Pop: 400K
Accounts: 90K
Become a **best-in-class** utility

...through development of an **enterprise asset management system**

Focus on **long-term life cycle analysis** & **risk-based planning**

Seek to meet regulatory requirements and **exceed level of service targets**
IT Master Planning

Transition from CAD to ESRI GIS

GIS Integration with Work Orders and Customer Data

GIS Integration with Finance, SCADA and Hydraulic Models

Approach to Enterprise Asset Management Program Development

Expected Benefits & Lessons Learned
IT Master Plan
Transition from CAD to ESRI GIS
GIS-Centric IT Architecture
Phase I

Spatial Mapping of Strategic Information
GIS | CMMS Integration

Spatial mapping and querying of work orders for linear assets

Improved speed and accuracy of existing workflows
GIS | CIS Integration

Spatial mapping and querying of account details, service calls & customer calls

Improved speed and accuracy of existing workflows:
GIS-Centric Architecture
Phase II

Spatial Mapping of Strategic Information
GIS | Finance Integration

Project cost mapping
YOU ARE HERE

Finishing the IT framework for Enterprise Asset Management (EAM)
Formally Create an Enterprise Asset Management Program

Align Organizational-wide Perspectives on Asset Management

Establish Formal Detailed AM Goals

Collect Fresh Requirements

Develop EAM Project List

Execute Projects Over the Long-Term
Quantification of Risk and Lifecycle Costs

Risk is the probability of an asset and the probability of it failing in a time frame.

Whole Lifecycle Costs

Life cycle costs are the sum of initial costs, operational, maintenance, and disposal costs.
Risk measures the criticality of an asset and the probability of it failing in a time frame.

Risk of asset failure should be a key consideration in the maintenance, inspection and CIP planning process.

\[ \text{Risk} = \text{Consequence of Failure (COF)} \times \text{Likelihood of Failure (LOF)} \]
Risk = Consequence of Failure (COF) x Likelihood of Failure (LOF)

Consequence of Failure

<table>
<thead>
<tr>
<th>Level of Service Category</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems for Identity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory Compliance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client Support</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Likelihood of Failure

<table>
<thead>
<tr>
<th>Level of Service Category</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
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<tr>
<td>Client Support</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Consequence of Failure

## Consequence by Level of Service Category

<table>
<thead>
<tr>
<th>Level of Service Category</th>
<th>Weight</th>
<th>Negligible = 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Adequate capacity for all existing flows and future development (No SSO's)</td>
</tr>
<tr>
<td>System Reliability</td>
<td>50%</td>
<td>Adequate capacity for existing flows (SSO &lt; 1,000 gallons)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loss of &lt; 30% of capacity (SSO between 1K - 25K gallons)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Les of &gt; 30% existing capacity (SSO &gt; 25K gallons)</td>
</tr>
<tr>
<td>Regulatory Compliance</td>
<td>35%</td>
<td>No permit violations and meet all Consent Decree reqs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minor violation with no formal enforcement action</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Formal enforcement action but no fines or Consent Decree impact</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Major enforcement action including fines &amp; adverse impact on Consent Decree</td>
</tr>
<tr>
<td>Fiscal Impacts</td>
<td>15%</td>
<td>Sufficient financial resources to meet capital and O&amp;M budget</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Need Director approval ($5-$10K)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Need Committee approval ($10-$100K)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Board of Directors approval (&gt; $100K)</td>
</tr>
</tbody>
</table>
• Use integrated systems, Geometric Network and Hydraulic Model to help determine consequence of failure
# Likelihood of Failure

## Likelihood by Category

<table>
<thead>
<tr>
<th>Likelihood of Failure Category</th>
<th>Weight</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>7</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Condition</td>
<td>60%</td>
<td>Very Good</td>
<td>Good</td>
<td>Fair</td>
<td>Poor</td>
<td>Very Poor</td>
</tr>
<tr>
<td>Performance</td>
<td>25%</td>
<td>Sufficient capacity to meet peak flows</td>
<td>Sufficient capacity but over-utilized</td>
<td>Sufficient capacity but does not meet functional requirements</td>
<td>Not sufficient capacity for peak flows</td>
<td>Not sufficient for average flows</td>
</tr>
<tr>
<td>History of Planned Maintenance as a % of Total Maintenance</td>
<td>15%</td>
<td>&gt; 70%</td>
<td>70% - 60%</td>
<td>60% - 40%</td>
<td>40% - 30%</td>
<td>&lt; 30%</td>
</tr>
</tbody>
</table>

![Graph showing failure rates over time](image.png)
Whole Lifecycle Costs

Use lifecycle costs to increase confidence in repair replace decision making

- What does a particular asset cost
- How does it differ from area to area
- Determine optimal time for asset renewal
  - workload planning improvements
  - Reduce spikes in reactive maintenance
Expected Benefits

- Cultural shift in AB understanding and approach
- Risk-based planning and decision-making
- Process and specific high-level initiatives leading to improved performance, stability, and decision-making for organizations and their board members
Cultural shift in AM understanding and approach
Risk-based planning and forecasting

Precise CIP Repair/Replace decision making by location will improve the SA’s understanding of where funds need to be spent, why and when – resulting in long-term cost savings. Key inputs include:
The system will learn over time...
Enterprise-wide alignment in AM project scopes & schedule
Lessons Learned

Develop EAM Program early in the process (after IT Master Planning)