infraMAP at EBMUD
Valve Maintenance and Shutdown Reporting in the Field
esri User Conference - San Diego

July 22, 2015

Presented By:
Teri Dean Alderson (EBMUD) & Patrick Ward (iWater Inc.)
EBMUD’s water system serves approximately 1.3 million people in a 331 square mile area in the East Bay, including:

- 4,137 miles of pipe
- 76,624 valves
- 30,099 hydrants
- 400,000+ service connections
Importance of Valves

• Valves are the keys to our water distribution system
• Enable operational and maintenance activities
• Start, stop and regulate flow to customers, WTPs, pumping plants, pressure zones, etc.
• Critical in the control of water loss
Current Challenges

• Aging valves and distribution pipes
• Long response time to control flow in emergencies
• No central management tool to track operational status
• No integration with customer data
• Manual shutdown planning required
• Existing valve testing and shutdown tracking applications extremely out of date
Existing Applications

Valve Test GIS
no longer in use

Shutdown Tracking System
Vision for new Valve GIS

NEW VALVE TESTING "PLUS" SOFTWARE

Hyperlinks to documents
- As Built
- Photos
- Training Videos

Map Field Notes
- Special Conditions
- Hazards
- Access Codes

Shutdown Tracking and Automated Pipeline Isolation
List/counts of:
- Pipes
- Hydrants
- Valves
- Customers

MAP TOOL

Map Redlines

Exists until processed by mapping

GIS EBMUD Infrastructure
From ENG/ISD

Map layers to "see"

Work Management
- Dispatching
- Scheduling
- Routing

WACHS Software/machine integration with Inspection

Inspection Forms
- Large Valve Inspection
- Hydrant Inspection
- Leak Detection Loggers
- Corroded Copper Svs
- Gatepot Inspections

When repairs needed, jump to

EBMUD ORACLE ENTERPRISE
OUR EXISTING WM5

GWD

ETS

AIM

POS

COS
EBMUD - infraMAP Project

- Portable, graphic and interactive distribution system
- Configurable inspection forms
EBMUD - infraMAP Project

• Integration with WACHS Valve Machine
  – Operate valve machine controller
  – Record data & track valve history/life cycle
  – Collect valve torque data & display animation

• GPS enabled
  – Locate valves
  – Manage work routes
EBMUD - infraMAP Project

- Map redlines, field notes, linked documents
  - Redlines created for ENG Mapping Services to make updates to master maps
  - Field notes captured for sharing of information about a valve or location
  - Ability to link documents, photos, drawings, etc. to a specific valve
EBMUD - infraMAP Project

- Specific water distribution network and customer identification with Pipe Isolation Trace tool
  - Valves to shut down for isolation
  - Hydrants, Customers & Mains affected by shutdown
EBMUD - infraMAP Project

- Configurable Form for Automated shutdown planning & reporting
New Shutdown Reporting Feature

- Associated with Pipe Isolation Trace tool
- Includes ability to record shutdown event

<table>
<thead>
<tr>
<th>Shutdown Report No. 02551</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shutdown Begin:</strong> 05/20/2015 13:50</td>
</tr>
<tr>
<td><strong>Person Reporting Out:</strong> T. Cleary</td>
</tr>
<tr>
<td><strong>Expected Duration:</strong> 6 HOURS</td>
</tr>
</tbody>
</table>

**IMPACTS:**

<table>
<thead>
<tr>
<th>Emergency</th>
<th>Main Shutdown</th>
<th>Hydrants Cut</th>
<th>Road Closures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REASON FOR SHUTDOWN**

<table>
<thead>
<tr>
<th>GWO:</th>
<th>Action:</th>
<th>Device:</th>
<th>Assigned To:</th>
</tr>
</thead>
<tbody>
<tr>
<td>123456</td>
<td>Repair</td>
<td>Man</td>
<td>ECRUEN</td>
</tr>
</tbody>
</table>

**LOCATION**

<table>
<thead>
<tr>
<th>BMAP: 2456</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streets:</td>
</tr>
<tr>
<td>Taylor Ave From 741 To 777</td>
</tr>
</tbody>
</table>

**Additional Location Information:**

**WATER DISTRIBUTION SYSTEM**

<table>
<thead>
<tr>
<th>Estimated Count of Mains</th>
<th>Pipe Extension(s)</th>
<th>Pipe Size and Material</th>
<th>Pressure Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6.517 36300</td>
<td>6 Cast iron 8 Asbestos Cement</td>
<td>G10</td>
</tr>
<tr>
<td>Estimated Count of Hydrants</td>
<td>Hydrant Number(s)</td>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>435</td>
<td>T77 Taylor Ave</td>
<td></td>
</tr>
<tr>
<td>Estimated Count of Valves</td>
<td>Valve Number(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>G044018 G044373 G044374 G044435</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AGENCY NOTIFICATION**

<table>
<thead>
<tr>
<th>Agency: Alameda FD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date/Time Out:</strong> 05/20/2015 16:51</td>
</tr>
<tr>
<td><strong>Person Contacted:</strong> 9570</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agency: Fire Department</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date/Time In:</strong> 05/21/2015 03:04</td>
</tr>
<tr>
<td><strong>Person Reporting In:</strong> RBARAZZA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Actual Duration:</strong> 11:26 Hours</th>
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</thead>
</table>

Created: 05/20/2015 16:51 by ABRECE
Last Updated: 05/21/2015 03:04 by MPARKER
Improvements

• Easy to locate valves and identify status
• Identify when valves are due for inspection and testing (preventive maintenance)
• Reduce time to plan and execute shutdown
• Reduce damage and water loss
esri Technical Specifications

- ArcGIS for Server 10.1 and higher
  - One feature service per template
  - One map service per template
  - One cached basemap map service per template
    - Can also use ArcGIS Online basemaps
  - One geocode service per template
    - Can also use ArcGIS Online service
  - One geoprocessing service for Pipe Isolation Trace/Shutdown Reporting
  - One print map task service per template
  - One geometry service per template
- ArcGIS JavaScript API
  - API hosted on ArcGIS Online
infraMAP NOW Tech. Specs

- JavaScript and HTML 5 for cross platform use
  - Google Chrome recommended but also runs on Safari, Internet Explorer
- Internet Information Services (IIS) 7
- .NET 4.5.1
- infraMAP Database in SQL Server or Oracle
- Future integration for EBMUD General Work Order (GWO) with infraMAP Work & Task
- infraMAP Field for fully disconnected use with Wachs Valve Machine
About infraMAP Software

infraMAP NOW - New Online Workflow

- Collect, inspect and update assets in real-time
- Runs on iPad, Android and Windows tablets
- Utilizes Esri’s ArcGIS for Server Technology
- New online workflow for Local Government and Utility agencies
- NOW connects the office with field crews and delivers the data they need when they need it, NOW

infraMAP Manager

- Centralized manager for your data settings
- Connect to multiple databases GIS, CAD, ATRN/ATL, CTMS and other external databases
- Control who, what and how users see your data
- Configure URL’s and other applications to run within the infraMAP Platform
- Features field specific quality assurance and quality control
- Supports any data model
- Configure any asset inspection form with the built-in form designer

infraMAP Field

- Collect, inspect and update assets disconnected
- Displays’s maintenance history from the office or out in the field
- Directly control Wachs hydraulic value machines
- Fully functioning GPS navigation system
- Features include Work and Tasks, Inspections, One-Click Reporting, Redlining and Isolation Tracing
- Utilizes Esri’s ArcGIS Engine Runtime Technology