

**System Modernization of our Precious Resource
GIS Implementation Project
San Juan Water District – HDR Inc.**



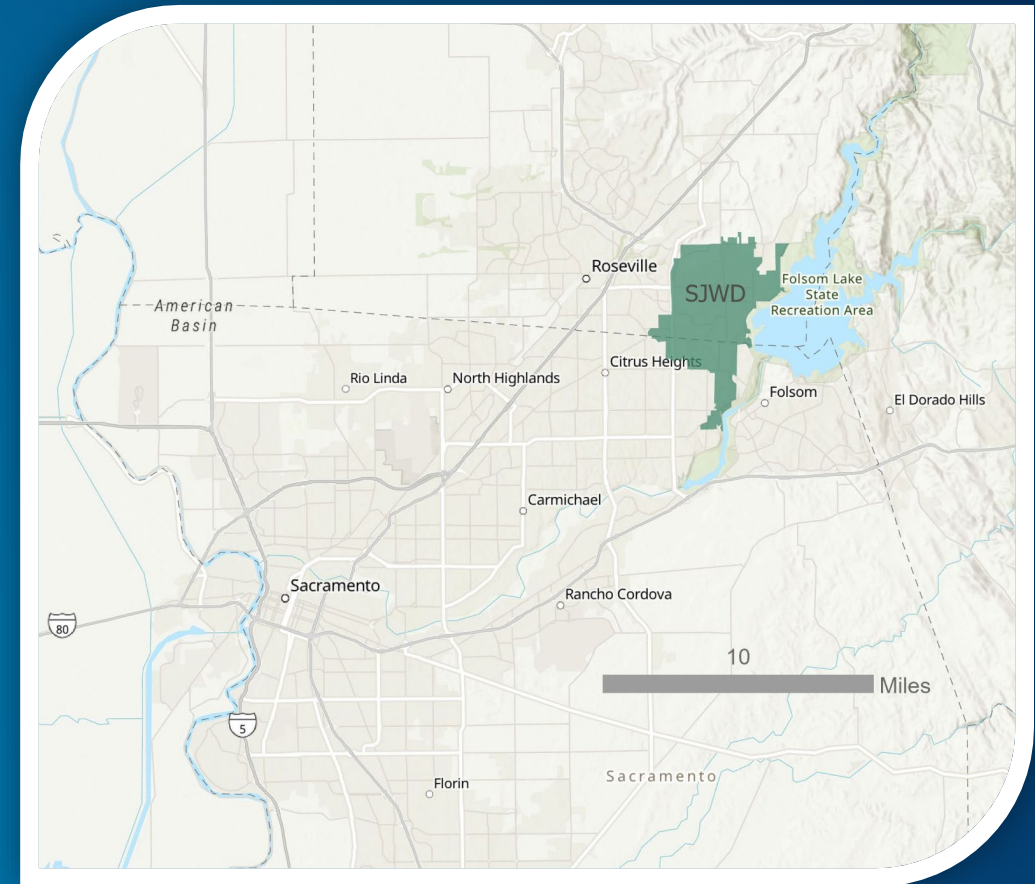
Agenda

- **GIS Implementation: San Juan Water District**
 - **SJWD Quick Facts**
 - **Migration Story**
 - **GIS Implementation**
 - Overall Project Scope
 - General Utility Network Components
 - User workflows
 - **Utility Network Implementation**
 - **Integrated Applications**
 - **Conclusion**



San Juan Water District – Quick facts

- Established 1854, Serves Community of Granite Bay and portions of Roseville, Folsom, and Orangevale California.
- Retail service area consists of approximately 17 square miles (10,880 acres), serving 12k retail customers.
- Service area has approximately 200 miles of pipeline, with diameters ranging from 4 inches to 72 inches.
- Owns and Operates a Water Treatment Plant facility, supplying water to downstream wholesale customers.
- 50 Employees



Migration Story - CAD to GIS

Needs Assessment Considerations

- Enterprise supported system

- Documented maintenance procedures

- Centralized database

- Staffing

- Integration

- CMMS

- Hydraulic Model

- CIS

- Document Management

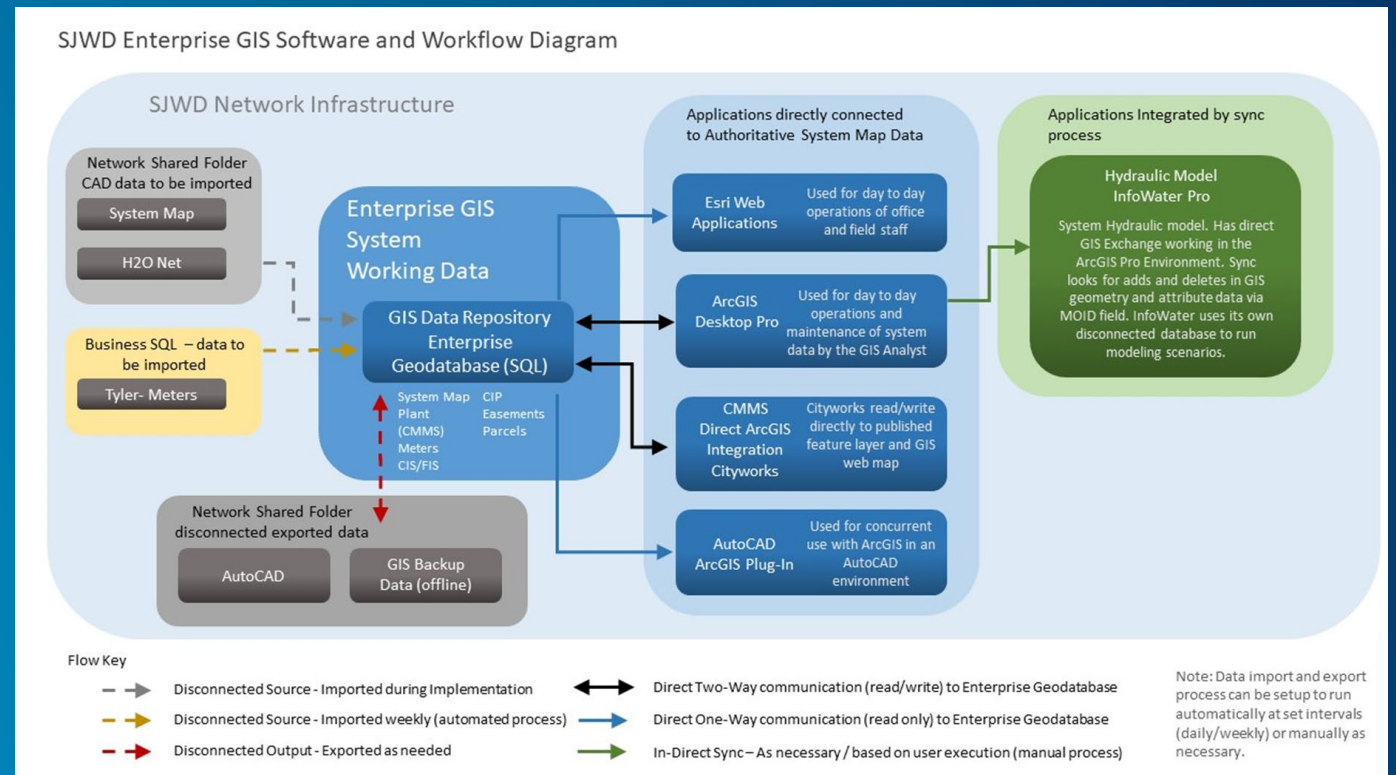
- Department Collaboration

- Engineering

- Customer Service

- Operations

- Security – all systems hosted internally



HDR Company Description

- **Employee-owned global AEC firm (founded 1917)**
- **Gold level business partner with Esri (20 years)**
- **Over 120 GIS professionals, 20 + developers**
- **2020 Esri Partner award for Platform Adoption**
- **Esri Utility Network Management and AGOL Specialty Partner**
- **In House Integration Experts**
 - Hydraulic Modeling
 - CMMS/UMS

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Program



Specialties

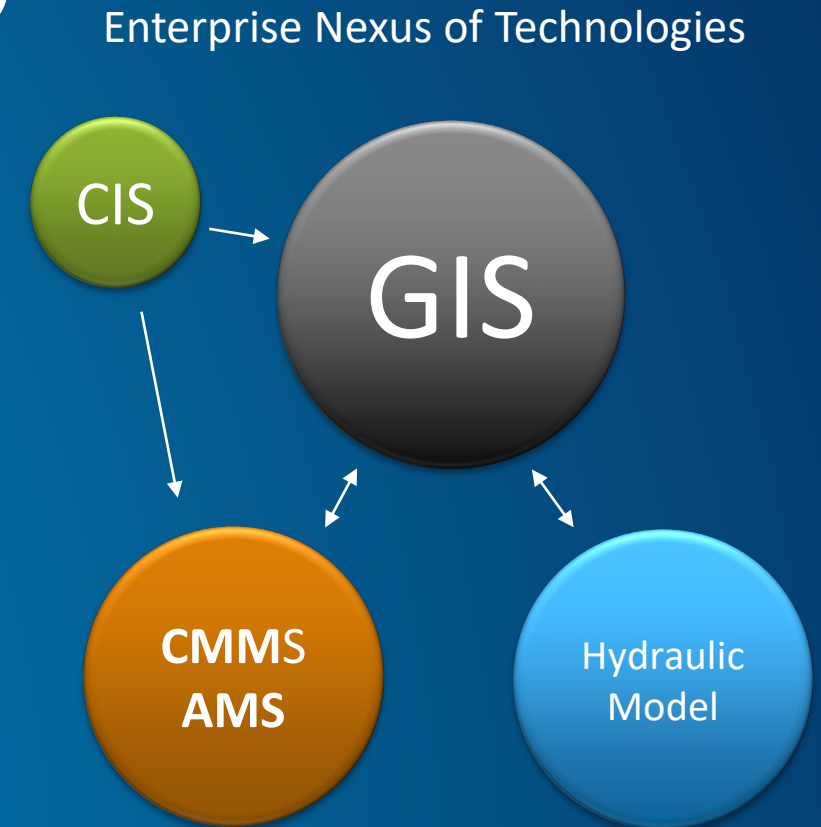


Awards



What - GIS Implementation Project Highlights

- **Data Migration from CAD to GIS Completed in 2019**
- **ESRI Small Utility Enterprise Agreement in Place (SUEA)**
- **Set-up and Administration of ArcGIS Enterprise Web Services**
 - **Water Distribution**
 - **Project Tracking**
 - **Willserve Applications**
 - **Field Services Support**
 - **Document Management**
- **Integration components included in GIS Implementation**
 - **CMMS (Cityworks)**
 - **Hydraulic Modeling (Innovyze)**
 - **CIS (Tyler)**



What - GIS Implementation Scope

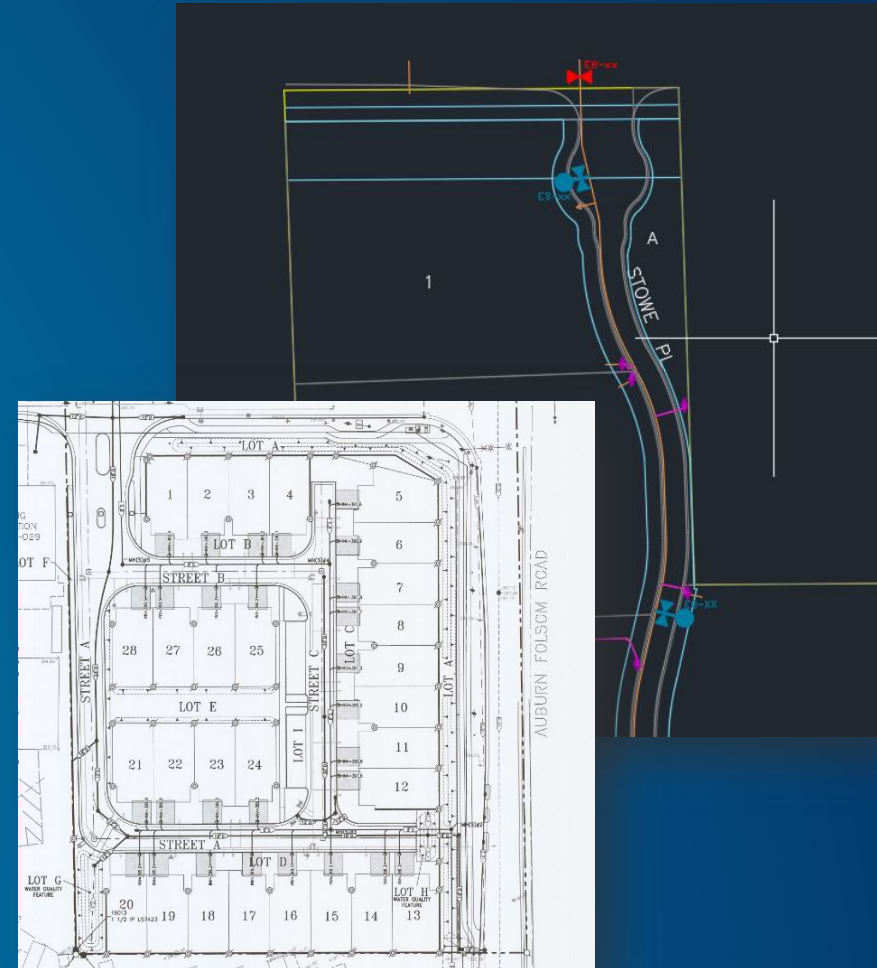
- **GIS Administration**
 - Form a Working Group
 - Mapping, Analysis, Data Requests
 - Technical Support and Training
 - Establish a GIS Program
- **GIS Platform**
 - Hardware/Software Design Plan
 - Platform Procurement
 - **Platform Deployment**
 - H20Net to InfoWater Upgrade (2,900 pipes)
- **Data Repository**
 - Data Development Plan
 - GIS Data Repository
 - GIS Data Documentation
 - Master Address Database
 - **Migrate Existing CAD and other GIS Layers**
 - Parcel Base Map
 - **Meters and Customer Information**
 - Demographics / Forecasting
 - **Document Management**
 - **Plant and SCADA Locations**
- **Ortho photo / Elevation Data**
- **Application Integration**
 - Application Development Plan
 - **Will Serve**
 - GIS Portal
 - **Water Distribution Network apps**
 - **CIS/FIS Integration**
 - **Project Tracking**
 - **CMMS Integration**
 - System Map Production
- **Training and Documentation**
 - Staff Training - Desktop GIS
 - Staff Training – IT
 - Staff Training - GIS Portal
 - **As-built documents and Operations and Maintenance Manual**

* Scope Items that took a majority of implementation time

User Workflows

New Subdivision GIS Process

- Add Parcels from SACOG Open Data hub or county GIS website
- Add CAD Design linework from contractor
- After improvement plans have been accepted by the district GIS features are digitized (Mains, service lines valves hydrants, etc..)
- GIS Features are then assigned Asset ID's and MOID's and can now be used in integrated CMMS and water modeling software.



Hard copy (PDF) and CAD line work

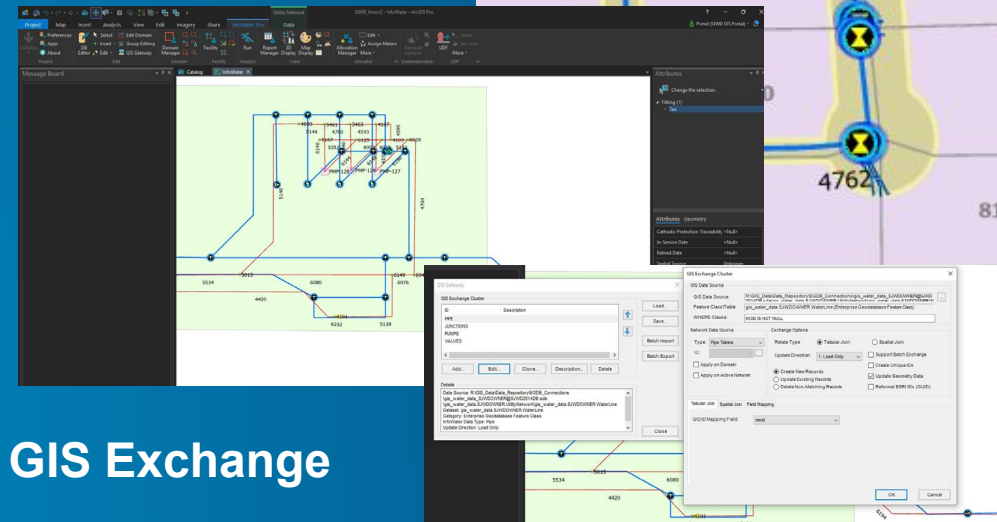
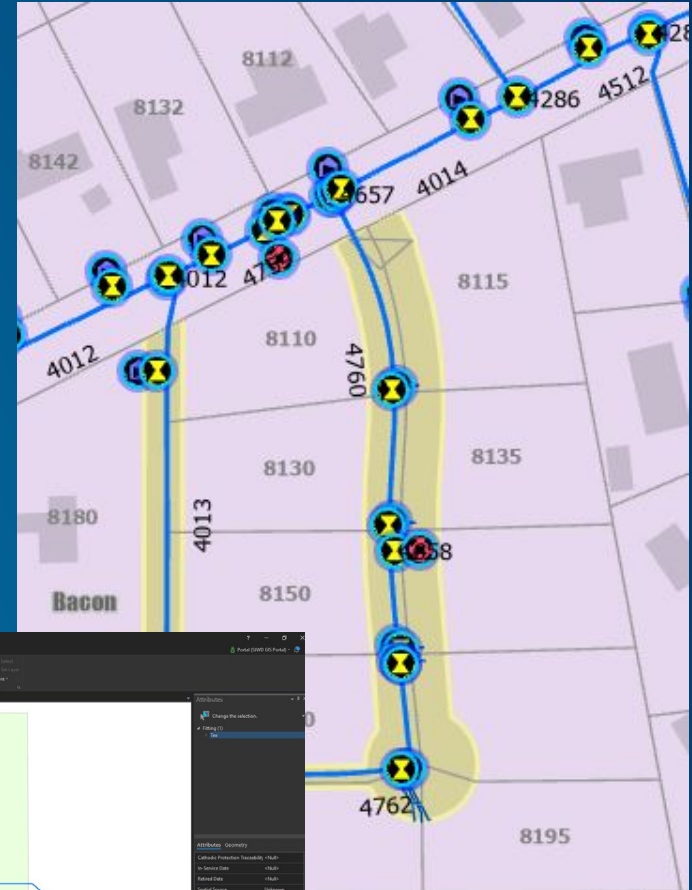
User Workflows – Integration and Document Management

- **System Integrations**

- CMMS (Cityworks) directly connects to the GIS web service.
- Hydraulic model InfoWater syncs directly to the enterprise geodatabase (SQL) for updates
- Customer Service CIS (Tyler) meter and customer info. is imported weekly and linked to meters in GIS

- **Document Management**

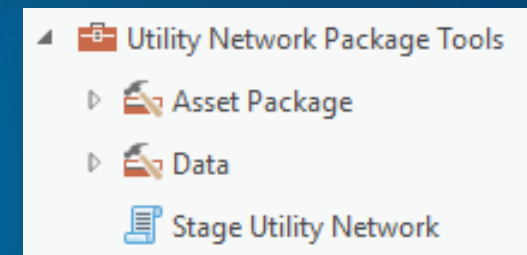
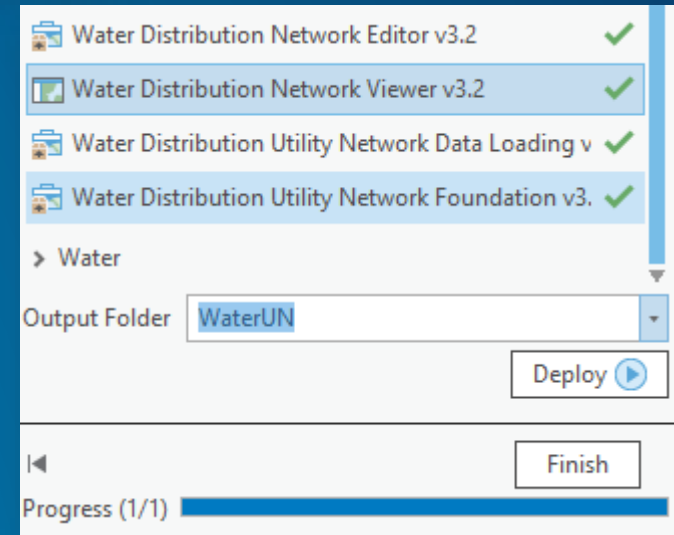
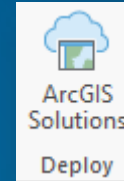
- Improvement maps are scanned and linked to subdivision layer
- As-Builts and locations sheets linked to corresponding GIS feature (Mainline, Hydrant, etc.)



InfoWater Map & GIS Exchange

Setting up – Big Picture Steps and components

- ArcGIS Enterprise (10.7) base deployment
- Install ArcGIS Pro (2.5) Solutions Add In
- Download and open Water Distribution Information Model Project Package
- Add Utility Network
- Import previous CAD or GIS features
- Publish Feature and map services
- Add rules or Subnetwork configurations
- Clean network errors
- Assign/Update Subnetwork Tiers (System/Pressure)



Setting up – The Water Distribution ArcGIS Pro Project

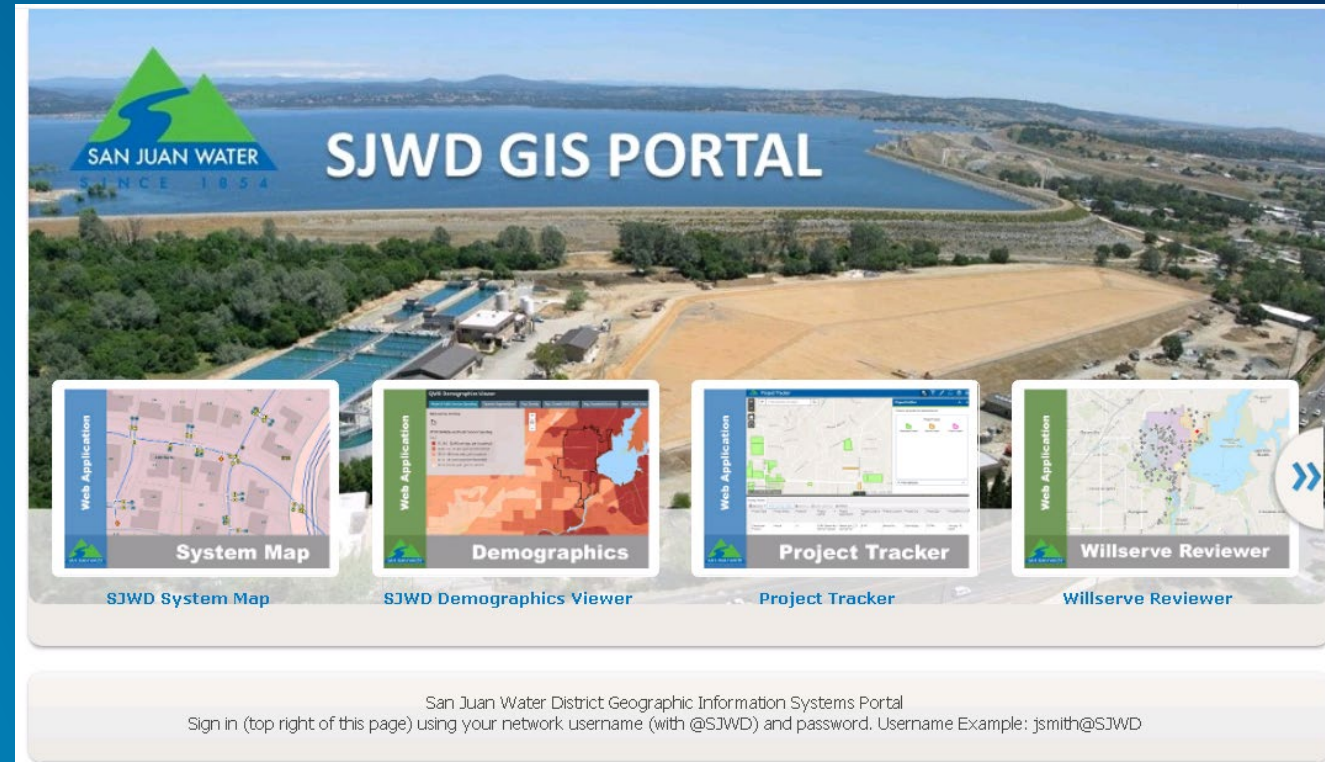
The screenshot displays the ArcGIS Pro interface for a Water Distribution project. The main window shows a map of a water network with various colored lines and nodes. The interface includes several key components:

- Utility Network Tab:** Located in the ribbon, it contains toolsets for Network Topology, Associations, Tools, Selection, Diagram, and Subnetwork.
- Network Topology:** A toolset in the ribbon that includes tools like Validate, Terminal Paths, Terminal Connections, Modify, Enter Containment, Exit Containment, Display Content, View, Trace Locations, Connected, Subnetwork, Subnetwork Controllers, and Upstream.
- Subnetwork:** A toolset in the ribbon that includes tools like Find, View, and Modify Controller.
- UN Dataset:** A callout box pointing to the 'Water Utility Network' layer in the Drawing Order pane.
- Geoprocessing:** A pane on the right side of the interface containing a list of tools for managing the utility network, such as 'Add Domain Network', 'Add Network Attribute', 'Add Network Category', 'Add Rule', 'Add Terminal Configuration', 'Add Tier', 'Add Tier Group', 'Create Utility Network', 'Delete Network Category', 'Delete Rule', 'Delete Terminal Configuration', 'Disable Network Topology', 'Enable Network Topology', 'Export Associations', 'Export Rules', 'Export Subnetwork Controllers', 'Import Associations', 'Import Rules', 'Import Subnetwork Controllers', 'Set Association Role', 'Set Edge Connectivity', 'Set Network Attribute', 'Set Network Category', 'Set Subnetwork Definition', 'Set Terminal Configuration', 'Add Trace Locations', and 'Export Subnetwork'.

The map shows a complex network of water lines and nodes, with different colors representing different network components. The interface also includes a 'Contents' pane on the left, a 'Tasks' pane at the bottom, and a status bar at the bottom right.

GIS Portal

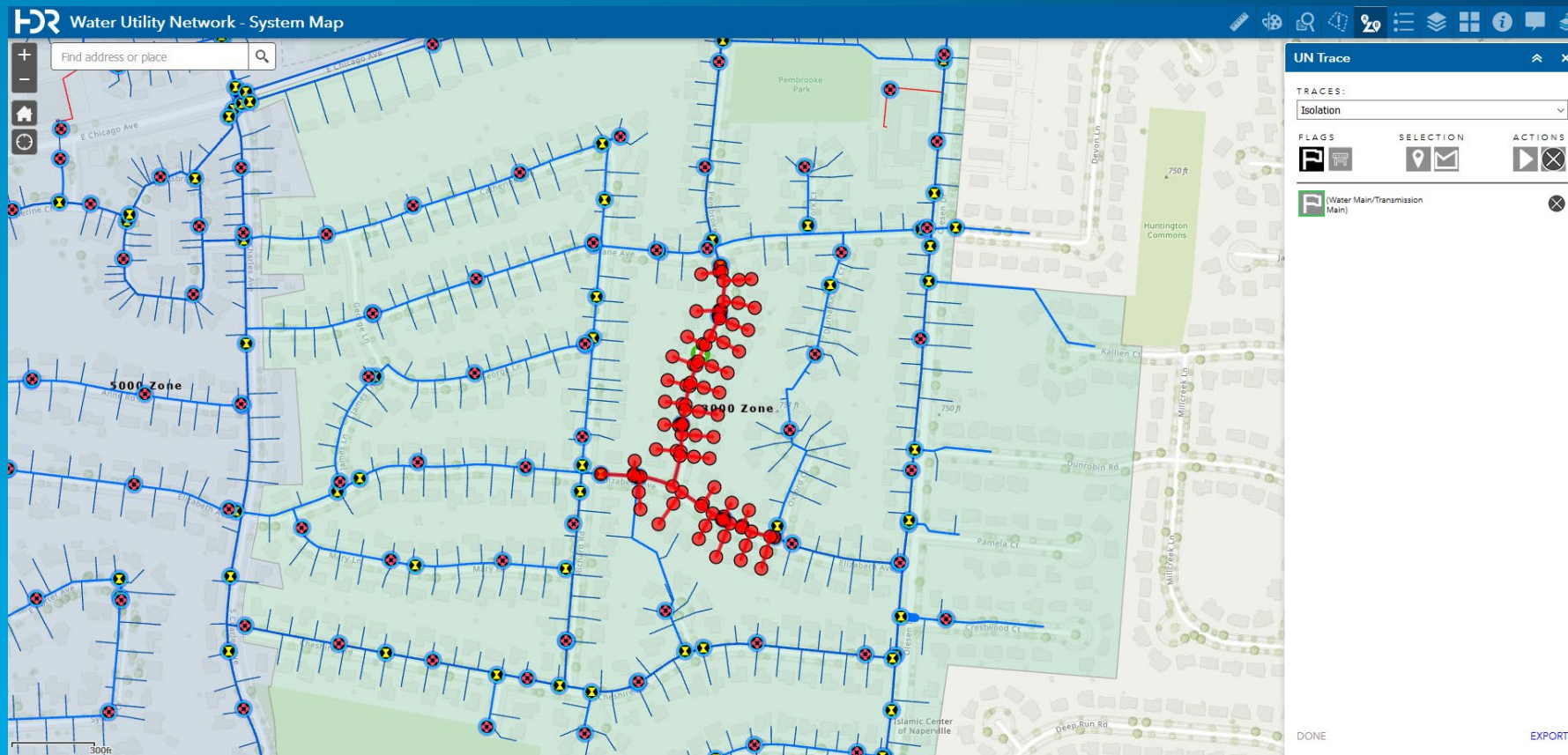
- Centralized location of data and applications
- Built using ArcGIS Enterprise 10.7 hosted on internal network
- Tailored to SJWD departments through use of groups and color coding
- Majority of app configuration using off the shelf Esri templates
- Two custom widgets were added to Web App Builder



Keystone Application – SJWD System Map

Distribution System, WTP, Landbase, CIS data in one app

Mapping tools Include: Measure, Graphics, Map Change Request (Editable), System Awareness, Network Tracing



Integrated Business Processes – Project Tracking

Internal Engineering and Customer Service Collaboration Tool

- Tracks Project from initial design to final construction.
- Migrated from MS Access standalone tool into Enterprise web application.

The screenshot displays the Project Tracker web application interface. The top header includes the San Juan Water logo and the text "Project Tracker Engineering Edit and Review Application". The interface is divided into several sections:

- Left Panel (Filters):** Contains a "Filter" section with "Quality" and "Quantity" options. It includes two filter groups: "Project Type" (set to "Developer Project") and "Project Status" (set to "Active"). A "Willserve" toggle is also present.
- Map:** A central map view showing a residential area with various lots and streets. A search bar at the top of the map says "Find address or place". The map shows a highlighted area in green and blue, with labels like "SPROW RANCH", "Gravity", "AMERICAN RIVER CANYON 2B", and "ARC-South".
- Right Panel (Project Details):** A "Popup Panel" displaying project information:
 - Project Status: Active
 - Project Name: 9565 Central Ave
 - Project Description: Curb and sidewalk installation
 - Project Location No: 9565
 - Project Location: Central Ave
 - Project City: Orangevale
 - Project Zip: 95662
 - Project Revision Date: 11/8/2006
 - Project Revision Number: 0
 - Notes: (empty text area)Buttons for "Clear", "Delete", and "Save" are at the bottom of the panel.

Integrated Business Processes – Willserve

Internal Engineering and Customer Service Collaboration Tool

- Tracks requests for water service from pre planning to post inspection.
- Migrated from standalone Excel spreadsheet into Enterprise web application.

The screenshot displays the 'Willserve Reviewer Map' web application. The interface is divided into several sections:

- Header:** Features the San Juan Water logo and the title 'Willserve Reviewer Map'.
- Info Summary:** Shows a diamond icon, the text 'Willserve', and a count of '12'. Below this is a search bar with the placeholder text 'Find address or place'.
- Filter:** A list of filter options with toggle switches:
 - Willserve Initiated (checked)
 - Inspection In Process (checked)
 - In Service - Inspection Complete (checked)
 - In Service - Ready for Billing (checked)
 - In Service - Entered in Billing - Willserve Complete (unchecked)
 - Willserve - Activation Date (unchecked)Below the filters is a date range selector: 'Date of Application is between' followed by two input fields and the word 'and'.
- Map:** A central map showing various residential areas including Sierra, Bacon, Lower Granite Bay, Upper Granite Bay, and Granite Bay. A search bar is positioned above the map. The map includes navigation controls (home, back, forward, zoom in, zoom out, full screen) and a scale bar indicating 0.4 miles. The map is powered by Esri.
- Popup Panel:** A panel on the right side of the map containing a 'Smart Editor' and 'Select' options. It includes several dropdown menus for data entry:
 - Ready To Inspect: Yes
 - STATUS: In Service - Inspection Complete
 - Pipe Inspection Complete: No
 - Pipe Inspection Complete Date: (empty)
 - Backflow Inspection Complete: Yes
 - Backflow Inspection Complete Date: 8/23/2019
 - Concrete Pad Inspection Complete: No
 - Concrete Pad Inspection Date: (empty)
 - Weather Bag Inspection Complete: No
 - Weather Bag Inspection Complete Date: (empty)At the bottom of the popup panel are 'Clear', 'Delete', and 'Save' buttons.

Integrated Business Processes – CMMS (Cityworks)

GIS based, map driven work order and inspection platform

Used for field services and water treatment plant operations groups

The screenshot displays the Cityworks CMMS interface. The main map shows a water treatment plant layout with various components labeled: Backwash System, Solids Processing, Sedimentation, Water Treatment Plant, Treatment Building, and Chemical. The interface includes a 'Tools' menu, a 'Legend' panel on the right listing asset types like Filter System, Generator System, Hinkle Reservoir, Process Water Pipeline, Sedimentation, Solids Processing, and Treatment Building. An 'Asset Viewer' window is open in the foreground, showing a tree view of assets under 'SEDIMENTATION - S Flocc Zone 2'. Below the tree view is a table of selected assets.

Asset ID	Name	Asset group	Asset type	Association status	Subnetwork name	Creation date	Creator
WTP-SED-FAC-007	S Flocc Zone 2	Sedimentation	6	0	Unknown	1/13/2020	SJWDOWNER

The Asset Viewer window also shows a list of assets under 'SEDIMENTATION - S Flocc Zone 2' with checkboxes for selection. At the bottom of the Asset Viewer are buttons for 'Expand', 'Check', 'Uncheck', and 'Flag'.

Conclusion

Benefits seen so far...

- **Greater knowledge of the distribution system**
- **Integration with CMMS**
- **Group Communication/Collaboration**
- **Tools used in the System Map App**
 - Measure, System Awareness, Map change request tool
 - Apps live in the field (less printing for Stephen)

Path Forward

- **Continue to develop partnership: HDR-SJWD-Esri**
 - Pressure Subnetwork Calibration
 - Additional Features – Backflow devices, CP
 - Water Treatment Network Model
 - Implementation and Integration Best Practices
 - 3D Applications

