally and financially painful situation. The hilly terrain, maintenance and capacity of storm drains, reduced storage capacity of retention ponds in various subdivisions, and increase in impervious surfaces all contribute to the localized flooding. These property owners are looking to the Village to develop, communicate and implement a solution, and have expressed a willingness to be part of that solution. This is a relatively common situation throughout Lake County, and the Lake County Stormwater Management Commission has programs and staff to assist its member communities. Lake Zurich has worked with those programs before, and could increase its level of participation to help solve this problem. Potential solutions include developing localized green infrastructure strategies, resources to help property owners relocate to less flood-prone areas, and a wealth of informational resources for property owners on flood hazard mitigation on private property.

These isolated instances have created a perception within Lake Zurich of flooding issues that do not match the extent of the problem. By resolving these pockets of flooding, and communicating those solu-

tions, the Village may be able to ameliorate this undeserved reputation.

## **Budgeting and Financial Mechanisms**

The underlying problem is that **revenues for water-related investments and operations have not kept pace with costs.** There are a number of reasons for this. The Village needs a clearly articulated asset management plan, which would provide a road map for minimizing the total life-cycle cost of owning and operating pipes, pumps, and other capital-intensive systems while delivering the desired service levels. Absent a defined level of service and system performance, it is impossible to account for what the actual costs are of meeting those expectations. Funds generated by and originally intended for water-related costs have been diverted to other village needs, leaving the Public Works Dept. with insufficient resources to maintain anything other than basic operations and emergency repairs.

While the cost of water resources management is continually increasing with the cost of energy, labor and materials, the Village's water rates are adjusted sporadically, leading to large bumps – a 34 percent increase in 2005, and a 25 percent increase at the end of 2011 – which are not always politically palatable. Some communities have moved to having small, automatic annual increases in the area of two or three percent in an effort keep pace with increasing operating costs. It should be noted that smaller automatic increases do not completely eliminate the occasional need for larger increases – new regulatory requirements, major capital expenses, unexpected infrastructure problems, or a sudden decrease in water consumption could all result in a need for a large rate adjustment. What's more, it would behoove the Village to develop a comprehensive asset management plan (see Asset Management sidebar, page 14). Several organizations in the region – CMAP, the U.S. EPA, American Water Works Association, and the Alliance for Water Efficiency – all offer services and technical assistance Lake Zurich could tap to leverage its own internal expertise.

The **gap between revenue and cost is compounded by inaccurate predictions of local water consumption.** Water consumption in Lake Zurich has declined in the past several years for a variety of reasons: Cool, wet summers have reduced lawn watering; some of the larger commercial and industrial users have ceased operations; the economic downturn led to many foreclosures; and population growth has slowed.

**FIG. 7. VILLAGE ION-EXCHANGE FACILITY**



Residential water use is declining nationwide, due primarily to declining household size and higher efficiency standards for water-consumptive appliances. Without a better understanding of the causes of declining water use, accurately forecasting future water demand and future revenue requirements will be more difficult. The Village's method for forecasting demand, as well as the source and accuracy of some of the data inputs, was not made clear to the task force. A consequence of these inaccurate predictions and long gaps in adjusting rates is that a few years into a new rate, revenues are out of line with actual costs. The same organizations listed in the previous recommendation could offer tools and technical expertise to Lake Zurich help build staff capacity and Board-level appreciation for improved demand forecasting. Additionally, the current rate system includes a monthly discount for senior citizens and the disabled, regardless of income. This discourages efficient water use, but also reduces revenues. Presumably, the discount is intended to reduce homeowner costs for low-income individuals, but 1) there is no income threshold for the incentive; and 2) it is not clear how the water and sewer demand response to the incentive is included in the Village's broader forecasting. Similarly, Village staff stated that sewer rates are based on winter-time consumption, which provides some disincentive for conservation during the summer through measures such as installation of native plants. Though the volume of water use still increases in summer, consumers pay an artificially low price for it, which may encourage more water usage. That is

not necessarily a bad thing, but it remains unclear how the ramifications of this policy affect overall demand forecasting.

**While the Village plans, builds and maintains stormwater infrastructure and services, it generates no revenue from doing so.** Water and sewer rates are largely dedicated to water and sewer expenses, as they should be, and as a result stormwater-related costs either must be paid by those revenue services, out of general revenues – or not at all. None of these is ideal. Additionally, because property owners do not associate their stormwater runoff as a direct cost of ownership, there is no financial incentive to improve onsite stormwater management. Creation of a stormwater utility fee – which could be based on the property's total area of impervious surfaces, or perhaps partially by the amount of I&I once that is fully understood (though I&I costs are typically part of the wastewater charge) – would generate needed revenue for the Village to tackle its I&I and stormwater problems, and give property owners an incentive for retrofits and rehabilitation. The nearby City of Rolling Meadows, Ill. has a modest fee based on impervious surfaces (\$1.65 per 3,604 sq. ft., as of 2008) that Lake Zurich could investigate as model practice.

More a fiscal reality than a weakness, the fact remains that even if the ion-exchange facility (fig. 7) is essentially shut down, Lake Zurich is still obligated to pay down the debt accrued from borrowing to build it. **Lake Zurich will be paying debt service on its ion-exchange facility until 2029.** Lake

Zurich had no control over taking on this debt as Lake Michigan water was unavailable at the time, and the Village was under a compliance commitment with the Ill. EPA. Nonetheless, the debt must be paid.

### **Land Use and Economic Development Policy**

While the market for "green" building as part of downtown redevelopment may be better than the overall market, the fact remains that **neither market for new development is very strong right now.** In the meantime, Lake Zurich should continue to try to identify a potential use and developer for its downtown holdings, as well as explore zoning ordinances and incentives that may lead to progressive onsite stormwater management.

**Retention ponds in Lake Zurich's many subdivisions are inconsistently controlled and maintained,** and as result many have lost a portion of their stormwater storage capacity. This may be contributing to localized flooding and downstream water quality impairments. These ponds were required at the time of construction, but were never part of a comprehensive stormwater management plan. Over time, Special Service Areas have been created to maintain some, but not all, of these ponds; as a result some homeowners pay an additional cost, above and beyond water and sewer charges, for stormwater services, while others do not. This has led to some political animosity. The Village could assume control over these retention ponds or work to streamline the management responsibilities of the individual homeowners associations. In either case, these ponds are a critical part of stormwater management, and they need to be restored to their designed capacity. If the preference of the homeowners associations is to hold onto maintenance responsibilities, some training and capacity building could be beneficial. Lake County provides technical assistance in this area on issues such as invasive species control, plant management, and water quality testing. Lake Zurich notifies homeowners associations of these seminars as part of its National Pollution Discharge Elimination System outreach program.

**The Parks and Recreation Dept. runs a wealth of recreational programs, but can do more to incorporate progressive stormwater management into its property management, and to conduct informational programs about water resources and their interconnectedness with nature.** For example, in 2010 the village worked with the Flint Creek Watershed

Partnership on a rain garden demonstration project in Paulus Park. Several of the village's other parks are high profile sites where informational displays or pilot green infrastructure programs would get high visibility. Many of its other land holdings are smaller sites with wetlands amenities that were donated over time as part of real estate development deals. Lake County Forest Preserve, Chicago Wilderness, Openlands, Liberty Prairie Conservancy, and many local conservation groups might be interested in working with Lake Zurich to develop a more concerted water ethic, informational programming, and site maintenance plans in order to take advantage of park assets.

## Water Ethics

### The Village could increase informational programming and outreach to communicate more with residents on water, stormwater and wastewater issues.

In recent years Lake Zurich changed bill formats, and in doing so, lost some ability to provide bill inserts and other informational materials. The current bill format only allows for a short statement to be included; this must be used very strategically, but it is readily available. Likewise, budget constraints forced the Village to reduce the frequency of its Newline from monthly to quarterly. Partially as a result of these reductions in outreach, many residents feel uninformed about the details during complex decisions about rates, infrastructure priorities, and the pros and cons of moving to Lake Michigan for water supply. It is also not clear how strategic the information is that the Village does provide; if I&I is a more immediate issue than water conservation, for instance, then a concerted effort to educate residents about I&I would be a more useful allocation of resources. Many public education resources exist. CMAP can provide tailored bill inserts, while the U.S. EPA's WaterSense program (of which the Village is a partner) offers a full library of materials. Some communities, such as Barrington, repackage stories from MPC and Openlands' What Our Water's Worth campaign in their own paper and digital newsletters. The IISG, University of Illinois Extension, and Lake County Stormwater Management Commission all conduct public workshops on a variety of topics, and likely would welcome the opportunity to partner with Lake Zurich. In regards to communicating with residents about pending Village decisions, a survey might reveal which means of communication – e.g. water bills, e-newsletters, social media, etc. – would be most effective for disseminating news.

## Managing Stormwater through Green Infrastructure

### Description and Benefits

Green infrastructure (GI) is a network of decentralized stormwater management practices, such as green roofs, trees, rain gardens, and permeable pavement, that can capture and infiltrate rain where it falls, reducing stormwater runoff and improving the health of surrounding waterways. GI practices have become increasingly popular in recent years because they can deliver ecological, economic and social benefits to a community.

In addition to reducing polluted stormwater runoff, GI practices also can positively impact energy consumption, air quality, carbon reduction, property values, and recreational opportunities. For more information about the multiple benefits GI can provide communities and how to calculate those benefits, refer to CNT's *Green Values Guide* at [www.cnt.org/repository/gi-values/guide.pdf](http://www.cnt.org/repository/gi-values/guide.pdf).

Lake Zurich has done some GI initiatives, but would benefit by expanding its use of GI. Localized stormwater impacts affect water quality downstream of the village, which could affect village compliance with regulations. GI practices that promote infiltration of water directly into the soil, or that detain stormwater for a period of time, could help with these problems. Green roofs, rain barrels, rain gardens, permeable paving, and rainwater reuse for non-potable purposes all present options Lake Zurich should consider. GI practices provide flexibility to communities that need to adapt their wet weather infrastructure but don't want to incur the substantial costs associated with more traditional, gray infrastructure projects, which take many years to implement before a community can begin seeing the benefits.



### Implementation

The degree of implementation for GI is flexible and adaptable to the needs of the Village. At a minimum, Lake Zurich could encourage residents to install GI by hosting additional workshops available through local watershed groups, distributing existing informational materials, and participating in regional/county discussions about the implementation of green infrastructure. Many communities in the region have or are considering this form of partnership. Lake Zurich's demonstration rain garden in Paulus Park could be the first of many, and if the community develops additional incentives or strategies to support GI use by private property owners, it should add that information to the green infrastructure presentations it gives at the annual Lake Zurich Chamber of Commerce Business and Community EXPO and the open houses it conducts as part of its NPDES outreach.

Funding assistance is available. Lake Zurich has a successful track record of securing funding through Ill. EPA's Section 319 funding (to improve downstream water quality), as well as Soil and Water Conservation District grants. For example, the Ill. EPA's Green Infrastructure Grant provides funding to communities that can demonstrate their GI project will reduce water quality issues in their area. Lake Zurich sought funding from this source in 2010 and 2011 to create a rain barrel cost-share program, and will continue to apply in the future. MPC is working on another initiative worth consideration: The organization is partnering with Chicago's 35th Ward and the Ill. EPA to offer grants for green infrastructure to private property owners within a specific corridor. While Lake Zurich has conducted many stormwater initiatives, it could take things even further through development of a GI implementation plan and adjust its current zoning and land use ordinances to influence future decisions regarding stormwater management best practices. An example would be to minimize the amount of impervious pavement required for new development.

### Potential Barriers

One particular barrier to GI is the lack of education about the practice. By providing outreach opportunities for community members to learn more about GI, the Village can begin to educate the community on its myriad of benefits. Another barrier can be cost. Managing a Village GI strategy will require staff time. Additionally, private property owners may be reluctant to install GI without a clear articulation of benefits both to themselves and the community, and/or some form of financial incentive. While federal, state or county loans and grants may be sufficient to kick-start a plan or useful in complementing Village resources, a meaningful GI strategy would require a sustained funding commitment, i.e., a stormwater utility fee or set-aside on the existing water and sewer bill (which might require a rate increase). For property owners, the Village could explore partnering with local financial institutions to establish a low-interest GI Revolving Loan Program to encourage GI adoption and defer installation costs.

As noted above, Lake Zurich does not generate any revenue dedicated to stormwater management, which makes dedicating staff time a challenge. Any substantial new commitment to GI would likely requiring adding staff.

## Stormwater Utility Fees

### Description and Benefits

Stormwater utilities operate, maintain, manage, and construct (or reconstruct) municipal stormwater drainage systems. Like municipal water supply and wastewater utilities, they are often part of the municipal government. Funded by dedicated fees, stormwater utilities provide infrastructure and service to help a community deal with wet weather. Communities with a well-managed and funded stormwater utility realize many benefits: flood mitigation and drainage, erosion and sediment reduction, enhanced water quality in local waterways, consistent maintenance of existing infrastructure, and an overall enhanced stormwater conveyance system.

Typically, a municipality will charge a stormwater utility fee to all properties within its jurisdiction based on the amount of runoff that each property generates and sends to the stormwater system. Hard, or impervious, surfaces such as rooftops, driveways and parking lots, prevent rainfall from infiltrating into the ground, thus increasing the amount of runoff a property creates. As a result, properties with more impervious area use the stormwater system more and consequently will be charged more, which is generally considered a more equitable mechanism for funding stormwater improvement projects.

The most widely used method for establishing stormwater fees is called the ERU system. ERU stands for Equivalent Residential Unit, which is the basic unit for the fee structure, and generally represents the runoff volume generated by a single-family residence. The utility assigns ERUs to other properties based on their size and percentage of impervious surface and bases all charges on these assignments

Climate change, an increase in impervious land, and lack of investment in storm drainage systems is forcing many communities across the U.S. to implement a stormwater utility fee for managing wet weather issues. A 2011 survey of national stormwater utilities received responses from 1,174 such utilities. According to the results, four states – Florida, Minnesota, Washington and Wisconsin – now have more than 100 stormwater utilities each, and the national average monthly fee is \$4.19.

### Implementation

Lake Zurich manages its own water supply utility and bills system users for wastewater services, provided by Lake County. Given its existing resources, the Village could implement a stormwater utility fee within its current administrative structure. Additional staff time would need to be dedicated to establishing and managing the fee structure and billing.

However, current state regulations require municipalities (through the Municipal Separate Storm Sewer System permit program) to reduce stormwater runoff volume and its associated pollutants, and meeting these requirements will only become more costly. By billing the appropriate users, the Village could begin to receive much-needed financial assistance to maintain and upgrade its stormwater infrastructure, provide safe and reliable stormwater service to its community, and reduce flooding and water quality issues.

### Potential Barriers

While interest in stormwater utilities is growing (including here in Illinois, where Rolling Meadows and Rantoul have implemented them), it is a relatively new concept and can take some time to build political acceptance. It is important to communicate the cost incurred to the community for stormwater management infrastructure and services; the purpose of the new revenue generated by the fee; and how property owners can reduce their contribution to stormwater runoff, and thus their fees.

Another potential barrier to running a successful stormwater utility is lawsuits about the validity of stormwater fees. Such legal challenges typically come from owners of large impervious areas (e.g. shopping plazas, churches, and warehouses) that may be assessed large fees for their impervious surfaces. Businesses may argue that such fees will hurt the local economy. However, a properly funded and managed stormwater utility can mean more parks and open space, less flooding, cleaner streams, and increased property values within a community, all of which improve the local economy.



CardinalNews

## Opportunities

Opportunities are external factors to take advantage of.

### Infrastructure Performance and Natural Resources Integrity

**Lake Zurich has an approved allocation of Lake Michigan water**, with a pending public vote to either accept or reject a switch. It remains to be seen whether a shift to Lake Michigan water is the best short-term or long-term water supply decision for the community; but the existence of the allocation, and the fact that there are several potential providers for actual connection, means that the village has a rare opportunity to publicly articulate the full range of existing costs and priorities, as well as the pros and cons of switching water supplies. This is a major decision, and village voters should be well-informed through a village-wide informational effort, before the vote takes place. This issue is more fully explored in the Lake Michigan Decision appendix (page 29).

### Budgeting and Financial Mechanisms

It is possible that **Lake Zurich could begin providing water or sewer services to additional neighboring communities**. This could help generate additional revenue, but if Lake Zurich I&I problems are left unchecked, also might entail capacity upgrades that would come at a cost, particularly for sewer service. The communities Lake Zurich would provide sewer service to (as well as those it already does) might have I&I problems comparable to Lake Zurich's, though communities with newer construction might not. That question must be addressed if Lake Zurich begins negotiations with prospective customers. Lake Zurich does have some flexibility in this area. For instance, its current contract with North Barrington stipulates that Lake Zurich will only provide sewer service in emergency situations, off-peak periods, and during dry weather. During wet weather North Barrington's wastewater (which is likely mixed with stormwater, due to its own I&I problems) is processed by a zero discharge graywater plant that provides water for golf course irrigation. Lake Zurich is not affected by North Barrington's I&I problems.

### Land Use and Economic Development Policy

During the stakeholder interviews, representatives from **Lake Zurich's industrial water users expressed an interest in**

**reuse of harvested rainwater, treated effluent, and/or graywater for irrigation or non-potable uses.** They also demonstrated a willingness to learn more about onsite stormwater management and green infrastructure. These industries are ready and willing to be partners. Reusing effluent likely would entail the construction of a new wastewater processing facility in Lake Zurich, which would be costly unless federal, state or private funding could be secured. A combination of green infrastructure and rainwater harvesting could provide enough water to reduce irrigation and consumption of potable water. For instance, the Field's Volvo dealership in nearby Northbrook collects runoff in an underground cistern, and that water is then used for a variety of non-potable purposes. The Village would need to first survey these industrial users to understand when, where and how they consume water and what sort of non-potable applications might exist.

### Water Ethics

The community survey indicates **many residents are willing to be a part of solutions**, such as installation of rain barrels or permeable paving. High totals for bottled water consumption may indicate a willingness to pay for what is perceived to be dependable, high-quality water. On the other hand, a concerted education campaign about the quality of Lake Zurich's water could reduce demand for bottled water.

**Lake Zurich is fortunate to be addressing its water resources strategic planning at a time when considerable external resources are being dedicated to the same issues.** The Lake County Stormwater Management Commission is actively looking for partner communities, while the U.S. EPA's Region 5 office might be the right partner for developing an asset management plan and a defined level of service. CNT is launching an initiative on finding solutions to I&I. CMAP, MPC, Openlands, and the U.S. EPA have existing templates for more informative bills, informational materials, workshops, and an array of readily available communications materials. Other federal and state grant programs – e.g. the Ill. Green Infrastructure Grant, Urban Small Waters program, Section 319 funding – could help Lake Zurich offset its own costs. The Village could also pursue participation as a partner community in the U.S. EPA's Integrated Municipal Stormwater and Wastewater Plans program.

**Recent Village Board and staff turnover is an opportunity to articulate a new**

**vision for the future**, develop policies and strategies, and commit to goal-driven, transparent investment of public dollars. Survey and interview responses reveal lingering distrust by some residents of the Village government, particularly regarding radium in the groundwater, ongoing struggles to redevelop the downtown and maximize the potential of the TIF district, and unresolved localized flooding. The creation of the 2011-2013 Strategic Plan is evidence of a shift in that direction, as is this project.

## Threats

Threats are external factors to be aware of.

### Infrastructure Performance and Natural Resources Integrity

While there is no immediate, short-term danger of Lake Zurich's water source – deep aquifer wells – running out of water (or running so low that pumpage costs become exorbitant), **the long-term outlook for the deep aquifers in northeastern Illinois is not good.** According to the Ill. State Water Survey, regional pumpage levels from the deep aquifer already exceed a sustainable threshold, and are likely to increase with population growth. Lake County may not be affected as soon as Kane or Will counties, but it is possible, even likely, that by 2050 the deep aquifer wells serving Lake Zurich will no longer be able to provide all of the water needed to sustain the economy and environment. Conservation, efficiency programs, and development of alternative water supplies (e.g. rainwater) could all extend that time horizon. However, shallow aquifer contamination and increasing demand for water to the north and west of Lake Zurich could shorten that time horizon if additional communities develop deep aquifer wells.

Partially as a result of those aquifer level declines, **the competition for allocations of Lake Michigan water is likely to become more intense.** Once Illinois reaches its limit for Lake Michigan water withdrawals that source will be off the table for any community not already tapped into it. This was the case 10 years ago when Lake Zurich built its ion-exchange plants. Since then, overall usage of Lake Michigan water has declined, and allocations are once again available. See the Lake Michigan Decision appendix (page 29) for more details.

**Future federal, state and county regulations could lead to significant cost increases for Lake Zurich**, some of which

may be so high as to change the calculus on several impending infrastructure issues.

First, the waste from the ion-exchange system is currently conveyed to the Lake County treatment facility in amounts that facility can handle. Most of the other communities served by the same facility use Lake Michigan or shallow aquifer water, and thus do not send radium and other by-products to Lake County. However, stronger regulations to protect the environment from that radium would increase Lake County's disposal costs, which would almost certainly be passed on to Lake Zurich. Lake Zurich could collect and dispose of the material itself, but that would also come at a cost.

Second (see the Lake Michigan appendix on page 29), while the deep aquifer is protected from contamination, Lake Michigan is not. An emerging array of contaminants known as endocrine disruptors are increasingly present in the nation's surface waters. These include plastic residues, pharmaceuticals, fertilizers, and other compounds not currently removed in most wastewater treatment processes. Increased treatment standards for potable water, which would require capital investment and likely more energy consumption, would increase the cost of procuring water from Lake Michigan.

Lastly, a much more pervasive stormwater management problem stems from the hilly terrain and high number of water bodies and waterways within the village. Many of these waterways cross municipal lines several times, but all ultimately flow downstream to another community. **The terrain significantly increases the risk of downstream water quality problems, and the regulatory compliance issues that come with them.** New regulations within the National Pollutant Discharge Elimination System could result in higher pollutant monitoring, remediation, and compliance costs for Lake Zurich and every other community. Precautionary measures to prevent contaminants and excessive nutrients from running into water bodies and waterways during storm events could prove to be more cost-effective than trying to remediate those ecosystems or pay fines after the fact. IISG has several pollution prevention campaigns that Lake Zurich could take advantage of, including Safe Disposal of Unwanted Medicine, which helps communities develop unwanted medicine programs, and Lawn to Lake, which helps communities implement healthy lawn and landscape practices to reduce nutrient and pesticide runoff into local waters.

**Most climate change models for northeastern Illinois forecast substantial changes in precipitation patterns**, with a higher likelihood of both more intense storm events and longer dry periods between rain events. The former will pose a stormwater management and I&I challenge, while the latter could lead to unexpected spikes in water demand. IISG, in partnership with CMAP, has developed strategies and policies for planners concerned with reducing water supply vulnerability in Illinois, which Lake Zurich could leverage.

### Budgeting and Financial Mechanisms

**As long as Lake Zurich relies on Lake County for wastewater treatment, the community will never fully control the cost of water resources management.** When Lake County's costs increase, so will Lake Zurich's. However, there are many advantages to being part of the larger Lake County system. Lake Zurich has fewer regulatory requirements to meet, costs are distributed, and the County is responsible for planning and implementing many large capital improvements.

The alternative – recommending wastewater treatment in Lake Zurich — would require an immense capital investment to build treatment plants and connect the collection system, and in all likelihood a long tenure of debt repayment after the fact. Additionally the Village would likely have to hire and maintain support staff to operate the facility increasing overhead costs. These costs would be in addition to any I&I or wastewater interceptor repair costs (for which the destination of the flow is largely irrelevant) or the potential cost of switching to Lake Michigan water (in which case Lake Zurich would again be purchasing a service from an outside partner and beholden to their cost demands). Lastly, assuming Lake Zurich remains on deep aquifer water, renewed wastewater treatment would place the burden of radium disposal squarely on the Village's shoulders.

This issue is compounded by the fact that **Lake Zurich pays the same rate as communities that do not pay to operate and maintain their own wastewater interceptor.** Lake County's rate is the same throughout its service areas, and in many other areas it owns, maintains and operates the interceptor lines. Customer communities, including

Lake Zurich, are charged for that. Lake Zurich, however, owns, maintains and operates its own wastewater interceptor and pays for it itself.

**On top of all of this, the costs for energy, chemicals, labor, regulatory compliance, and equipment are all generally on the rise.** Some of these increasing costs can be mitigated by efficiency upgrades, but those upgrades themselves come at a cost.

**As detailed in the Lake Michigan Decision appendix (page 29), a switch to that water source would place Lake Zurich in a situation in which it did not have total control over the cost of its water supply.** The Village would have to purchase Lake Michigan water treatment and delivery costs from some other entity, and as a result would not be in total control of those costs.

### Land Use and Economic Development Policy

As discussed above, **current and potential future water quality regulations could increase the cost of downtown redevelopment**, but this may be offset if the Village chooses to target this niche market. Any downtown redevelopment will have to be “green” to prevent excessive stormwater runoff and downstream water quality impacts. The Downtown Lake Zurich Redevelopment Strategies Plan identified market interest in “environmentally sustainable” lifestyles as an opportunity for Lake Zurich.

### Water Ethics

**All water informational and outreach materials are not the same, and not all of it will help the Village with its priorities.** There are many informational programs and outreach products for Lake Zurich to take advantage of, so the Village should strategically deploy them so as to not dilute their impact or confuse residents. If the Village decides that water supply conservation is not an immediate priority but that onsite stormwater management is, it would be less efficient to inundate residents with messages about reducing household water consumption simply because those messages and materials are available at little or no cost.

### Public Information Programs

#### *Description and Benefits*

Clear and purposeful communication between a municipal government and its residents, businesses, and stakeholders is essential. A public information program (PIP) in Lake Zurich would increase the public's awareness regarding the value of water resources and what sustainable management entails. Lake Zurich used to allocate resources to include water resources management information in its monthly Newslines, but funding for this outreach tool has been cut, and it is now issued quarterly. Exposure is at a premium, as each Village program must compete for space given the reduced frequency. A revived and expanded program should be multifaceted and include a variety of communication strategies, including media, workshops, advertising, public relations, and promotional tactics to help raise awareness. PIPs enable a smoother transition when making policy and programmatic changes, promote stewardship, and report on specific actions the water utility is taking to achieve strategic goals.

Consistent with this report's proposed water resources strategic goals, a PIP is especially important and could serve two purposes: to clarify and confirm past water quality issues that have been addressed and to prepare the village's residents and businesses for future decisions concerning water supply, wastewater, and stormwater. For example, a PIP could be useful to inform residents about the advantages and disadvantages associated with switching from groundwater to Lake Michigan water before the referendum in 2012, or provide information on ways in which residents and businesses can conserve water or manage stormwater on a day-to-day basis. Water bills, the village web site, public meetings, newspaper inserts, and voting guides are all strategies to provide more information on this topic.

#### *Implementing a Public Information Program*

The extent of PIPs range depending upon the needs of the community and the resources – both staff time and budget – available.

At a minimum Lake Zurich could host an annual workshop with other local entities to provide information to the public about water management issues pertinent to the village. The Village could also use their water bill to provide additional information to customers such as comparative usage data, unit conversion equations, or conservation tips. Taking things a bit further, Lake Zurich could dedicate staff time to developing and hosting workshops, creating a working group to focus on water conservation issues, and sending staff to conferences to gain peer-to-peer experience and knowledge. Obtaining grant funding and committing to a pilot program that improves water conservation/efficiency conditions in the village is another option.

#### *Potential Barriers*

Funding and resources are the primary concerns, followed by the ability of a program to effectively communicate with residents and businesses. For example, residents may not thoroughly read their water bill or visit the Village web site, in which case they may not receive information. Identifying residents' preferred means of communication would make longer-term efforts more effective.



# Strategic Goals and Prioritization

As stated, the Village does not have a clearly stated set of comprehensive water resources management goals. This makes it difficult to provide recommendations for achieving the village's preferred conditions. Strategic goals embody a set of core values, and provide invaluable reference points for decision making. However, once goals are established, they will provide transparency in decision making, and a stakeholder-approved justification for making difficult, and potentially unpopular, choices. In the case of water resources management, an explicitly stated set of strategic goals would aid in making complex choices about such issues as water rates, infrastructure repairs, relations with other units of government, and other policies. These goals need to be updated on a regular basis to account for changes in technology, demographics, finances, and the condition of water resources.

By reviewing the Village's 2011-2013 Strategic Plan (fig. 8), interview responses, and survey results, the task force was able to offer the following strategic goals, which, of course, must be refined by the Village and its residents before being implemented. The goals, as much as possible, are derived from the Village's Strategic plan, and follow the form and method of that document. There are four high-level strategic goals for water resources management, each with four corresponding objectives, as well as actions the task force recommends to move from current conditions toward achieving the strategic goals.

Some of these recommendations can be acted on almost immediately and at little cost. Others will require systemic change and more intensive efforts. For instance, the development of a capital improvement plan with strategic priorities based on available financial resources first requires a comprehensive assessment of infrastructure conditions, a clear expectation of the level of service and system performance expected by Village residents and businesses, and decisions driven by agreed-upon criteria. It will

take time and effort to gather the appropriate information and build the framework for making informed, priority-driven decisions. However, once that system is in place, it will enable current and future village leaders and residents to regularly update the plan to respond to the needs of the moment.

The scope and recommendations from this report will require systemic change and means of prioritizing investments. The purpose of this project was to conduct a technical assessment of integrated water management strategies available and applicable to the community, and to help the Village Board, staff and residents prioritize issues based on external, objective input. However, no matter how many external partners the Village works with, it will be impossible to do everything at once. The Village needs to set priorities and then use its available resources as cost-effectively as possible to maximize their usefulness.

The following section prioritizes the task force's recommended strategic goals, objectives, and implementation measures. The Village Board and staff, with public input,

will need to refine these recommendations so they truly belong to Lake Zurich.

## Strategic Goal 1

Contribute to the long-term sustainability of the Village of Lake Zurich through cost-effective, priority-driven water resources management – infrastructure, ecosystems, human capital, and service provision – to meet the projected need of all residents, businesses, neighboring communities, and the environment.

As noted in the Village's 2011-2013 Strategic Plan, achieving this goal will require "a high level of maintenance for public infrastructure as well as private property in addition to the need to revisit and renew the plans and strategies for infrastructural maintenance on a regular basis." However, achieving this goal first requires a definition of the desired level of service (see Strategic Goal 2), and then the preparation and implementation of capital improvement plans.

**FIG. 8. VILLAGE OF LAKE ZURICH 2011-2013 STRATEGIC GOALS AND VILLAGE BOARD OBJECTIVES**

### 1. Ensure the long-term sustainability of the Village

- 1.1. Ensure the maintenance of the Village's capital assets and infrastructure through systematic planning processes
- 1.2. Promote the overall development/redevelopment of the community
- 1.3. Utilize up-to-date best practices and policies
- 1.4. Attain fiscal balance and sustainability

### 2. Provide community-focused municipal services

- 2.1. Tailor service delivery to the needs of the community
- 2.2. Deliver Village services efficiently and effectively
- 2.3. Maximize the quality of Village services based on available financial resources and strategic prioritization

### 3. Facilitate informed decision-making

- 3.1. Provide timely, relevant, and high-quality information and analysis
- 3.2. Utilize results-oriented reporting and evaluation procedures
- 3.3. Promote interactive communication throughout the organization
- 3.4. Foster innovation and ingenuity at all levels of municipal operations to allow decision-making responsibility and accountability at the most effective organizational levels

### 4. Adhere to ethical behavior in all government operations

- 4.1. Comply with all contractual obligations and governmental regulations
- 4.2. Foster active stakeholder participation in government
- 4.3. Promote openness and transparency in governmental processes

Throughout this process, however, the task force found it difficult to ascertain the current condition and performance of much of the Village's infrastructure. What information exists is not compiled in a readily digestible form, is dated at different times, and so on. For the village to make informed choices about the future of its infrastructure and operations, the Board, staff and residents need to understand the present.

Furthermore, the Village needs to establish explicit water resources management priorities, and then consider where those priorities fit into broader priorities. Ideally the water, sewer, and stormwater functions of Lake Zurich would operate as a self-sufficient enterprise within the Village, with dedicated funding, rather than in competition for resources with such other functions as road maintenance, police protection, and so on. At the same time, this enterprise should not be the only entity within the Village responsible for pursuing the community's water resources goals. Aspects of parks management, economic development, fire protection, and building maintenance all present opportunities for improved water resources management.

#### **Objective 1.1**

*Ensure the maintenance of the Village's water resources assets through systematic, integrated planning processes.*

**The Village should prepare a current and comprehensive assessment of the state of its water, sewer and stormwater infrastructure system,** including that portion of the system that lies on private property. This will entail several independent studies—an infiltration and inflow (I&I) assessment, a review of detention pond conditions, soil and terrain mapping to identify optimal locations for stormwater improvement, a leak detection study, etc. This assessment is a necessary and critical first step.

**The Village should establish its water resources priorities, with short and long-term horizons, and set achievable, quantifiable goals consistent with them.** For instance, if I&I is deemed a priority by the Village, then an achievable goal would be reducing the daily peaking factor from 4:1 to 3:1 over the next 10 years.

Once these priorities and goals are established, **the Village should develop a screening process to vet potential investments.** This process should determine whether a single project can advance multiple goals, what amount of progress the

project provides in relation to its cost, and what external partners and funding sources exist that Lake Zurich could leverage.

All of these are consistent with what is called an "asset management approach." Developing such an approach could entail comprehensive training for staff and introductory education for Board members, including participation in workshops conducted by external partners. **The Village should explore a partnership with U.S. EPA's Region 5 to cultivate this approach to managing natural and built assets.**

#### **Objective 1.2**

*Integrate water resources management within overall economic (re)development and land use planning.*

While green infrastructure presents an opportunity for improving stormwater management within Lake Zurich, it is important to recognize that requiring green infrastructure could present an additional cost to development. This could be borne by the developer if Lake Zurich required it, or by Lake Zurich through incentives. **The Village should explore opportunities for integrating green infrastructure into all new development, including possible incentives if warranted.** Some incentives may not be financial; granting additional height allowances or reducing parking requirements can be attractive to developers of certain real estate products, and have the added benefit of reducing impervious surfaces.

The industrial stakeholders interviewed for this project expressed an interest in water reuse. Depending on what the Village determines its priorities to be, a practice such as capturing rainwater and using it for coolant, irrigation or sanitation would be the kind of initiative that would achieve multiple goals (by reducing potential inflow to the sewer and helping conserve water). **The Village should work with industrial stakeholders and the Chamber of Commerce to determine the level of interest in water reuse, and simultaneously work to educate industrial users about reuse options.** This is an initiative an industry could lead on behalf of the Village. It's important to note that at present, graywater reuse for non-potable purposes is discouraged by the Illinois Dept. of Public Health, while rainwater harvesting is allowed only by variance from the Illinois Plumbing Code. The state's code will be updated in the near future, pursuant to HB 4496, but until the time, it does constrain Lake Zurich's ability to pursue these practices.

The Parks Dept. maintains several tracts of land that have been given to the Village over time as part of real estate development transactions. Some of these have limited recreational value, but could possibly provide greater stormwater management benefits than they presently do. Additionally, some of the properties contain wetlands areas that might be attractive from an informational standpoint. **As the Village develops its comprehensive assessment of existing assets, these park properties and their potential role in stormwater management should be analyzed,** perhaps with the assistance of groups such as Chicago Wilderness, Openlands or the Liberty Prairie Conservancy.

#### **Objective 1.3**

*Utilize best management practices and context-sensitive technologies for water resources management.*

**Once the Village has developed its water resources management priorities, it should collect all pertinent information on the best management practices and context-sensitive technologies that will contribute to pursuing them.** Then the Village will need to use its screening method to determine which practices are most conducive to achieving its goals cost-effectively. Based on the priorities identified by the task force, the Village would stand to benefit from investigating practices to reduce I&I (e.g. rain barrel programs, downspout disconnection, sump pump disconnection, rainwater reuse, replacement of lateral lines), the risk of localized flooding (e.g. retention pond maintenance, infiltration basins), and the water quality impacts from stormwater runoff (e.g. alternative road salts, green infrastructure broadly). Per the request of the Village, additional detail on a handful of best management practices is included in sidebars throughout this report.

In the area of stormwater management, deploying context-sensitive technologies first requires a thorough understanding of soil types, terrain, land use, and drainage patterns. Some areas of Lake Zurich have relatively sandy soils, which could enable efficient infiltration; others have sharp inclines. Strategies to slow runoff could reduce erosive power and related nutrient loading to waterways. **As the Village develops its comprehensive assessment of existing assets, it should include a thorough analysis of its landscape to ascertain locational differences and a valuation of its green assets.**

**Objective 1.4**

Attain water resources fiscal balance, sustainability and resiliency.

**The Village should move toward full-cost pricing for its water, sewer, and stormwater services.** Revenue generated should be sufficient to cover operational expenses, debt repayment, planned capital expenses, and the steady build-up of a reserve fund. The Village should explore building a rate structure that guarantees sufficient revenue to maintain operations even if sales fall short of expectations. It is not clear at present whether the Village’s senior discount, for instance, is consistent with its overall water resources goals. As part of this, the Village needs to revise how it projects water sales.

**The Village should develop indicators of fiscal health and monitor them closely.** For instance, these indicators might include

desired ratios of cost to revenue, reserves to operating budget, and summer to winter revenue (fig. 9).

**The Village should explore a stormwater fee to fund stormwater-related services and capital investment.** This would help resolve the funding gap between stormwater expenditures and revenues, enable the Village to increase its capacity for proactive stormwater management, and if structured correctly, provide incentives to customers for improved onsite stormwater management. Stormwater fees are often based on a property’s square footage of impervious surfaces, which would be consistent with a goal of reducing stormwater runoff and related water quality impacts and localized flooding. Lake Zurich also may wish to explore a fee tied to I&I so as to encourage property owners to resolve their share of that problem.

**Strategic Goal 2**

Provide a level of water resources services informed by community desires and consistent with overall water resources management priorities.

Without a clearly defined level of service, and no mutually agreed upon contract between the Village and its residents, businesses and neighboring communities, there is no justification for prioritizing capital improvement projects. Defining that level of service will provide the Village with numerical benchmarks by which all stakeholders can evaluate performance.

**Objective 2.1**

Tailor water resources services to community needs and the Village’s desired level of service.

**The Village and its stakeholders should cooperatively define a level of service.**

This will be determined through survey, public forums, and other means. It should provide a clear statement of the community’s expectations of and willingness to pay for achieving defined levels of service – e.g. what level of unaccounted-for-flow, ratio of dry weather-to-wet weather flows, frequency of localized flooding, water quality, taste and appearance, water pressure for fire suppression, or response time in emergency situations is acceptable?

Determining that level of service will require substantial education so that all stakeholders understand the issues. That effort must entail the preparation of a single comprehensive document detailing the current condition of the village’s water resources assets – this report may well be the first step toward that – and information on the relative costs of repairing or upgrading those assets. There is close relationship between the community’s desired level of service and its willingness to invest, so the two must be discussed simultaneously.

Performance benchmarks such as leakage rates, wet weather wastewater flows, and emergency response time demonstrate to the community whether the money it invests through water and sewer rates, as well as property taxes, is being efficiently deployed in a manner consistent with the Village’s strategic goals and established priorities. Regular reporting of progress and investment outcomes is wholly consistent with the Village’s strategic goals related to openness and transparency.

**FIG. 9. FULL-COST PRICING**

Prices signal value to consumers, which is why it is important for prices to reflect the increasing scarcity of water. Water value includes the increasing financial obligation needed to maintain our water and wastewater systems’ aging infrastructure. Fortunately, much of Lake Zurich’s water pipes are relatively young; however, there is increased demand for stormwater and sewer capacity and need for additional resources. The EPA Office of Water views sustainable infrastructure as supported by four pillars: enhancing utility management, saving water through efficiency measures, cooperative ventures via the watershed approach, and full-cost pricing.

Full-cost pricing is usually interpreted to mean factoring all costs—past and future, operations, maintenance, and capital costs—into prices. Full-cost pricing can take the form of any of the rate structures discussed below, so long as all costs are recovered through prices. Most of the funding for water and wastewater comes from the revenues generated by prices. Pricing water to accurately reflect the true costs of providing high-quality water and wastewater services to consumers is needed both to maintain infrastructure and encourage water efficiency.

For more information: [http://water.epa.gov/infrastructure/sustain/financing\\_priceofwater.cfm](http://water.epa.gov/infrastructure/sustain/financing_priceofwater.cfm)

*Benchmarks*

The operating ratio (OR) can be used to show the ability of operating revenues to cover operating expenses. A utility that employs full-cost pricing will have an OR greater than 1.0, indicating that operating expenses are covered. Bond rating agencies frequently use the debt service coverage ratio (DSC) as a measure of a utilities’ debt carrying capacity. Utilities with a DSC ratio of 1.0 have just enough cash to cover debt service – less than 1.0 and they are likely paying debt service with transfers from the general fund. Average active debt per customer can be used as another indicator of a utility’s capacity for new debt. Finally, sufficiently funded emergency reserves are another measure of full-cost pricing. For example, a utility might choose to set aside the cost of replacing its largest pump in case of pump failure. It is generally recommended that a utility maintain one month’s worth of annual operating expenditures in cash reserves.

Metric	Calculation	Benchmark
Operating Ratio	$\frac{\text{Operating Revenues}}{\text{Operating Expenses}}$	1.0
Debt Service Coverage Ratio	$\frac{\text{Operating Revenues} - \text{Operating Expenses}}{\text{Debt Service}}$	1.0
Active Debt per Customer	$\frac{\text{Total Active Debt}}{\text{Number of Customers}}$	Average
Percent of Annual Operating Expenditures in Cash Reserves	$\frac{\text{Cash Reserves}}{\text{Annual Operating Expenses}}$	One month

## Objective 2.2

*Deliver water resources services efficiently and effectively.*

**The Village should assess which components of its desired objectives, best management practices, etc., must be executed by the Village itself, which could be done by private property owners (and of those, which would require incentives or mandates), and which could be accomplished by partnering with external partners.** For instance, Home Depot, the University of Illinois Extension, and other external partners conduct workshops on rain barrel installation, maintaining rain gardens, and other practices potentially consistent with Lake Zurich's water resources goals. The Village would simply need to coordinate and host those events. Similarly, U.S. EPA's WaterSense program, CMAP, American Water Works Association's Only Tap Water Delivers, American Society of Civil Engineers/Colcom Foundation's Liquid Assets, Water Environment Federation's Water is Life and Infrastructure Makes it Happen, and MPC and Openlands' What Our Water's Worth campaign all provide informational content that Lake Zurich could use if appropriate.

The Village should assess which water source, or sources, are most conducive to meeting established community needs. This is not an issue of aquifer vs. Lake Michigan (see appendix), but rather potable vs. non-potable. The Village, working with industrial, larger commercial, and institutional users, and the Chamber of Commerce, should assess what quality of water is required for meeting the needs of some of the primary uses in the community. For large landscaping, heating/cooling, and some washing and sanitation purposes, potable water may not be necessary. If it proves cost-effective, the Village could then explore means of providing the right quality of water for these uses.

## Objective 2.3

*Maximize the quality of Village water resources services based on financial resources and strategic prioritization.*

This objective requires setting priorities and defining a level of service. **The Village also should include quality of customer service as one of its operational goals.** When someone's street floods, or their car is damaged, or a water main breaks, Village staff need to be responsive and sensitive to the personal impacts on residents and property owners.

## Strategic Goal 3

**Facilitate informed decision-making regarding water resources by officials, staff and residents.**

Survey results and comments made at the community forum indicate that many residents and business owners feel uninformed about water resources issues in the Village; thus, they are unclear as to what the community's priorities are or should be. This is true for most of Lake Zurich's water resources challenges – stormwater runoff, I&I, financing, etc. It is particularly true for the upcoming referendum on the Lake Michigan allocation. Many residents – who ultimately will vote on the village's future water supply – feel they do not understand why this decision is being made at this time, the positive or negative ramifications, or related costs. This uncertainty was consistent among Board members and staff as well.

### Objective 3.1

*Provide timely, relevant and high-quality information and analysis for personal and community decision-making on water resources protection.*

**The Village should lay out a comprehensive case both for and against moving to Lake Michigan water, so that voters can choose the water source most consistent with the Village's established priorities.** This informational initiative should include a discussion of the pros and cons of the current groundwater regime in comparison to a potential Lake Michigan connection, and should be conducted through a variety of means so as to reach the most people possible.

### Model Water Use Conservation Ordinance

CMAP developed a Model Water Use Conservation Ordinance to provide assistance to communities that wish to promote water conservation initiatives. The ordinance addresses indoors and landscape water use in both the residential and commercial/institutional/industrial sectors. More than an ordinance, this document is a tool that contains commentary, potential water savings, current examples, and resources for further research. By adopting the requirements of the proposed ordinance, communities may achieve significant water use reductions while deferring the need for water infrastructure expansion.

Read more at [cmap.illinois.gov/water-2050/model-ordinance](http://cmap.illinois.gov/water-2050/model-ordinance)

The timing of the decision also must be explained to clarify implications of making the decision now or in a few years. For more on this, see the Lake Michigan Decision appendix (page 29).

**Given the amount of information needed for voters to make an informed decision on the Lake Michigan question, the Village also should consider delaying the public referendum currently scheduled for November 2012.** It will take a significant amount of time and effort for the Village to fully vet the costs, risks, and uncertainties of both groundwater and Lake Michigan water, and then convey those to voters.

Moreover, if as a result of this project the Village develops a set of water resources priorities and a strategic plan for achieving them, there may be other priorities deemed more pressing than switching water supply sources. For instance, if the Village opted to prioritize I&I reductions, the considerable cost of that effort might change voters' willingness to add new costs associated with a switch of water supply sources. By allowing more time for public education, voting residents should feel a greater degree of confidence that they are making an informed decision in the best long-term interests of the community.

Lake Zurich could delay its vote for a period of time without immediate ramification. The Ill. Dept. of Natural Resources (IDNR) would not immediately rescind an existing allocation permit if the public referendum is delayed to conduct additional research and education, but could rescind a permit if a referendum is held and the community votes to reject the water supply switch. However, this leniency will not last forever. Lake Zurich will need to make a decision one way or the other in the next few years. It is worth noting, however, that nearby Long Grove, Ill. held a public referendum on whether or not to move to Lake Michigan water before requesting an allocation. It was resoundingly voted down, but the municipal government moved ahead with the process and did receive an allocation from IDNR.

### Objective 3.2

*Use results-oriented reporting and evaluation procedures to build community awareness of progress made toward achieving strategic water resources goals.*

**The Village should prepare and disseminate an annual infrastructure and operations report, detailing progress**

**made toward its strategic water resources goals.** All water utilities, whether investor-owned or part of a municipal government, are required by the U.S. EPA to provide customers with an annual water quality report. Lake Zurich does this, and in recent years it has focused on the success of the ion-exchange system for removing naturally-occurring radium from the deep aquifer water. This is in itself a good practice, but attendees at the community forum noted it was the only documentation they receive from the Village on water issues, and as a result they were under the impression that water quality assurance was a major ongoing concern. Lake Zurich also should provide a similar report detailing progress made toward goals related to infrastructure and operations.

### Objective 3.3

*Promote interactive communication throughout the village and between residents and the Village's officials and staff, to build awareness of the Village's strategic water resources plan.*

**The Village should first determine the preferred method(s) of communication between itself and its residents and businesses.** The Village has many cost-effective means at its disposal—monthly bills, local cable TV, e-newsletters, the Village web site, Facebook, Twitter, information sent home with school children, etc. To determine which medium is best for disseminating information, the Village should survey stakeholders to determine their preference. The survey itself will need to be done through different means, so as to not bias the results of the survey.

Once the appropriate means of communications is determined, **the Village should provide regular updates on progress made toward its strategic goals.** This is one of the advantages of developing numerical goals for water resources management – i.e. reduce I&I by 50 percent, provide rebates for 500 rain barrels, etc. By continually updating residents and businesses on progress toward these goals, water resources issues will be top-of-mind and utility customers will know where their money is going.

### Objective 3.4

*Foster water resources management innovation and ingenuity throughout the community, and encourage responsibility and accountability at the most effective level of water resources management.*



**The Village should foster innovation and ingenuity by tapping existing informational opportunities of external partners.** The Village should reach out to potential partners within the region to bring speakers to Board meetings, Chamber of Commerce sessions, industrial council gatherings, school events, and so on. These can be purely informational, and the topics should be consistent with the Village's established objectives. In addition to the project team for this report, other potential partners would include the Illinois State Water Survey, GreenTown, College of Lake County, Chicago Wilderness, Illinois Sustainable Technology Center, and other groups with established programming.

**Additionally, Village Board members and staff should explore cost-effective opportunities for continuing education.** The groups listed above often host events throughout the region, and usually at little cost. Regular attendance at these events by Board members and staff would require at least some dedicated funding for registration fees and travel, and that cost should be accounted for in the comprehensive water resources budgeting process.

**The Village should expand its participation in regional and sub-regional coordinating bodies, to leverage resources, partner on solutions at the scale of water resources, and benefit from programming and expertise outside the community.** Lake Zurich is a member of the Des Plaines River and Flint Creek Watershed planning groups, as well as the Lake County Stormwater Commission municipal advisory committee. Newer water supply focused groups – the Northwest Water Planning Alliance, and any future iterations of the Northeastern Illinois Regional Water Supply Planning Group – present additional options for Lake Zurich.

**The Village should survey residents and businesses to determine their willingness and ability to implement aspects of the strategic water resources management plan on their private properties.** Once the Village has established and articulated its water resources priorities and begins examining best practices that could be a part of implementation efforts, it should identify which of those measures can or should take place on private properties. For instance, rain barrels, rain gardens, downspout disconnections, natural lawn care, and rerouting of sump pump discharge could all be effective means for the Village to pursue its goals and decentralize some of the responsibility for implementing the plan.

## Strategic Goal 4

Adhere to ethical, transparent behavior in water resources management.

Many of the components of ethical, transparent behavior in water resources management have been addressed above: providing a steady stream of information to residents and businesses, utilizing current budgeting practices, developing metrics to track success.

### Objective 4.1

*Comply with all contractual obligations and governmental regulations germane to water resources management, and proactively communicate with the community about the status and potential consequences of pending regulations.*

**The Village should establish a comprehensive and regularly updated public document or web site to provide an overview of its regulatory obligations to county, state and federal agencies.** Lake Zurich, like many communities, is

**FIG. 10. RECOMMENDED FUTURE RESEARCH AND ANALYSIS**

Implementation Measure	Lead, Partners	Role for Consultant?
Establish level of service metrics for the Village's water services	Village Administration, Public Works Dept.	Can be done internally
Perform updated infiltration & inflow assessment	Public Works Dept.	Likely requires contract with an engineering firm specializing in municipal sanitary and storm sewer systems
Review detention pond conditions	Public Works Dept.	Can be done internally, with a watershed partnership, and/or through contract with firm specializing in drainage engineering and natural resource management assessments
Map optimal stormwater improvement opportunities	Public Works Dept.	Same as above
Analyze current water rates to ensure sufficient revenue to maintain established level of service	Finance Dept., Village Administration, and Public Works Dept.	May require contract with a firm specializing in financial planning and water resources economics
Explore opportunity to create a stormwater utility fee	Finance Dept., Village Administration, and Public Works Dept.	Initial estimates can likely be done internally. More detailed analysis may require a contract with a firm specializing in financial planning, stormwater management, and land use planning
Research what the O&M cost savings could be if no longer using Village's current water supply source and ion-exchange system	Finance Dept., Village Administration, and Public Works Dept.	Can be done internally
Conduct more detailed study of groundwater levels for Lake Zurich to understand future supply availability	Public Works Dept.	Likely requires contract with Ill. State Water Survey or an engineering firm specializing in groundwater resource investigations
Analyze potential rate changes for community if switching to a Lake Michigan water source	Village & Consultant	May require contract with a firm specializing in financial planning and water resources economics
Estimate costs for new infrastructure if switching to a Lake Michigan water source	Finance Dept., Village Administration, and Public Works Dept.	Can be done internally

beholden to a complex array of regulatory requirements, and at present there is no single document or web site explaining all of them and how they influence – or control – municipal decisions. By laying all of these out for Board members, staff, residents, and businesses, as well as developing compliance metrics and reporting regularly, the Village will greatly enhance the transparency and logic of many water resources decisions.

**Objective 4.2**

*Foster active stakeholder participation in water resources management.*

**The Village should work with homeowners associations to establish their roles in implementing the strategic water resources plan.** From retention pond maintenance to road salting, fertilizer usage to sump pump management practices, Lake Zurich's many homeowners associations can and should be valuable partners in achieving the village's strategic goals.

**Objective 4.3**

*Promote openness and transparency in water resources management processes.*

**The Village should continue its current system of billing on a monthly**

**cycle, and explore options to provide more information on water resources issues through its water bills.** Once the Village's meter system is fully automated, monthly billing will become less onerous and staff-intensive. Providing monthly bills gives relatively current usage information to customers and helps them make informed decisions about future water use. Changing the format of the water bills to include information on the customer's historic usage trends, or comparisons to the usage of comparable customers also would help customers make more informed decisions. Templates for bills like this exist and are common for electricity and cellular phone services.

**The Village should consider establishing a citizen advisory committee for water resources issues, so as to build a base of knowledgeable community members able to help implement the strategic water resources plan.** This advisory committee would help establish priorities, track success, and serve as a group of ambassadors to the rest of the community. By bringing informed community members into the decision-making process, Lake Zurich will cultivate a new sense of openness and transparency, consistent with the logic of this project.

**Conclusion**

As Lake Zurich moves ahead with developing its strategic plan for water resources, this report will help Village officials and staff set priorities, clearly articulate the pros, cons and uncertainties of any given decision to residents and other stakeholders, and choose and implement optimal practices to meet the community's goals (fig. 10). MPC, CNT, CMAP, and IISG all eagerly await the next step in this ongoing process – the Village's prioritization and goal setting – and the subsequent implementation.



# Appendices

## The Lake Michigan Decision

The Village of Lake Zurich has secured an allocation permit from the Ill. Dept. of Natural Resources (IDNR) to receive a daily average withdrawal of 2.1 MGD (with a peaking factor of 1.75, for 3.675 MGD) of Lake Michigan water. Initially, Lake Zurich ventured into the Lake Michigan discussion with several other communities in western and northern Lake County, all of which have concerns over the long-term viability of groundwater resources. Many of the other communities rely on shallow aquifer wells, whereas Lake Zurich relies on deeper sources and faces a unique array of management concerns as a result, most notably the need to remove naturally occurring radium and other compounds.

The initial proposal for these Lake County communities was to be part of one supply chain, requiring a substantial investment in a new 50-mile pipeline to bring water across the northern border of the county, then down the western edge to Lake Zurich, which would have been the last community on the line. The total cost of that project, and Lake Zurich's contribution to it, were deemed excessive by the Village Board, particularly given the village's close proximity to several alternative means of connecting to lake water. The Village withdrew itself from the larger Lake County proposal and is now vetting several different options to connect to an existing user of Lake Michigan water, if that is the direction the village's voters choose to go. These different options – buy from Option X vs. Option Y – have different costs associated with them.

The decision of whether or not to switch to Lake Michigan as Lake Zurich's source of water is currently planned for November 2012 by public referendum. Voters will be asked whether the Village should act on the allocation permit, and make the move to Lake Michigan water, or stay on the existing groundwater source. The advantage of this timing is that the overlap with a national presidential election should mean a high number of voters. It should be noted that IDNR does not require such a public referendum, nor do they require an immediate decision by the Village as to whether it will act on the allocation permit. IDNR will take no immediate action if the Village needs more time to do research or inform voters about the options, though a decision would

still need to be made within the next year or two. If voters choose to stay on groundwater, IDNR could file a petition to rescind the allocation permit, though that, too, would take some time. If that happens, the Village could still re-file for an allocation permit at some point in the future and begin the process over again.

Regardless of when the actual decision is made, this project team recommends the Village should lay out a comprehensive case both for and against moving to Lake Michigan water, so that voters have the most thorough and objective information available as they choose the water source most consistent with the Village's priorities. This decision, as much as any other the Village must make in the coming years, is not simply about water supply, but is heavily influenced by wastewater and stormwater issues, and thus requires viewing the village's entire water portfolio as one complex system. The following information may aid in that process:

### Arguments for Lake Michigan Water

- A shift to lake water would reduce the costs of operating and maintaining the ion-exchange system to remove radium and naturally occurring contaminants from the groundwater. These costs would not totally disappear, as the Village would need to maintain a limited number of its deep wells and ion-exchange system in case of emergency. Protecting that back-up option is part of building a resilient water supply system. The Village should identify these operational cost reductions, as well as the ongoing maintenance costs, and make them both clear to voters.
- It is possible that the disposal and treatment costs associated with the radium-laden wastewater backwash could increase over time if Lake County's treatment facilities require upgrades or if safety regulations are strengthened. This is a known risk, but the likelihood of this happening is uncertain.
- Community survey results and anecdotal evidence suggest that many residents and businesses do not trust current water quality, despite the investment

in ion-exchange technology in the past decade. That lack of trust may be carrying over to other elements of the Village's water management, and even to other non-water issues. A switch to lake water might mitigate this trust gap, and encourage skeptics to re-engage in the village's water decisions.

- A switch to lake water would move Lake Zurich largely out of water treatment (with the caveat above that the Village may need to maintain some deep aquifer wells in case of emergency). This would reduce much of the regulatory burden and reporting requirements – and related costs – on Lake Zurich associated with compliance with the U.S. Safe Drinking Water Act. Those cost reductions could be offset, however, if the cost of procuring water increases.
- There may be an opportunity to sell lake water to neighboring communities, which could generate some revenue for the Village, but also might increase operating costs and even require capacity improvements to water infrastructure. If revenue generated from water sales exceeds the marginal increase in operating and capital costs, then this may be a good option for Lake Zurich.
- The research done in conjunction with *Water 2050: Northeastern Illinois Water Supply/Demand Plan* demonstrates that water levels in the region's deep aquifers are declining, and that within the next 30 to 50 years, these water resources may not support all expected needs. At present, withdrawal rates exceed recharge rates; as a result, the deep aquifer is essentially being mined. Like coal or oil, once removed from the ground, these water resources will not recharge any time soon. A region-wide commitment to conservation and efficiency could extend the usable lifespan of the deep aquifers, and Lake Zurich should participate in those regional efforts. With that said, if the village and other communities around it continue to grow, the time may come when the deep wells cannot sustain the people, businesses, and ecosystems of Lake Zurich.

- Federal rules limit how much water Illinois can divert from Lake Michigan in any given year, and a portion of that total is then allocated for public consumption. Having permitted allocations to Lake Zurich and other communities in western Lake County, Illinois' current diversion is now hovering at about 95 percent of its allowable total (though that percentage fluctuates from year to year). Competition for that remaining percentage could be intense, particularly if the deep aquifers serving the southwestern portion of the Chicago region continue to be depleted at current rates. If Lake Zurich voters were to reject the lake water option in the upcoming referendum, IDNR might rescind the existing allocation permit. Lake Zurich could reapply for a permit in the future, but there is no guarantee that any water would be available.

### Arguments for Groundwater

- Lake County currently controls a portion of Lake Zurich's wastewater costs and rates; when the County's costs and rates go up, so do the Village's. In contrast, Lake Zurich controls all of its groundwater-related infrastructure, and thus the associated costs and rates. A switch to lake water would eliminate that self-control. Lake Zurich likely would become a member of a Joint Water Action Agency; that body would have control over water rates, and Lake Zurich would have some say in determining those.
- The deep aquifer water Lake Zurich currently uses has naturally occurring contaminants, but because it is capped by bedrock, that water is largely protected from any new, man-made contamination. Fertilizers, road salt, and the class of emerging contaminants known as endocrine disruptors are essentially a non-issue for Lake Zurich as long as it stays on deep aquifer water. Lake Michigan, in contrast, is very susceptible to contamination by those compounds and others. Evidence from studies by the Alliance for the Great Lakes suggests that endocrine disruptors are already in the lake. Moreover, if the U.S. EPA, state, or county increase water treatment requirements, it would lead to an increase in treatment costs for whomever Lake Zurich purchased water from. This is a known risk, but the likelihood of this happening is uncertain.
- There will be a cost for new infrastruc-

ture to connect to a supplier of lake water. The Village is vetting several supplier options and an array of possible costs. Beyond building that infrastructure, there will then be the ongoing cost to actually purchase water and maintain any portion of the connection system controlled by Lake Zurich.

- Those capital and operations costs will be on top of the Village's existing debt obligation stemming from the construction of the ion-exchange system. This debt should be paid off in 2029. At least for the near future, a switch to Lake Michigan water would mean paying for significant new water delivery infrastructure while continuing to pay off the debt for an advanced treatment system that would no longer be in regular use (but would need to be maintained in good working condition, in case of emergency).
- Additionally, if Lake Zurich develops a strategic plan for its water resources that prioritizes investment in its wastewater system, infiltration and inflow solutions, etc., then those costs would be on top of existing debt obligation as well.
- Lastly, despite the fact that Illinois does have a defined limit as to how much water can be diverted from the lake every year and that the state is currently at about 95 percent of that, there is a strong possibility that an allocation could still be available 10 to 20 years from now. That said, 10 years ago when Lake Zurich built its ion-exchange system, no allocation was available.
- Per capita usage of Lake Michigan water has been on the decline for many years for a variety of reasons, including efficiency gains in plumbing and fixtures, increases in water rates, and a growing commitment to conservation. In the next round of allocation permitting, it is possible, even likely, that the amount of water allocated to each permittee will drop, freeing up more water for other communities. Likewise, improvements in water infrastructure to reduce leakage also would increase the amount of water available for allocation.
- Moreover, public consumption is not Illinois' only use of Lake Michigan water. A substantial portion of the state's allowable diversion – roughly 10 percent – is used in Cook County for flushing

waterways clean of residuals from sewer overflows after large storms. The Metropolitan Water Reclamation District of Greater Chicago's large Tunnel and Reservoir Plan is slated for total completion in 2029. In theory, at that point the 10 percent of the lake diversion used for those sanitary purposes may no longer be necessary, and thus could become available for public consumption. It is also possible that Illinois' allowable diversion could be reduced when this water is no longer needed for sanitation.

- Improved stormwater management in areas close to the lake (largely in Cook County) could increase available supply allotments if stormwater were returned to the lake. Large-scale adoption of rainwater harvesting and reuse would have a comparable affect, as consumed rainwater would offset stormwater runoff and pumpage from the lake.
- None of this is guaranteed, but there is a strong possibility that lake water might be available in the future.

### Other Considerations

- Lake Zurich has an approved allocation of Lake Michigan water now, and while it is possible that the community might be able to acquire another allocation, it is equally possible that it might not. The future availability of Lake Michigan water is unknown at present.
- Lake Zurich officials and staff have yet to determine how much it would cost to move onto Lake Michigan water, and so cannot yet compare that with the anticipated costs of remaining on groundwater.

See [fig. 11](#), next page, for a further examination of the water supply decision.



**FIG. 11. LAKE ZURICH WATER SUPPLY DECISION MATRIX**

Stay with groundwater		Switch to Lake Michigan water	
+ Benefits	- Risks	+ Benefits	- Risks
+ Maintain local control regarding costs and rates for supply	- Future groundwater availability is not certain	+ Guaranteed supply as stated in IDNR permit	- Loss of local control regarding cost of service and subsequent rates
+ Do not incur additional costs/rates for new supply source	- May lose opportunity to switch to Lake Michigan water in the future	+ Lake Zurich is no longer directly responsible for regulatory requirements related to supplying water	- Village will incur new, additional costs/debts for building infrastructure to use Lake Michigan supply and maintain infrastructure and transmission costs over time
+ Few neighboring communities use the deep aquifer groundwater that Lake Zurich currently uses	- Possible regulatory changes in future could increase costs of treatment and disposal of naturally occurring contaminants	+ Potential opportunity to sell lake water supply to neighboring communities	- Required to pay existing debt obligations for current groundwater infrastructure and will incur maintenance costs for keeping current groundwater supply system running as back-up
+ With the ion-exchange technology, current supply is within water quality standards		+ Community may have more trust in Lake Michigan supply quality and may not incur as much cost for investing in bottled water	- Susceptible to emerging contaminants such as pharmaceuticals
+ Supply source protected from emerging contaminants such as pharmaceuticals			

## Memorandum of Understanding

*Metropolitan Planning Council Agreement For Development of an Integrated Water Resources Plan*

### Scope of Services

The purpose of the Integrated Water Resources Management Team (hereafter known as the “Team”), led by the Metropolitan Planning Council (MPC) and consisting of the Chicago Metropolitan Agency for Planning, Center for Neighborhood Technology, University of Illinois Extension, and Illinois-Indiana Sea Grant, is to advise the Village of Lake Zurich as it develops an integrated water resources plan addressing water supply, wastewater, and storm water management. The Team will be comprised of members from the above agencies as well as an MPC Community Building Initiative task force of technical experts from a variety of fields – public or private utilities, engineering, planning and design, real estate development, plumbing, water management, finance and cost analysis, and resource economics – that will provide their expert knowledge and assistance to complete the work.

The Village of Lake Zurich is at a critical decision making time where it has to weigh 1) the substantial financial costs and benefits of major water infrastructure investments to meet existing and future demand; 2) an assessment of possible stormwater management and other water-related impacts from redevelopment of its downtown; and 3) opportunities for economic and resource use efficiencies gained through water reuse. There are concerns about the long-term availability and rising costs of deep aquifer water, and the Village has obtained a Lake Michigan allocation as an alternate supply. The potential for significant investment calls for an exploration of supply and demand management and future planning that could impact infrastructure investment options. Stormwater systems experience periodic flooding under extreme conditions. Further, it remains unclear whether the current system of exporting wastewater to Lake County treatment facilities is the best long-term strategy. An integrated water resources plan comprehensively and simultaneously addresses water supply, wastewater and storm water management, with an eye toward revenue stability, efficiency of operation, and environmental protection. These three areas of water policy, planning, and

management are often artificially separated in many organizations. An integrated approach seeks to mitigate that condition, leading to far better results.

MPC, through the Community Building Initiative, works with community partners throughout the Chicago region to tackle local issues related to natural resources management, transportation, housing, and economic development. The Initiative brings together public and private sector experts to support communities as they work to address complex land use and development challenges. Although this study will be water-resource focused and thus, impact the entire village, specific examples of additional community challenges that would be amenable to this approach are (1) the village’s downtown redevelopment effort and (2) revitalization of the village’s industrial park.

MPC will lead the Integrated Water Resources Management Team. The members of the Integrated Water resources Management Team and its task force bring a diverse and essential set of skills to perform a needs assessment and provide recommendations to address supply and demand-side management strategies, green infrastructure,

conservation programs, financial capacity, and public education for the Village of Lake Zurich.

Working with designated Village of Lake Zurich staff, elected officials, and a Lake Zurich Project Group of local stakeholders that can offer background on village utilities, planning and design, real estate development, building codes and current water management, the Team will undertake an information-gathering phase. The Team and task force will conduct a multi-day comprehensive needs assessment by reviewing local water management practices, projected demand and infrastructure needs, regional considerations, revenue and cost concerns, and other issues. The Team and task force also will review technical materials and tour relevant facilities in order to help the community develop a strategy for future action.

### **Term of Agreement**

March 2011 – December 2011; Renewable Upon Mutual Agreement

### **Proposed Approach**

At the onset of the Integrated Water Resources Management Team's work for the Village of Lake Zurich, the Team will meet with designated village staff and elected and appointed officials to refine and initiate the project. The Team and task force will then remain available as advisors throughout the term of this agreement.

In order to assist the Village of Lake Zurich with assessment of its water supply needs and develop a set of recommendations, the Team and task force will work with Lake Zurich elected officials, staff, and Project Group stakeholders to address issues including the following. These will be further refined during the initial stage of the project:

Defining the community's water goals and objectives, their impact on water management decisions within the context of water supply, wastewater, and storm water issues, and opportunities for funding;

Identifying strategies to coordinate policies across departments to protect water quality and maintain existing infrastructure, including integrating both water and "non-water" policies, such as building and plumbing codes, zoning ordinances, salt use, lawn care, parking requirements or fire protection, into water-related decision making, utilizing national best practices and standards;

Developing strategies to balance projected supply with demand management;

Developing local capacity to ensure the long-term financial viability of the water system;

Assessing optimal wastewater management strategies, including potential for economic development opportunities stemming from wastewater reuse;

Assessing storm water management, particularly in the context of downtown redevelopment plan;

Defining public education and communications strategies to support implementation of the recommendations.

### **Activities/Products**

The Team will present the initial scope of service to the Village Board, and work with the Village of Lake Zurich to determine the best means of engaging residents and stakeholders over the Term of this Agreement. This could entail a town hall meeting, education through local water bills or community newsletters, or surveying to assess pre- and post-project understanding of water-related challenges and opportunities.

The Team and task force will then review available data, plans and codes, convene key stakeholders and experts for a series of interviews, and deliberate on strategic recommendations to guide Lake Zurich toward its water goals and objectives. The Team will produce a written report and verbal presentation detailing the recommendations of the Team and task force and providing examples of best practices from the region and around the nation. The Team will maintain editorial control over the scope and content of such a report, and before releasing anything to the public, will share materials in advance with designated Village staff for factual review and for consultation on the scope and timing of an appropriate distribution. Lake Zurich acknowledges that the copyright, if any, for this final work product shall belong to the Integrated Water Resources Management Team, however the Team hereby agrees that Lake Zurich may use the final work product and any data or material created or collected by Lake Zurich related to this Agreement or the final work product for any purpose related to Lake Zurich business and operations and may reproduce or use the final work product and any associated data or material as Lake Zurich deems appropriate without any additional compensation to or need for permission from the

Team. However, Lake Zurich agrees not to sell the copyrighted material to third parties solely for Lake Zurich's financial profit. To the extent any of this final work product or associated data or material is considered subject to the Illinois Freedom of Information Act, Lake Zurich may produce such material in a manner consistent with that Act without additional notice to or permission from the Team. MPC will be the primary point of contact between Lake Zurich and the Team.

Cost of Service: \$8,000. The Village of Lake Zurich will pay the Metropolitan Planning Council \$4,000 upon execution of the agreement and \$4,000 upon receipt and Village approval of the final report and final presentation to the Village Board on the Team's recommendations.

### **Confidentiality**

To the extent not inconsistent with the terms of this agreement, the Village of Lake Zurich, Integrated Water Resources Management Team and the members of its task force agree to maintain the confidentiality of all projects, draft documents and other aspects of work conducted pursuant to this agreement, provided that none of the parties shall be required to maintain confidentiality with respect to any project, document, or other information that constitutes a public document or that is otherwise subject to disclosure under the Illinois Freedom of Information Act. There shall be no financial penalty or claim of breach in the event of a claim that confidentiality has been compromised.

### **Follow Up**

The Team will contact the Village after the term of this agreement to assess the success of the Team's recommendations, gain feedback about the Village's satisfaction with services related to this Agreement, and determine if there are ways that the Team and the members of task force can be of further assistance.

The parties hereto have executed this Agreement, effective March 7, 2011.

Signed: Bob Vitas, Former Administrator, Village of Lake Zurich; and MarySue Barrett, President, Metropolitan Planning Council

## Interviewed Stakeholders

Mike Adam  
Lakes Management Unit  
Lake County Health Dept.

Gerry Bloomer  
Sandy Point Homeowners Association

Suzanne Branding  
President  
Village of Lake Zurich

Dave Brask  
Dave Brask Office Building

Michael Brown  
Public Works Dept.  
Village of Lake Zurich

Jim Connors  
Administrator  
Village of Deer Park

Robert Duprey  
Public Works Dept. (former)  
Village of Lake Zurich

Lyle Erstad  
Director of Facilities  
Community Unit School District 95

Jeffrey Halen  
Board of Trustees  
Village of Lake Zurich

David Heyden  
Director, Public Works Dept.  
Village of Lake Zurich

Ken Klick  
Cuba Marsh Forest Preserve

Kathy Kozlowski  
Villas at Lucerne Lakes Homeowners Association, Inc.

Jim Maiworm  
Public Works Dept. (former)  
Village of Hawthorn Woods

Terry Mastandrea  
Board of Trustees  
Fire/Rescue Dept. (former)  
Village of Lake Zurich

Donna Mazurkiewicz  
Concord Village Homeowners Association

Patsy Mortimer  
Flint Creek Watershed

Vincent Mosca  
Hey and Associates, Inc.

Mike Novotney  
Lake County Stormwater Commission

Hank Paulus  
President (former)  
Village of Lake Zurich

Phil Perna  
Lake County Public Works

Dale Perrin  
Lake Zurich Area Chamber of Commerce

Tom Poynton  
Board of Trustees  
Village of Lake Zurich

Dana Rzeznik  
Board of Trustees  
Village of Lake Zurich

Dick Schick  
Lake Property Owners Association

Steve Schmitt  
Public Works Dept.  
Village of Lake Zurich

Nancy Schumm-Burgess  
Schumm Consulting, LLC

John Sfire  
The Fidelity Group

Jonathan Sprawka  
Board of Trustees  
Village of Lake Zurich

Richard Sustich  
Board of Trustees  
Village of Lake Zurich

Dana Swanson  
Mohawk Point Homeowners Association

Judi Thode  
Oak Ridge Marsh Conservation Group  
Robertson Avenue Homeowners Association

Bob Vitas  
Administrator (former)  
Village of Lake Zurich

Mike Warner  
Lake County Stormwater Commission

Dave Wheelock  
Fire/Rescue Dept.  
Village of Lake Zurich

Kurt Woolford  
Lake County Stormwater Commission

Al Zochowski  
Finance Director (former)  
Village of Lake Zurich

# Survey Results

## Water Source and Usage

How is your water delivered to your home?

Municipal Water Supply	94.2%
Private Well	3.5%
Not sure	2.3%

What is the source of the water that is delivered to your home?

Underground aquifer	79.6%
Surface water (lake, river)	1.5%
Not sure	18.8%

About how many gallons of water do you think your household uses indoors (for drinking, bathing, cleaning) on a typical day? *Please make your best guess.*

Range	0 to 18,000
Average	546
Median	133

How would you describe your household's water use?

Use an average amount for water	58.5%
Use more water than average	10.0%
Use less water than average	25.8%
Not sure	5.8%

About how much do you pay for water and sewer in a typical month?

Range	\$5 to 5,100
Average	\$120.70
Median	\$48

How would you describe your typical water and sewer bill?

I pay an average amount for water	45.4%
I pay more than average for water	32.3%
I pay lower than average for water	9.6%
Not sure	12.7%

Do you currently have water-saving devices installed in your home (for example, low-flow toilet or showerhead)?

Yes	66.5%
No	25.8%
Not Sure	7.7%

## Tap and Bottled Water

How often does your household drink bottled water at home?

Never	17.8%
Infrequently	25.6%
Sometimes	16.7%
Frequently	15.1%
Always	24.8%

What percentage of all your household's drinking water consumption at home comes from bottled water? (Please make your best guess)

Range	0 to 100%
Average	35.6%
Median	10%

How much does your household spend on bottled water each month? (Please make your best guess)

Range	\$0 to 600
Average	\$21.84
Median	\$10

## Stormwater

My home floods:

Never	73.5%
Several times per year	4.3%
1 or 2 times per year	3.2%
Once every 2 to 3 years	1.2%
Less than once every three years	17.8%

Where do you think stormwater in your community goes after it enters a storm drain or roadside ditch?

Directly into surface water (lakes, rivers, streams) without treatment	41.5%
To a wastewater treatment plant, and then to surface water (lakes, rivers, streams)	26.1%
Not sure	28.9%
Other ( <i>write-in responses follow</i> )	3.6%
Both (a) and (b) above, Recharge, Retention/De-tention	

Are you aware of stormwater problems, such as flooding? *Check all that apply.*

On your property	21.5%
On other peoples' properties	48.1%
In the street	37.7%
Not sure	28.1%
Other ( <i>write-in responses follow</i> )	

Areas in need of maintenance, Buffalo Creek, Ditches, Near Waterways, Other neighborhoods, Parks

Where have you read or heard about stormwater issues affecting the Village? *Check all that apply.*

Lake Zurich Courier	25.8%
Lake Zurich Patch	10.4%
Daily Herald	33.1%
Chicago Tribune	9.6%
Village web site	12.3%
Other Internet or web site	3.8%
TV news or weather	4.6%
Radio	2.7%
Other newspaper articles	3.5%
Word of mouth	21.9%
Not sure that I have heard about storm water issues	36.9%
Other ( <i>write-in responses follow</i> )	

Lake Zurich Area Chamber, LZACC, Personal Observation, Village Meetings, VOLZ Newsletter

Have you ever used any of the following to manage stormwater on your property? *Check all that apply.*

Sump pump	79.2%
Planting trees	27.7%
Dry well	3.1%
Rain barrel	9.2%
Rain garden	3.1%
Native plants	10.8%
Re-directing downspouts	58.8%
No	10.4%
Other ( <i>write-in responses follow</i> )	

Drain Tile, Drainage Pipe, Regrade Landscaping Retention, Runoff Gully, Sump Pump to Storm Sewer, System Maintenance

Have you ever observed any of the following conditions in the lake of Lake Zurich?

Lake looks green	28.5%
Areas of cloudy blue-green water	21.9%
Surface scum (green, blue, white)	29.2%
Strong odors	20.0%
None of the above; clear water	45.0%

## Lake Michigan Water Service

Are you aware that the Village of Lake Zurich has received an allocation for Lake Michigan water supply from the Illinois Department of Natural Resources?

Yes	74.3%
No	25.7%

Suppose there were a referendum tomorrow to obtain approval for the Lake Michigan water supply project. Passage of the proposal would cost your household \$10 more every month on your water bill for the foreseeable future. Would you vote for the proposal?

Yes	58.3%
No	41.7%

What is the highest monthly water bill increase that you would be willing to pay for the foreseeable future to fund the Lake Michigan water supply proposal?

\$0, would not vote for the program	41.7%
\$5	14.7%
\$10	19.8%
\$15	7.1%
\$20	6.3%
\$25	3.6%
\$30	4.8%
\$35	0.4%
\$40	1.6%

If you indicated that you would not vote for the program, why?

I think the current water source is adequate. We do not need Lake Michigan water.	17.1%
I support the proposal to attain Lake Michigan water, but do not think I should have to pay for it in increased water bills.	13.3%
I do not think that this program would be cost-effective. We should use our newly upgraded treatment facilities.	43.8%
Other ( <i>write-in responses follow</i> )	25.7%
Against Bill Increase, Avoid Sunk Cost, It removes local control, Lake Michigan Water Quality Concern, Need Cost Info, Need More Info, Protect Great Lakes	

## Future Water Choices

We are interested in your opinions about water resources in your community. For each statement below, please choose *one* answer that best describes your level of agreement.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
Unfiltered water from the faucet is safe to drink	24.4%	40.0%	16.0%	18.0%	1.6%
Conserving water is important	56.8%	40.4%	1.2%	1.2%	0.4%
I like the taste of unfiltered water that comes directly from the faucet	16.0%	38.0%	19.6%	18.8%	7.6%
There is a possibility of a water shortage in Lake Zurich in the near future	4.4%	34.0%	24.4%	13.2%	24.0%
Property tax increases to finance water, wastewater, and storm water related issues should be avoided	42.8%	27.6%	19.6%	5.6%	4.4%
It is safe to use rainwater for some indoor uses, such as flushing toilets	21.6%	42.8%	14.8%	4.8%	16.0%
The way I maintain my home (lawn care, trash disposal, pet care) affects the water quality of lakes and streams in my community	36.0%	48.4%	6.4%	4.4%	4.8%
Managing stormwater is the responsibility of the village	29.6%	61.2%	4.0%	1.2%	4.0%
Water and wastewater bills should be kept low	37.6%	50.0%	7.2%	0.8%	4.4%
Water efficient toilets flush effectively	16.0%	41.6%	21.2%	8.0%	13.2%
Water-conserving outdoor landscapes, such as those that feature native plants, look as good as traditional lawns	26.0%	42.4%	16.0%	0.8%	14.8%

Below is a list of actions that residents might take to help conserve and protect their communities' water. For each, please indicate which of these actions you already do. For those actions you do not already do, indicate how willing you would be to undertake the action.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
Install water-efficient plumbing devices (for example, low-flow toilet or showerhead)	51.2%	12.8%	24.8%	4.0%	5.6%
Reduce the amount of salt used on sidewalks, driveways, and streets during the winter	49.6%	18.4%	21.6%	8.0%	0.8%
Install a rain barrel	9.6%	28.0%	31.6%	17.6%	11.6%
Test soil prior to applying lawn fertilizer	11.2%	23.6%	27.2%	17.2%	19.2%
Dispose of household hazardous waste, such as motor oil, pesticides, and pharmaceuticals, at a community collection day event	64.4%	27.2%	5.2%	0.4%	1.2%
Convert yard area from lawn to native landscape	14.8%	18.4%	26.4%	28.8%	10.0%
Reduce the amount of weed and feed used on lawn	33.6%	20.0%	31.6%	7.2%	6.0%
Use less water at home during storm events	24.8%	33.2%	24.8%	2.8%	12.8%
Replace concrete and asphalt on your property with permeable pavers	7.6%	11.6%	29.2%	32.8%	17.2%
Repair or replace privately owned lateral lines running from the house to the street sewer. ("Lateral line" is the water delivery pipe supplying water to your home from the main valve)	5.6%	7.6%	17.2%	32.8%	35.2%
Let lawn go dormant (brown) during periods of drought	52.4%	14.0%	22.4%	8.8%	0.8%

## Demographic Questions

What is your gender?

Female	37.3%
Male	62.7%

Age

18-24	0%
25-34	12.3%
35-44	18.4%
45-54	29.5%
55-64	31.1%
65+	8.6%

What is the highest level of education you have completed?

High school or equivalent	4.1%
Vocational/technical school (2 year)	3.7%
Some college	16.4%
Bachelor's degree	45.5%
Master's degree	26.2%
Doctoral degree	1.6%
Professional degree (MD, JD, etc.)	2.5%

Please specify your ethnicity.

Hispanic or Latino	1.6%
Not Hispanic or Latino	98.4%

Please specify your race.

American Indian or Alaska Native	0.4%
Asian	2.5%
Black or African American	0.0%
Native Hawaiian or Other Pacific Islander	0.0%
White	97.1%

What is your place of residence?

Village of Lake Zurich	97.1%
North Barrington	0.0%
Kildeer	0.0%
Hawthorn Woods	0.4%
Other, Unincorporated area or elsewhere (please specify): Forest Lake, Midtown, Unincorporated Lake County	

How long have you been a resident of the Village of Lake Zurich?

Less than one year	2.5%
Between 1 and 10 years	25.4%
Longer than 10 years	72.1%

How many people, including yourself, are in your household?

1	7.8%
2	35.2%
3	19.3%
4	25%
5	9.0%
6	2.5%
More than 6	1.2%

Which category best describes your total household income for 2010?

Under \$25,000	2.9%
\$25,000 - \$34,999	2.9%
\$35,000 - \$49,999	8.2%
\$50,000 - \$74,999	13.5%
\$75,000 - \$99,999	21.3%
\$100,000 - \$199,999	39.8%
\$200,000 - \$499,999	10.7%
500,000 or more	0.8%

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