Alternative Water Source Study

Village Board Update

February 1, 2021

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WATER SUPPLY OBJECTIVES

SUSTAINABLE

REGULATORY COMPLIANT

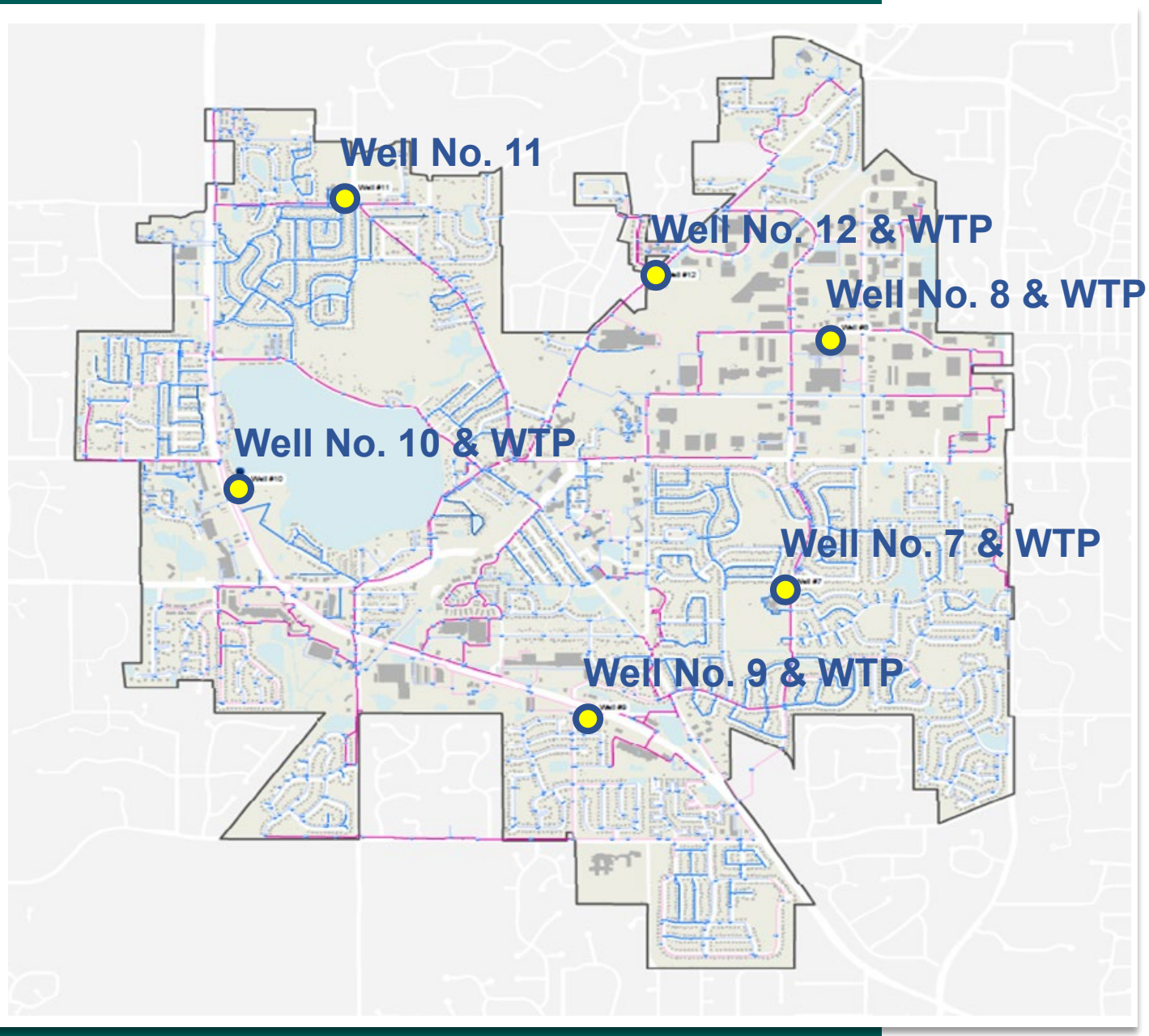
HIGH QUALITY

COST EFFECTIVE

Agenda

1. Existing Water System Inventory
2. Water Demand Projections
3. Needs Assessment Calculations
4. Deep Sandstone Aquifer Sustainability
5. Lake Michigan Supplier Meetings
6. Next Steps

EXISTING WATER WORKS SYSTEM



- 6 Deep Wells (Well No. 11 – Emergency Backup)
- 5 Water Treatment Plants (WTP) – Cation Exchange
- 2 Elevated Water Storage Tanks
- 113 Miles of Water Main

WATER DEMAND PROJECTIONS

Water Demand Projections

1. POPULATION REVIEW

Review Historical Population Trends

2. DEMANDS REVIEW

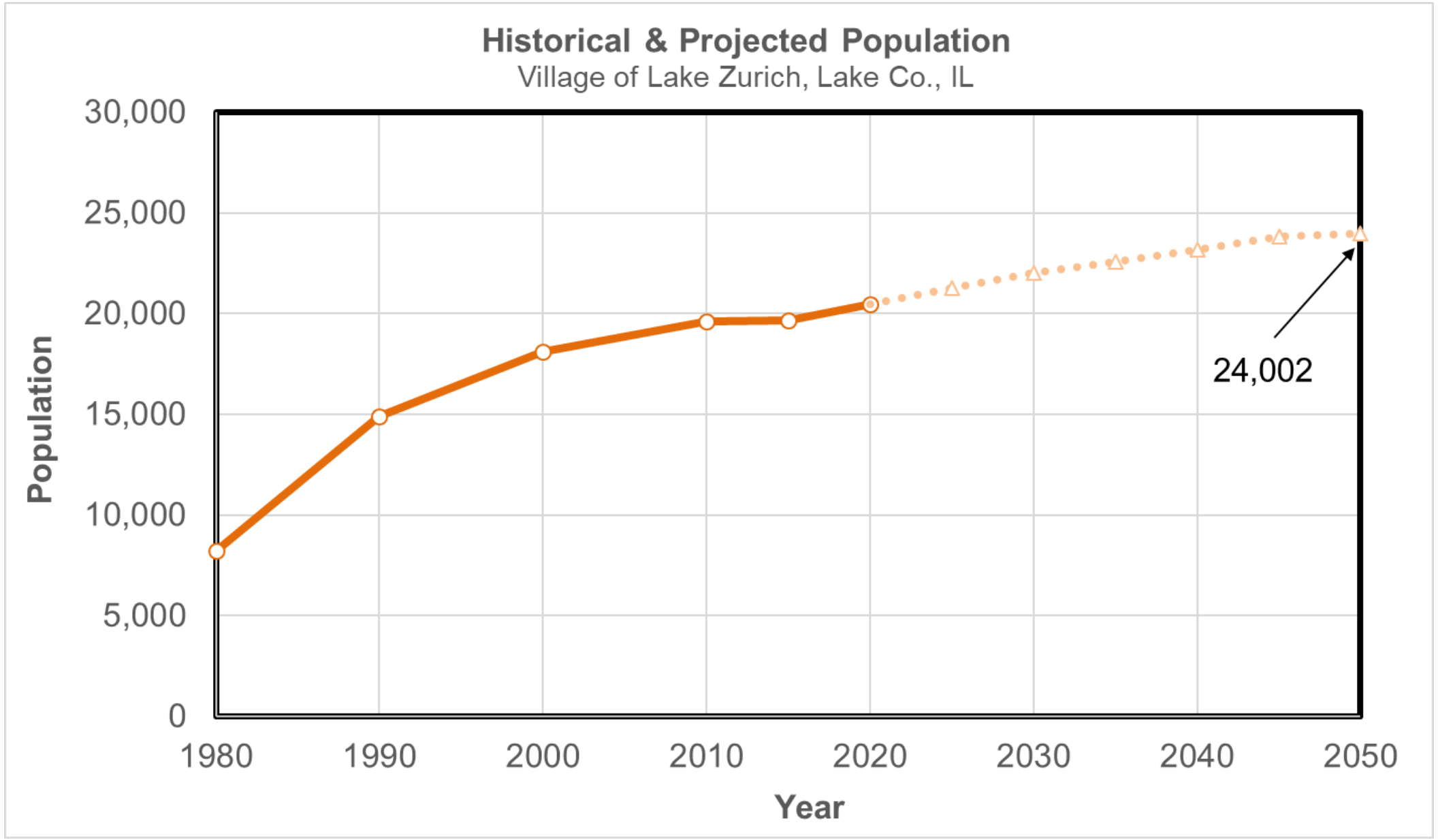
Review Historical Demands & Establish Current Trends (CT) Water Demand Characteristics

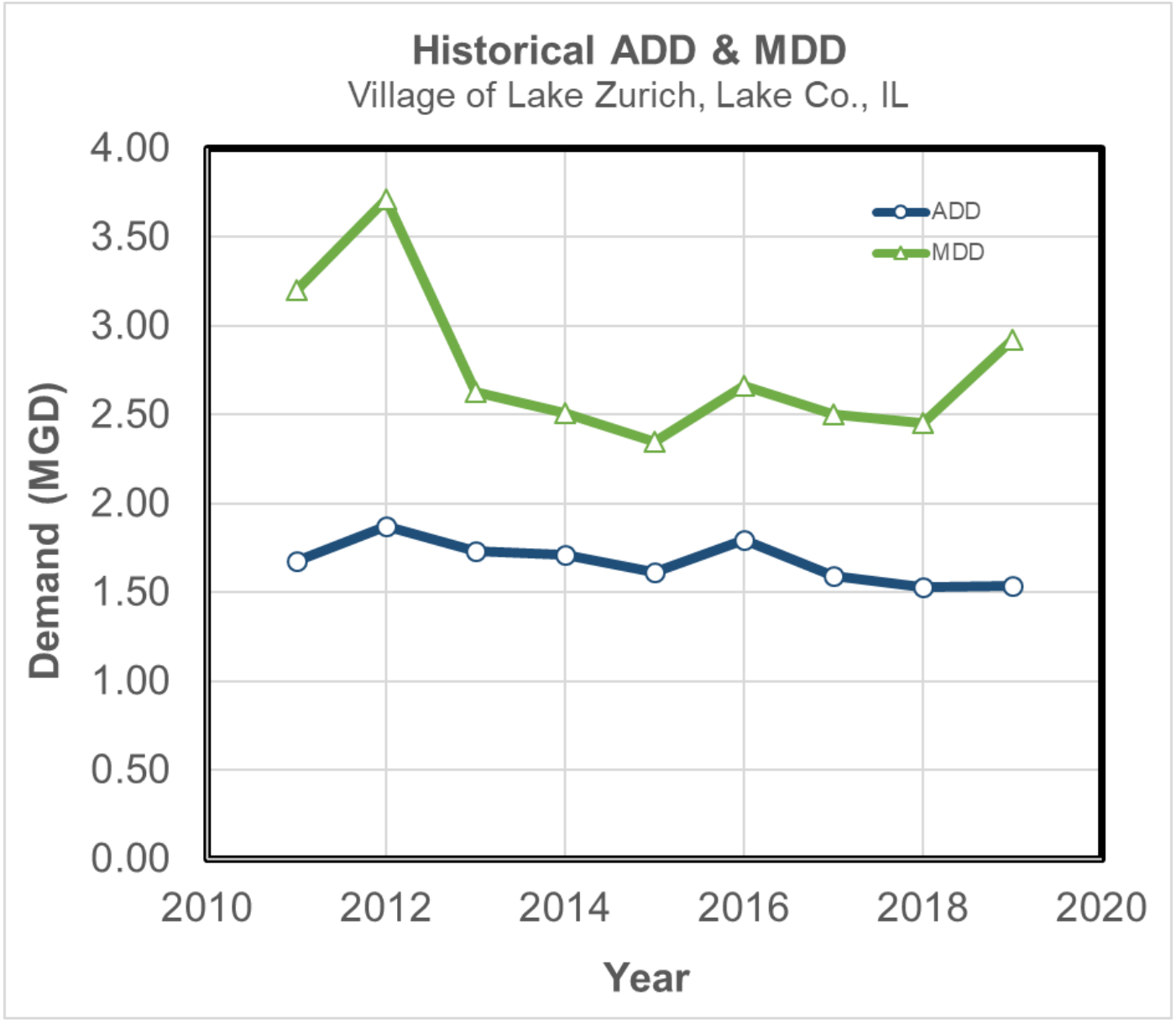
3. POPULATION PROJECTION

Project Population Throughout Planning Period

4. DEMAND PROJECTION

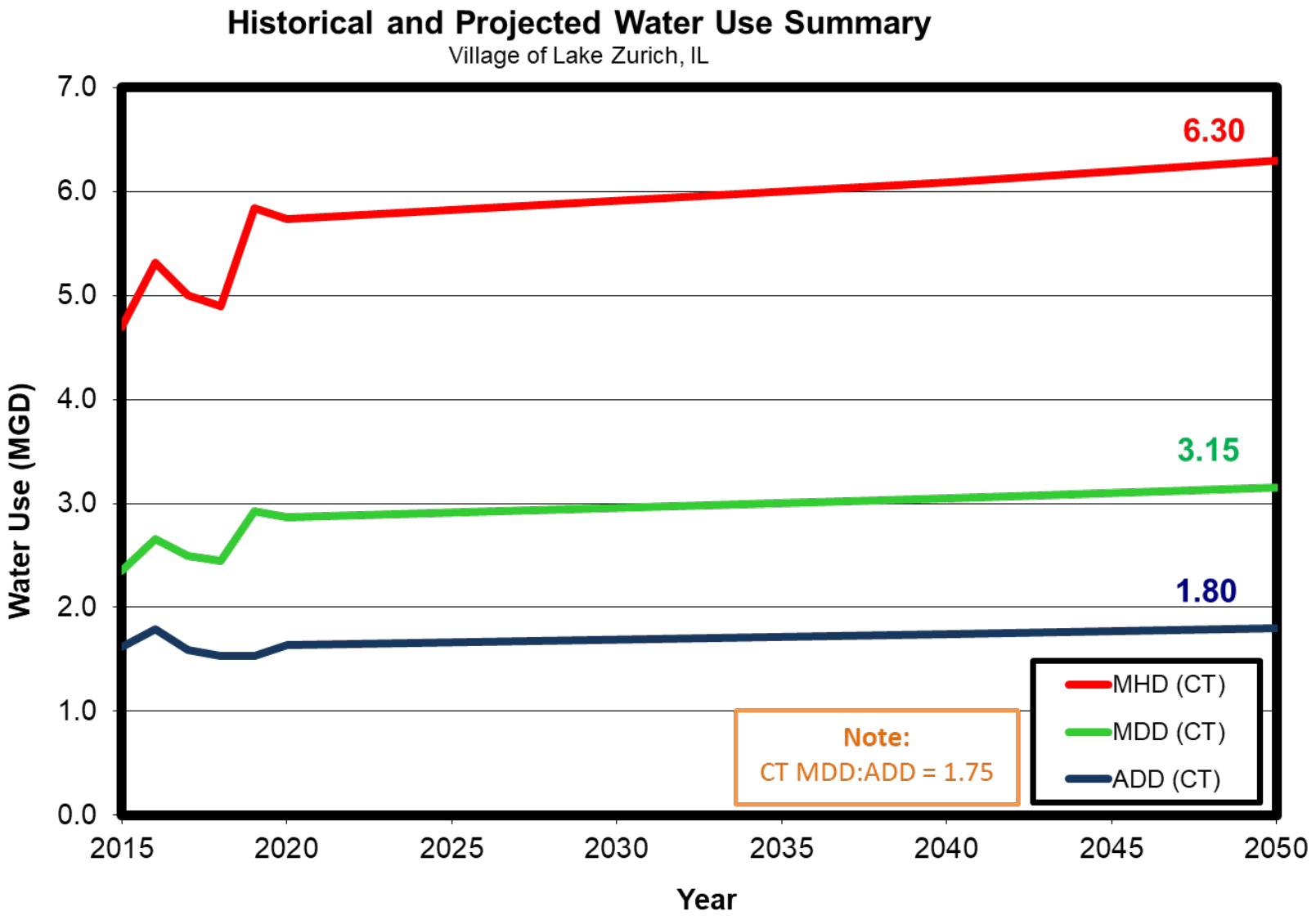
Project Demands Throughout Planning Period


Historical & Projected Population
Village of Lake Zurich, Lake Co., IL
Population
30,000
25,000
20,000
15,000
10,000
5,000
0
1980
1990
2000
2010
2020
2030
2040
2050
Year
24,002



Historical Water Demand Review (2011 – 2019)

- Average Day Demand (ADD): 1.53 MGD (2019) – 1.83 MGD (2012)
- Maximum Day Demand (MDD): 2.35 MGD (2015) – 3.71 MGD (2012)
- MDD:ADD Ratio: 1.46 (2015) – 1.98 (2012)
- Water Use Per Person: 75 gpcd – 91 gpcd



Projected Water Demands

- Projected MDD:ADD Ratio: 1.75
- Projected Water Use Per Person in 2050: 75 gpcd

Summary and Application – Water Demand Projections

Population

CMAP 2050 Projection Used

Slow, Steady Growth Projected

May Be Slightly Conservative

Water Demand

Projecting Decrease In Water Usage Per Capita (82 gpcd in 2020 to 75 gpcd in 2050)

Overall Trending Increase in Total Water Usage Due to Projected Population Increase

NEEDS ASSESSMENT CALCULATIONS

Supply & Storage Needs Assessment Calculations

ULTIMATE SOURCE CAPACITY

Ability of the system to meet the Maximum Day Demand with the largest well out of service

RELIABLE SOURCE CAPACITY

Ability of the system to meet the Maximum Day Demand with all wells pumping 16 hours per day

EMERGENCY SUPPLY

Ability of the system to meet the Maximum Day Demand from storage and wells with backup power

PEAK HOUR STORAGE

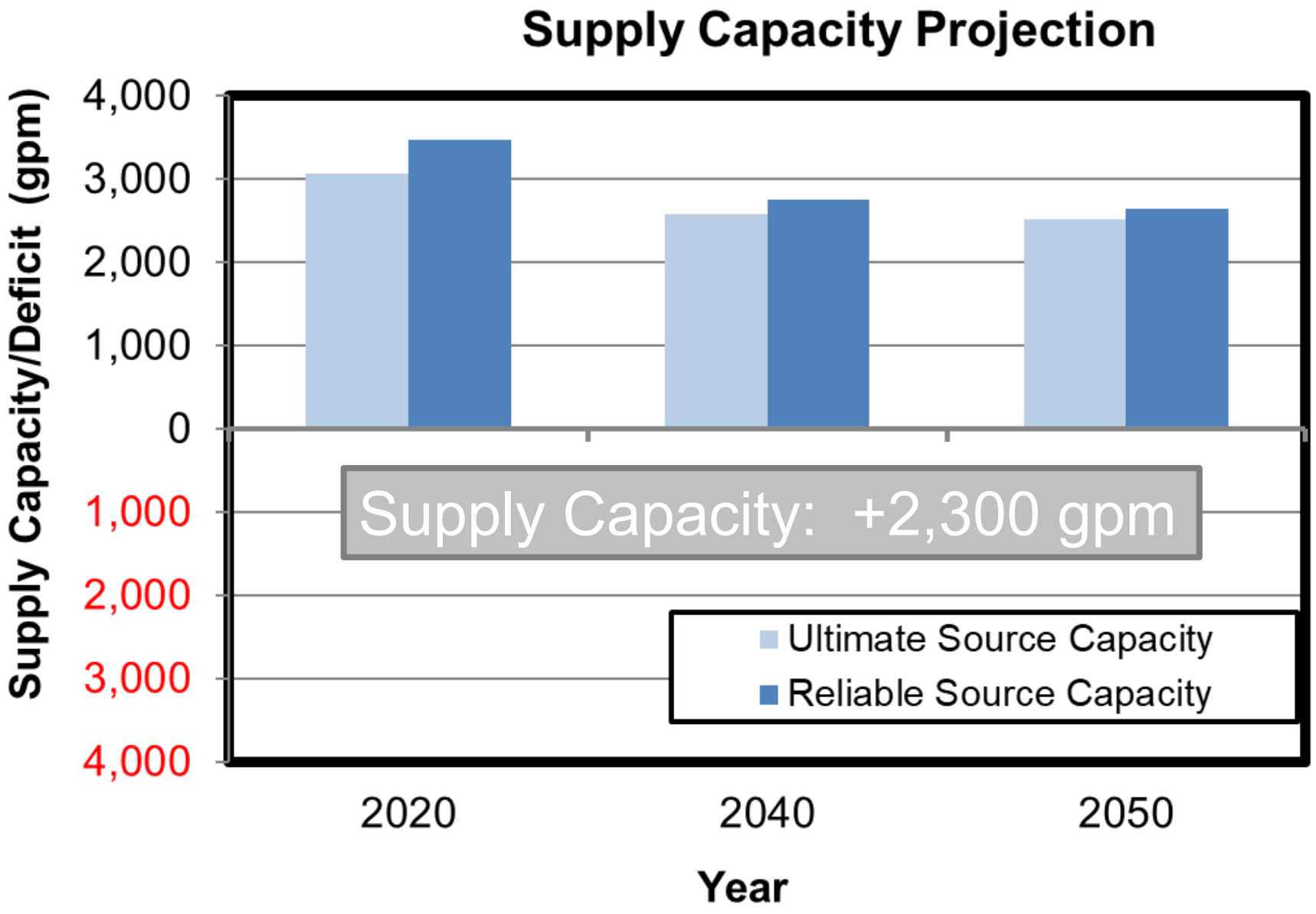
Ability of the system to meet the Peak Hour Demand for 4 hours without depleting storage by 50%

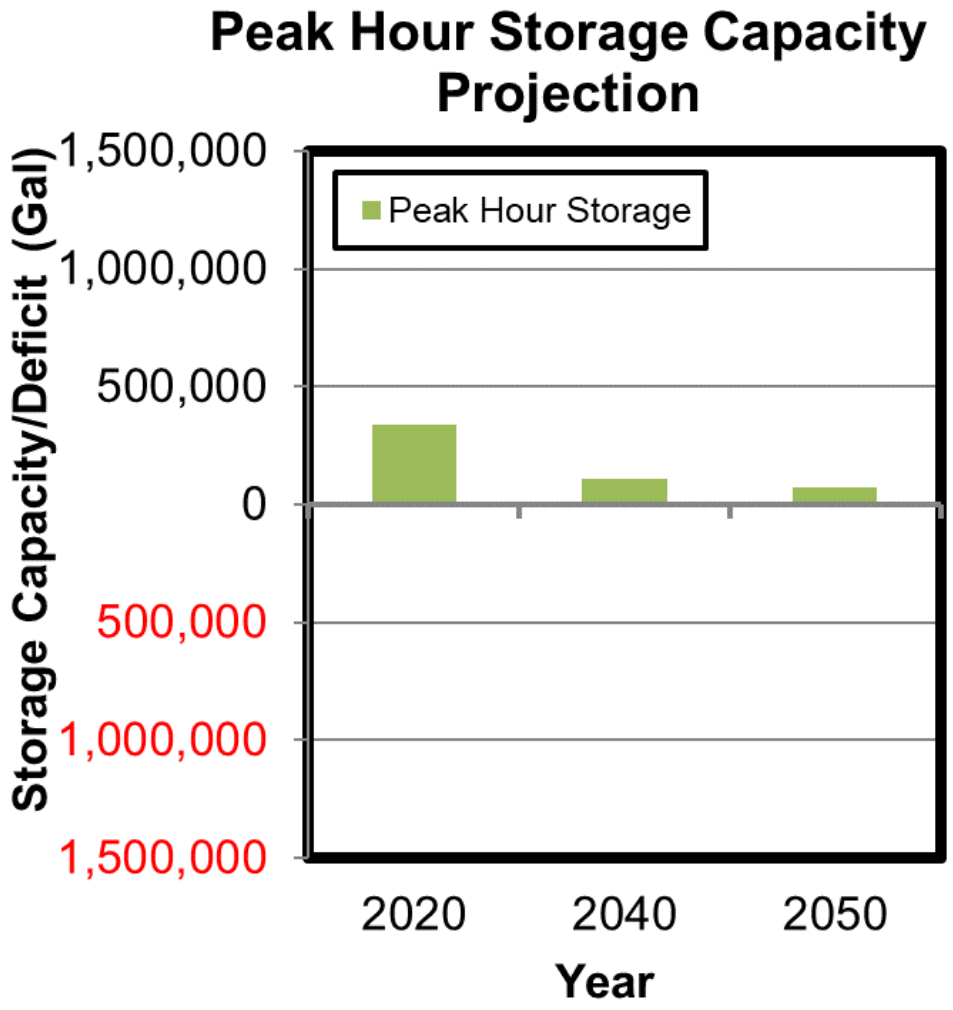
STORAGE DAYS NEEDED

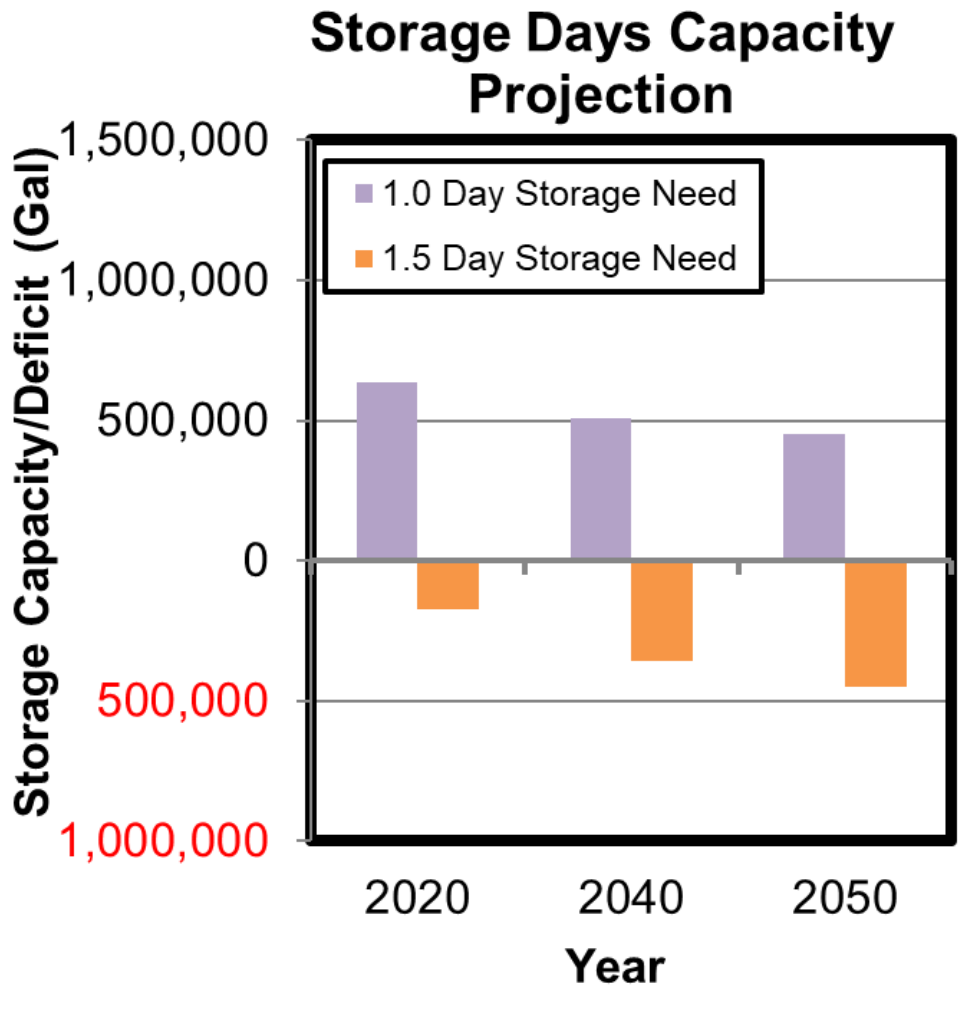
The storage needed to meet a defined number of days of Average Day Demand

FIRE FLOW

The ability of the system to meet a fire flow of 3,000 gpm for 3 hours


Supply Capacity Projection
Supply Capacity/Deficit (gpm)
4,000
3,000
2,000
1,000
0
1,000
2,000
3,000
4,000
Supply Capacity: +2,300 gpm
Ultimate Source Capacity
Reliable Source Capacity
2020
2040
2050
Year





Storage Capacity

Well, CLCJAWA & NWC: +75,000 Gal

NSMJAWA: (450,000) Gal

Summary and Application – Supply & Storage Needs Assessment Calculations

SOURCE CAPACITY (WELLS)

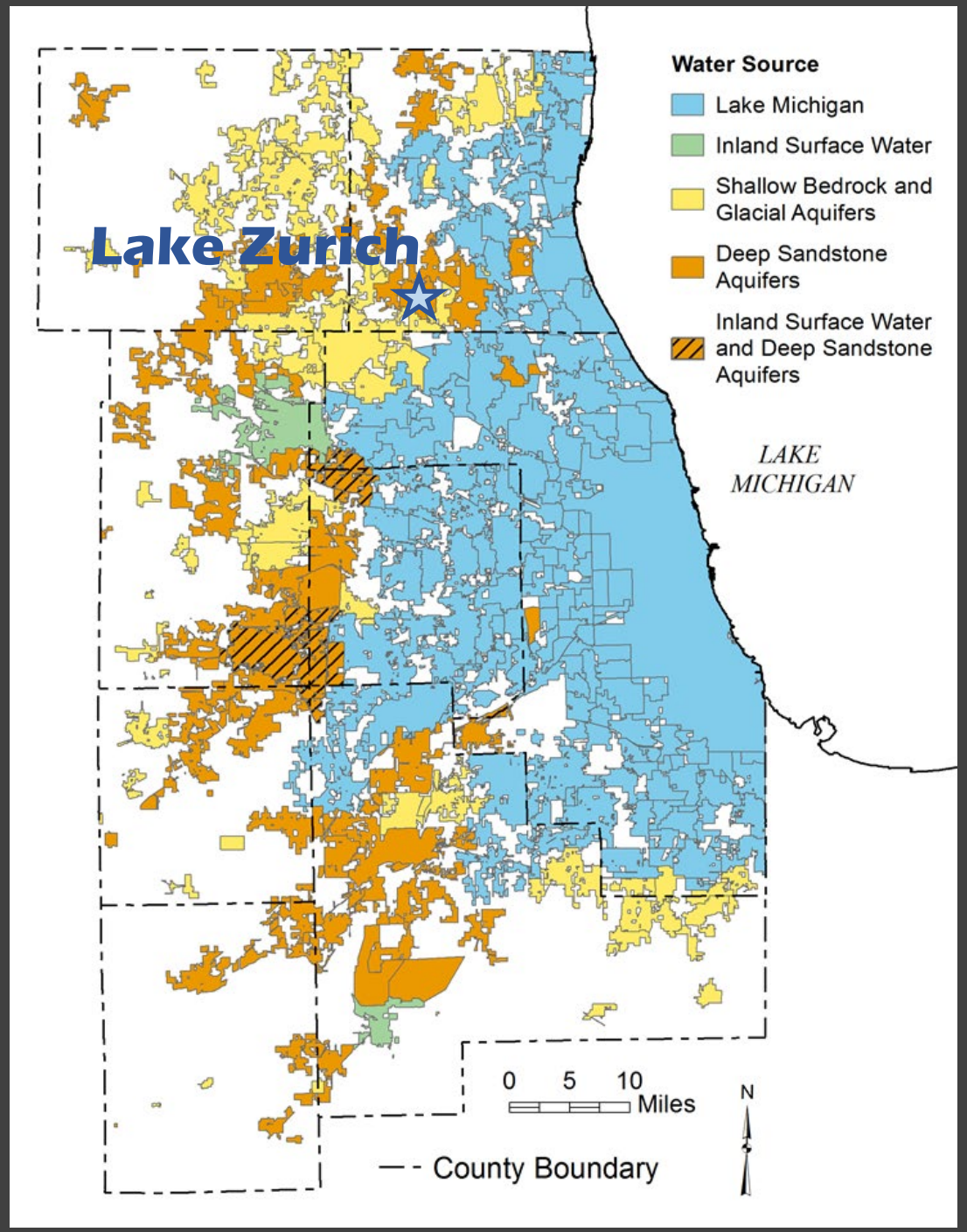
All Evaluated Metrics Indicate Adequate Source Capacity to 2050 With Existing Wells

STORAGE

Adequate Storage Capacity to 2050, Except if Connecting to NSMJAWA

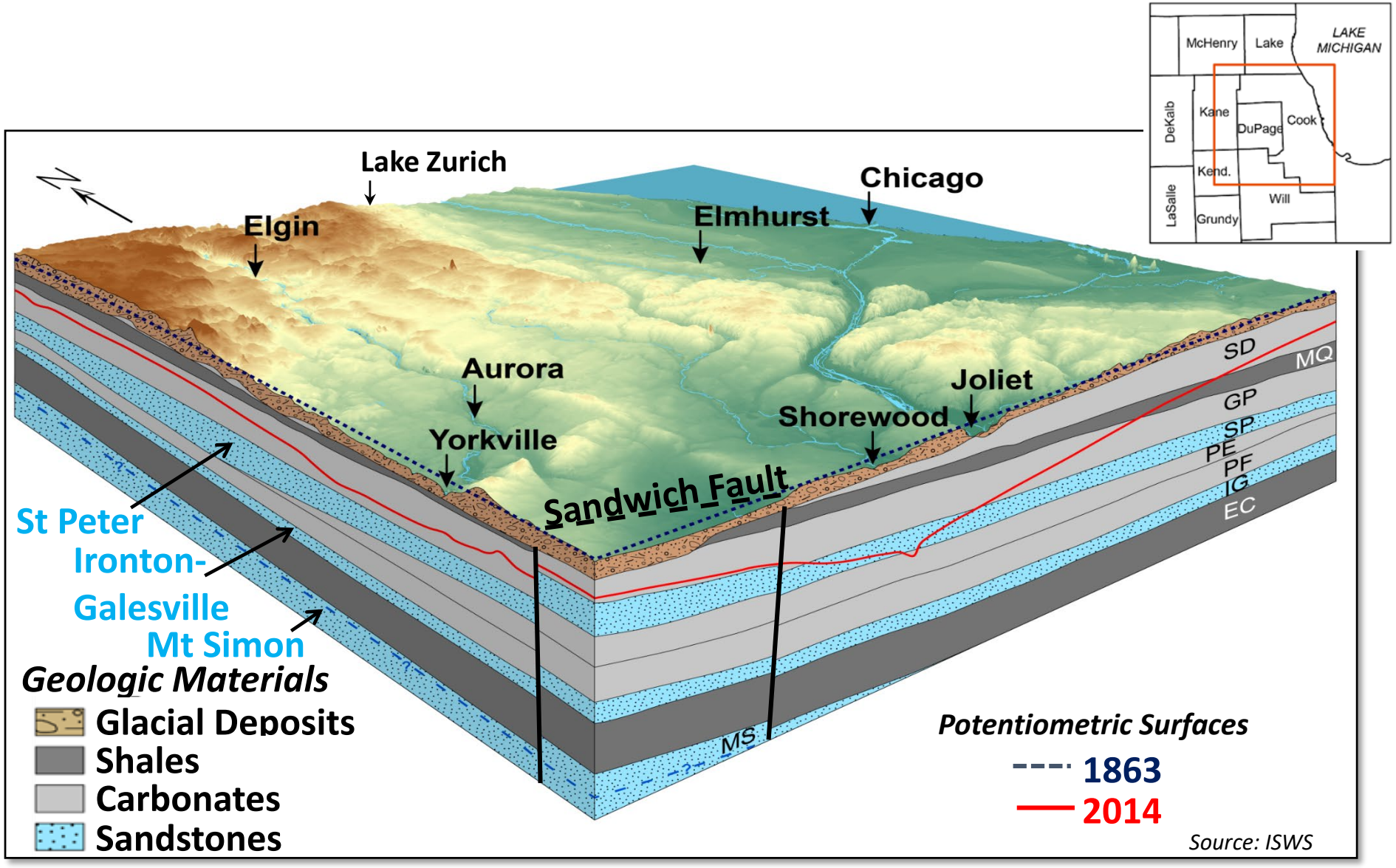
Will Want to Consider Ground Storage Tank at Receiving Station Regardless of LM Supply Option

DEEP SANDSTONE AQUIFER SUSTAINABILITY



2015 Source of Water In Chicago Region

- Most Outer Suburbs Rely on Groundwater
- About 90 MGD Being Withdrawn From the Deep Sandstone Aquifers, Which Is At Least 2X the Amount ISWS Estimates Is Sustainable
- Communities Switching to LM Water In Last Five Years: Bartlett, Wauconda, Volo, Lake Villa, Lindenhurst, Fox Lake Hills (unincorporated), Grandwood Park (unincorporated)


McHenry
Lake
LAKE MICHIGAN
DeKalb
Kane
DuPage
Cook
Kend.
LaSalle
Will
Grundy
Lake Zurich
Elgin
Chicago
Elmhurst
Aurora
Yorkville
Joliet
Shorewood
Sandwich Fault
SD
MQ
GP
SP
PE
PF
IG
EC
MS
St Peter
Ironton-
Galesville
Mt Simon
Geologic Materials
Glacial Deposits
Shales
Carbonates
Sandstones
Potentiometric Surfaces
1863
2014
Source: ISWS

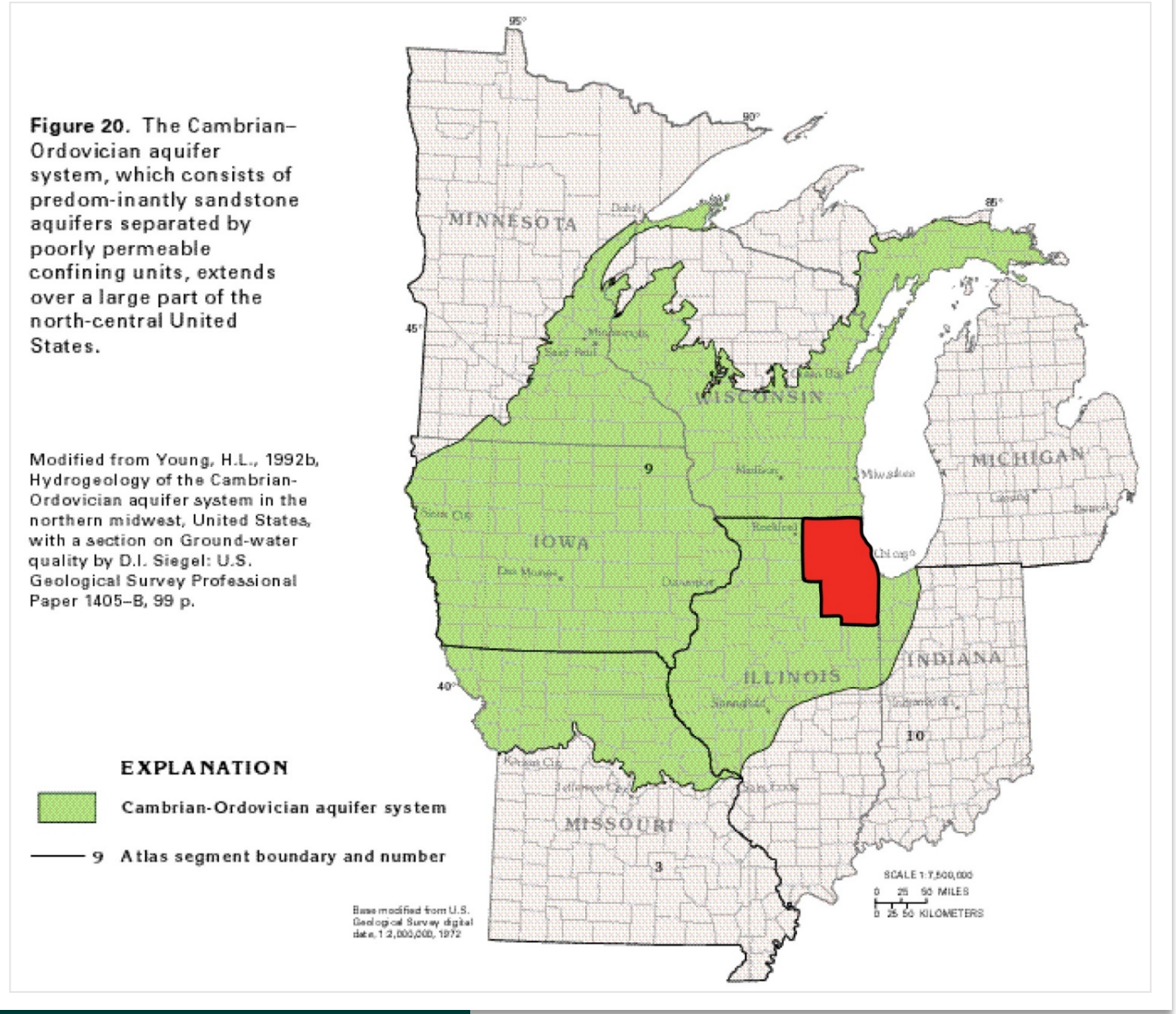
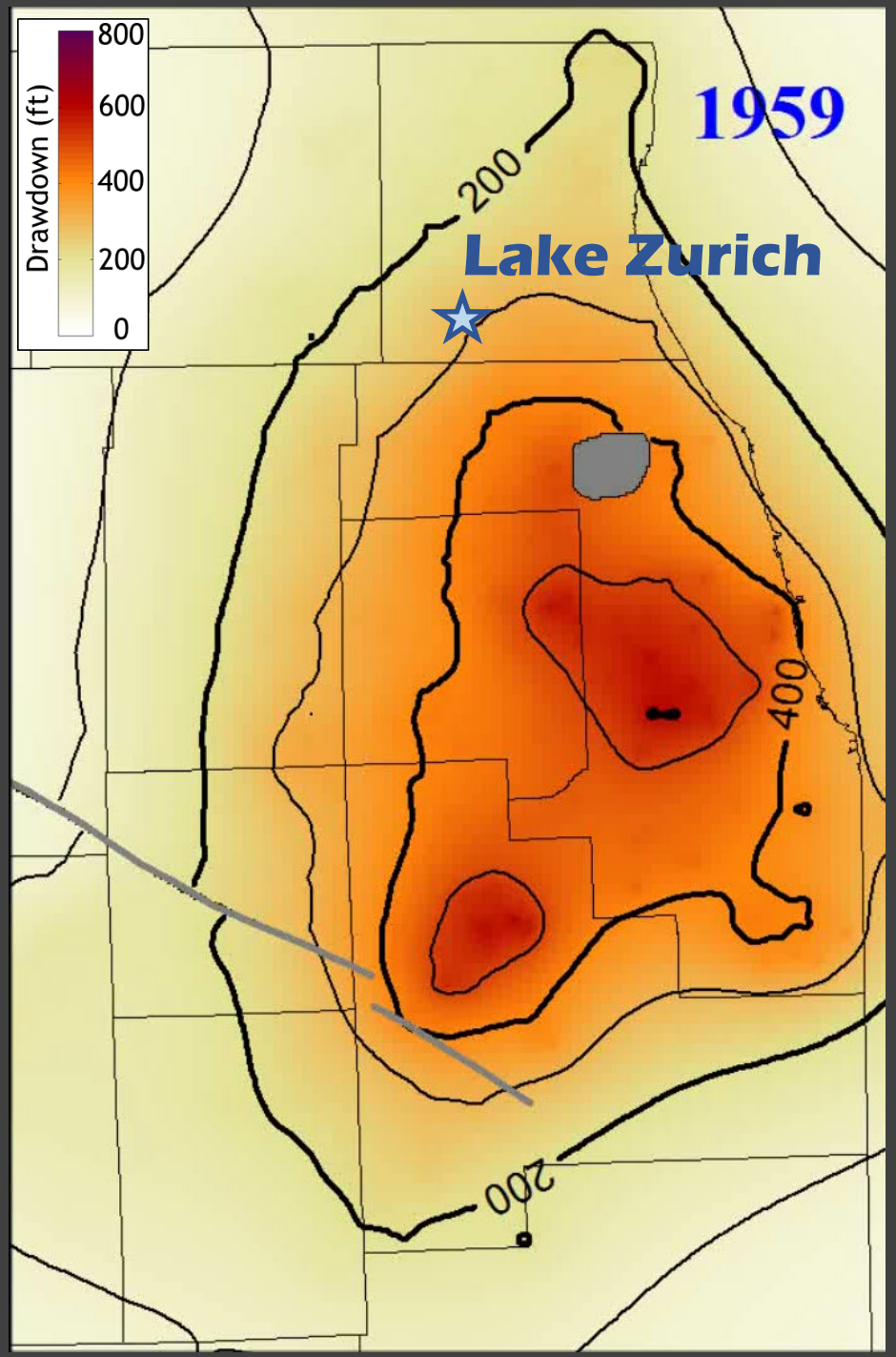


Figure 20. The Cambrian–Ordovician aquifer system, which consists of predom-inantly sandstone aquifers separated by poorly permeable confining units, extends over a large part of the north-central United States.

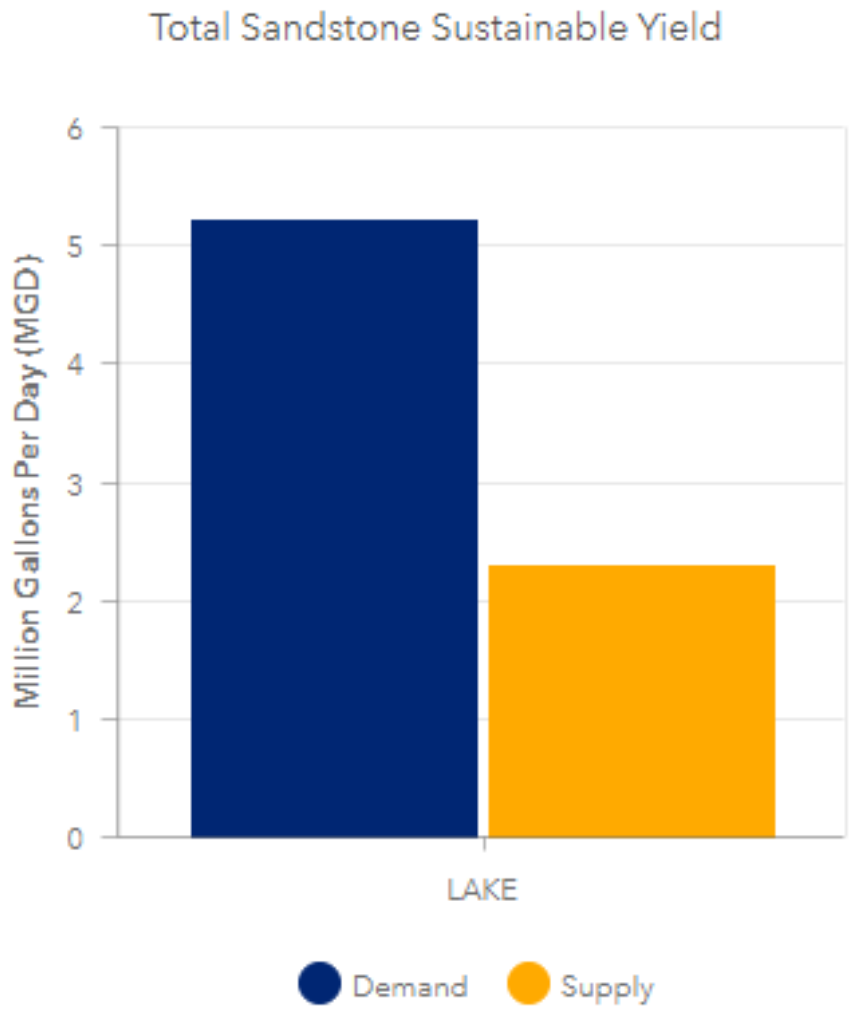
Modified from Young, H.L., 1992b, Hydrogeology of the Cambrian-Ordovician aquifer system in the northern midwest, United States, with a section on Ground-water quality by D.I. Siegel: U.S. Geological Survey Professional Paper 1405–B, 99 p.

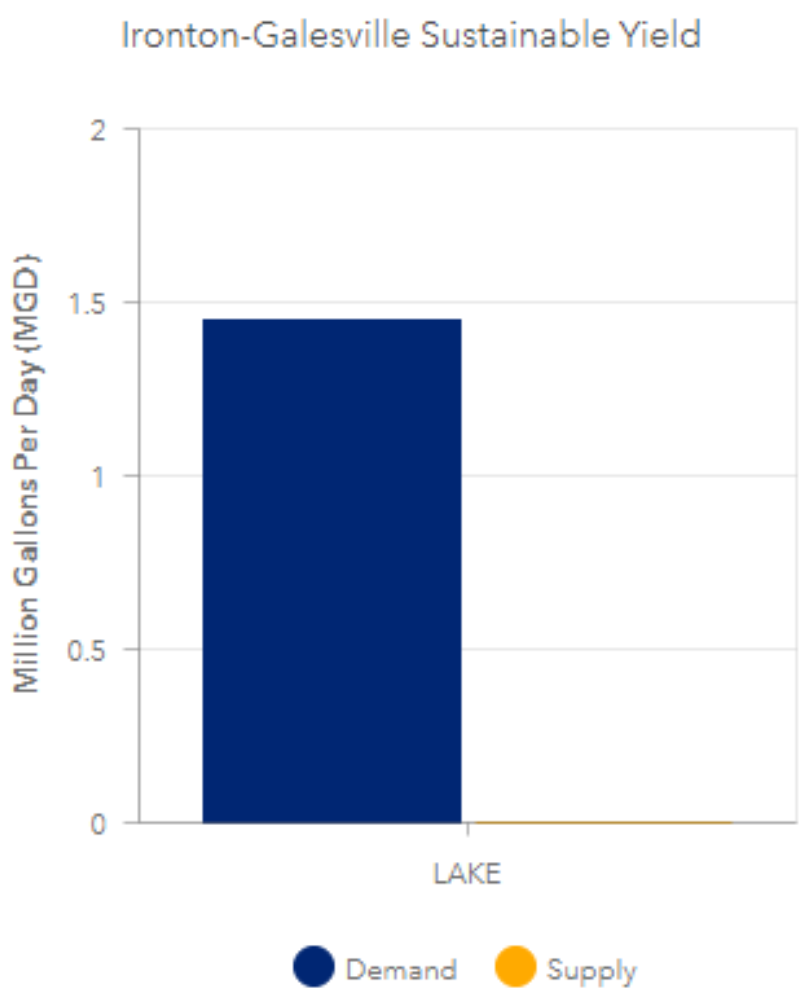
Base modified from U.S. Geological Survey digital data, 1:2,000,000, 1972



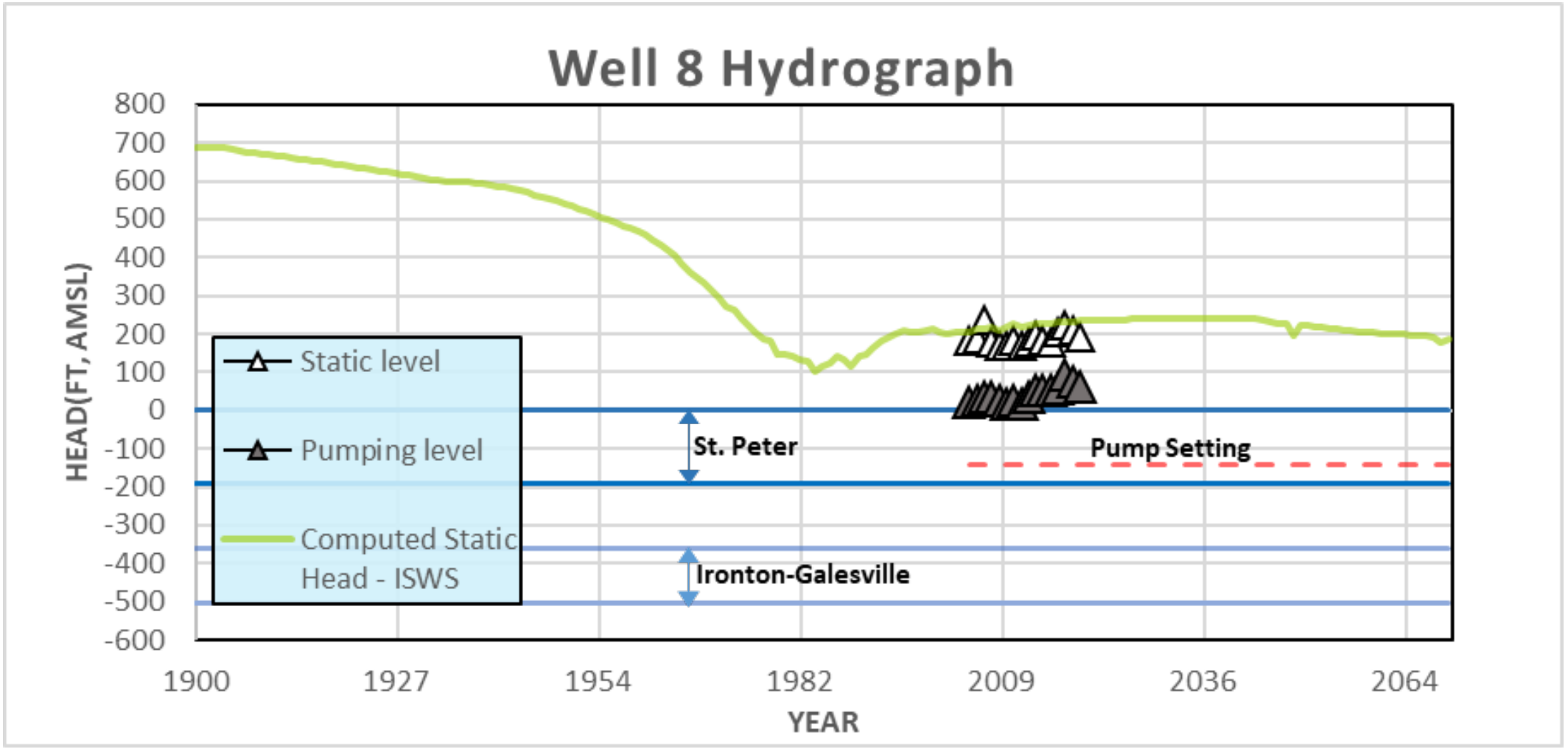
Historical Deep Sandstone Withdrawals In NE IL

- Sandstone Aquifers Tapped For Almost 150 Years
- Major Cone of Depression Centered Around Elmhurst By 1970s
- Cook & DuPage Municipalities Convert To Lake Michigan Water In 1980s & 1990s
- Partial Recovery Of Sandstone Aquifers Into Early 2000s
- Continued Pumping In Southern/Western Suburbs Causing Expansion of Cone of Depression





https://prairie-research.maps.arcgis.com/apps/opsdashboard/index.html#/9825690df3b14da39f03bdfeb69cd33e


Well 8 Hydrograph
HEAD(FT, AMSL)
800
700
600
500
400
300
200
100
0
-100
-200
-300
-400
-500
-600
1900
1927
1954
1982
2009
2036
2064
YEAR
Static level
Pumping level
Computed Static Head - ISWS
St. Peter
Pump Setting
Ironton-Galesville

Summary and Application – Deep Sandstone Aquifer Sustainability

HISTORIC TRENDS AND CURRENT STATUS

Significant Depletion of the Water in the St. Peter and Ironton-Galesville Aquifers

Slight Recovery in Deep Aquifers Since 1980's Due to Decreased Usage (Increased Regional Usage of Lake Michigan)

Current Status – Aquifers Are Adequate for Village's Use

PROJECTED TRENDS

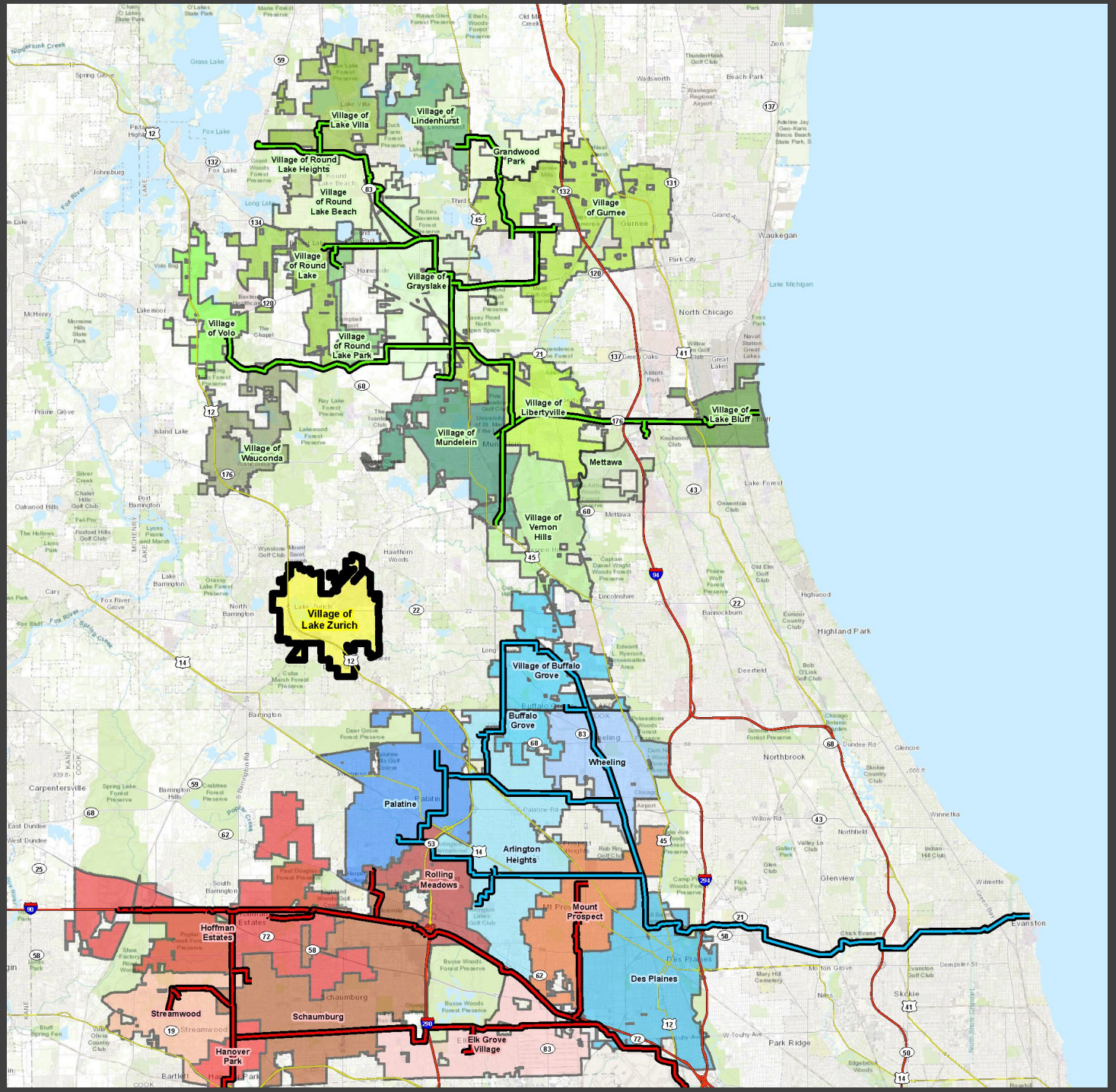
Water Levels in the Deep Sandstone Aquifers are Projected to Decline

Highly Dependent on Regional Development and Usage of the Aquifers

Lake County Demand for Water From Deep Aquifers is Greater Than Replenishing Supply

Implications to Village: Short-Term Sustainability Adequate, but Long-Term (30+ Years) Sustainability a Concern

LAKE MICHIGAN SUPPLIER MEETINGS



Lake Michigan (LM) Supplier Options

Legend

Lake Michigan Water Source

- Central Lake County JAWA (From Lake Bluff)
- Northwest Water Commission (From Evanston)
- Northwest Suburban Municipal JAWA (From Chicago)
- CLCJAWA Transmission Main
- NWC Transmission Main
- NSMJAWA Transmission Main

Lake Michigan (LM) Supplier Meeting No. 1 Topics

Background Information

Population & Water Demand Projections

LZ AWSS Motivation

Long Term Sustainable Source; Radium Waste Compliance; Historical Lake Michigan Review

LM Supplier Overview

Members; Demands; Capacity; New Customer Evaluations; Governance; Service Disruptions; Expansion Status; Connection Fee Approach

Connection Considerations

Process For Joining; Anticipated Agreement Term; Min/Max Demands; Delivery Structure Approach; Storage Requirements; Rates; Financing

Request For Info

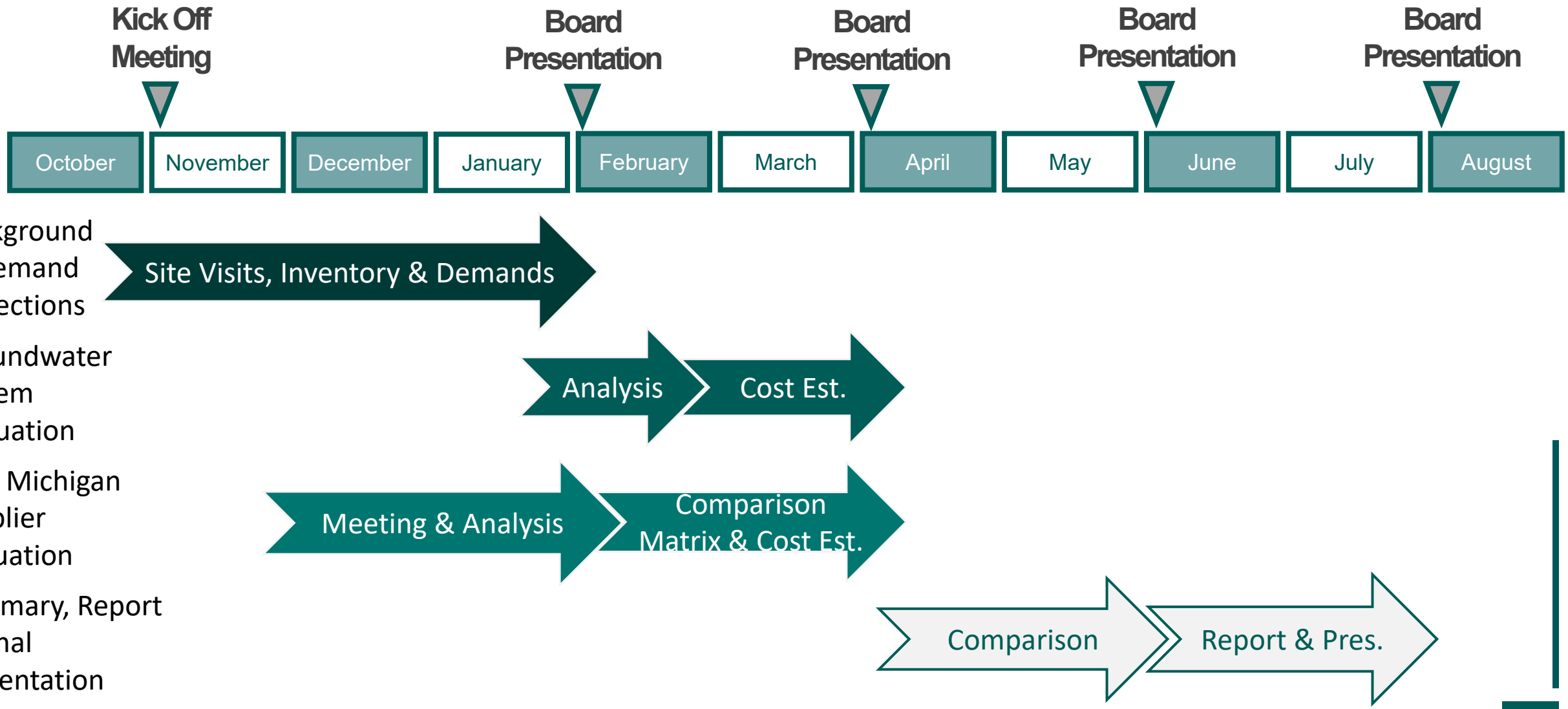
Bylaws; Agency Agreements; Water Purchase & Sale Contract; Maps

Next Steps/Schedule

AWSS Schedule; LM Supplier Site Visits & Board Presentations

Next Steps

PROJECT SCHEDULE



WORK ITEM STATUS

BACKGROUND INFORMATION & WATER DEMAND PROJECTIONS

~~Review past reports; Site Visits; System Inventory; Population & Water Use Projections; Needs Assessment Calculations;~~ Rate Review; Regulatory Audit

GROUNDWATER SYSTEM EVALUATION

Review Ordinance; Meeting With County; Evaluate Treatment Options; Cost Estimates; Rate Impact Evaluation; Develop Implementation Plan

SUMMARY, REPORT & FINAL PRESENTATION

Summarize Options; Prepare Report; Prepare Presentation; Final Village Board Presentation

LM SUPPLY EVALUATION - CLCJAWA

~~Kick-Off Meeting with CLCJAWA; Identify Connection Points;~~ Evaluate Transmission Main Routes; Evaluate Backup Source & Treatment Needs; Evaluate Distribution System Improvements; Cost Estimates; Rate Impact Evaluation; Analysis Review Meeting With CLCJAWA

LM SUPPLY EVALUATION - NWC

~~Kick-Off Meeting with NWC; Identify Connection Points;~~ Evaluate Transmission Main Routes; Evaluate Backup Source & Treatment Needs; Evaluate Distribution System Improvements; Cost Estimates; Rate Impact Evaluation; Analysis Review Meeting With NWC

LM SUPPLY EVALUATION - NSMJAWA

~~Kick-Off Meeting with NWC; Identify Connection Points;~~ Evaluate Transmission Main Routes; Evaluate Backup Source & Treatment Needs; Evaluate Distribution System Improvements

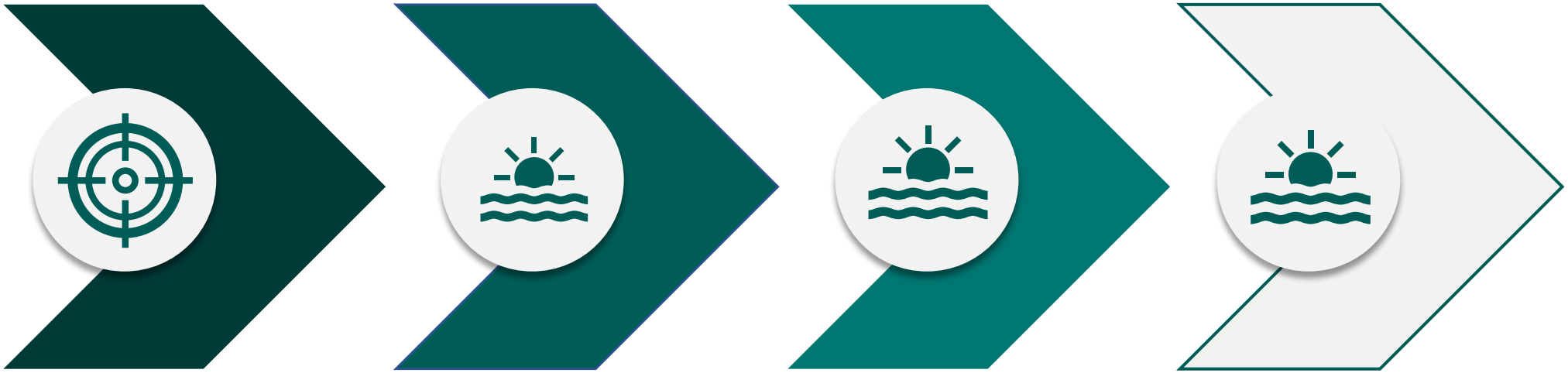
WORK ITEMS FOR NEXT MEETING

GROUNDWATER SYSTEM EVALUATION

Review Ordinance; Meeting With County; Evaluate Treatment Options; Cost Estimates

NWC ANALYSIS

Evaluate Transmission Main Routes; Evaluate Backup Source & Treatment Needs; Evaluate Distribution System Improvements; Cost Estimates



CLCJAWA ANALYSIS

Evaluate Transmission Main Routes; Evaluate Backup Source & Treatment Needs; Evaluate Distribution System Improvements; Cost Estimates

NSMJAWA ANALYSIS

Evaluate Transmission Main Routes; Evaluate Backup Source & Treatment Needs; Evaluate Distribution System Improvements

Questions or Comments?

THANK YOU

We value your time and appreciate the opportunity to present this evening.

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