77,000 Service Lines Identified in 1,000 days – GIS to the Rescue

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Vancouver

Oldest Washington Community

- Settled 1825
- Incorporated 1857

Third Largest Water Utility

- Streets – 1,900 lane miles
- Sewers – 773 miles (1890)
- Water – 1,050 miles, 10 BGal/yr

Water System Milestones

Expansion in response to Urban Fires

1870's & 1890's

First Distribution System

1940's

WWII Growth

Copper Service Line STANDARD DETAIL

June 25,1971

Polybutylene 1973-1984

1986

SDWA Amendment – Pipes <8%, Solder <0.2%

LCR Passed; LCR Corrosion Control Study

1991 & June 1994

2019 - PEX allowed for Public WSL

WSL Inventory

October 2024

1994 Corrosion Control Study WSL section focusing on Public Side – 80% Cu, 20% GIP

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Service Line Identification Methods

GIS Tools

Field Methods

Historical Records

Interpolation

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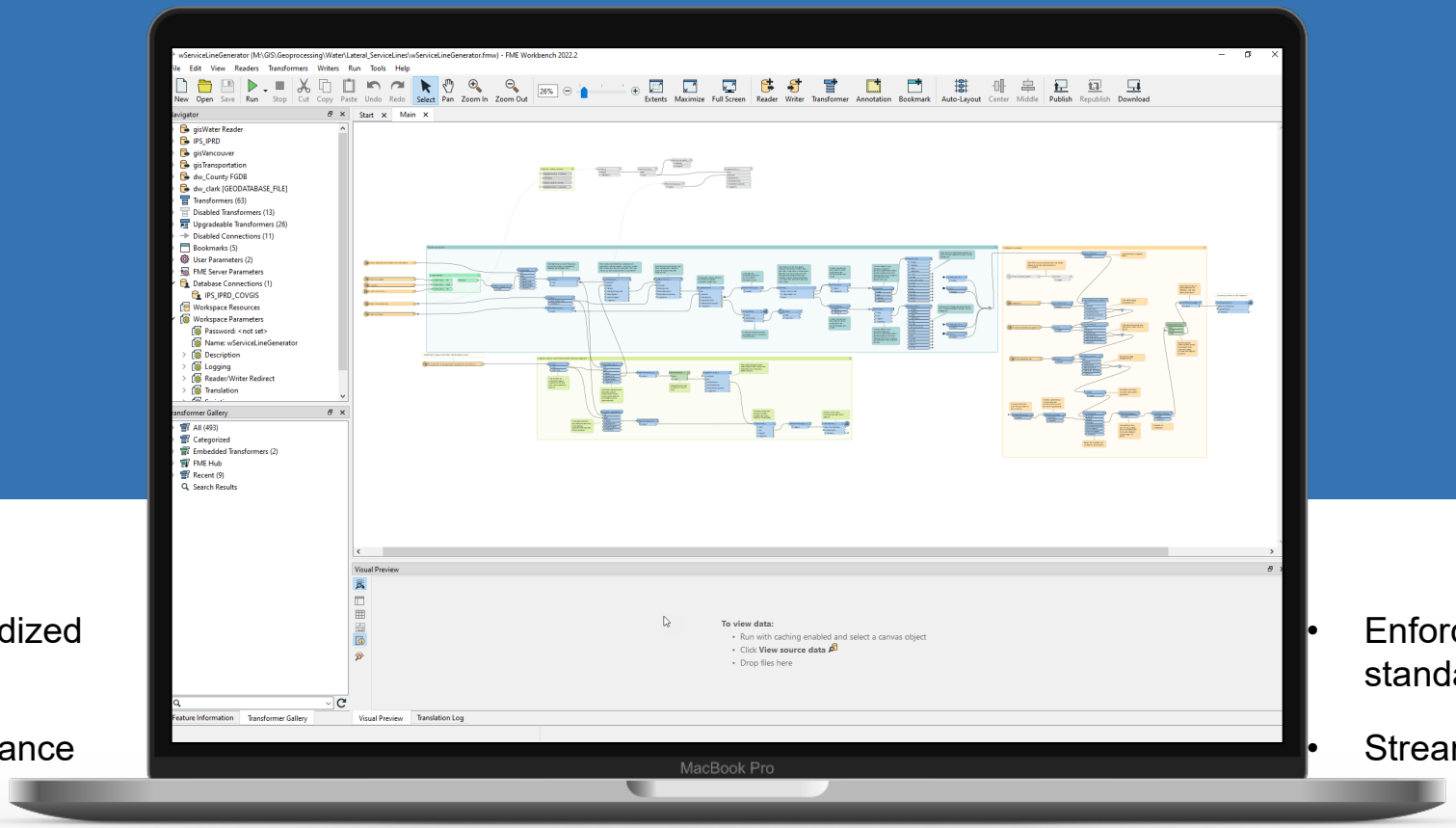
Challenges

- How to create and maintain such a large dataset from scratch (150k + records)
- Integrate data between systems and workflows
- Resources
- Timelines
- Historical or non-existent records

Path forward

- Small tasks that will build to the end goal
  - Public, Private, QA, Desktop & Field
- Streamline workflow and limit resource output
- Find a starting place to build from
  - Water Meters
    - Locations: survey grade precision
    - Attributes: Utility Billing maintained

One automation (FME) to rule them all



Logic

- Built off of known standardized dataset – Water Meters
- Integrate service maintenance replacement records
- Data QA
- Attribution and defaults
- INSERT or UPDATE

Advantages

- Enforces creation and management standards
- Streamlines field and manual workflows
- Runs routinely in the background
- Low code visual environment allows non-experts insight into process flow

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OPS Field Crew collecting Data

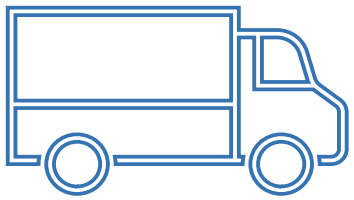
Field Crew using Field Maps

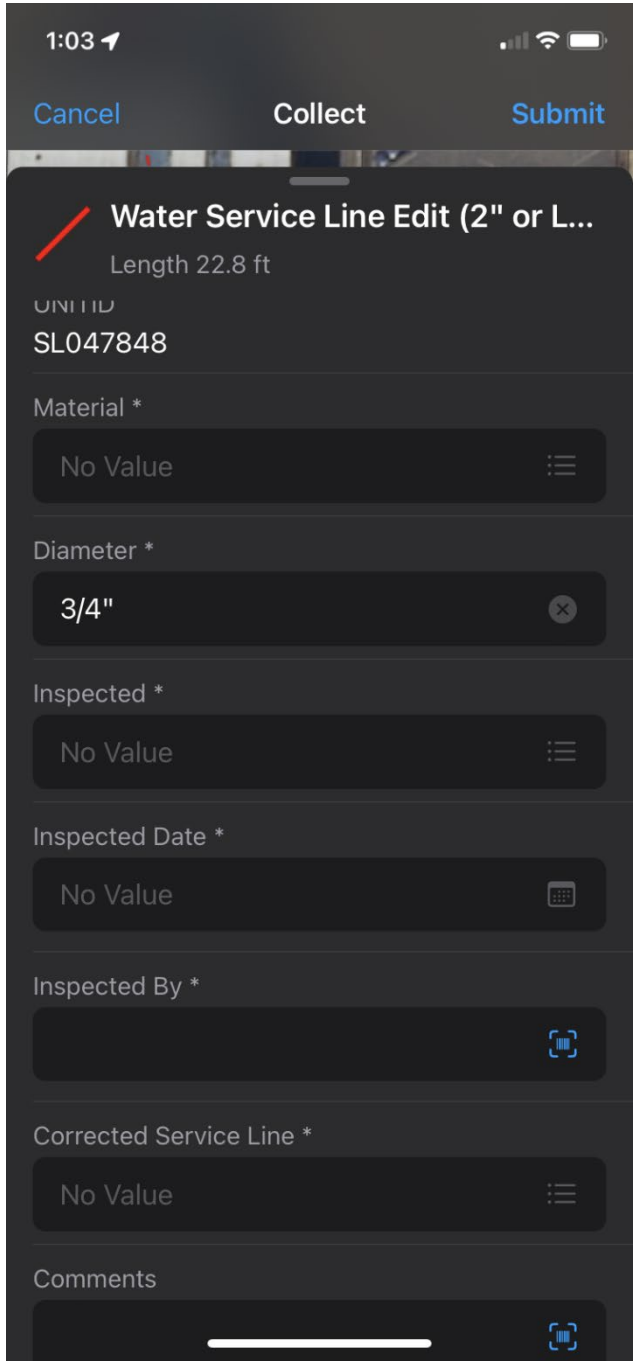
We have a dedicated 2 man crew that is inspecting the Service Lines in the field. This crew is using Field Maps on an iPad so they can make Real Time updates to the Service Line Layer.

Field Maps also shows the location of the Field Crew so they can see their location and make sure they are inspecting the correct Service Line

We have made 6 fields Required (*). These fields need to be filled out before they can submit their updates/changes.

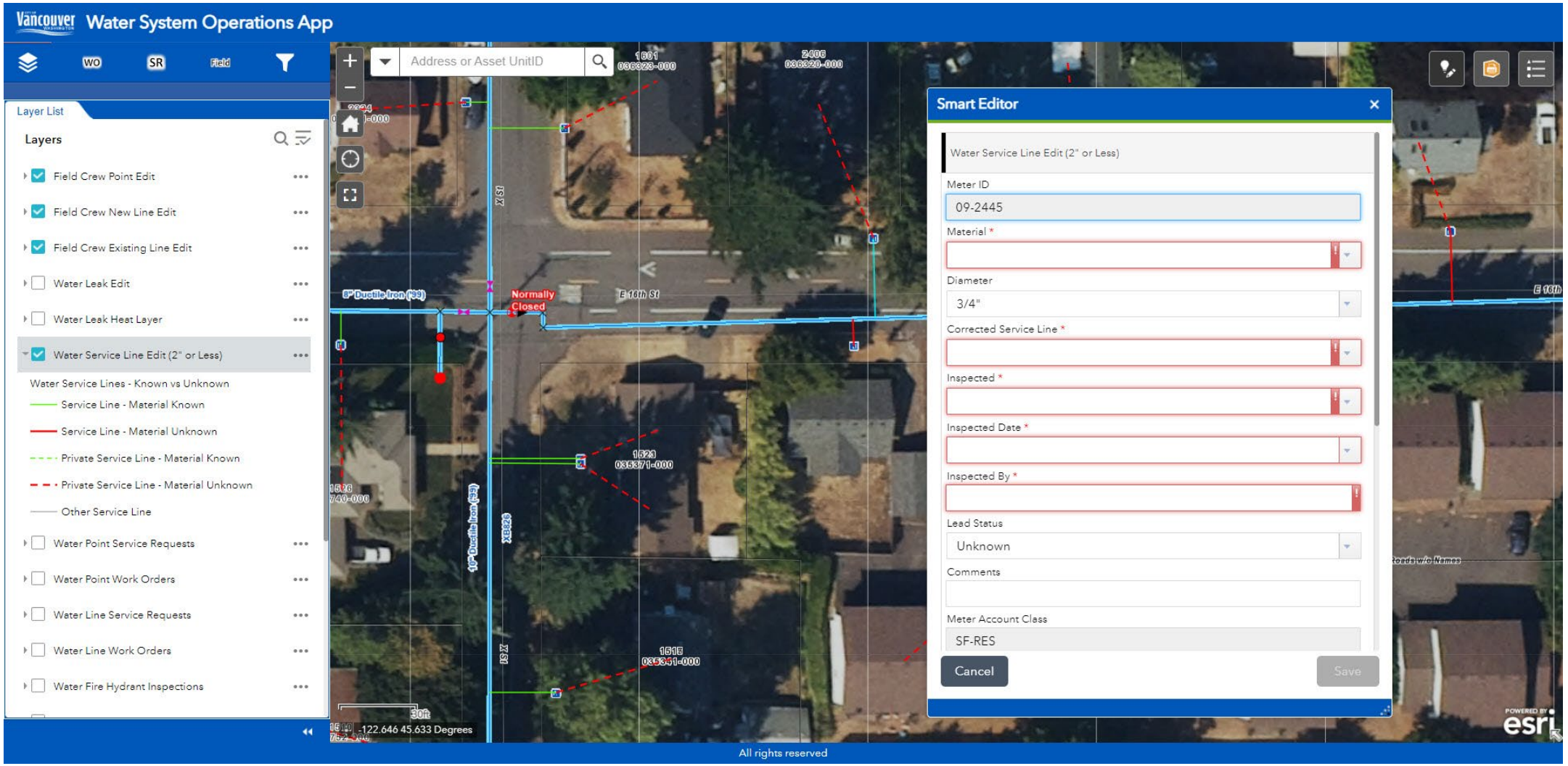
Required Fields: Material, Diameter, Inspected (Yes or No), Inspection Date, Inspected By & Corrected Service Line (Yes or No). We added the Corrected Service Line (Yes or No) to track if our inventory & office work is correct and consistent.





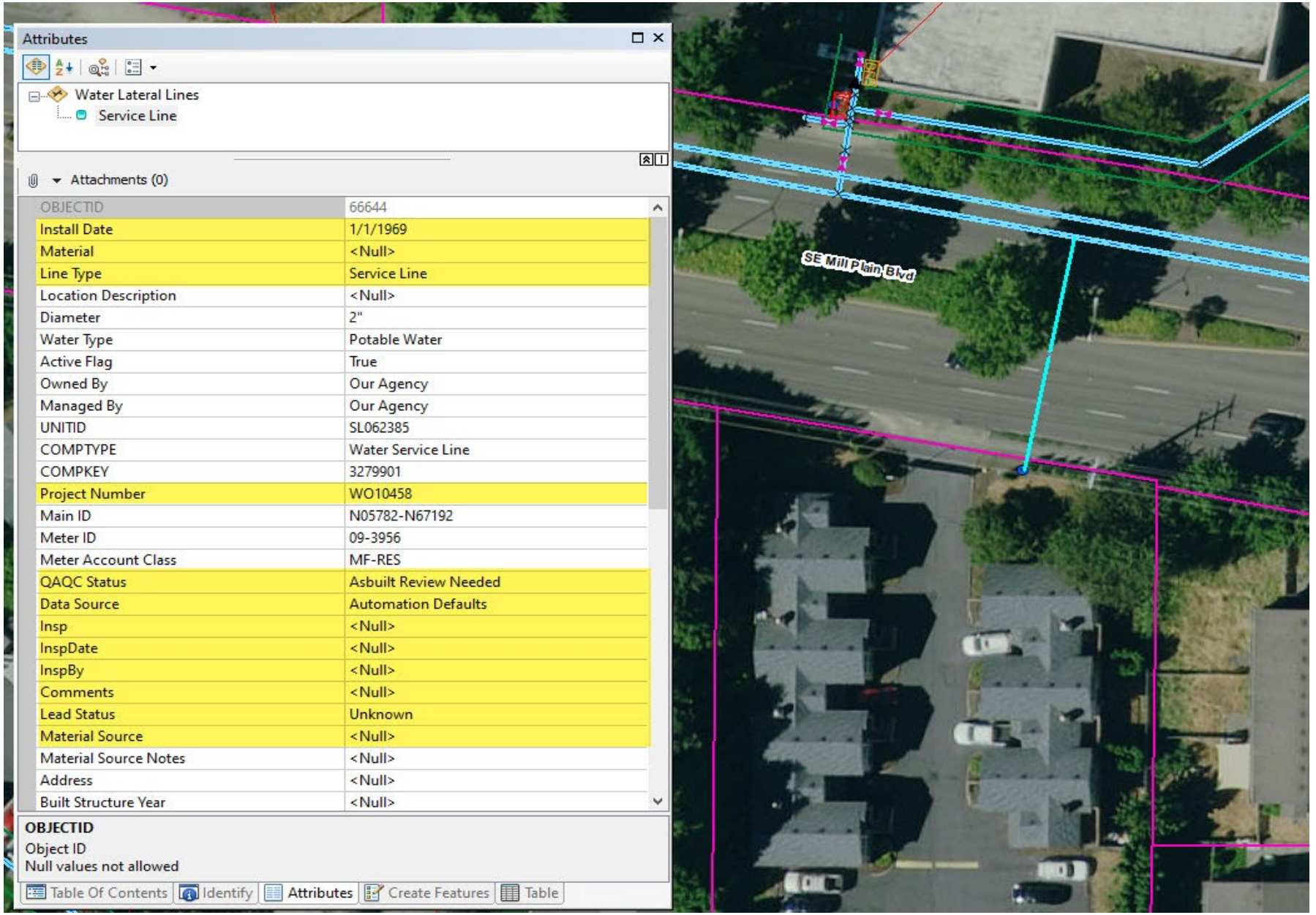
OPS Field Crew collecting Data

OPS Field Crews collect Data in the field and the Manager inputs the Data into our Water System App back in the office. This is done because not all of our Field Crews have handheld devices out in the field.



GIS Tech Steps

- Service Lines added by Automation (FME) or manually by GIS Tech
- Service Lines are created by Automation (FME) after new Water Meter has been GPS and within 50’ of Water Main
- Service Lines created manually by GIS Tech if Water Meters are further than 50’ from Water Main
- QAQC is needed to add missing Service Lines and to update the Attributes (Materials, Non-Lead Status & etc.)



QAQC Tools

As-Builts are used for New and Existing Service Lines to Identify Material, Date, Diameter

CONSTRUCTION NOTES

① INSTALL 4" SEWER LATERAL TO THE BACK OF THE 6" UTILITY TRENCH. SEE DETAIL S-1.4

② INSTALL 4" SEWER LATERAL AT 2% SLOPE TO LENGTH SHOWN ON THE SEWER LATERAL TABLE. SEE DETAIL S-1.4

③ STA 0+00.00 WATER LINE=STA 5+11.06 8.0' LT CUT IN AND INSTALL 12"X8" MJ TEE WITH TB. INSTALL (1) 8" MJ GATE VALVES AND (1) 12" MJ BUTTERFLY VALVE. INSTALL 34.3 LF OF 8" CL 52 DUCTILE IRON PIPE. PIPE BEDDING AND BACKFILL PER DETAIL W-5.

④ STA 0+34.35 WATERLINE=STA 5+45.41 8.0' LT INSTALL 8" MJ X 6" FLG TEE WITH TB. INSTALL 6" FLG X MJ VALVE. INSTALL 10.7 LF OF 6" CL 52 DUCTILE IRON PIPE. INSTALL 8"X4" MJ REDUCER. INSTALL STANDARD FIRE HYDRANT ASSEMBLY WITH 'STORZ' ADAPTER AS PER DETAIL W-10. MECHANICALLY RESTRAIN ALL JOINTS. CONSTRUCT 4'X4' CONC. PAD.

⑤ INSTALL 368.8 LF OF 4" CLASS 52 DUCTILE IRON PIPE. PIPE BEDDING AND BACKFILL PER DETAIL W-5.

⑥ STA 2+76.12 WATERLINE=STA 7+87.18 6.82' LT INSTALL 4" MJ 22 1/2° ELBOW WITH TB. DEFLECT JOINT 4 1/2 DEGREES.

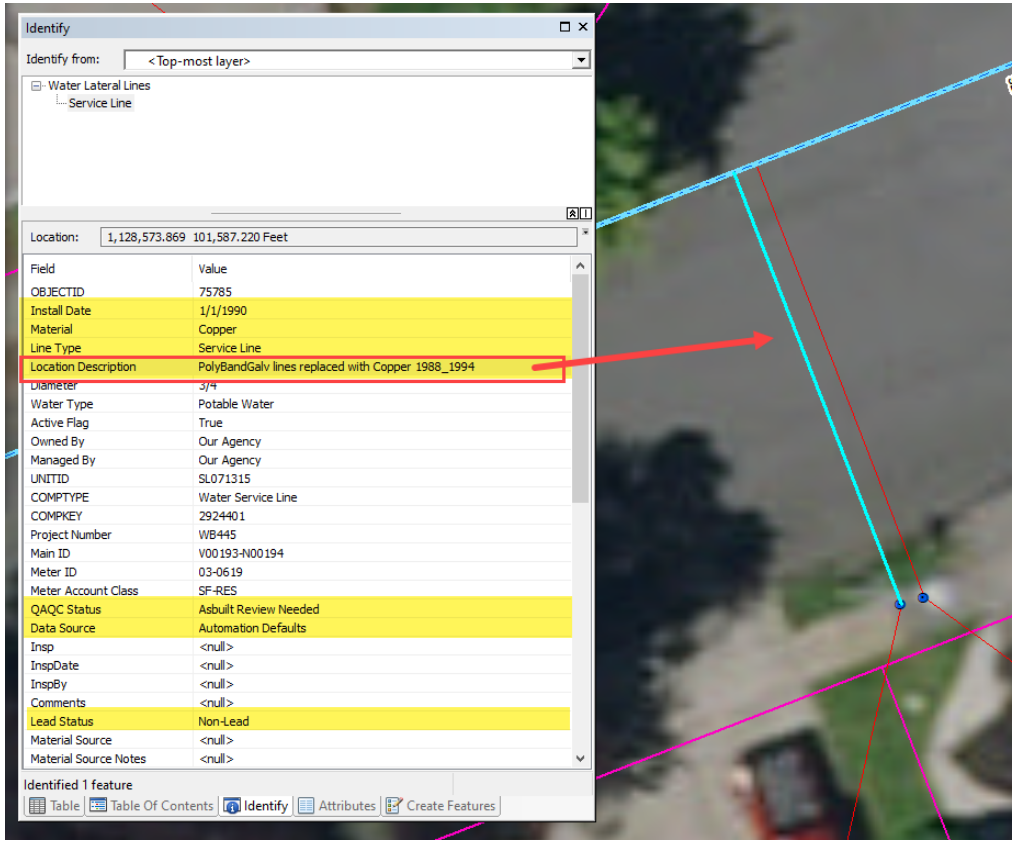
⑦ STA 4+03.10 WATERLINE=STA 9+16.57 8.0' LT INSTALL 4" MJ PLUG WITH TB. INSTALL 2" STANDARD BLOWOFF ASSEMBLY. SEE DETAIL W-8.

⑧ INSTALL 1" SEAMLESS TYPE K COPPER WATER SERVICE. CITY TO PROVIDE METER. INSTALL VALVE BOX AND COVER PER DETAIL W-12.

⑨ NOTE NOT USED

⑩ MANHOLE SEALING REQUIRED

From 1988 – 1994 Operation Crews replaced all polybutylene service and some galvanized services with copper



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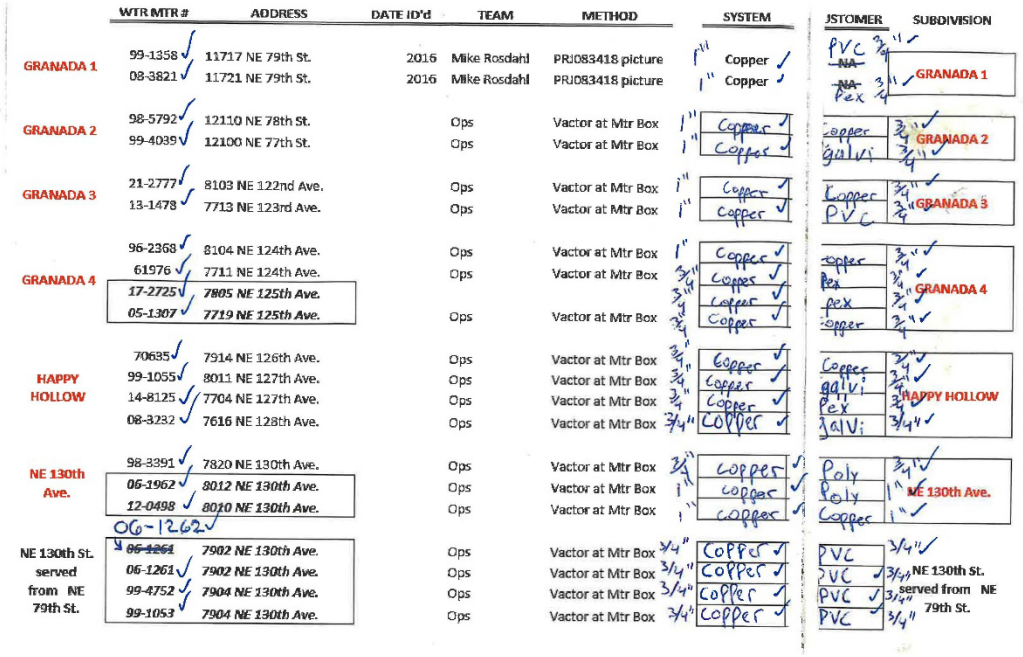
QAQC Tools

OPS Crews surveyed from 2009 – 2014 (about 17,000 services), in which case the material will show based on their survey

	A	B	C	D	E	J	K	L
1	UnitID	Address	Diameter	Length	Material	Insp	InspDate	yes
1567	98-5698	2511 E 18TH ST	0.75	L	COPPER	Y	Apr 22, 2013	petersda
1578	67621	2808 E 29TH ST	0.75	S	COPPER	Y	May 01, 2011	petersda
1579	03-1110	3007 FAIRMOUNT AV	1	L	COPPER	Y	May 02, 2011	petersda
1580	05-3946	707 GILLIS ST	0.75	S	COPPER	Y	Oct 18, 2010	petersda
1581	53122	3601 E 11TH ST	1	L	COPPER	Y	Jun 25, 2011	petersda
1582	97-0556	2611 NEALS LN	0.75	L	COPPER	Y	Aug 16, 2011	petersda
1583	99-5559	701 E 29TH ST	1	L	COPPER	Y	Mar 28, 2013	petersda
1584	54809	900 E 29TH ST	0.75	S	COPPER	Y	May 25, 2011	petersda
1585	10-0960	2609 E 5TH ST	0.75	L	COPPER	Y	Dec 03, 2010	petersda
1592	01-2081	2402 BROADWAY ST	1	L	COPPER	Y	Dec 04, 2014	petersda
1593	07-2250	2704 E MCLOUGHLIN BL	1	L	COPPER	Y	Feb 27, 2013	petersda
1594	08-2749	8618 SE EVERGREEN HY	1	S	COPPER	Y	Jul 28, 2011	petersda

Sheet1 | Sheet2 | Employee Name Crosslink

Sample Spot Checks for Neighbors (OPS) – If enough Service Lines are a certain material then that material will be applied to the rest of the Neighborhood on the Public Side. (The Private Side is another story because the Material can be all of the place.)



Improvement Steps

- City Inspectors collect WSL information when they are on a Project Site Visit
- GIS Data Reviewer Tool to check for any issues or Attributes that don't line up
- Hire an Intern to help review the more than 150,000 Service Lines (Public & Private) in our Water Boundary
- OPS Water Meter Crew reviews Service Line Material & Size when changing out old Water Meters

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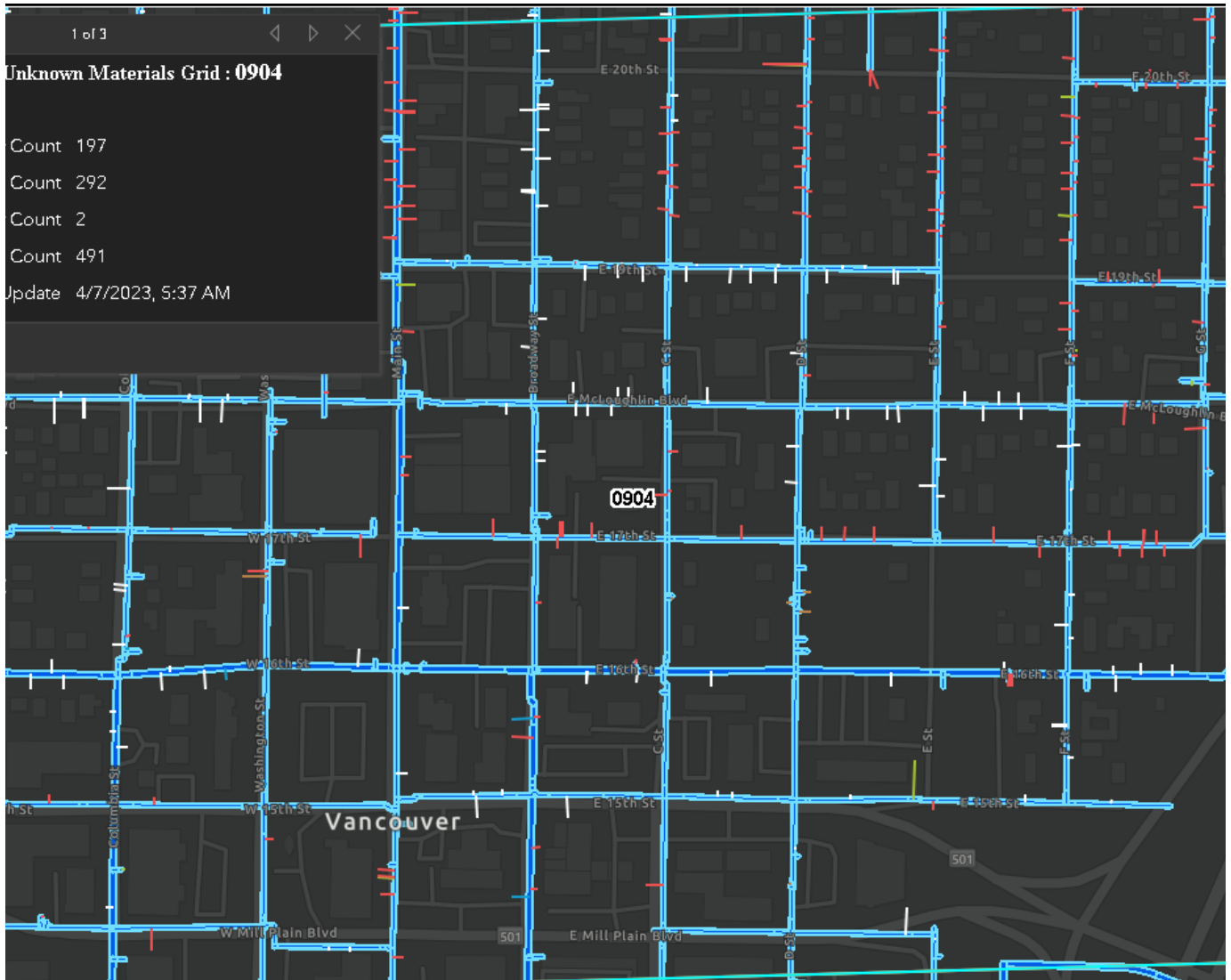
Grid-by-Grid



SL043839 - Service Line	
Material	Copper
Diameter	3/4"
Inspected	Yes
Inspected Date	4/7/2023
Inspected By	Jonas v
Install Date	12/31/1962

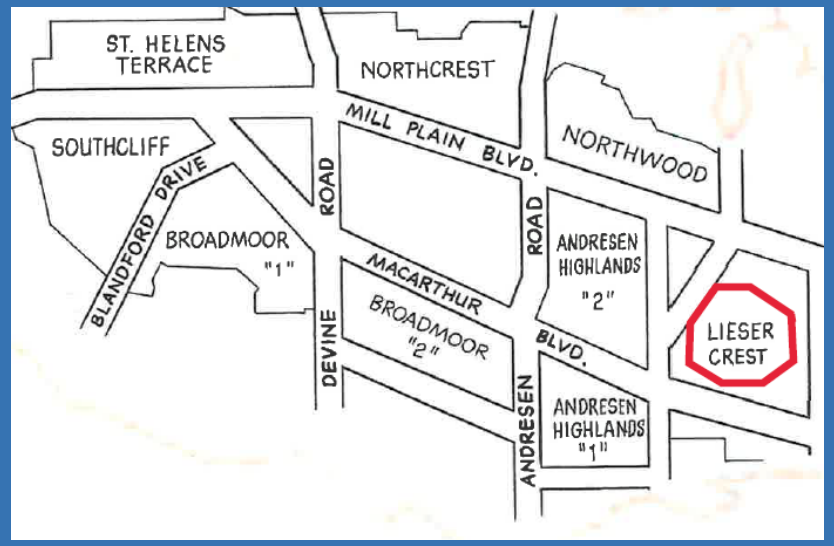
- Serviceline attributes added in field with tablet.
- Picture taken as well.

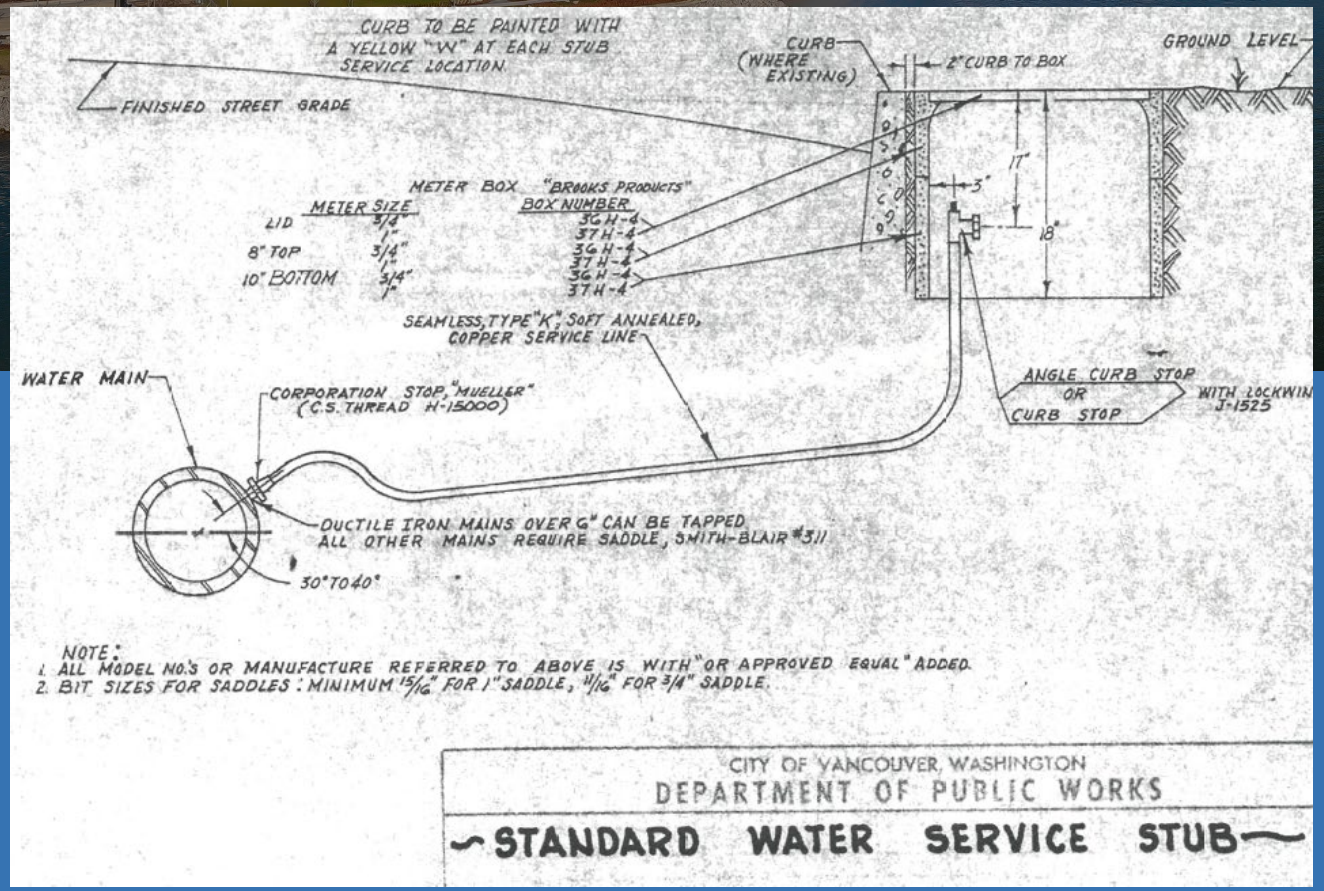
Historical Records

Pre-1986 records are not really accessible.

Difficult to convince others of importance.

Services not documented.



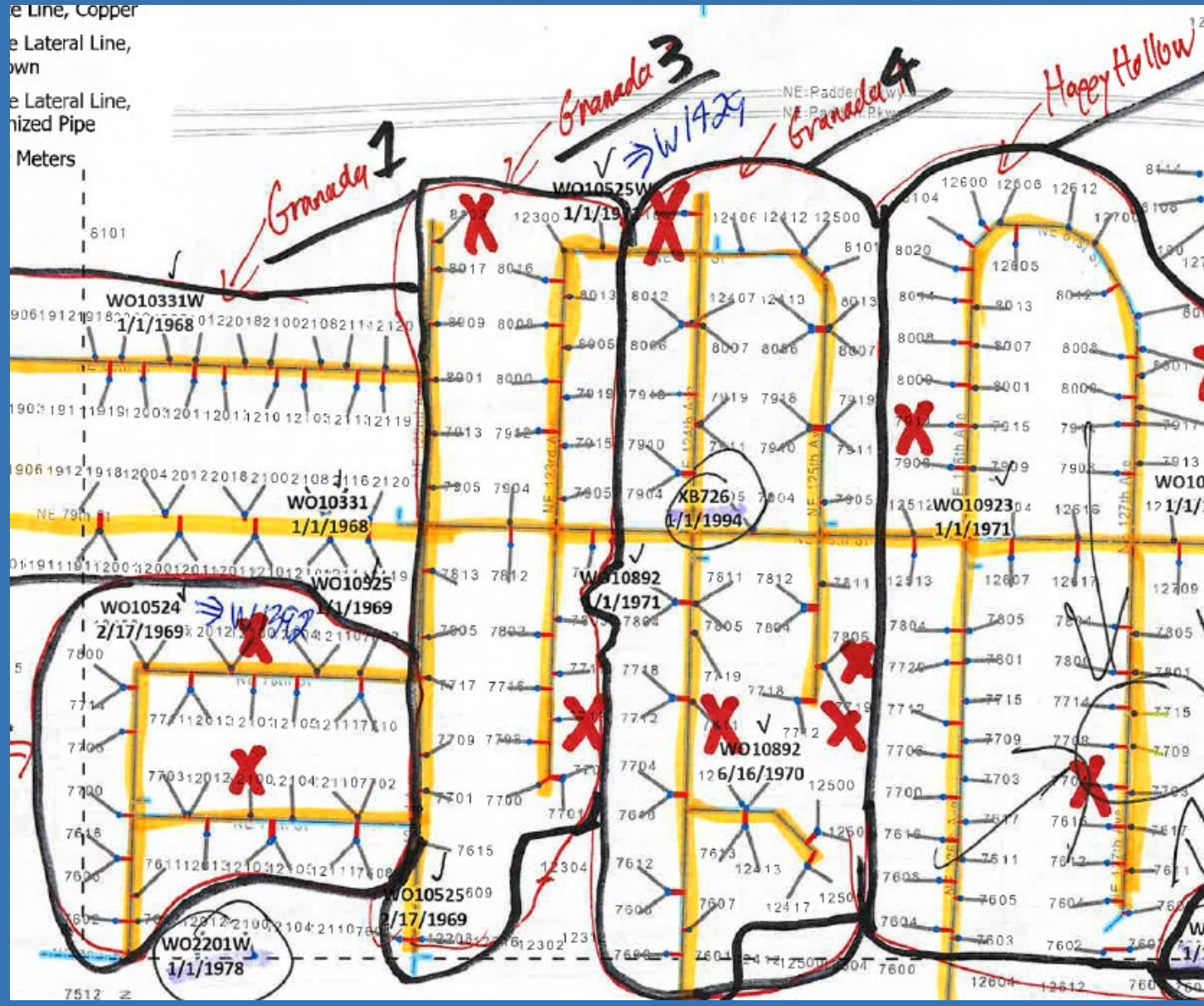


Subdivision – Interpolation

System built subdivision by sub incrementally with same material.

Identify a portion of each segment and apply to all units.

Only appropriate for public side.



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Thank You

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