RESERVOIR PLANNING STUDY:
A COMPREHENSIVE ASSESSMENT OF EVANSTON’S WATER STORAGE NEEDS

Presentation to City Council

April 8, 2014
Reports Completed to Date

- CTL Group’s structural evaluation of 1913 facilities (2010)
- CTL Group’s structural evaluation of 1934 Reservoir and 1948 Settling Basins No. 1 & 2 (2012)
- CDM Smith’s review of CTL Group’s report on 1934 reservoir (2013)
- CTL Group’s Inspection of 1934 Reservoir (2013)
- CDM Smith’s 1934 Reservoir Inspection Report (2013)
Reason for Current Study

• Comprehensive evaluation of several factors:
  ▪ Finished water storage requirements
  ▪ Water treatment requirements
  ▪ Efficient pump operation

• Recommendations based on decision criteria:
  ▪ Industry best management practices
  ▪ Age and deteriorated condition of existing structures
  ▪ Life cycle cost for repair and / or replacement
Reason for Current Study

• Complete a life cycle cost analysis to weigh short-term repairs against long-term solutions.
  ▪ Repairing the reservoir would extend its life by 20 years maximum
  ▪ Compare long-term financial impacts of building a new reservoir now or in 20 years
  ▪ Is it cost-effective to invest millions of dollars rehabilitating the 1913 and 1923 facilities when the concrete structures are likely at the end of their useful life?
Study will consider six alternatives

• 1 – Replace 1934 Reservoir roof and modify to use entire volume, repair 1913/1923 Clearwells
• 2 – Replace 1934 Reservoir in existing footprint, repair 1913/1923 Clearwells
• 3 – Replace 1934 Reservoir in larger footprint, decommission 1913/1923 Clearwells
• 4 – Construct a new clearwell on the east side of Sheridan Road, decommission 1934 Reservoir
• 5 – Construct a new reservoir and pumping station at Leahy Park
• 6 – Repair 1934 Reservoir roof and modify to use entire volume, repair 1913/1923 Clearwells
# Existing Condition of Storage Facilities

Evanston’s water storage is provided by five facilities that must be evaluated together:

<table>
<thead>
<tr>
<th>Storage Facility</th>
<th>Gross Storage (MG)</th>
<th>Year of Construction</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Plant Clearwells</td>
<td>2.4</td>
<td>1913 and 1923</td>
<td>Poor</td>
</tr>
<tr>
<td>East Plant Clearwells</td>
<td>2.0</td>
<td>1948 and 1964</td>
<td>Unknown</td>
</tr>
<tr>
<td>Finished Water Reservoir</td>
<td>5.0</td>
<td>1934</td>
<td>Poor</td>
</tr>
<tr>
<td>South Standpipe</td>
<td>5.0</td>
<td>1984</td>
<td>Good</td>
</tr>
<tr>
<td>North Standpipe</td>
<td>7.5</td>
<td>1986</td>
<td>Good</td>
</tr>
</tbody>
</table>
Water Plant Structural Evaluations and Concerns
Vertical and horizontal wall cracks are prevalent inside the clearwells.
1913 Clearwells Existing Condition

Cracking was also found on the outer clearwell wall faces and in the filter walls above the clearwells.
“It is CTLgroup’s opinion that the most reliable method to repair the clearwell cracks and eliminate infiltration would be to 1) excavate to expose all roof and wall surfaces, 2) execute full-thickness crack repairs, and 3) apply a water proof coating to all exterior surfaces. However, given the highly-invasive nature of such a repair, it is questionable whether such measures would be considered practical”

John J. Roller, CTL Group, registered professional engineer and registered structural engineer in the state of Illinois.
1934 Reservoir Existing Condition

- CTL Group found cracks throughout the underside of the roof slab in their 2012 inspection.
- Walker Restoration Consultants found “near disintegration” of the top 1.5 – 2 inches of the roof slab in their 2013 inspection.
1934 Reservoir Existing Condition

Steel rebar is exposed and corroded in many locations on the roof slab.
1934 Reservoir Existing Condition

CDM Smith’s 2013 report states of the 1934 Reservoir:

“Given that this concrete structure is about 80 years old, the rate of deterioration and degradation is expected to be accelerating for the remainder of its useful life. Under normal conditions, the average expected useful life of a concrete structure is about 100 years. This life span can be significantly reduced if the concrete structure is subject to constant high humidity and repeated freeze-thaw cycles. This is exactly the case for the finished water reservoir, especially for the roof slab of the reservoir. Therefore, ...it is probable that the useful life of the walls and the floor slab will not exceed 100 years.”

Wendell Yang, CDM Smith, registered professional engineer (1983) and registered structural engineer (1985) in the state of Illinois.
QUESTIONS?