Using a 360° Approach to Leverage GIS, Asset Management and CAD Design

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City of Vancouver
Public Works

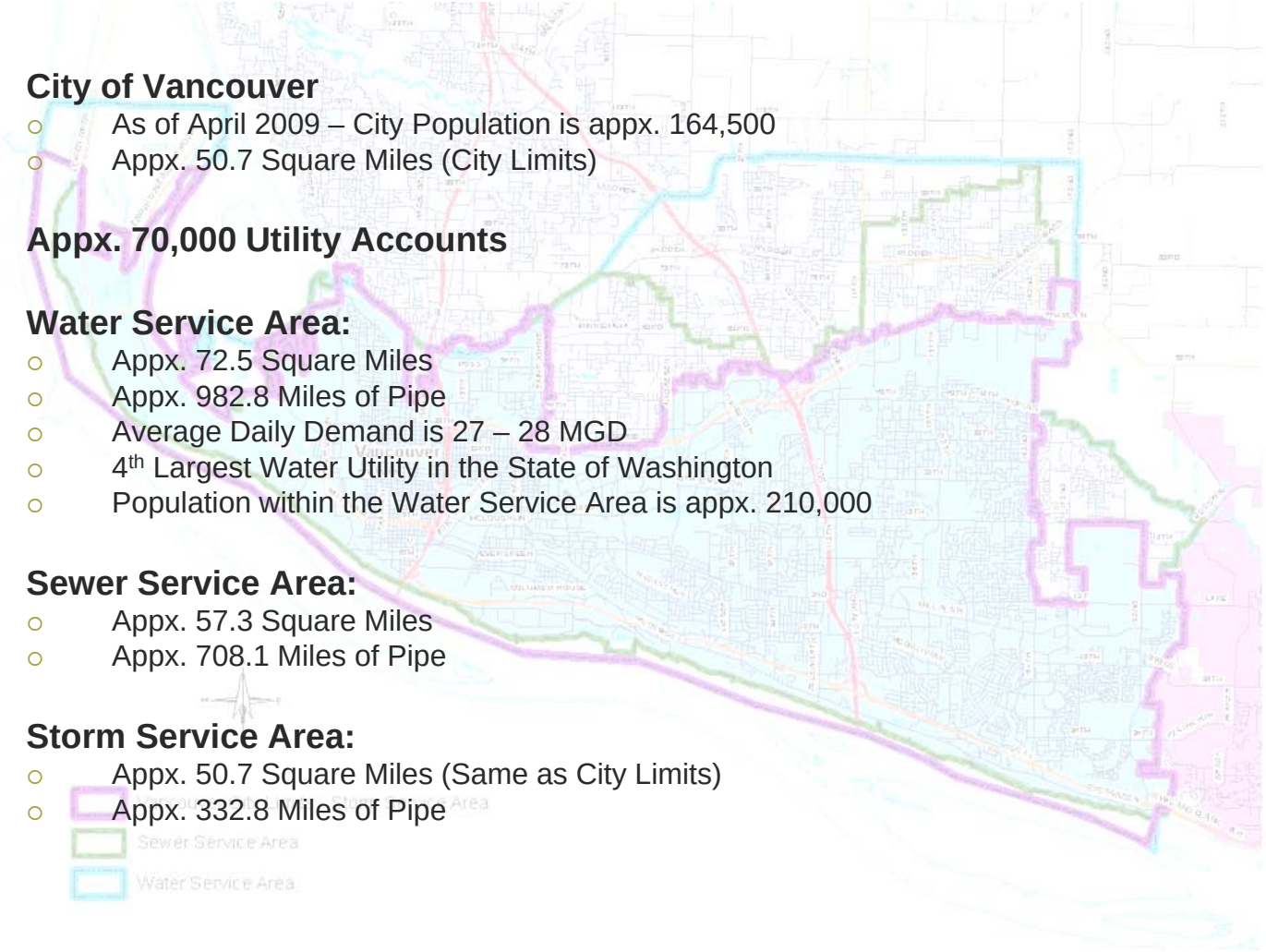
PNWS – AWWA Water Works Conference 2010

My Background…

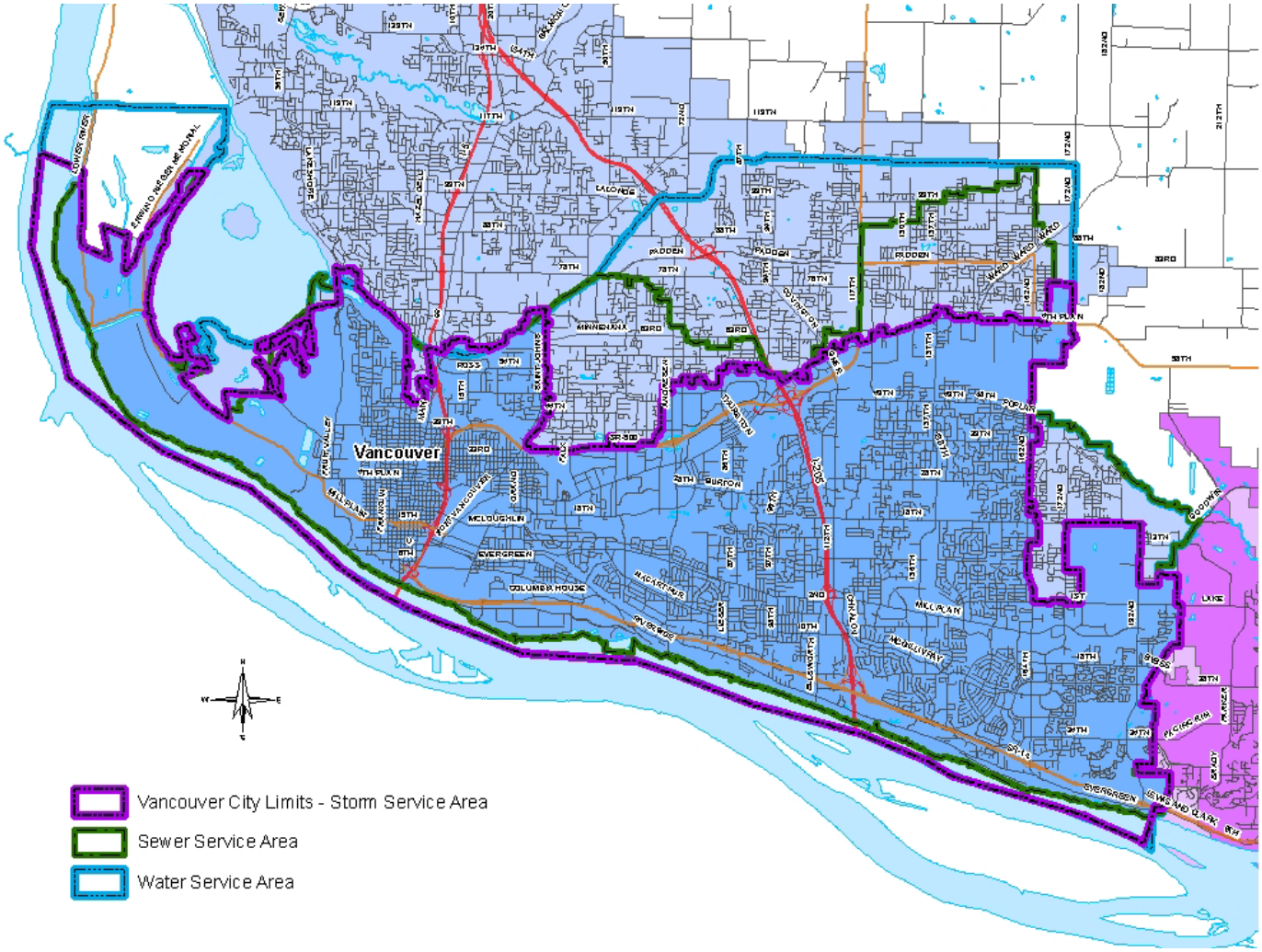
- With the City of Vancouver for 5 years (2005 – Present).
- Prior employment experience:
  - Rockwood Water PUD – 3 years (2002 -2005).
  - Port of Portland – 4 years (1998 – 2002).

Quick Facts

- **City of Vancouver**
  - As of April 2009 – City Population is appx. 164,500
  - Appx. 50.7 Square Miles (City Limits)
- **Appx. 70,000 Utility Accounts**
- **Water Service Area:**
  - Appx. 72.5 Square Miles
  - Appx. 982.8 Miles of Pipe
  - Average Daily Demand is 27 – 28 MGD
  - 4th Largest Water Utility in the State of Washington
  - Population within the Water Service Area is appx. 210,000
- **Sewer Service Area:**
  - Appx. 57.3 Square Miles
  - Appx. 708.1 Miles of Pipe
- **Storm Service Area:**
  - Appx. 50.7 Square Miles (Same as City Limits)
  - Appx. 332.8 Miles of Pipe



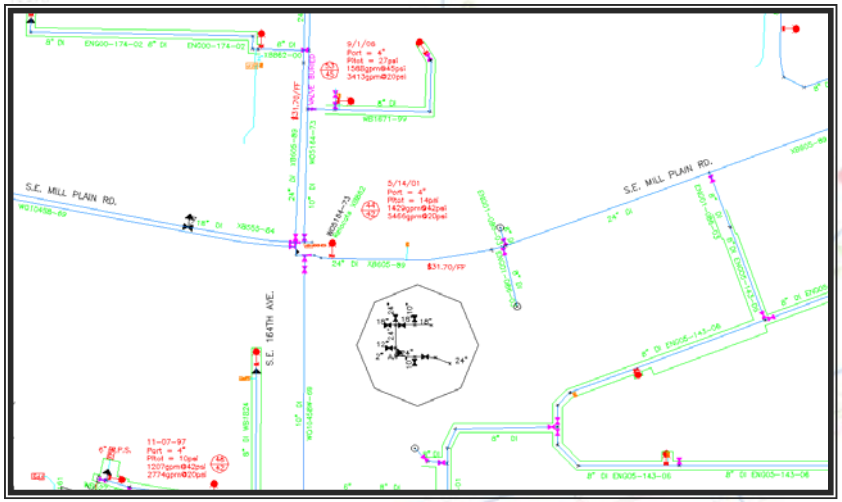
Vancouver Service Areas

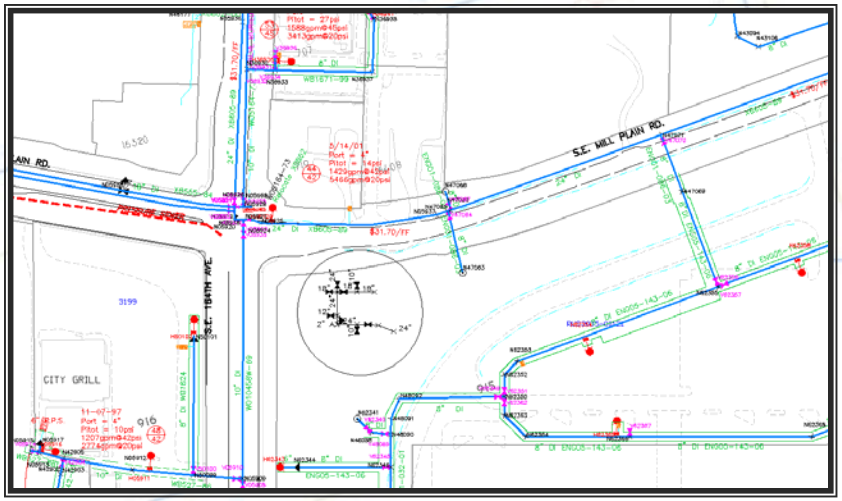


Asset Management & Mapping Background

- Prior to 2009
  - Mapping was maintained by each individual utility department within Engineering.
  - Asset Management was separate and maintained by one individual in Engineering for all 3 utilities.
- Effective Jan, 1st 2009
  - Due to re-organization – A GIS Workgroup was created.
  - All GIS mapping and asset management tasks were re-assigned to the workgroup.
- GIS Workgroup has several internal customers:
  - Engineering
  - Operations
  - Construction Services
  - Development Review Services
  - Other City departments

Brief History





Prior to 2005

- Utility mapping was maintained in AutoCAD Map 3D w/Object Data.
- Several issues that were recognized - due to Asset Management and utility mapping being separate:
  - Redundant and inconsistent data input:
    - Created lack of confidence in data.
    - Data was hard to query because it was input inconsistently.
    - Other issues…
  - Lack of standardization within utility mapping.
- Maps were published to DWF and deployed out to the field crews.
  - Inconsistent scheduling.
  - Slightly different look and feel per department.

Brief History

2005 – Present

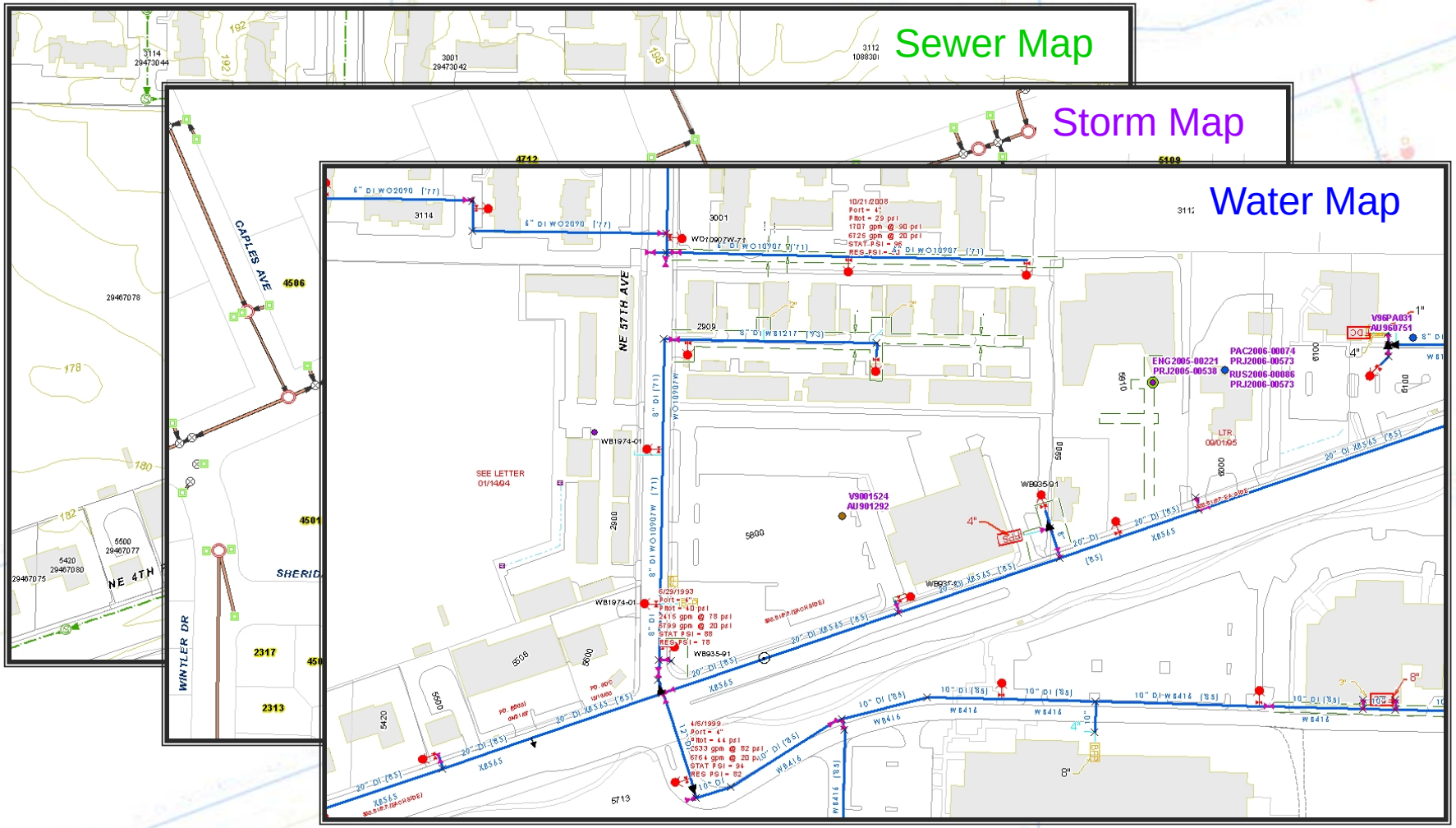
- Converted utility mapping from CAD mapping to GIS based utility mapping.
- Upgraded the Asset Management System from RJN CassWorks to Hansen.
- Interfaced GIS with Asset Management System.
  - Enabled synchronization of attribute information which resulted in reduction / elimination of data input redundancy which also resulted in higher quality data.

Brief History

2005 – Present

- Deployed “dynamic” utility mapping to internal customers via a combination of the following:
  - ESRI ArcSDE
  - Citrix Servers (not deployed initially)
  - Verizon Air Cards
  - NetMotion (not deployed initially)
  - Marshall GeoResults Mobile
  - Cues Granite XP
  - Hansen v7.x
  - ArcView
  - ArcReader
  - Safe Soft FME

Sample Maps


Sewer Map
Storm Map
Water Map
CAPLES AVE
NE 4TH
WINTLER DR
NE 57TH AVE
SEE LETTER
01/14/04
V9001524
AU901292
ENG2005-00221
PRJ2005-00538
PAC2006-00074
PRJ2006-00573
RUS2006-00086
PRJ2006-00573
V96PA831
AU960751
LTR
09/01/95

Issues Encountered

Several Issues to be Overcome

- Data clean-up to make it GIS ready. (GIS forces some standardization)
- Field laptop performance with size of data.
- Maintaining Network / Internet connectivity from field.
- Frequency of updating data on 40 laptops (initially started with static data).
- Managing software installation and updates on 40 laptops.
- Training field staff and building confidence of all users.

Issues Resolved

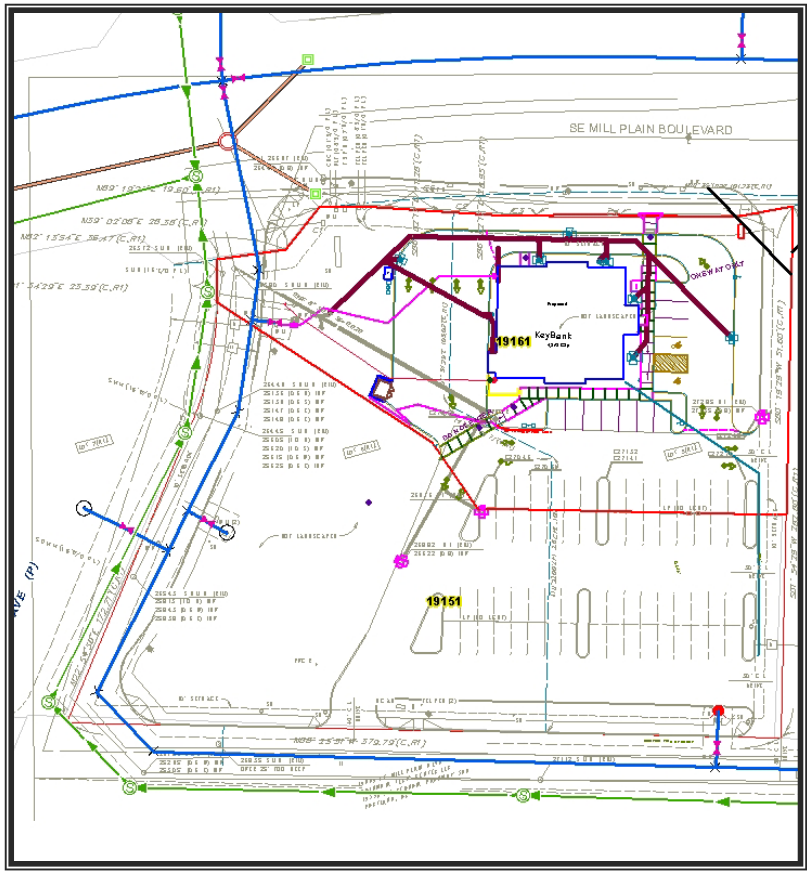
Solutions to Issues Encountered

- Implementation of Citrix and NetMotion to supplement Verizon.
- Able to install and maintain the applications on 3 Citrix servers instead of 40 laptops.
- This took care of 2 issues:
  - Maintaining software on 40 laptops.
  - Performance issues. (The software was no longer using the laptops to process data. The data was processed by Citrix servers.)
- NetMotion allowed the wireless connectivity to become a bit more stable.
  - NetMotion makes it easier to log-in to our secure network without having to enter the password 6 different times.
- NetMotion and Citrix also allowed us to connect to the network and stay connected, which enabled us to access our data dynamically.
- Provide customized user training. (Meet regularly with individual crews, workgroups to help answer questions, and help identify and resolve issues.)

360° Workflow Process (CAD To GIS)

Updating GIS from CAD

- Require as-builts to be submitted in AutoCAD format.
- Use 2 common points to GeoReference CAD as-builts in GIS.
  - Manual process due to a lack of standardization requirements from private community.
  - We are currently working on coming up with standardization but are a ways out.



360° Workflow Process (CAD To GIS)

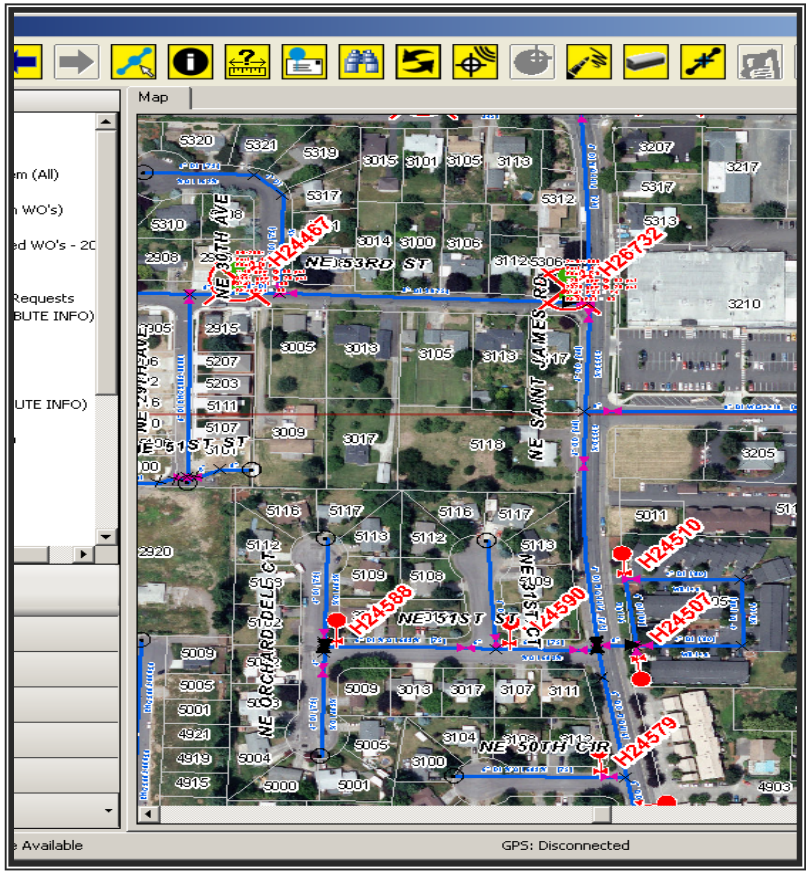
Updating GIS from CAD

- Use updated high resolution aerial imagery to reference data for better mapping accuracy.
- Use of custom tools to automatically assign:
  - Asset ID's
  - Addresses within 100 ft
  - Location Descriptions (i.e. nearest intersection)
  - Overlay references (i.e. pressure zones, basins, etc…)
- Use custom tools to create Hansen data and synchronize attribute information between GIS and Hansen.

360° Workflow Process (GIS To Field)

Deploying Dynamic Maps to Field Users

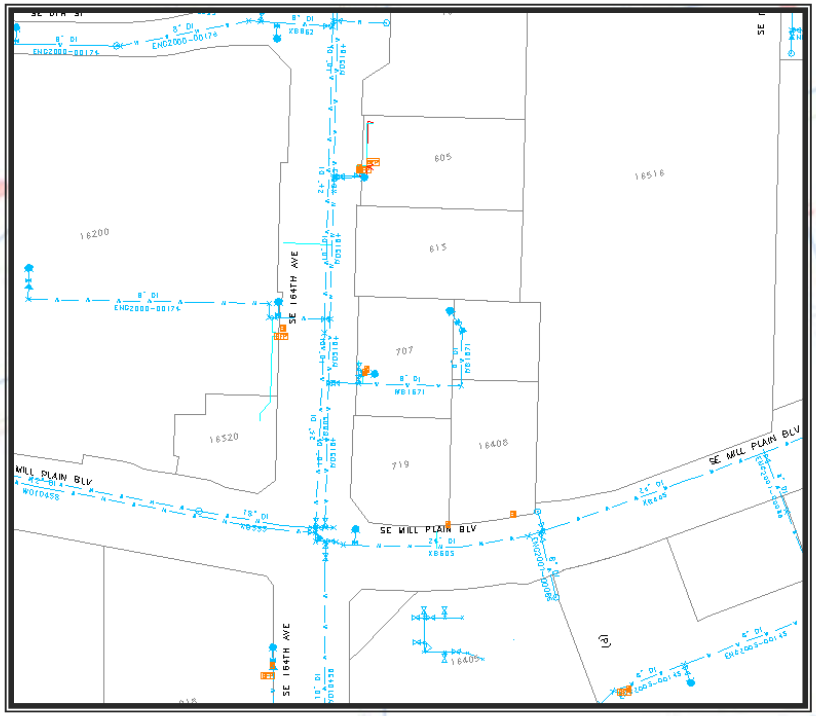
- Field staff use GeoResults Mobile to:
  - View our updated maps in real-time.
  - Access, create and update Work Orders and Service Requests from the field.
  - Update GIS data for:
    - Hydrant flushing program
    - Valve exercising program
    - Sewer and Storm TV program
    - Other…
  - Search and zoom to an address, intersection, asset or work order.
  - More…

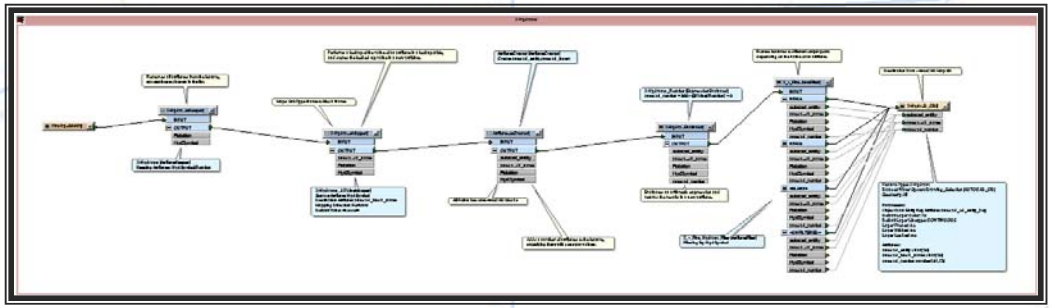


360° Workflow Process (GIS To CAD)

Updating CAD from GIS

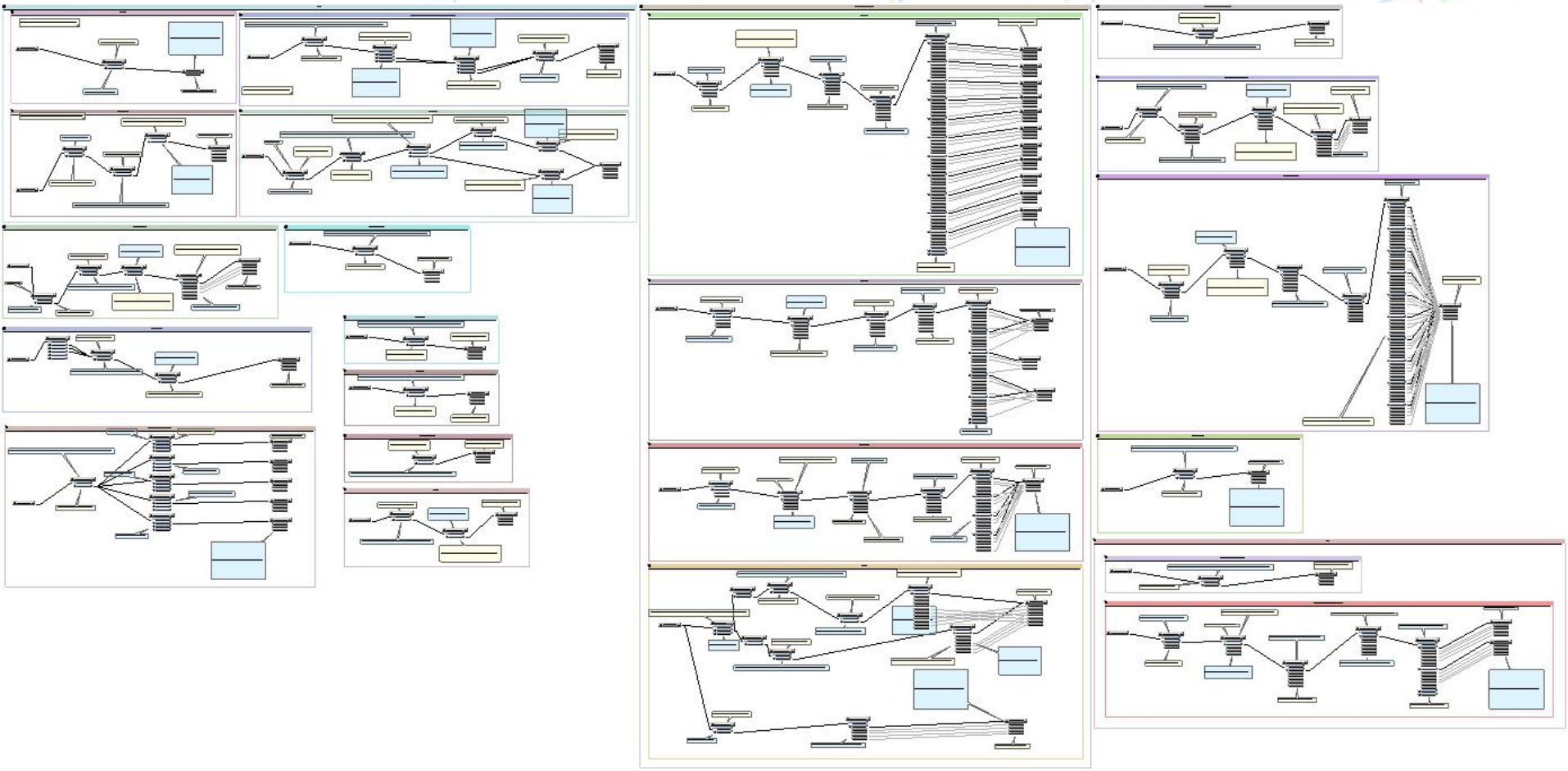
- Using Safe Soft's FME application – we export GIS data to AutoCAD Map 3D for Engineering design projects.
- The output CAD drawing takes on the in-house CAD design standards that were set up by our design team and is ready to be used for design projects.





360° Workflow Process (GIS To CAD)

FME Model for Vancouver's Water System GIS To CAD Process…



Current Projects

- GPS project for acquiring Water Meter locations with sub-foot accuracy.
  - Trimble Yuma rugged tablet PC.
  - Trimble ProXRT w/Zephyr GPS receiver.
  - Started in September 2009.
  - Collected 18K+/- water meters to date.
- Parcel adjustment project.
- Address clean-up project.
- Transportation / Streets Department Transition:
  - Capture Street Lights.
  - Use Retro Reflectometer w/GPS to inventory signs.

Future Projects

- Use GIS to inventory impervious areas for Storm and Utility Billing.
- Work with Clark County GIS to interface scanned As-Built database into GIS for accessing scanned images via GIS.
- Work with Clark County GIS to load our utility data onto secured “intranet” site.
- We plan on linking the GPS Water Meter data to our Utility Billing system. This will allow us to import water demand information into our Water and Sewer Hydraulic Modeling.

Questions?

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