

# From Bond Ratings to Work Orders

## GIS Integration for Utilities



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# Abstract

- Five years of GIS development and integration in a water utility has brought improvement to many aspects of the company. Progressing from semi annually updated micro fiche maps of field assets to intelligent GIS mapping functions on rugged field laptops. Improved customer service and GIS data access through a company wide IMS. ERP integrations ease access and analysis of work orders and notifications. Animated historical growth mapping is used to secure and maintain a high bond rating to lower interest rates. GPS data collection improves data quality and decreases time needed to locate assets in the field. GIS modeling allows for better planning and scenario analysis. GIS has went from a cryptic tool only used by a few computer specialists to being of the one most used applications in the company other than time sheets and office productivity suites.

# Who and Where

- 💧 Quasi Municipal Water District
- 💧 Eastern Kansas
- 💧 SW 1/4 of Kansas City
- 💧 ~140,000 customers
- 💧 2,500 miles of pipe and growing
- 💧 Service Area 272.5 sq. mi.
- 💧 356 employees



# Where We Started

- 💧 Paper Map books updated yearly
  - 💧 Cost \$50,000 a year
  - 💧 Never current
  - 💧 Very Large
- 💧 Micro Fiche replaced map books for field
  - 💧 Updated twice a year but still not current enough
  - 💧 Hard to use

# Where We Started (cont.)

- 💧 CAD

- 💧 Lacked ability for query and analysis

- 💧 Mainframe

- 💧 Silo systems lacked integration

- 💧 Many Access databases

- 💧 Lacked integration

- 💧 Duplicated effort

- 💧 Difficult to support user “Tweaks”

# Solutions Identified

- Enterprise GIS is promoted and eventually accepted as a priority.
  - Convert data
  - Hire dedicated and trained GIS staff
  - Purchase and install Enterprise ESRI software
- Data sharing partnership with Johnson County Automated Information Mapping System (AIMS) for base mapping needs

# Solutions Identified (cont.)

- 💧 Replace Silo Mainframe Systems with ERP system
- 💧 Develop Mobile GIS capabilities
- 💧 Implement GPS for improved data capture and improved spatial accuracy
- 💧 Integrate GIS and ERP system
- 💧 In house Water Pipeline modeling



# Implementations

- 💧 More or less this is the order that implementations and integrations occurred
  - 💧 Data conversion completed ~2001
    - 💧 Several years to complete
  - 💧 SDE and versioned editing
    - 💧 Migrated / retrained CAD personnel to work in versioned enterprise GIS
    - 💧 ESRI version 8.1
  - 💧 Simple application developed to generate up to date paper maps
    - 💧 Business workflow model based on ¼ mile map pages made this a natural starting place

# Implementations (cont.)

- 💧 Mobile GIS implemented
  - 💧 Semi Rugged laptops
  - 💧 Developed Trace tool to help isolate main breaks
  - 💧 Customized and simplified interface
  - 💧 ArcView Standalone on each laptop
  - 💧 ArcReader as Backup software
  - 💧 Laptop GIS databases updated weekly
  - 💧 Crews rapidly developed dependence on GIS

# Implementations (cont.)

- 💧 IMS implemented

  - 💧 Released to users in a trickle

  - 💧 Heavily used in distribution

  - 💧 Light use in other areas of company but expanding

- 💧 GIS centric water modeling software and model creation

  - 💧 First implementation used Standalone modeling software with imported GIS data

  - 💧 Second implementation uses Software integrated into ESRI ArcView with direct connection to SDE

# Integration

- 💧 Installed ERP to replace silo mainframe systems
  - 💧 SAP replaced old systems and is current backbone of virtually all WaterOne business processes
- 💧 1<sup>st</sup> Integration of GIS with ERP software
  - 💧 Custom developed integration between GIS and SAP
  - 💧 Integration confined to Mains, Valves, Hydrants and Services
  - 💧 Interface was GIS to SAP only
  - 💧 IMS component
  - 💧 No Synchronization of GIS and SAP

# Integration (cont.)

- 💧 2<sup>nd</sup> Integration of GIS with ERP system
  - 💧 Out of Box solution developed by Impress software
  - 💧 Integration still only Mains, Valves, Hydrants and Services
  - 💧 Increased functionality
  - 💧 Integration of SAP work orders and notifications in GIS
  - 💧 Interface goes both directions, SAP to GIS and GIS to SAP
  - 💧 No IMS Component
  - 💧 Allows nightly synchronization runs to promote database integrity

# GPS

- 💧 GPS just started
  - 💧 Purchased survey grade equipment
  - 💧 Capture of commercial Automated Meter Reading (AMR) meter locations
  - 💧 Will save mountains of time and money by providing for accurate location of underground assets

# Benefits and ROI

- 💧 Increased Efficiency
  - 💧 Contractor location questions handled instantly by dispatch
  - 💧 Line locators can more easily mark pipe locations to avoid costly breaks and repairs
  - 💧 Emergency repair crews can isolate leaks in a more timely manner reducing costly property destruction

# Benefits and ROI

- 💧 Cost savings through better planning and asset management
  - 💧 Projects easier to plan visually with other municipal entities e.g. if we see a city is planning street repairs over aging mains we can coordinate replacement at the same time
  - 💧 Predictions of early pipe decay from GIS analysis of high acid soils and pipe material allows for better asset management planning and savings



# Benefits and ROI

- 💧 Cost savings through data sharing
  - 💧 Sharing data through a county program helps all participating utilities avoid costly damage and expedites problem identification for all parties
  - 💧 Data sharing agreement with base map data provider reduces cost of data

# Benefits and ROI

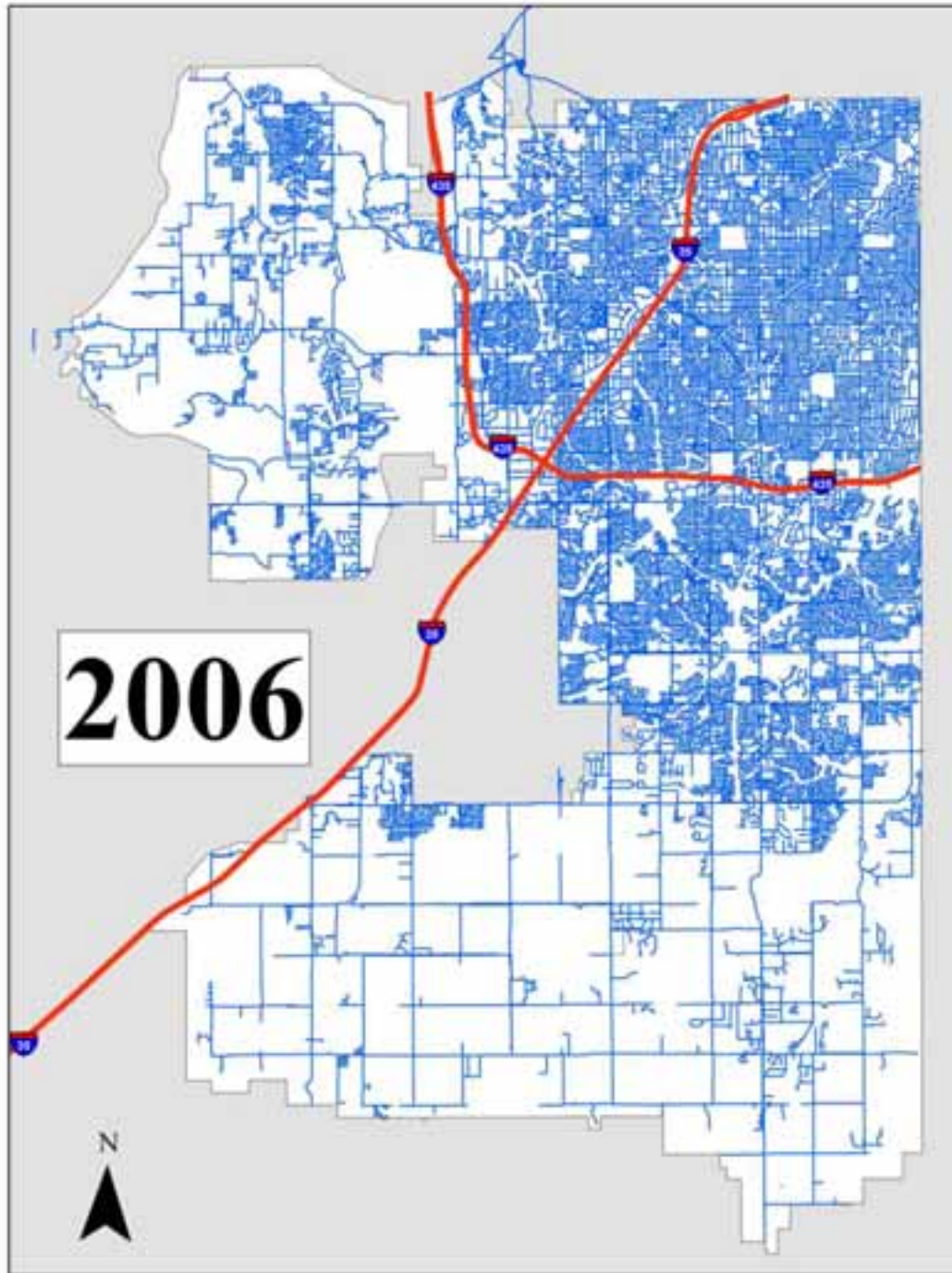
- 💧 Increase customer safety
  - 💧 GIS can be used to determine areas requiring customer notification for various reasons
  - 💧 GIS is useful for contamination modeling and emergency preparedness planning

# Benefits and ROI

- 💧 Savings from improved workflow
  - 💧 GIS integration of ERP work orders allow for better management of crews in the field
  - 💧 GIS integration with ERP reduces duplication of data entry and streamlines process of adding new services

# Bond Rating

- 💧 Presentation of historic growth using GIS data helped maintain our AAA bond rating
  - 💧 This allows us to borrow money at the lowest rates for our CIP projects
  - 💧 Allows the company greater flexibility to keep rates low and still make improvements to the system
  - 💧 Following slides show we have plenty of growth potential (new income) within our existing boundaries



**272 square  
mile service  
area only  
50%  
developed**

Source:  
WaterOne GIS

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- 💧 Too many WaterOne personnel, vendors and contractors are responsible for the successful implementation of the projects to mention here. If anyone wishes more information please contact me directly and I will provide as much information as appropriate.

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