



Connecting people to information through integrated data and maps.

ESRI INTERNATIONAL USER CONFERENCE & AEC SUMMIT

JULY 2014

SAN DIEGO, CA

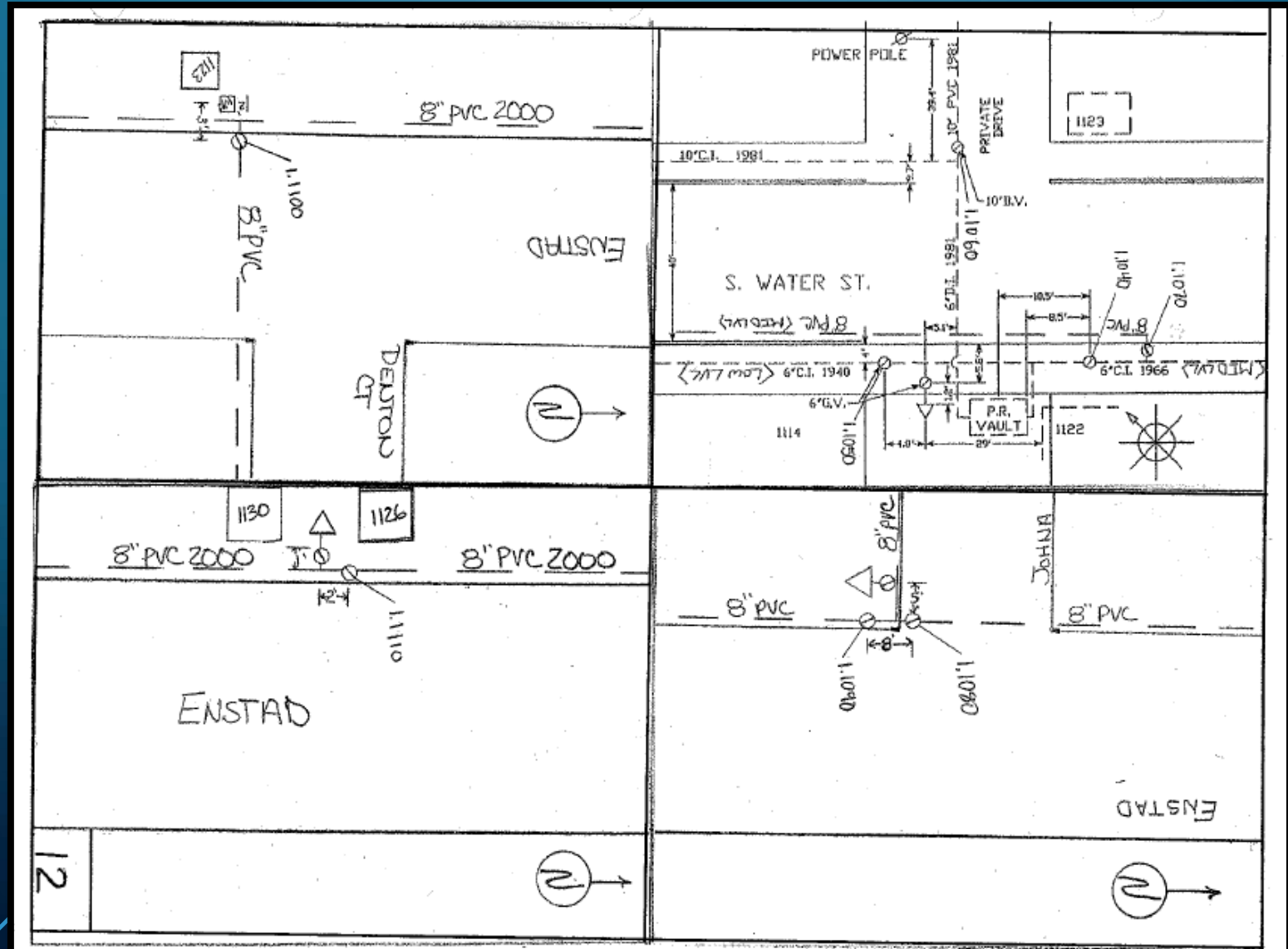
EVALUATE THE SYSTEM

- The Big Meeting:
 - PW Director
 - Superintendent of Water & Streets
 - Superintendent of Sewer & Stormwater
 - Engineering Division: Civil, Environmental & GIS
- Graded each GIS feature:
 - All points, lines, and polygons assigned
 - Confidence levels: High, Medium, Low
 - Precision/Accuracy: aerial photo, GPS, or survey

Goal - How “good” is our GIS



HAND DRAWINGS FROM PW DIRECTOR — BORLAND'S CARDS —



THE PROBLEM

One example:

- February 2011
- McMenamins - Edgefield
- A fire hydrant was hit
- Field crew unable to locate the shut off valve using GIS and as-built drawings
- Spatial data >50 ft off



POSSIBLE SOLUTIONS



- Tape measure the town

- Hand drawings from PW Director – example from another city
- Lots of \$, lots of time (years) – too many crew hours
- Multiple crews – inconsistency
- Laborious to integrate into GIS



- GPS the city

- Lots of \$, lots of time (years)
- Many crew hours



- Field Survey every street

- Requires Request For Proposal (RFP) process
- Lots of \$\$\$\$
- Limited data capture (only select features)



- 3D Mobile LiDAR Scan

- < 8 hours
- Captures everything in site at once:
- Each point has location, elevation, and measurement information
- Overnight post processing
- 4 hours of training the next day, ready to get data into GIS
- Saved on a single hard drive with backup of raw data files, city owned data
- Record of the City of Troutdale 2011
- Easily repeatable in future



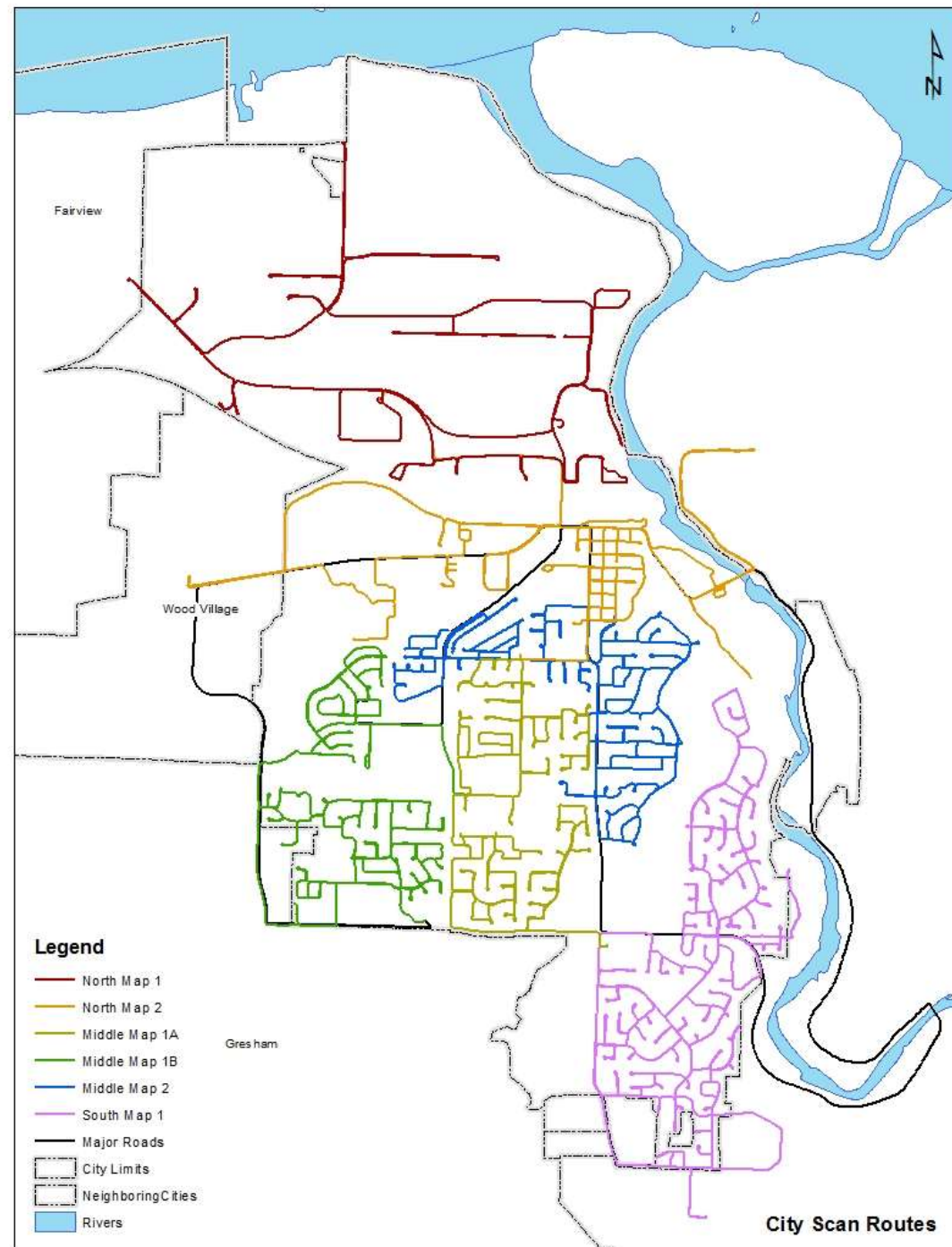
CITY OF TROUTDALE'S 3D MOBILE MAPPING PROJECT

- August 22, 2011
- Rented IP-S2 system from PPI Group, Portland
- Created a map with 6 routes - 1 hour sections
- Set up a base station at a well site - near the center of city
- If we have an extra 30 min. at the end of the day
 - we scan the county streets within the city limits

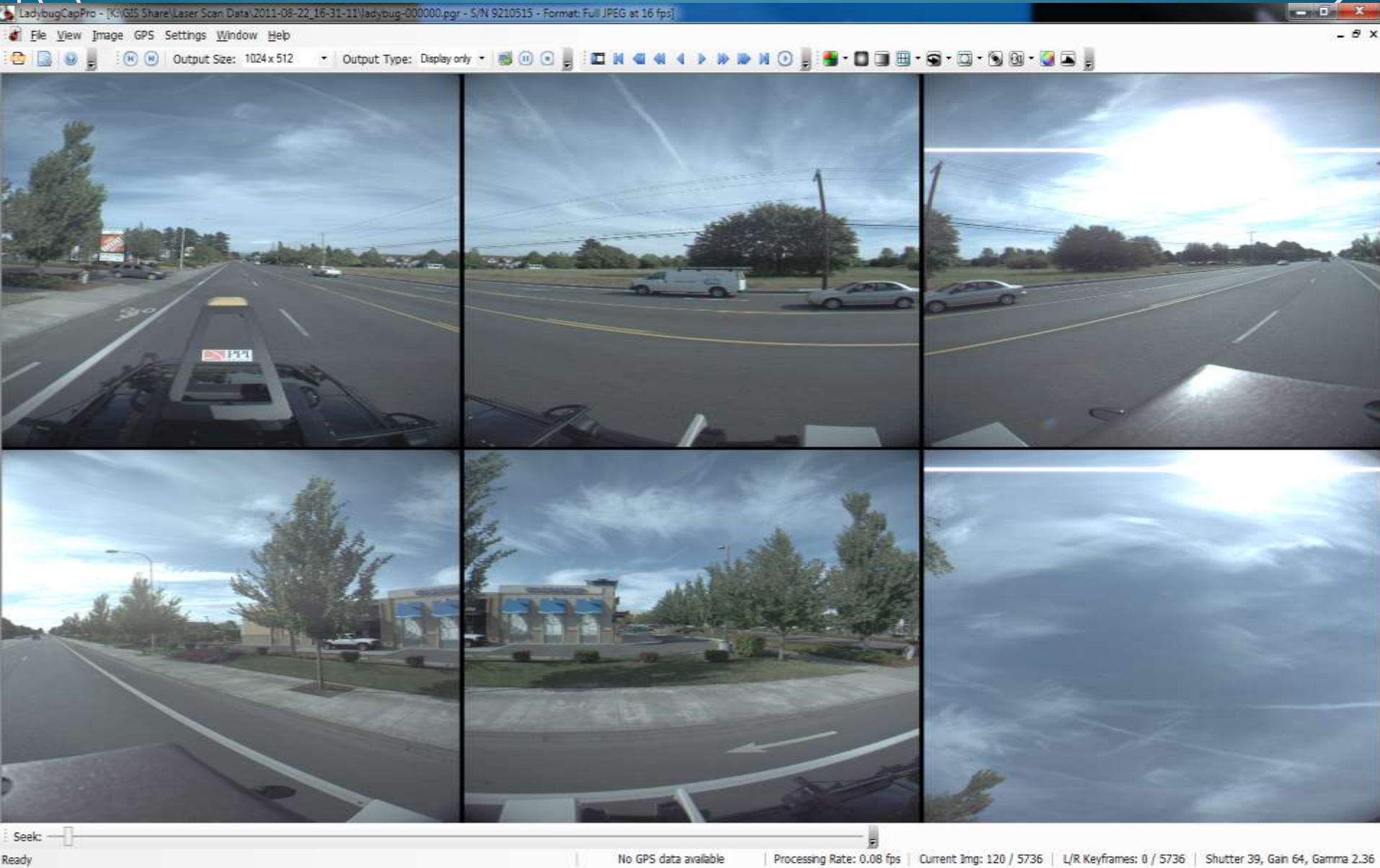


ROUTE MAP

- 6 - 1 hour sections
- Timed by staff
- Reboot points selected
- Transition paths
- North - morning
- South – afternoon
- Trajectory map product



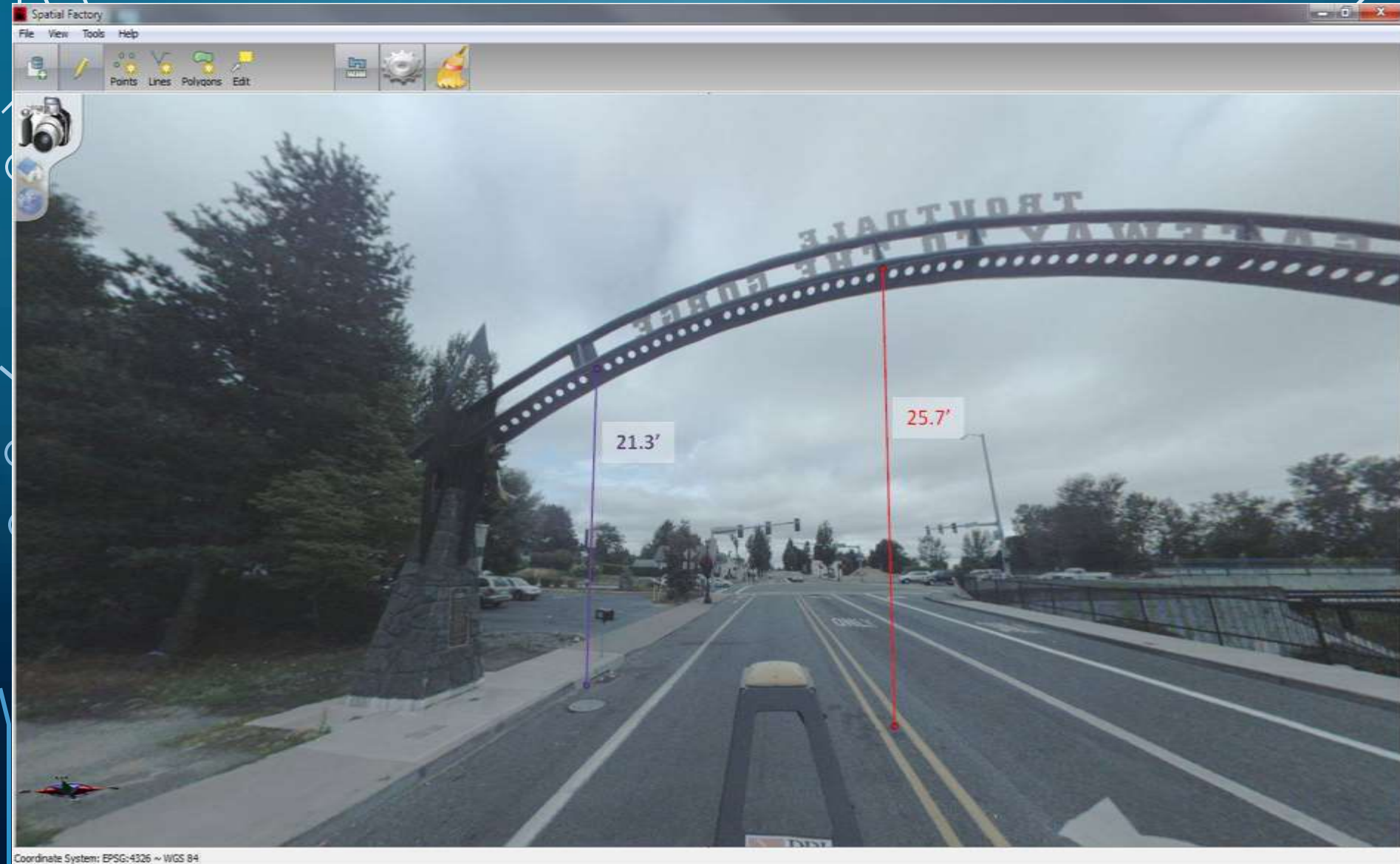
IMAGES CAPTURED EVERY 3 METERS



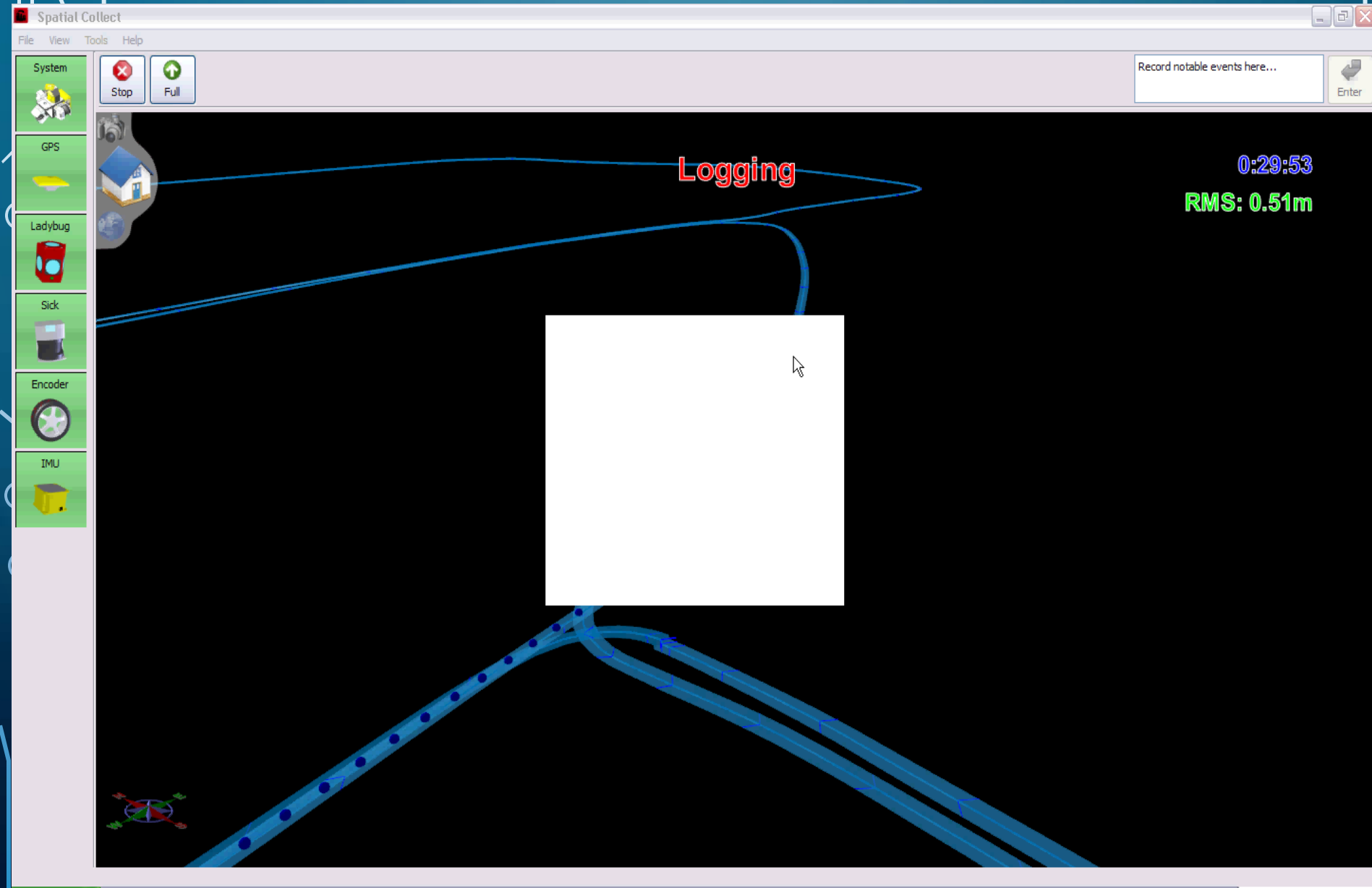
THE POINT CLOUD



EASILY TAKES MEASUREMENTS (+/- 3 CM)



REAL TIME DISPLAY WHILE DRIVING



WHY DID WE CHOOSE TO SCAN ?

Accurately locate all utility surface features and more

- Fire hydrants
- Catch basins
- Storm and sewer manholes (mains)
- Street trees
- Pavement marking
- Street signs
- Water valves (mains)
- Face of curb
- Railroad crossings
- Bridges
- Tunnels
- Utility poles (PGE, Frontier)
- Traffic Signals (Multnomah County)
- and a lot more

Data collection speed and cost

- 1 working day, a total of 8 hours with breaks, ~ 108 miles
- Spent \$ 5K for drive time, \$ 2K for processing & training, \$ 5K software
- Entire city's record fits on a 500 GB ext. hard drive
- City owns the data, we have rights to sell data
- Historical record of the entire city in summer of 2011



2 YEARS LATER ... PROGRESS REPORT

- Goal accomplished
- Positive newspaper and web articles
- Extra info gathered simultaneously
- Features gleaned from program:
 - Data transferred to GPS machines
 - attributes updated by field crew during work related activities



Water System

Fire hydrants: 497
Water valves: 1551
Water meters: 4739
Water mains partially fixed

Stormwater System

Catch basins: 1493 :1562
Stormwater manholes: 979 : 997
Drywells:130 :132
Inlets, culverts, ditch lines
Stormwater mains fixed (~2 months)

Sewer System

Sewer manholes: 1180 : 1360
Sewer cleanouts
Sewer mains fixed (~15 days)

Streets

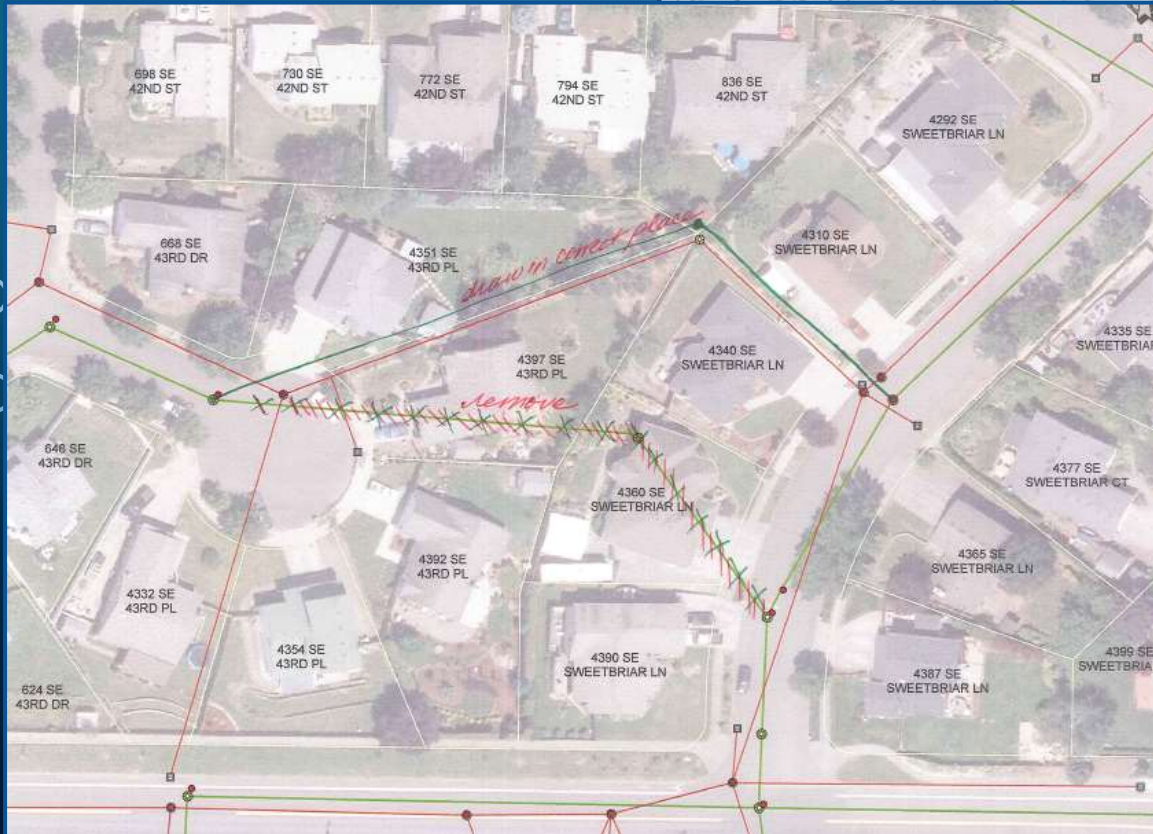
Street Trees: 4470
Street signs
Sidewalks
Pavement Markings
Face of curb
Right of way



COMPARE LOCATIONS – OLD VS. NEW

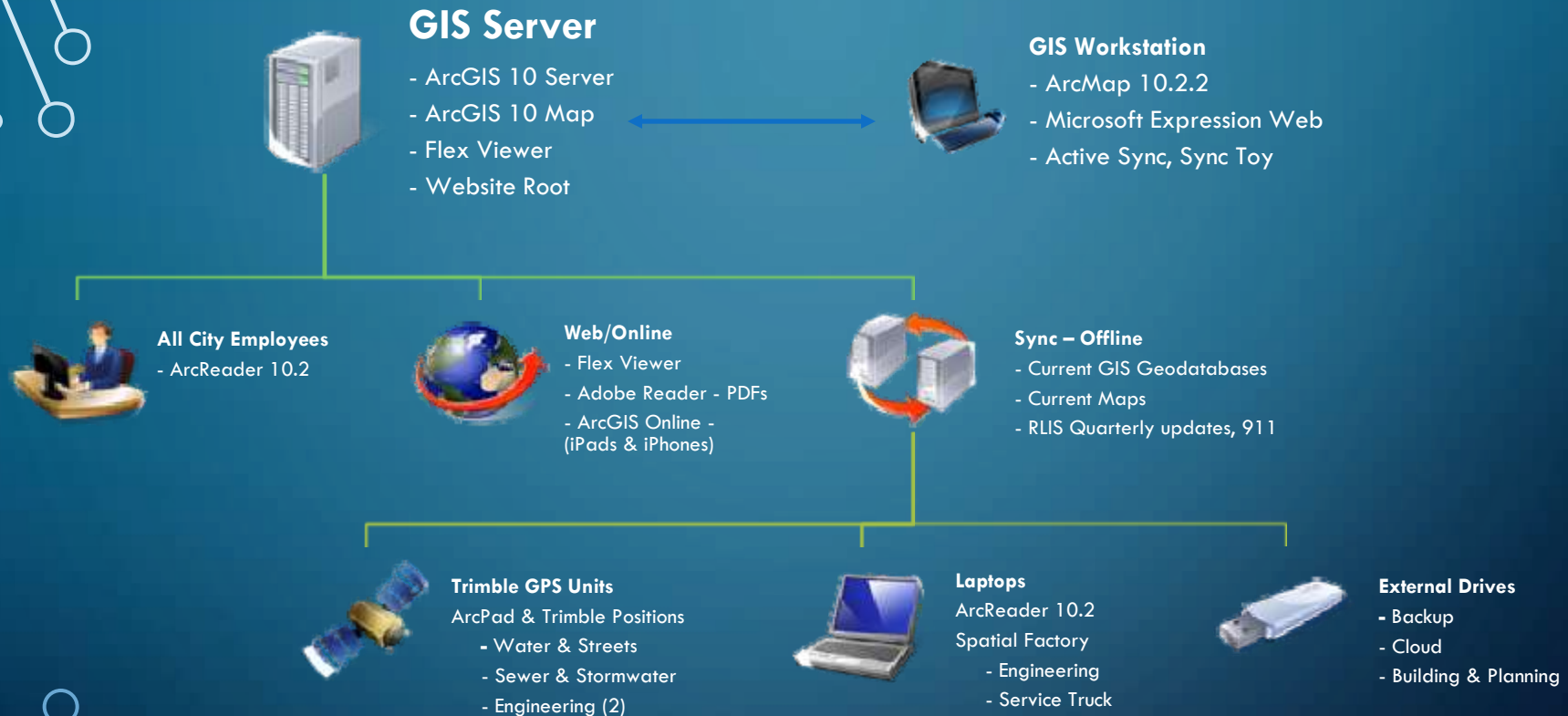


Engineering as-built



Sewer system fixed

READY TO SHARE



Enterprise GIS Design 2013

- We are designing simple and elaborate bridges that connect people to information.

INTEGRATED GIS

Complete Redesign of the City's Enterprise GIS

- New GIS Server: website, GIS data, ArcServer 10.0
- ArcGIS 10.2.2 for all editors
- All city employees can access data through ArcReader or ArcGIS Online
- Field crews are using Trimble, iPhones & iPad Devices
- Online Interactive Maps & pdfs for the world
- Permitting & Street Trees databases are joined to features
- Building, Planning & Parks Departments layers synced
- Finance Department's utility billing database linked
- FEMA Flood Datasets & digital FIRMs created
- Future Projects:
 - Story maps for the Parks & Rec. Department
 - 3D City Engine integrated maps

- We are designing simple and elaborate bridges that connect people to information.

