Constructing a New Paradigm:

Building a Visual-centric Knowledge Management System for the San Jose/Santa Clara Regional Wastewater Facility (RWF)

Developed and Maintained by the Geographic Information Services Team at the San Jose/Santa Clara Regional Wastewater Facility (RWF)
What is GIS?

A geographic information system (GIS) lets us visualize, question, analyze, and interpret data to understand relationships, patterns, and trends.
Why use GIS?

- Cost Savings from Greater Efficiency
- Better Decision Making
- Improved Communication
- Better Record Keeping
- A Visual Based Medium for Knowledge Management
From this...

Data/Documents Management System Before GIS

to this...GIS database

Evolution of a Visual-based Knowledge Management System

Finally...to this...Web Map Application
GIS at the RWF is the core of multiple knowledge capture processes.
How GIS is Used

- Capture Valve and Pipe Information
- Capture Buried Utility locations and key characteristics
- Disseminate critical knowledge in a visual format
- Integrate Critical Systems
- Integrate key documents, drawings, and diagrams
- Capture abandoned above and below ground infrastructure
- Tool to train new staff
- Key element in Intelligent Document Management System
- Integration with Asset Management/CMMS
- Links to Videos and Photos past and present
- Identify exposed buried utilities
Software and Tools used:

**Software**
- ArcGIS for Desktop - Advanced
- ArcGIS for Server - Enterprise
- ArcGIS for Schematics
- ArcGIS Web AppBuilder
- InfoWorks ICM
- InfoWater
- Microsoft SQL Server
- Microsoft Visio

**Global Positioning System**
- Trimble Geo6000 w/ Sub-Dm Option and GPS Base Station

**Ground Penetrating Radar**
- GSSI UtilityScan DF w/ Ruggedized Cart

**Pipe/Cable Locator**
- RadioDetection RD8000
- FlexiTrace and Sondes
The following slides will illustrate some of the key elements of the RWF’s GIS-based Knowledge Management Program

- WebMap Viewers
- Dynamic Diagrams/Schematics
- Hydraulic Modeling
- Geotagged Photos
- RWF Subsurface Utilities Damage Prevention Program
- Electrical System Linkages

Visualizing the past in the present
GIS-based Web Map Viewers – the visual medium of knowledge management

Software Used: ArcGIS for Desktop, ArcGIS for Server, and ArcGIS Web AppBuilder
GIS-based Smart Diagrams/Schematics – shun dumb diagrams

Diagrams linked to centralized GIS database. As database changes, so do diagrams.

Software Used:
ArcGIS for Desktop
ArcGIS for Schematics
Microsoft Visio
GIS-based Hydraulic Models

Model hydraulics of flows into, within, and thru your Plant for any system

Software Used:
ArcGIS for Desktop
InfoWorks ICM and InfoWater
Geotagged Photos of Exposed Buried Utilities

- 3,000 Geotagged Photos in GIS Database
- 2,000+ locations inside RWF
- Each photo is tagged with high-accuracy GPS coordinates
- Can easily identify what utility is buried where and how deep
- Photos complement drawings and GIS
Tools and Transport used for the RWF Subsurface Utilities Damage Prevention Program

Ground Penetrating Radar (GPR)

Pipe/Cable Locator

Global Positioning System (GPS)

“We do not locate, mark, and forget. We locate, mark, capture, and store!”
Tim Hayes, RWF GIS Supervisor
Electrical System Knowledge Capture

Link Manhole Foldout Diagrams to EMH Locations in Electrical WebMap
Create Foldout Diagrams for all Handholes and Manholes
Field Verify all Pull Boxes
Generate Single Line Diagrams using GIS
Results of RWF GIS-centric approach to Knowledge Management

A positive medley of tangibles and intangibles

- Everyone is more safe.
- Staff have an easy way to utilize and disseminate critical knowledge when they need it most.
- Money and time has been saved.
- Significantly lower risk of knowledge being lost when staff leave.
- New staff get oriented to facility faster.
- Everyone has higher morale.