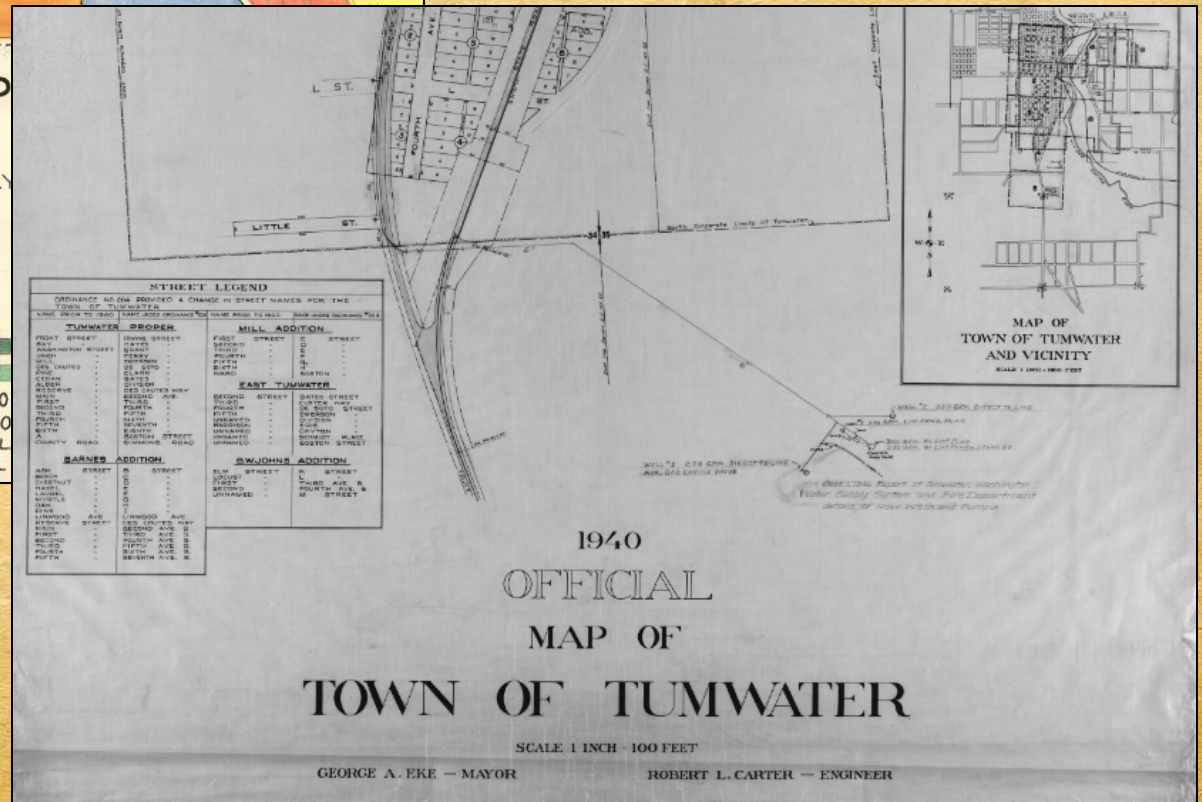
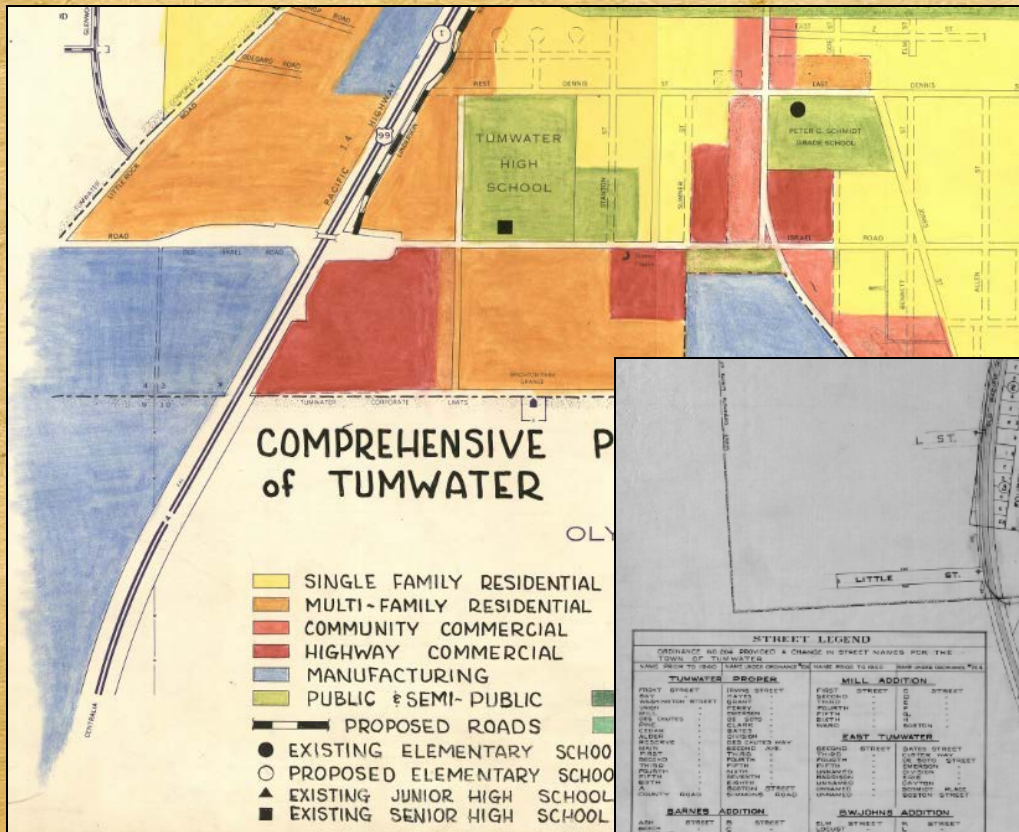


# Maps they are a Changin'



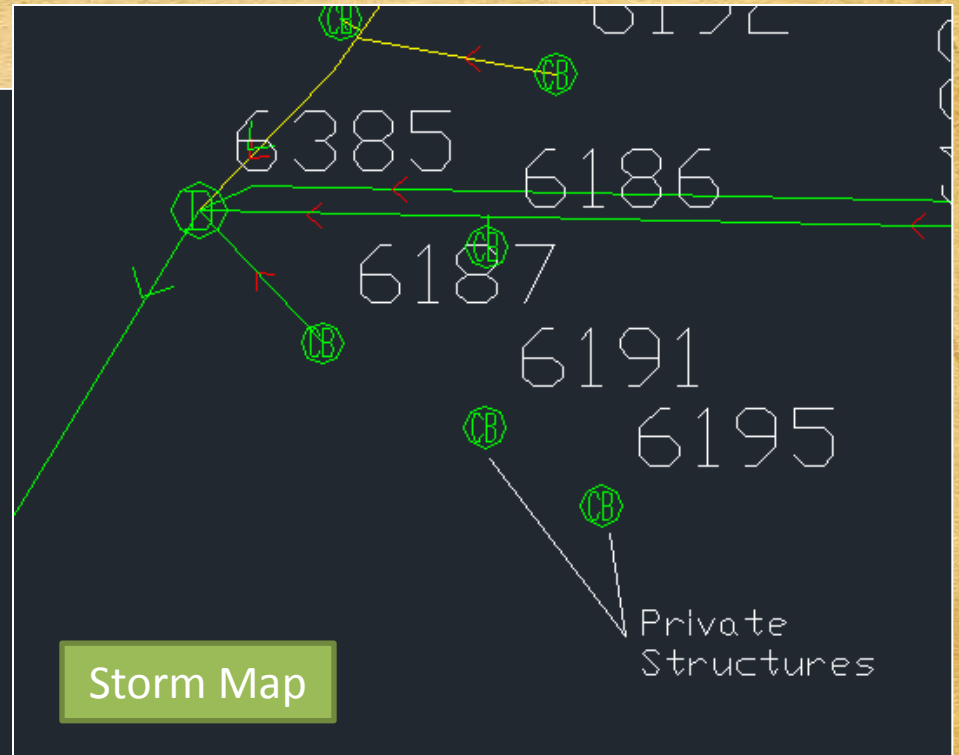
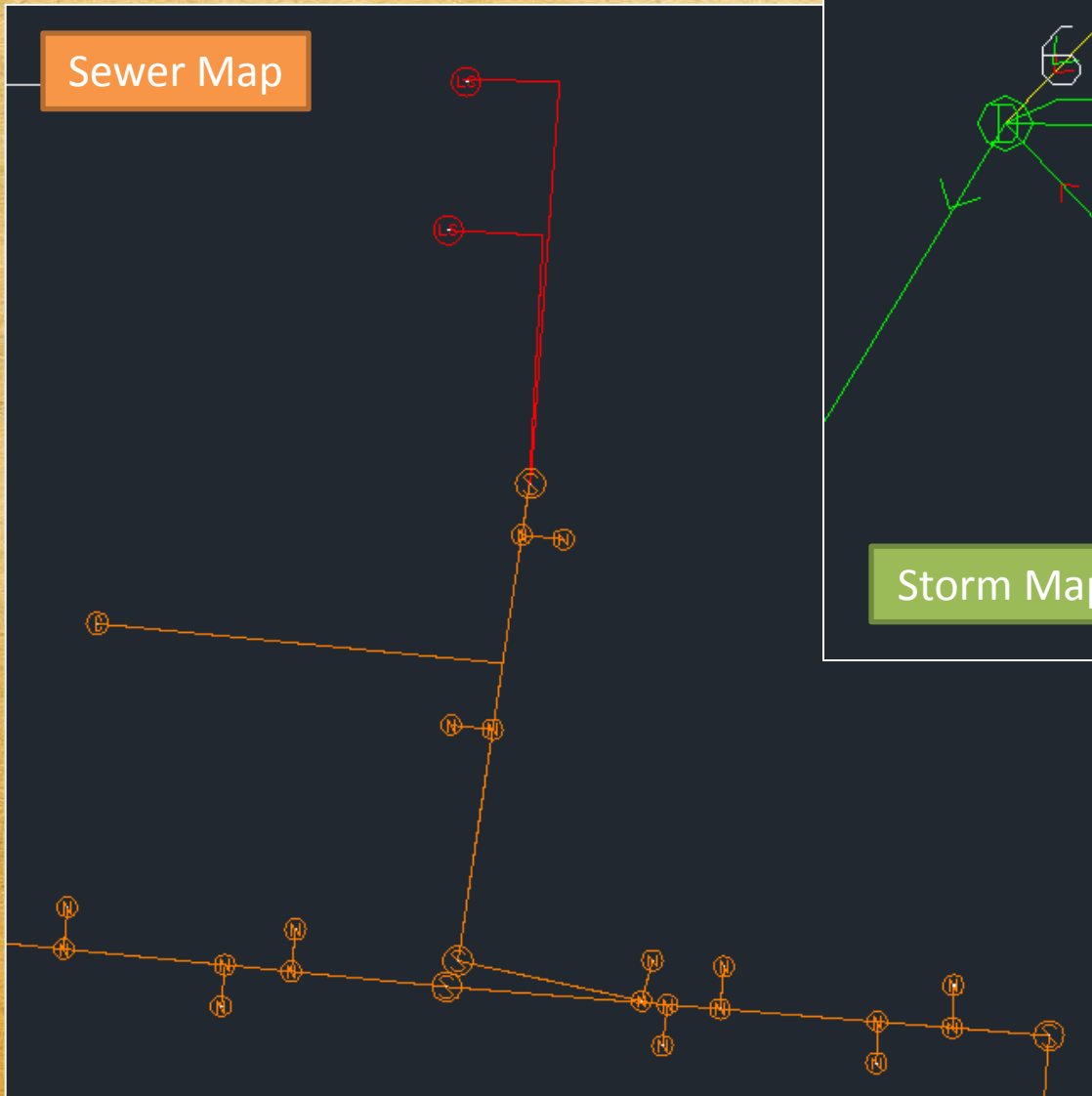
## The history and evolution of GIS and Lucy

# The Way Things Used to Be...





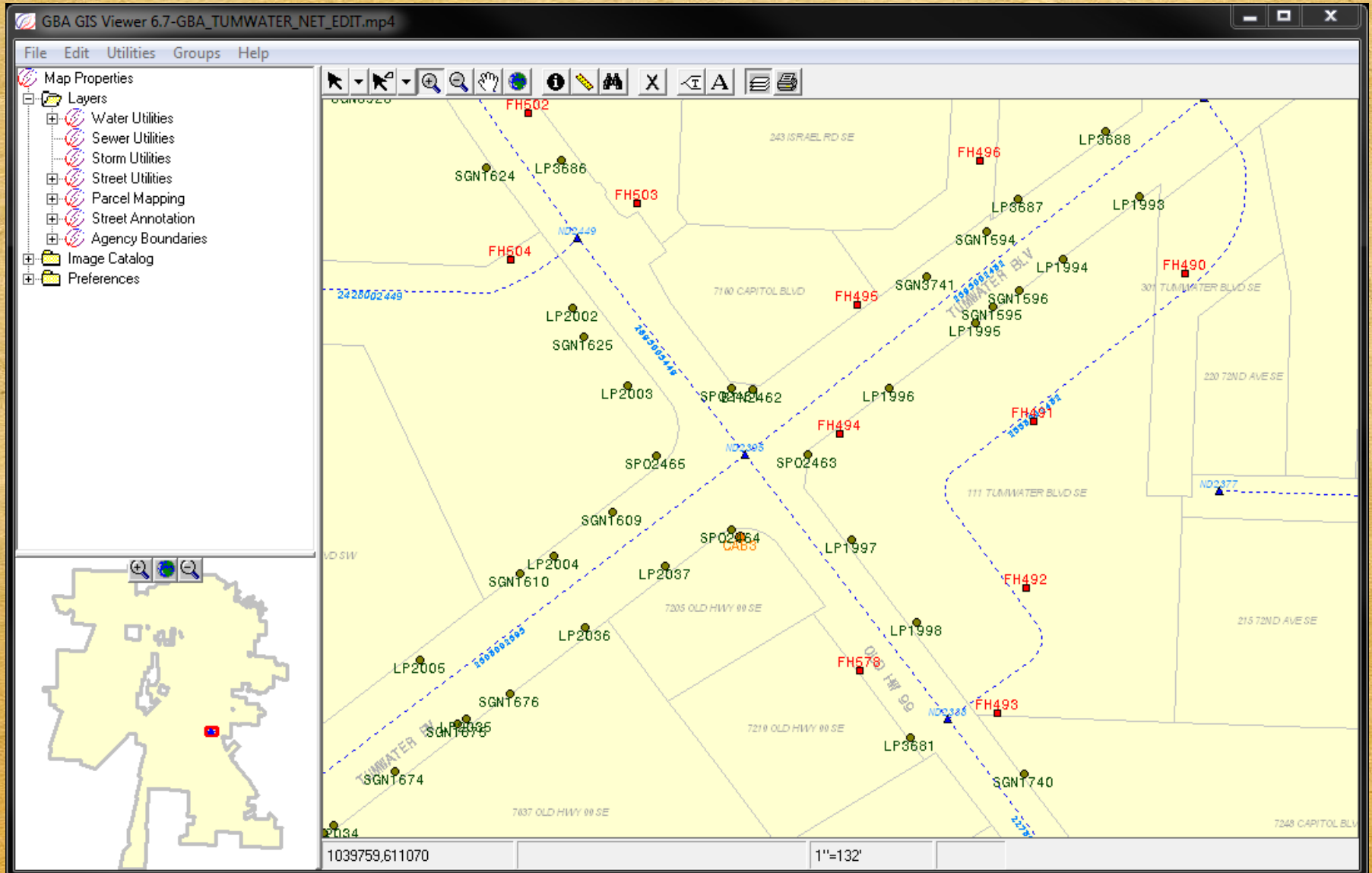
# AutoCAD Utility Maps



**Great for Engineering Design**

**NOT great for GIS**

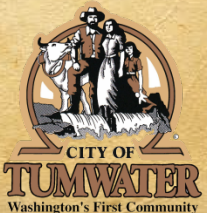
# GIS for Public Works – the GBA GIS Viewer



1990's technology

# History of Tumwater Mapping

- Paper & Mylar “Manual” Mapping – 1800’s to Present
- Thurston County starts regional GIS program - 1984
- AutoCAD Electronic Mapping – late 1980’s
- AutoCAD Facility & Parcel Mapping starts – 1994
- City Planning started using GIS – 2000
- GIS Coordinator hired – 2013
  - Conversion of facility maps from AutoCAD to ESRI GIS begins
- Lucity Desktop GIS Viewer – 2007 to 2014
  - Using GIS Shapefiles of a few facilities



We were “Up against the wall”



We couldn't upgrade Lucity until we upgraded the GIS system

# Where are we at with GIS today and How did we get there





# GIS Assessment

- Status of Facility Mapping
- Computer Hardware
- GPS Equipment
- GIS Software
- The 41 page transition document

Executive Summary

Sewer	<ul style="list-style-type: none"> <li>• The sewer system is about 80-85% mapped according to the shop.</li> <li>• All sewer mapping is in AutoCAD format.</li> <li>• The sewer maps are not linked to the Lucy system.</li> <li>• Nahn Vo reported that the mapping of the manhole rim elevations is complete and a sewer system model has been built.</li> </ul>
Storm	<ul style="list-style-type: none"> <li>• The stormwater system is about 65% mapped according to the shop.</li> <li>• All stormwater mapping is in AutoCAD format.</li> <li>• The stormwater maps are not linked to the Lucy system.</li> </ul>
Street	<ul style="list-style-type: none"> <li>• The street system, including all related assets like light poles and signs, is about 95% mapped.</li> <li>• All “mapped” street system assets are in GIS shapefile format. Almost all of these assets are linked to the Lucy system. The shop said that there are a few records in Lucy that need to be linked to the GIS data.</li> </ul>
Water	<ul style="list-style-type: none"> <li>• The GPS and mapping work has been completed for Zones 549 and 454. Prints of these two zones have been made for the shop to review and give feedback.</li> <li>• The GPS and mapping work for the 350 zone is about 30% done.</li> <li>• All hydrants have been mapped (except any new hydrants since March 2012).</li> <li>• All hydrants include elevation data.</li> <li>• The hydrants are in GIS shapefile format. The rest of the water system is in AutoCAD format (hydrants are in both GIS and AutoCAD).</li> <li>• Only the hydrants are linked to the Lucy system.</li> </ul>

# The Upgrade Plan & Checklist

Notes from meeting on 6/25/14  
Matt Stull, Steve Craig,  
Matt Ames, Lance Inman,  
Brian Scharber

lots of configuration and settings

## Lucy Upgrade Task Checklist (do them in the order listed):

← Steve  
← 1st task - clean up files

- Lucy Wellness Check (Lucy - Luke Savage)
- Upgrade to SQL Server 2012 – SQL Server 2012 will be on a new server (IT)
- Migrate the existing Lucy database to the new SQL Server 2012 server??? (IT)
- Create a server for ArcGIS for Server (IT)
- Install ArcGIS for Server on new sever (Matt)
- Install SQL Server Native Client on all workstations that will connect to the SDE database via ArcMap or ArcCatalog (IT)  
*ArcGIS Server ✓ Matt PC ✓*
  - a. The version of the client software must match the version of SQL Server, including patch versions (this means that SQL Server 2012 versions can be different depending upon the patches that have been applied)
- Connect to ArcGIS for Server from ArcCatalog (GIS)
- Create the Enterprise Geodatabase / SDE Database – use the latest Lucy GIS schema (GIS & IT)
  - a. The GIS and Lucy Databases should be in the same SQL instance
- Migrate existing Lucy GIS data to the SDE Database (GIS)
- Register the Geodatabase in ArcGIS for Server (GIS) - has to do with permissions to the DB
- Create "altID's" for Sewer Pipe and Storm Conduit inventories. (GIS and Lucy Support)
  - a. These need be created prior to upgrade. Is this a GIS thing? I'm not sure who does this.
- Upgrade Lucy Software / Database (IT and Lucy Support)

ties to Eden - how does that affect upgrade?

- Protect Default Version how?  
- Cache images

# GIS Database Setup

- Upgrade ArcGIS Desktop to 10.2
- Lucity GIS DB Schema
- Before Lucity Upgrade → File Geodatabase
  - This was temporary to get us going on the mapping
- After Lucity Upgrade → Enterprise (SDE) Geodatabase
  - Platform → ArcGIS 10.2 and SQL Server 2012
  - Security & Permissions – **VERY IMPORTANT!!!**
- Projection issue (AZ state plane coordinates)
- “GIS person is now like a DBA” - *Luke Savage*



# Shapefile → Geodatabase Conversion

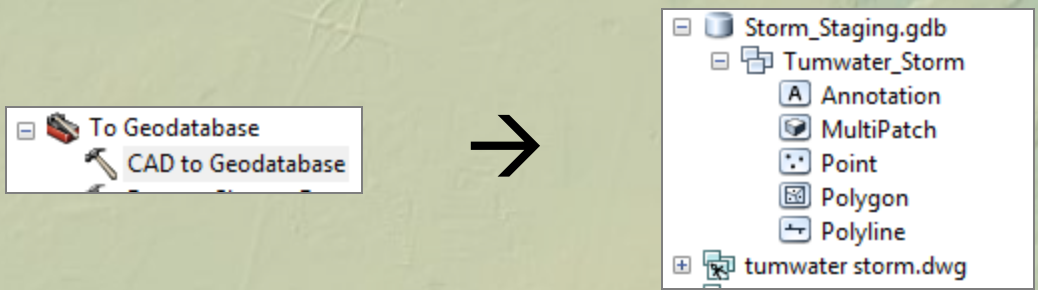
- We converted our existing shapefile data into the File Geodatabase, they are:
  - Hydrants
  - Street Poles (Signs, Street Lights, Signals, etc)
  - Signal Cabinets
  - Street Segments & Intersections



Poles Mapping		3144 Features
Lucity GeoDB	old Shapefile	3370 in Lucity
FacilityID	PLG_NUM	226 difference
PoleType	PLG_PLTY_C / PoleType	
Lucity ID	PLG_ID / Lucity ID	

# AutoCAD → ArcGIS®

- The rest of the existing facility maps were in AutoCAD and needed to be converted to ArcGIS
  - Sewer, Storm and Water...
- “*CAD to Geodatabase*” conversion tool



- Selected needed data from the staging Geodatabase and imported it into the working File Geodatabase

# Mapping Data Conversion is done so...

## What is next?

- Not ready for Lucity upgrade just yet...
- Mapping of missing facility data (*GPS*):
  - Hydrants
  - **Stormwater**
    - Defining what structures are what
  - Street Poles (signs, lights, signals)
- Markups from the Ops Crew
- Lots of *meetings, calls, emails* to answer questions and plan for the upgrade
  - Lucity staff, City IT staff, City Operations Management & Crew



# It's Time for the Upgrade!

- SQL Server 2005 → 2012



- ArcGIS 9.3 → 10.2 (ELA)

- Lucity 7.3 → 2014 R2



- Licensing changes → added GIS Web module  
→ dropped the GBA GIS Viewer

- Migrated File Geodatabase to SDE Database

- New virtual server for ArcGIS for Server (*web server*)

- Windows Server 2008 R2 Datacenter

- New virtual server for SQL Server 2012

- Windows Server 2008 Enterprise
- For Lucity Database and GIS SDE Database

# Other Upgrade Items

- Added new Alt ID #'s for Storm and Sewer pipes

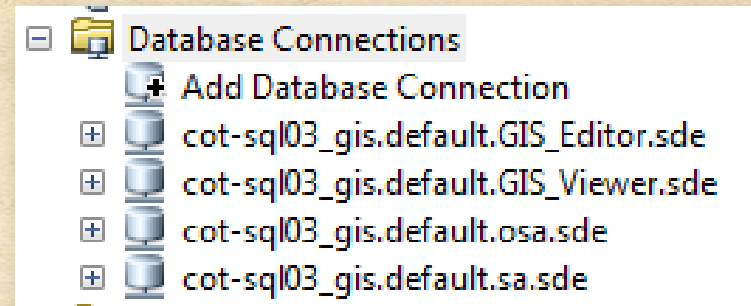


- Using a Feature Service to link GIS to Lucity
  - Not using the older Map Service/SOE
- Linked some of our facility map layers to Lucity
  - Storm Structures, Hydrants, Street Poles & Cabinets
- Using the Lucity GIS tools in ArcGIS Desktop
  - Force Sync, Data Loader, Renumber Structure, Geodatabase Configuration, etc



# GIS Permissions / Security

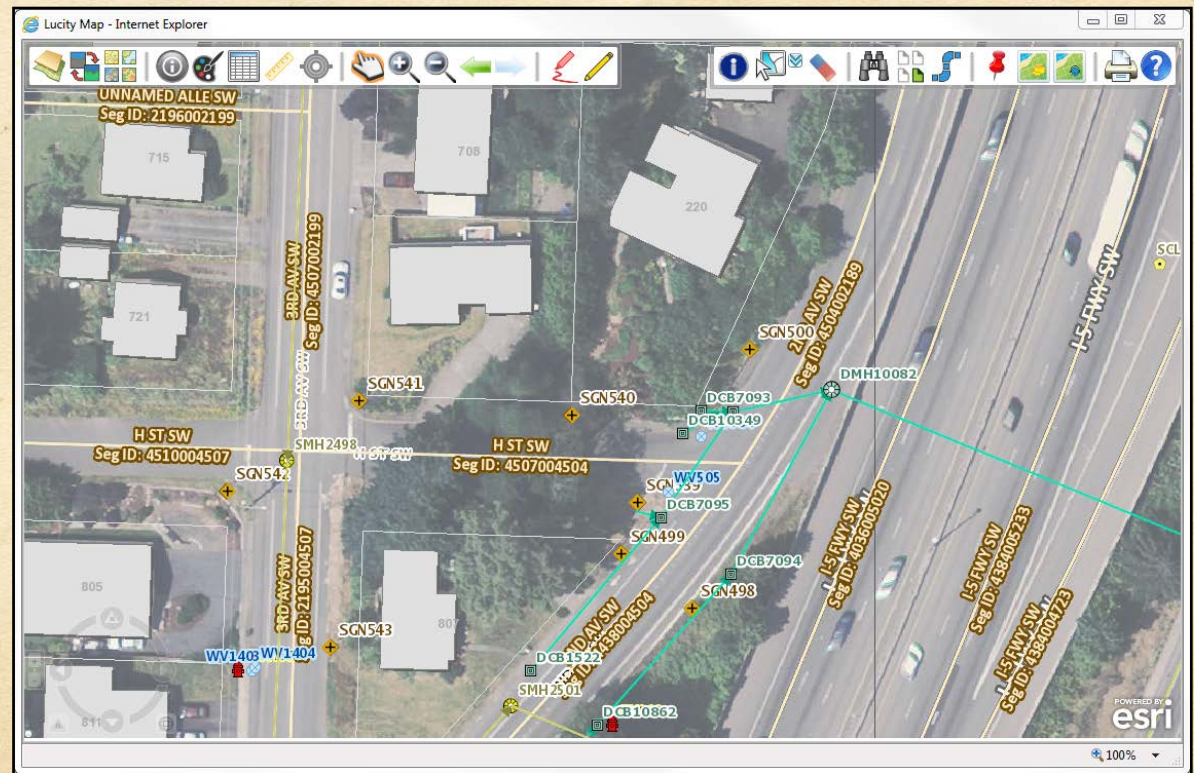
- Different connections to the GIS SDE Database
  - Viewer
  - Editor
  - Operating System Authentication
  - Administrator (sa)



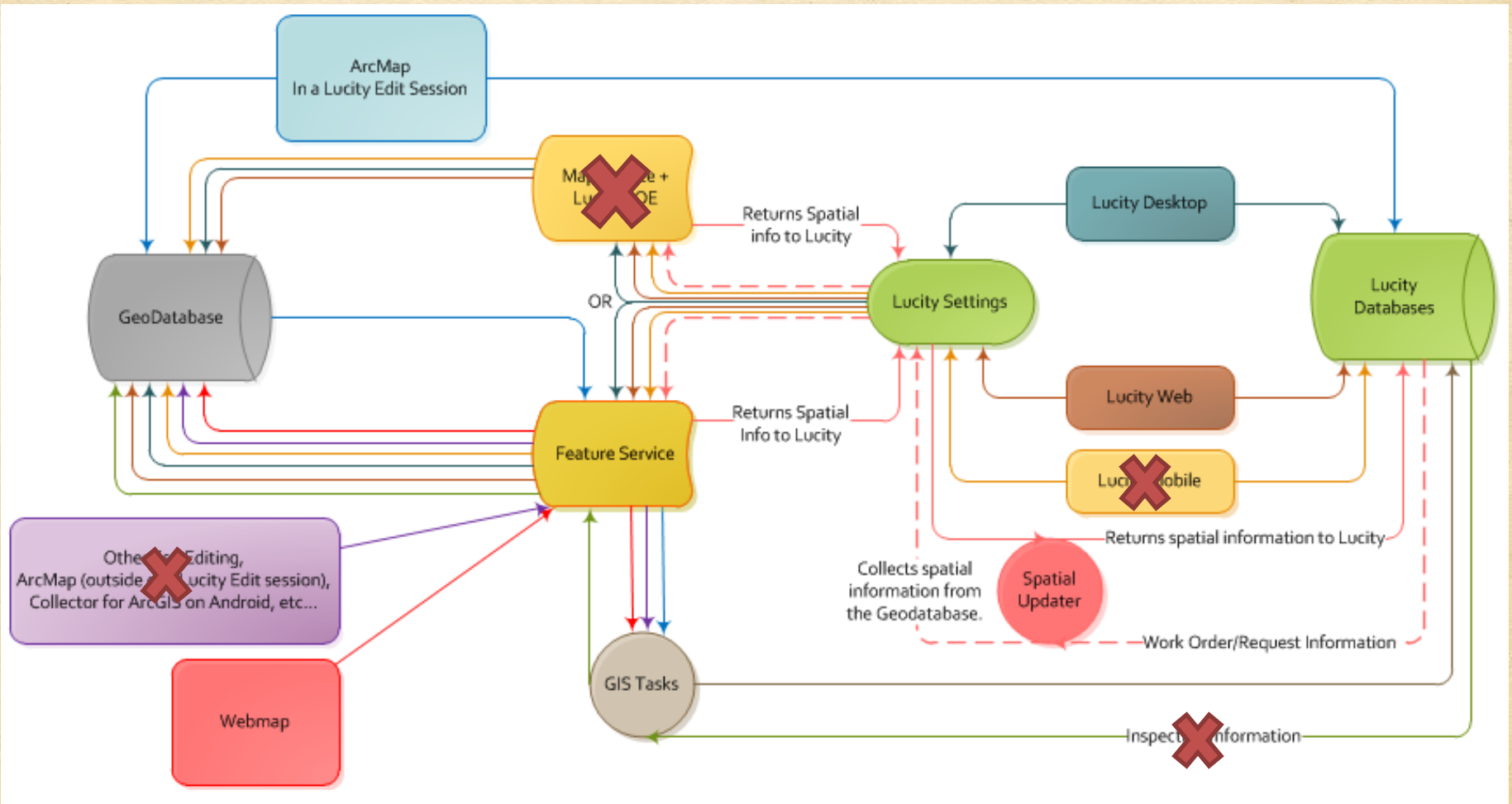
- Redlining
  - Security in ArcGIS for Server

# Web Map Setup

- Cached the Aerial Photo base maps
- Geocoding setup - using 911 street data
- Optimizing GIS layers/services for speed
  - Symbols, Labels, Text, Projection
- Redlining
  - Editor tracking
- Base map Layers
  - Addresses
  - Aerial Photos
  - Building Outlines
  - Hillshade
  - Parcels



# Current Setup / Configuration Diagram

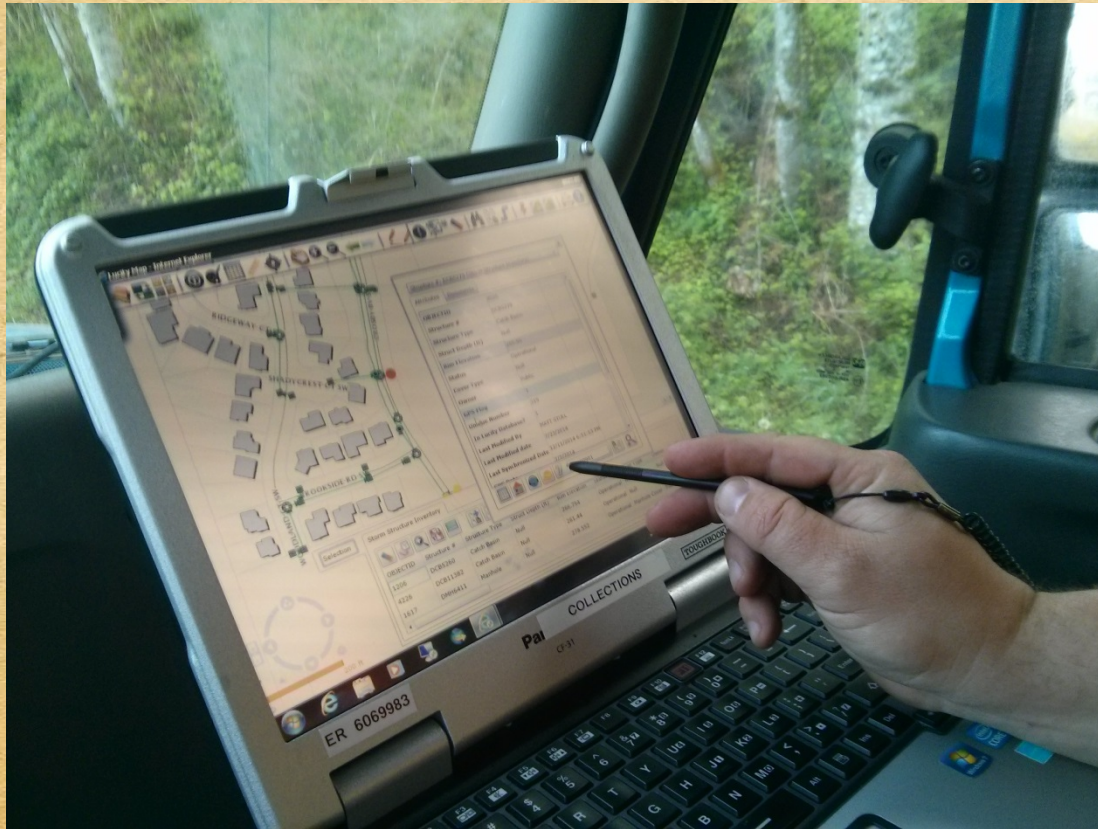


# Working with Lucity & GIS in the Office

The screenshot displays a GIS interface with a map of an urban area. A road labeled "LITTLE ROCK RD SW" is visible. Several utility nodes and lines are shown, including DCB10197, DCB10198, DCB10199, DMH10051, DTS108, DIS103, DAS1031, and DAS1032. A data entry form is overlaid on the left side of the map.

Top Port Elev.(ft)	183.46	GPS	<input checked="" type="checkbox"/>
Alt Elevation (ft)		GPS Upload	/ /
X Coordinate	-122.91685609	GPS Source	3 City Engineering
Y Coordinate	46.99400733	Extensions	

# Working with Lucity & GIS in the field



# Problems and Issues

- GIS Administrator needed access to the “sa” account on SQL Server GIS Database
- Importing shapefiles with Z values using the Data Loader
  - *Caused the Data Loader not to work*
- Feature service that connects Lucity and GIS is VERY important!!
- Auto complete on the Redlining tool – *ESRI bug*
- Selecting assets on web map above “100 scale”
  - *Lucity bug fixed in 2014 R2 SP1*
- Make sure base maps are in the same projection / coordinate system
  - *Will cause issues with Web Map if they are different*
- Slowness of Web Map over cell connection
- Cleaning up street name table
- How do we manage retired and moved assets
  - Example → Poles that have moved; update their GIS information
    - Case by case basis, some assets are replaced, some are moved.
  - Retired assets (that no longer exist) are put in an archived GIS database



# Benefits of the upgraded system



- More efficient processes for updating GIS data using only 1 software package, instead of 4
- We can now do the following dynamically:
  - Label assets and Show the direction of flow
- Maintenance crew can now easily attach assets to work orders through the web map
- Web Map has provided an “All Utility Map” to City staff for the first time!

# The Lucity-GIS Wish List

- Open Web Map directly
- GIS Setup Checklist
- A button to login to Redlining in the Web Map
  - (Instead of having it popup every time I open the map)
- Opacity Sliders for Base Map layers in Web Map
- Have measure tool results stay as a graphic on screen
- Have the option to have map layers turned off by default in the Web Map
- Email notification when Redline is created



# The Future

- Implement Lucity Mobile
  - Tablets, Smartphones
- Finishing the facility mapping
  - Water, Sewer, Signs, Fiber, etc
- All GIS facilities layers linked to Lucity
- Streamlined and efficient work processes
- Publicly available mapping
- Implement new and existing Lucity GIS tools
- ??? The Unknown ???





# Questions & Discussion



## Contact Information:

Matt Stull

GIS Coordinator

City of Tumwater, WA

360-754-4147

[mstull@ci.tumwater.wa.us](mailto:mstull@ci.tumwater.wa.us)

