Mobile GIS Optimizing Leak Detection

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Agenda

• Leak Detection Key Drivers
• Methodology
  – Leak survey
  – Survey data validation
  – Digital leak reports
  – Digital analysis
  – Digital deliverables
• City of San Marcos, TX
• Project Overview
• Conclusions
Key Drivers to Leak Detection

- Drought
- NRW
- Regulation
- Revenue
Key Drivers: Non Revenue Water
Key Drivers: Revenue

### Value of Water Lost (USD)

<table>
<thead>
<tr>
<th>Diameter of Leak Hole (inches)</th>
<th>.1&quot;</th>
<th>.25&quot;</th>
<th>.33&quot;</th>
<th>.5&quot;</th>
<th>.75&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year</td>
<td>$2,509</td>
<td>$15,684</td>
<td>$27,826</td>
<td>$62,734</td>
<td>$141,152</td>
</tr>
<tr>
<td>5 Years</td>
<td>$12,547</td>
<td>$78,418</td>
<td>$139,130</td>
<td>$313,670</td>
<td>$705,758</td>
</tr>
<tr>
<td>10 Years</td>
<td>$25,094</td>
<td>$156,835</td>
<td>$278,261</td>
<td>$627,340</td>
<td>$1,411,515</td>
</tr>
<tr>
<td>20 Years</td>
<td>$50,187</td>
<td>$313,670</td>
<td>$556,521</td>
<td>$1,254,680</td>
<td>$2,823,031</td>
</tr>
</tbody>
</table>

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Key Drivers: Regulation

- No Policy for Water Loss Management
- Basic Water Loss Reporting
- Annual Water Loss Reporting with AWWA M36 Terminology
- Annual Water Loss Reporting with AWWA Free Water Audit Software
- Annual Water Loss Reporting with AWWA Free Water Audit Software with Validation of Audits Submitted
Key Drivers: Drought

San Marcos, TX
Leak Survey Methodology

- Leak Sounding
- Identify areas of suspected leakage
- GPS surface assets
- Document asset and mapping discrepancies

- Populated
  - Suspect Leak Features
  - Survey Line Features
  - Survey Point Features
Survey Data Capture: Project Tracker

• Mobile GIS Platform

• Ipad/Smartphone collection via Arc GIS Online

• Ability to view Project Tracker – Not an Ipad App.

• Client can view Real Time Data Collection Data
Survey Data Capture:
Project Tracker
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Project Tracker
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Survey Data Capture: Project Tracker
Survey Data Capture
# Digital Leak Report

## Address
- None

## Street
- Yarrington Road

## Cross Street
- IH 35 Service Road

## Project
- San Marcos

## Facility ID
- 12198

## Report No.
- WWS-000006

## Region
- South

## Coordinates
- 2322319, 1384172.7

## Date/Time
- 2/2/2015 2:34:29 PM

## Classification
- 2

## Status
- Active

## Leak Type
- Hydrant Leaking

## GPM
- 10

## Visual Water
- Yes

## Pipe Size
- 6

## Pipe Material
- DIP

## Depth
- 

## Surface Cover
- Grass

## Manufacturer
- American Darling

## Acoustic
- Yes

## Correlation
- No

## Technician
- Wachs Water Services

## Location Notes
- 100 Yards West of Intersection

## Marked
- Yes

## Field Notes
- None
City of San Marcos TX

- Population 60,000
- Aquifer water supply
- One treatment plant FY 2015 6.24 MGD
- 200 miles water distribution
- Proactive leak detection program – every year, multiple years
- Using contracted services
Project Scope

- Leak survey
- Valve inventory and assessment
- Hydrant inventory and assessment
- GIS updates
- Leak location
- Leak attributes
- Reporting
Project Overview

- 75 miles Acoustic Leak Detection Survey
- 3,742 Survey Points
- Surface asset GPS and condition
- Identification of asset & mapping defects
- Delivery of digital leak reports and asset data
Project Area

Leak Detection Survey - San Marcos TX

Legend
- Leak Points
- Survey Lines
Deliverables

• GIS plot of Leak Survey Assets
• GIS plot of Confirmed Leaks
• Digital Leak Reports with photograph
• GIS plot of Asset Defects
• GIS plot Mapping discrepancies
• Project Summary and Final Report
Survey Results

- 80 documented leaks
- 32 leaks not surfacing
- 164 gallons / minute
- 236,160 gallons / day
- 86,198,400 GPY
- 130 Olympic Swimming Pools!
- $108,609 in savings annually!
Percentage of Leak by Type

- Hydrant: 42%
- Meter: 49%
- Service: 8%
- Main: 1%
Volume of Leaks: Type (GPM)

<table>
<thead>
<tr>
<th>LEAK TYPE</th>
<th>GPM</th>
<th>GPD</th>
<th>GPY</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDRANT</td>
<td>88</td>
<td>126,720</td>
<td>46,252,800</td>
</tr>
<tr>
<td>METER</td>
<td>38</td>
<td>54,720</td>
<td>19,972,800</td>
</tr>
<tr>
<td>SERVICE</td>
<td>30</td>
<td>43,200</td>
<td>15,768,000</td>
</tr>
<tr>
<td>VALVE</td>
<td>3</td>
<td>4,320</td>
<td>1,576,800</td>
</tr>
<tr>
<td>OTHER</td>
<td>3</td>
<td>4,320</td>
<td>1,576,800</td>
</tr>
<tr>
<td>MAIN</td>
<td>1</td>
<td>1,440</td>
<td>525,600</td>
</tr>
</tbody>
</table>
Volume of Leaks: Pipe Material

- AC: Leaks, Total GPM, Average GPM
- CIP: Leaks, Total GPM, Average GPM
- COP: Leaks, Total GPM, Average GPM
- DIP: Leaks, Total GPM, Average GPM
- GAL: Leaks, Total GPM, Average GPM
- PVC: Leaks, Total GPM, Average GPM
# Asset Defects

<table>
<thead>
<tr>
<th>Type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot Locate</td>
<td>139</td>
</tr>
<tr>
<td>Covered Over</td>
<td>15</td>
</tr>
<tr>
<td>Lid Missing</td>
<td>28</td>
</tr>
<tr>
<td>Lid Stuck</td>
<td>1</td>
</tr>
<tr>
<td>Structure Misaligned</td>
<td>2</td>
</tr>
<tr>
<td>Full of Debris</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>188</strong></td>
</tr>
</tbody>
</table>
## Map Discrepancies

<table>
<thead>
<tr>
<th>Type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not In GIS</td>
<td>159</td>
</tr>
<tr>
<td></td>
<td>159</td>
</tr>
</tbody>
</table>
Map Discrepancies

159 Assets not on GIS
Conclusions

• Efficient Leak Detection Process
• Water Loss Reduction
• Revenue Recovery
• Accurate Data Collection
• Improved Asset Inventory
• Updated Mapping Records
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