T-MINUS 12 MONTHS: LESSONS LEARNED AND INFORMATION GAPS FOR INITIAL LSL INVENTORIES

Moderator – J. Alan Roberson, P.E.,

ASDWA Executive Director

asdwa

Association of State
Drinking Water Administrators

WEBINAR PANELISTS

- Brenden Obrien, Stantec
- Richard Lettchau, Mott MacDonald
- Lauren Wasserstrom, Jacobs
- Becki Rosenfeldt and Rusty Nigro, Hazen & Sawyer
- Pierre Kwan, HDR
- Chad Seidel and Shonnie Cline, Corona Environmental Consulting
- Sandy Kutzing, CDMSmith
- Caroline Russell, Carollo Engineers
- Katie Porter, Brown & Caldwell
- Erica Walker, Arcadis
- Kiran Udayakumar, AECOM

History of Lead and Copper Rule(s)

LEAD AND COPPER RULE (LCR)

- Currently being implemented by most states

LEAD AND COPPER RULE REVISIONS (LCRR)

- Finalized January 2021
- Pulled for agency review and re-confirmed in December 2021
- LSL Initial Inventories due in 2024
- Additional components of the rule may change with LCRI
- States working on primacy applications/extensions

LEAD AND COPPER RULE IMPROVEMENTS (LCRI)

- Increasing the pace of lead service line replacement
- Streamline action level and trigger level requirements
- Proposal was to be in September 2023
  - November is likely
- Final needs to be before October 16, 2024

Lead Service Line Inventories

- All systems should be working on initial inventories now
  - Not sure about a strategy of 100% unknowns for initial inventory
- Lots of questions/details
  - Records versus field work for validation
    - EPA guidance
    - ASDWA inventory framework
    - ASDWA webinar recordings
- BIL funding helping/complicating
- Knowledge continues to evolve

INITIAL INVENTORY REQUIREMENTS

§ 141.84-Lead service line inventory and replacement requirements

- Required to investigate
  - All construction & plumbing codes, permits, and existing records pertaining to service lines connecting structures to the distribution system
  - All water system maps & records, including each service connection, meter installation records, past capital improvements, and std. operating procedures
  - All inspections and records of distribution system materials
  - Any resource, information, or identification method provided or required by the State to assess service line materials
- Required to identify and track surface service line materials encountered in normal operations, e.g., checking materials when reading meters, etc.

INITIAL INVENTORY REPORTING

- State spreadsheets are tracking many more data elements than the four to be reported to EPA
  - States are working on how to organize the spreadsheets into actionable information to track changes in the inventories as well as replacements
    - A significant data management effort by states
- Four (not eight) data elements to be reported to EPA
  - Lead, galvanized requiring replacement (GRR), lead status unknown, non-lead
  - Assuming annual reporting based on updated inventories
- 30-day Public Notification (PN) requirement
  - What is the date that the 30-day clock starts ticking?

EXISTING TOOLS & RESOURCES

- Feb. 2022 - ASDWA State Implementation Framework for the Lead Service Line Inventory Requirements under EPA's LCRR – link
  - Companion Excel spreadsheet template
  - 2022 LSLI Symposium & additional webinars – latest on 10/16/23
- Aug. 2022 – EPA Guidance for Developing and Maintaining a Service Line Inventory - link
  - Also a companion Excel spreadsheet template
- Most states have developed inventory templates, FAQs, and additional resources
  - Systems need to listen to what their state is telling them
- Technical Assistance Providers & Consultants

TWO POLLEVERYWHERE QUESTIONS

- What is your estimate of the percentage of systems that will make the October 16, 2024 deadline for initial inventories?
  - 0%-25%
  - 25%-50%
  - 50%-75%
  - 75%-90%
  - 90%-100%
- What is your estimate of the percentage of systems that will have 100% unknows?
  - Same percentages

Poll Questions for Today's Call

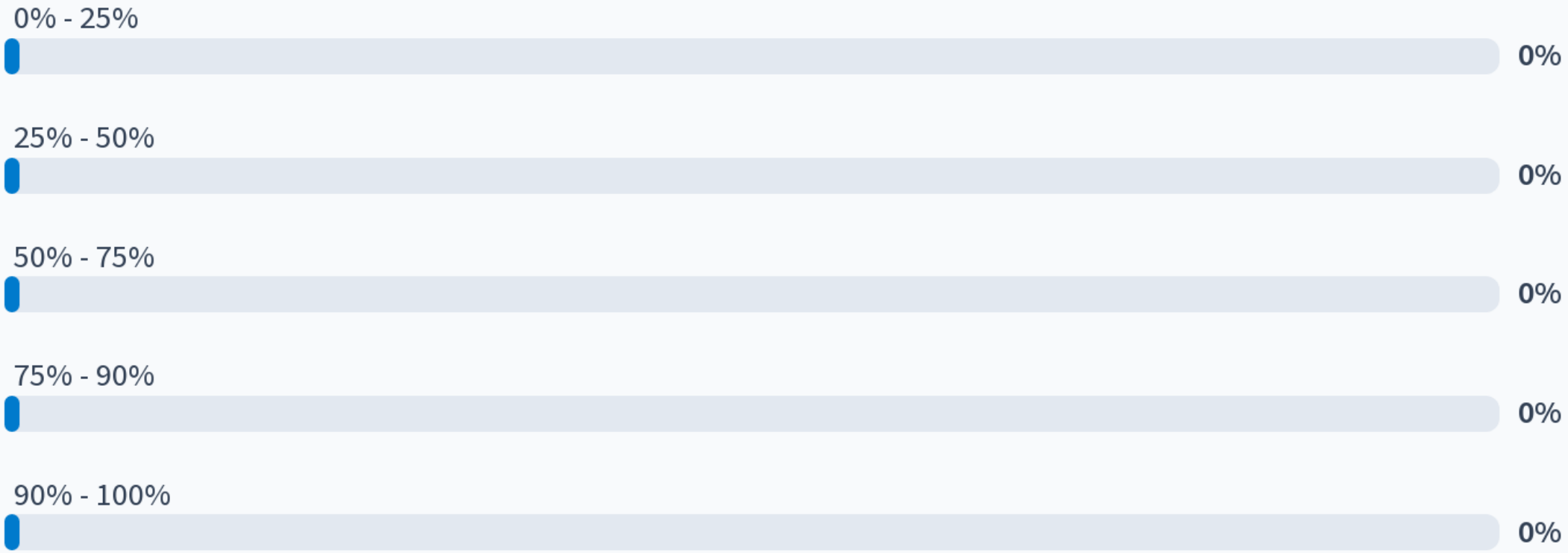
Visit: pollev.com/asdwaa436

or

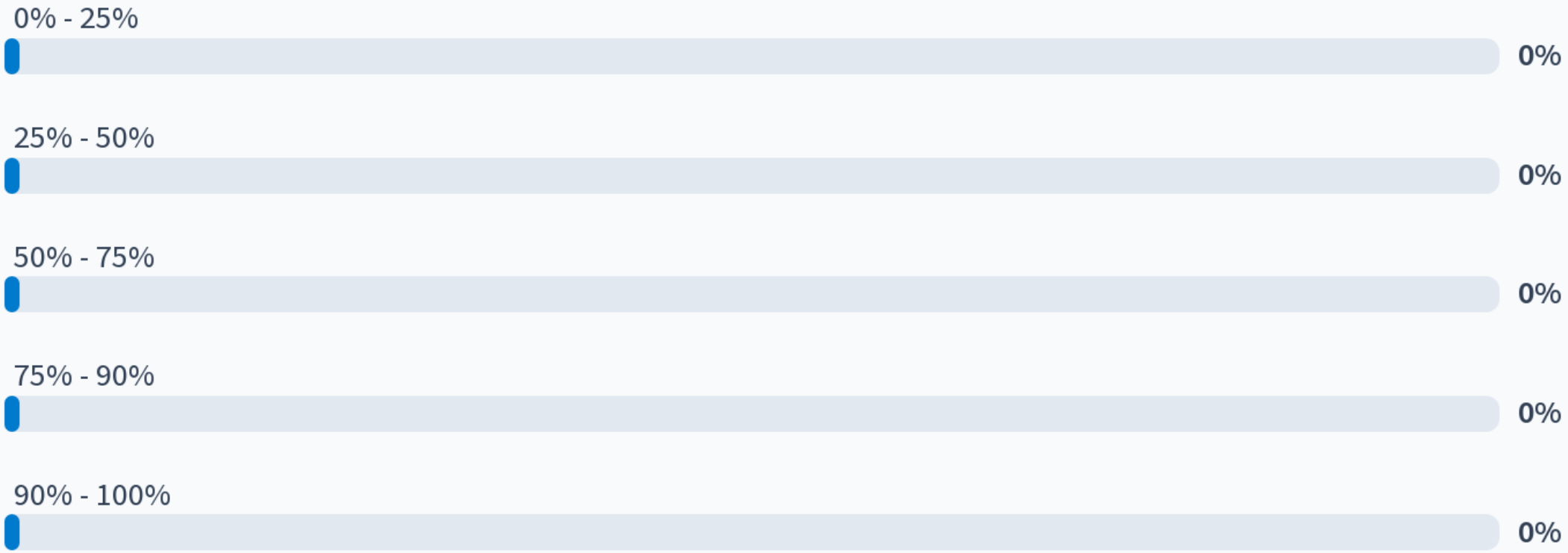
Text: asdwaa436
To: 22333

Or use QR code

What is your estimate of the percentage of systems that will make the October 16, 2024 deadline for initial inventories?



What is your estimate of the percentage of systems that will submit an inventory with 100% "unknown" service lines?



ALAN'S OBSERVATIONS ON INVENTORIES

- States are taking different approaches on some issues
  - And that's OK as almost all systems operate in only one state
    - There are some exceptions
- States are developing inventory templates with some differences
- Three(ish) lead service line categories for systems
  - A fair amount of lead – Upper Midwest and Northeast
  - Some lead – many of the older cities across the country
  - Limited or no-lead – new areas or lead wasn't the common practice
    - Approaches will vary between these categories
- EPA guidance on inventories and public notification templates still leaves many questions to be answered

MANY INVENTORY QUESTIONS

- What is good enough for the initial inventory?
  - Does a system have to go beyond the initial records search?
  - Is a narrative for what the system did needed for the initial inventory?
  - What's the appropriate response for systems that submit an initial inventory with 100% (or 98% or 90%) unknown materials?
    - Unknown service lines public notifications (PNs) – 30 day regulatory requirement
      - How are the PNs going to be tracked & violations issue?
  - What's the appropriate response for systems that miss the deadline?
- What will Year 2 & 3 updates look like?
  - How many customers are interested? (inventory & eventual replacement)
  - How many services lines are going to be need to be potholed?
    - How many holes per service line – both public and private sides?
    - How might modeling be used to reduce the number of necessary excavations?
  - How much will the percentage of unknowns decrease? – annual PNs
    - What is good enough for the decrease?

PANEL DISCUSSION

- Ten national engineering consultants will provide their experiences so far, followed by Q&A
  - Some pre-prepared questions and looking for audience questions

Lead Service Line Inventories
T-Minus 12 Months
Lessons Learned and Data Gaps

Stantec

LESSONS LEARNED

Collecting evidence: 3 methods

Historical records review

- Previous materials evaluation
- Construction records and plumbing codes
- Water system records
- Distribution system inspections and records

Identify service line material during normal operations

- Water meter readings
- Repairs and replacements of water meters, service lines, or mains
- Backflow prevention device inspection

Service line investigations

- Visual inspection at meter pit
- Customer self-identification
- CCTV inspections at the curb box
- Water quality sampling
- Mechanical or vacuum excavations

Collecting evidence: 3 tiers

Bronze: Historical records

Installation record (e.g., tap card)

Water sampling only with no records

Field inspection only with no records

Previous materials evaluation

Installation date is after the lead ban

SL diameter > 2 inches

SL repair or replacement record

Silver: Indirect Verifications

Visual inspection at meter pit

Customer self-identification

CCTV Inspection at Curb Box - Internal or External

Water Quality Sampling – Targeted, Flushed, or Sequential

Gold: Direct Verifications

Mechanical Excavation at 1 or multiple locations

Replacement

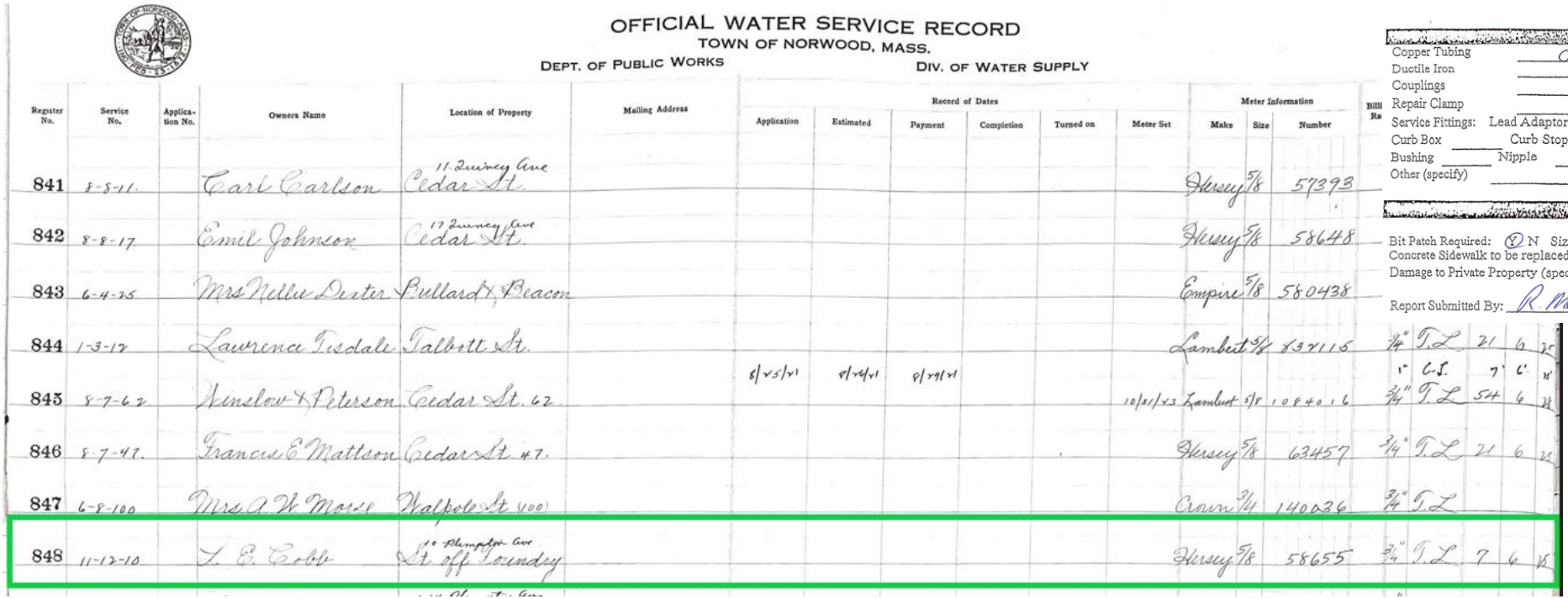
Repair

LESSONS LEARNED

Information Holds Different Weight

- Town Ledger (1880-1950 records) shows T.L. for material: **tin-lined lead pipe**

- Department Service Report: “Leak on customer side we dug the street side and found **¾” copper from main to curb stop**. There is a concrete duct back between the curb and the water main. There is also **a lead ¾”** phone line in the gutter we pulled about 60’ of it by hand.”



OFFICIAL WATER SERVICE RECORD
TOWN OF NORWOOD, MASS.
DEPT. OF PUBLIC WORKS — DIV. OF WATER SUPPLY

Register No.	Service No.	Application No.	Owners Name	Location of Property	Mailing Address	Record of Dates: Application	Estimated	Payment	Completion	Turned on	Meter Set	Meter Information: Make	Size	Number
841	8-8-11		Carl Carlson	11 Quincy Ave Cedar St.								Hersey	5/8	57393
842	8-8-17		Emil Johnson	17 Quincy Ave Cedar St.								Hersey	5/8	58648
843	6-4-25		Mrs Nellie Dexter	Bullard & Beacon								Empire	5/8	580438
844	1-3-17		Laurence Tisdale	Talbott St.								Lambert	5/8	437116
845	8-7-62		Winslow & Peterson	Cedar St. 62		6/25/41	6/26/41	6/29/41			10/21/43	Lambert	5/8	1004016
846	8-7-47		Frances E Mattson	Cedar St 47								Hersey	5/8	63457
847	6-8-100		Mrs A W Morse	Walpole St 1000								Crown	3/4	140036
848	11-12-10		L E Cobb	10 Plimpton Ave St. off Foundry								Hersey	5/8	58655

paving Project

TOWN OF NORWOOD - WATER DEPARTMENT
SERVICE REPORT

Date: 6/11/2018 Location: 10 Plimpton Ave

Employees: K. McCloud, K Jones, J. Frail, R. Manning

Equipment (Check & Specify): Backhoe mini ✓, Dump Truck ✓, Utility Truck ✓, Compressor ✓, Other (specify) #43 ✓

Type of Work Performed: Service Repair ☐, Main Repair ☐, Hydrant Repair ☐, Hydrant Replacement ☐, Service Replacement ✓

System Data: Size of Service ¾ copper; Size of Main; Pipe Material: Ductile Iron; Cast Iron ___ Cement Lined: Y N; Iron Service ___ Lead Gooseneck ___; Lead Service ___; Copper Service ___; Pipe Condition: Poor ☐ Pair ☐ Good ☐

Comment: leak on customer side we dug the street side and found ¾ copper from main to curb stop. There is a concrete duct back ~~ABOVE~~ between the curb and the water main. There is also a lead ¾" phone line in the gutter we pulled about 60' of it out by hand

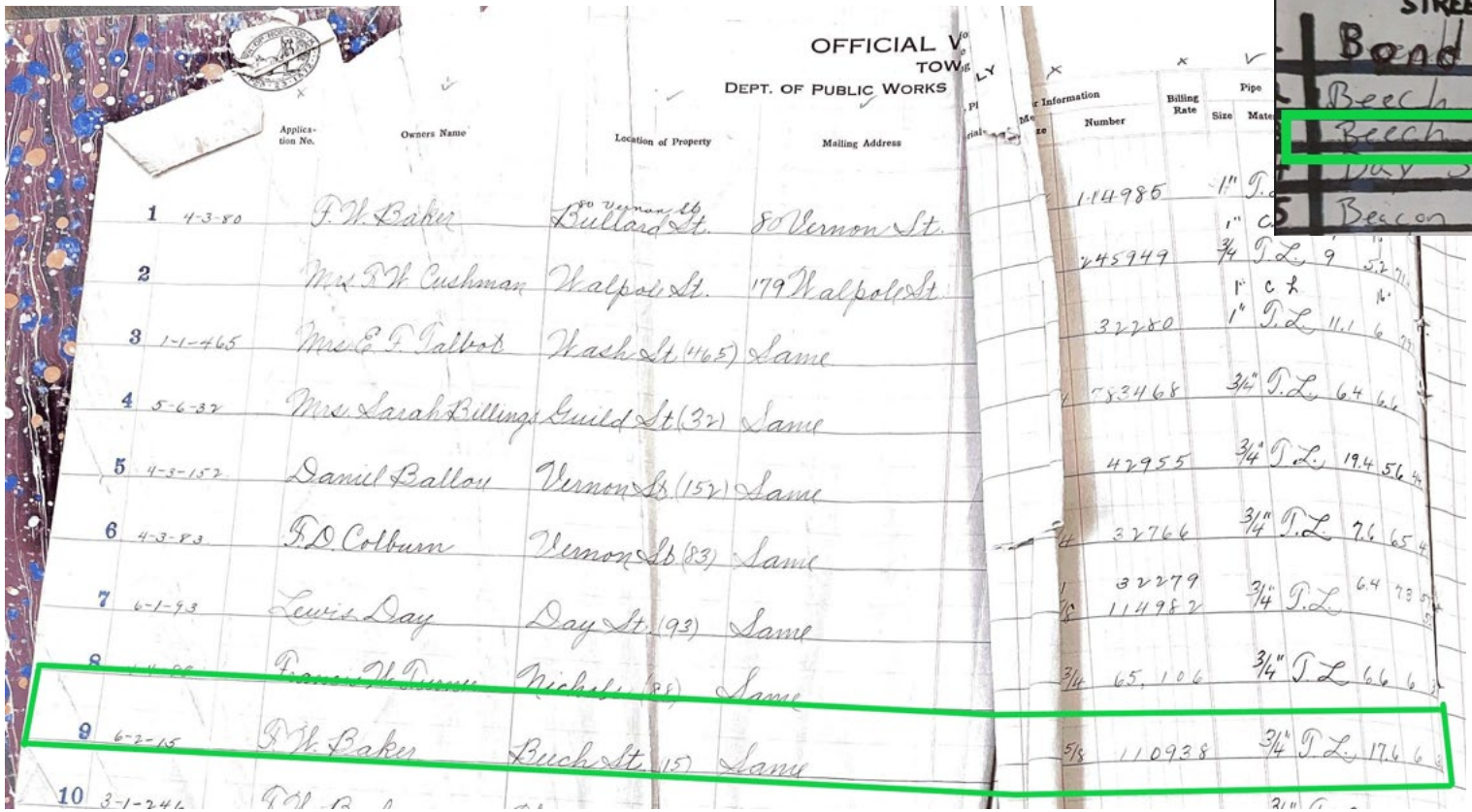
Materials Used: Copper Tubing 0 ft. of ¾ (size); Ductile Iron ___ ft. of ___ (size); Couplings ___; Repair Clamp ___; Service Fittings: Lead Adaptor ___ Telsco Adaptor ___ Coupling ___; Curb Box ___ Curb Stop ___ Corporation Stop ___ Ball Valve ___; Bushing ___ Nipple ___ Elbow ___ Tailpiece ___ Meter ___; Other (specify) ___

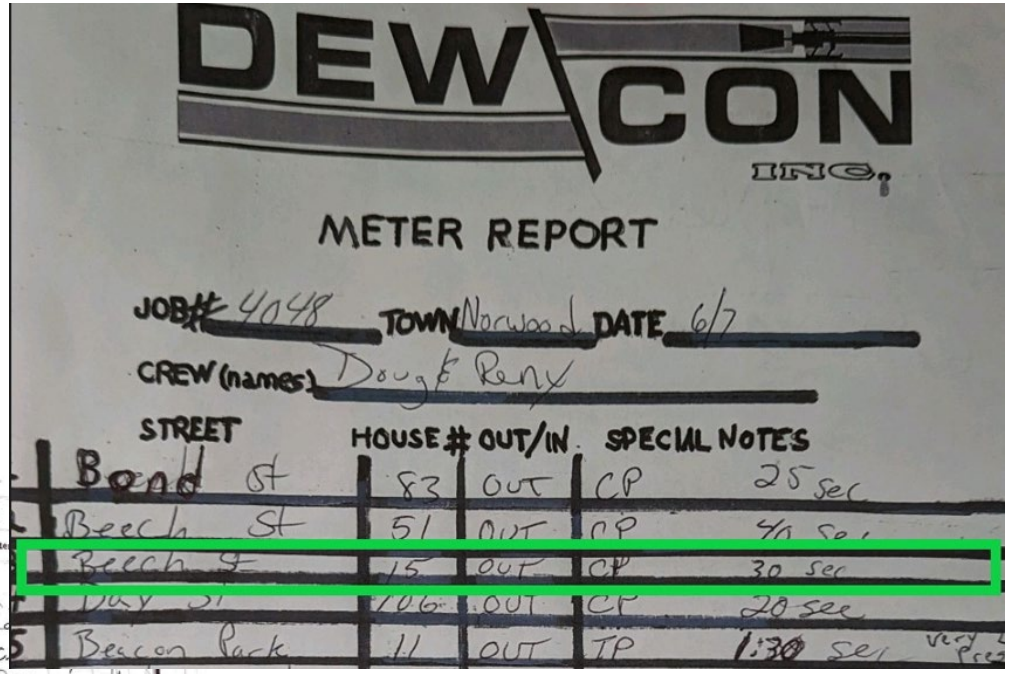
Paving: Bit Patch Required: Y (N) Size: Cold Patch Installed: Y (N); Concrete Sidewalk to be replaced: Y (N) Size: 3X4 Sidewalk Disturbed: (Y) N; Damage to Private Property (specify): no

Report Submitted By: R Manning

Information Holds Different Weight (continued)

- Town Ledger (1880-1950 records) shows T.L. for material: **tin-lined lead pipe**
- Contractor internal meter inspection report for cleaning and lining project: **copper leaving the foundation wall**



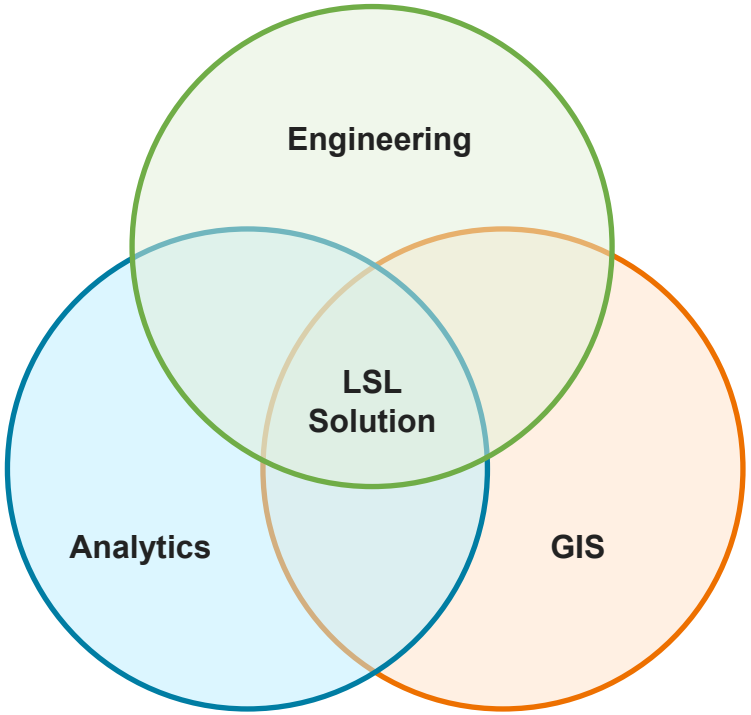


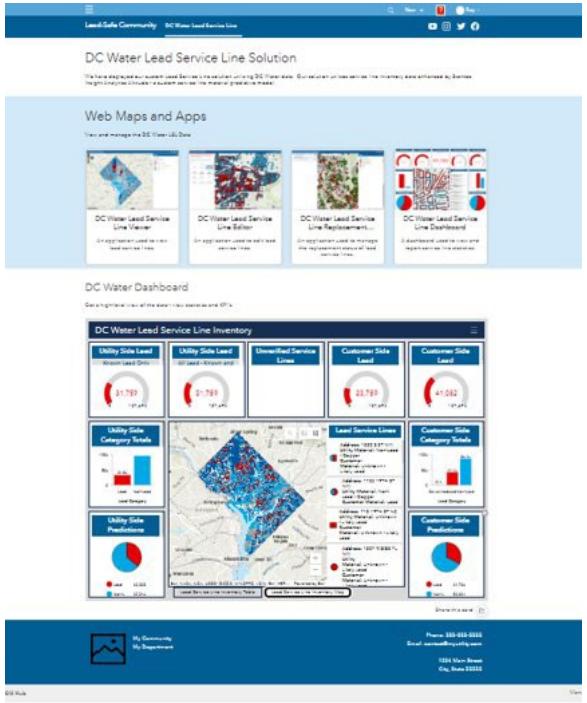
Utilizing a Centralized Hub for Inventory Development

LSL IDENTIFICATION

Leveraging an existing Esri ecosystem

Ingests your data to build a living service line inventory.
Accessed through a centralized hub.



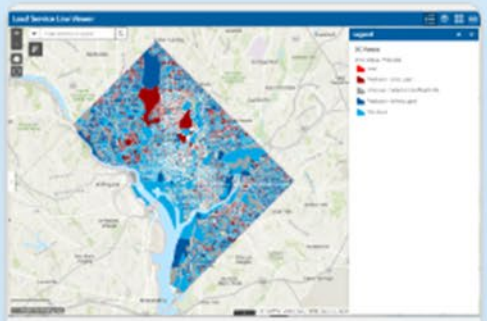


Augmenting the solution

Choose the solution interfaces that meet your needs

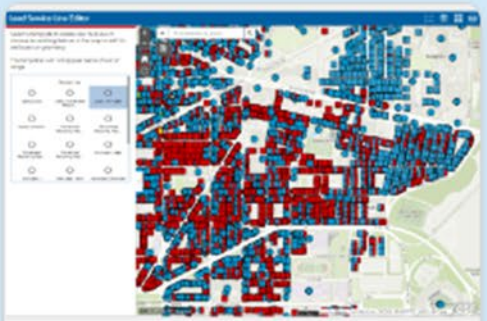
Web Maps and Apps

View and manage Your Community Service Line Inventory



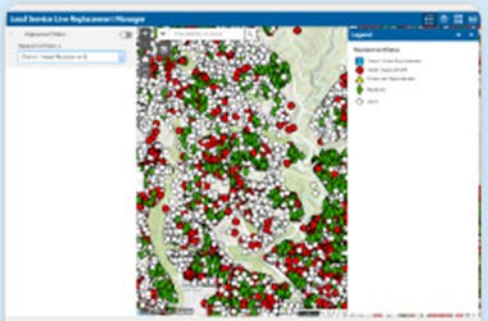
Lead Service Line Map

An application used to view lead service lines.



Lead Service Line Editor

An application used to edit lead service lines.



Lead Service Line Replacement Manager

An application used to manage the replacement status of lead service lines.

Lead Service Line Dashboard

A dashboard used to view and report service line statistics.

LSL Potholing Progress

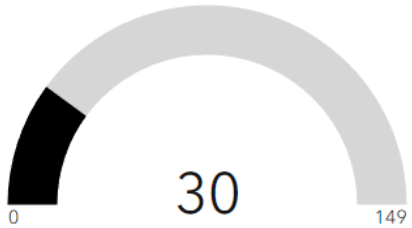
Sites Investigated

30

Potholes Dug

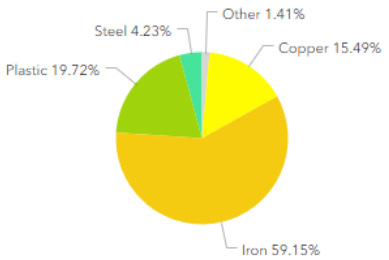
71

Phase 1 Progress



Count locations include Phase 1 Residental Locations & JPS Schools.

Pipe Material Types Found



Addresses Investigated:

Click on an address to zoom to that location on the map.

Address: Johnson Elementary School 1339 Oak Park Drive Jackson, MS 39213
Inspection Date: October 13, 2023

Address: Walton Elementary School 3200 Bailey Avenue Ext. Jackson, MS 39213
Inspection Date: October 13, 2023

Address: Chastain Middle School 4650 Manhattan Road Jackson, MS 39206
Inspection Date: October 13, 2023

Address: McWillie Elementary School 4851 McWillie Circle Jackson, MS 39206
Inspection Date: October 13, 2023

Address: Wells APAC Elementary School 1120 Riverside Drive Jackson, MS 39202
Inspection Date: October 12, 2023

Address: Murrah High School 1400 Murrah Drive Jackson, MS 39202
Inspection Date: October 12, 2023

Address: Murrah High School 1400 Murrah Drive Jackson, MS 39202
Inspection Date: October 12, 2023

Address: John Hopkins Elementary School 170 John Hopkins Road Jackson, MS 39209
Inspection Date: October 12, 2023

Address: Raines Elementary School 156 Flag Chapel Road Jackson, MS 39209
Inspection Date: October 12, 2023

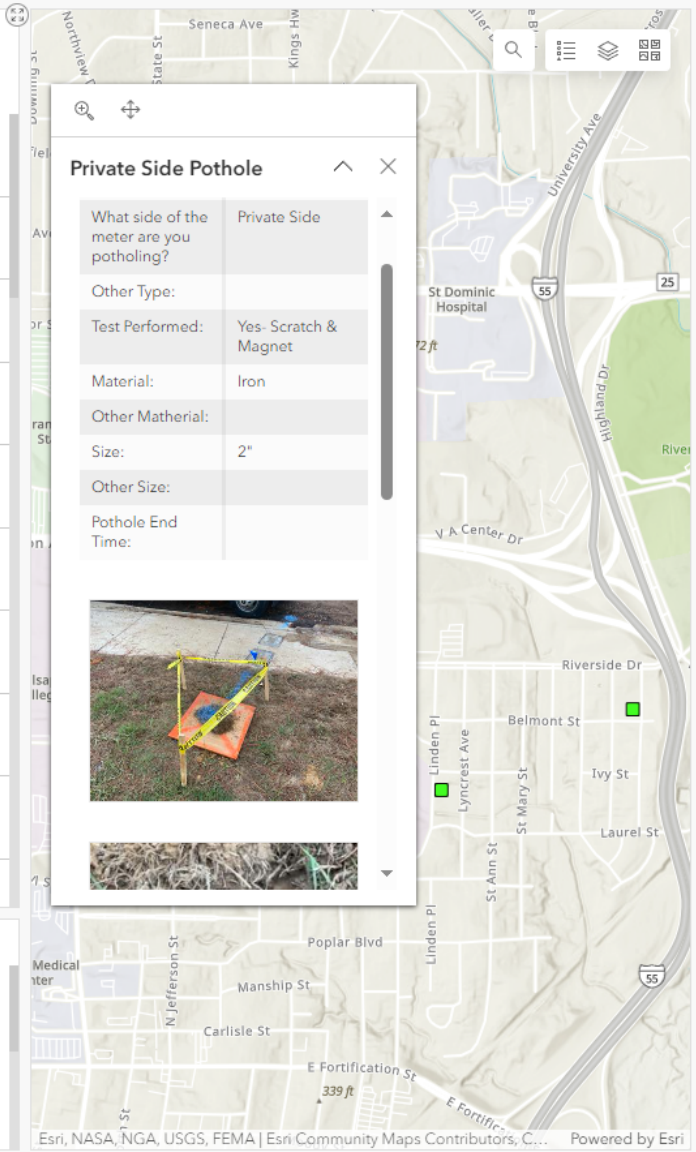
Address: Galloway Elementary School 186 Idlewild Street Jackson, MS 39203

Map Legend

Lead Service Line - Pothole Locations

Investigated Site information

- Lead Service Line - Pothole Locations



Private Side Pothole

What side of the meter are you potholing?	Private Side
Other Type:	
Test Performed:	Yes- Scratch & Magnet
Material:	Iron
Other Matherial:	
Size:	2"
Other Size:	
Pothole End Time:	

Location: Murrah High School 1400 Murrah Drive Jackson, MS 39202

Crew Number:	One
Inspection Date	October 12, 2023
Field Comment:	

Last edited by Tking2023 on 10/12/2023, 10:57 AM.

Site Info | Pothole Info

Thank you!

Questions?

Brendan O'Brien, P.E.

Project Manager

Brendan.OBrien@stantec.com

MOTT MACDONALD

LSLI T-Minus 12 Months

Lessons Learned and Information Gaps for Initial Lead Service Lines

Richard Luettchau II

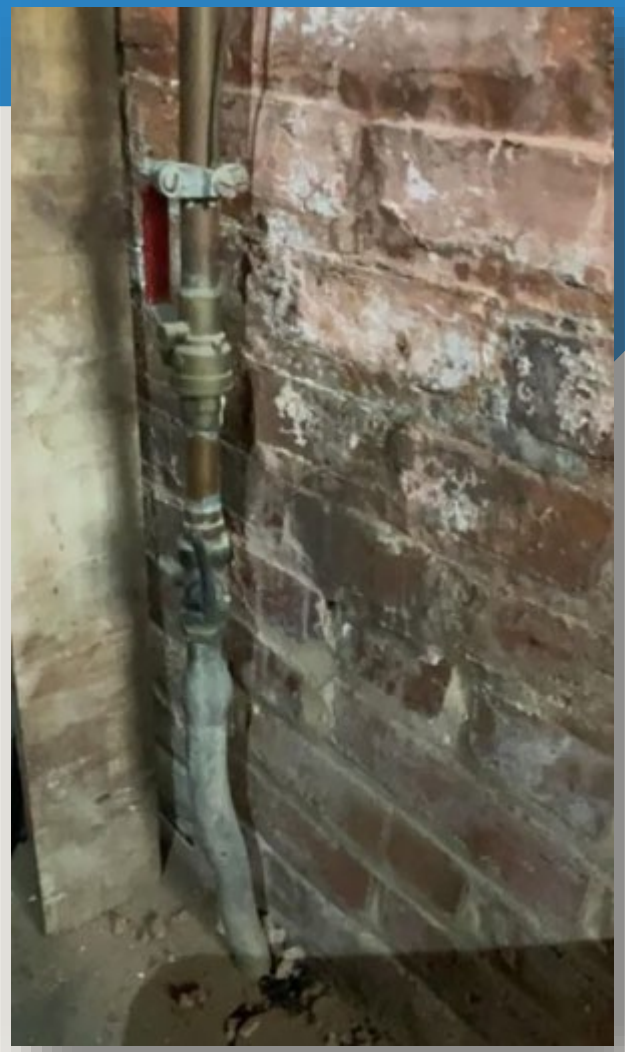
October 16, 2023

asdwa

Lessons Learned

Lead Ban Dates

- When assuming non-lead allow for a 1 to 2 year buffer from lead ban
  - Contractors were allowed to finish projects that spanned the ban date with available materials
  - Plumbers tended to use up their available stock past the ban dates



Lessons Learned

Tap Date vs Parcel Construction Date

- Date of tap and building construction may be on different sides of the lead ban
  - Lead stub may have been installed even if the building construction occurred after the ban
- If installation eras do not match, assume **unknown** or **lead**
- **Only** assume non-lead if both dates indicate non-lead

Know Your Submittal Requirements, Don’t Be Surprised In October 2024

Lessons Learned

Regulatory Submittals

- Submittal Requirements Vary Between States
  - **Review** your submittal requirements
- Understand **what** is required and **who** is responsible for the information
- If there are questions **now** is the time to ask the regulators

Street Address	Zip Code	Town	Lot (Optional)	Block (Optional)	Easting (X) (Optional)	Northing (Y) (Optional)	Latitude (Optional)	Longitude (Optional)	Locational Identifier (Optional)

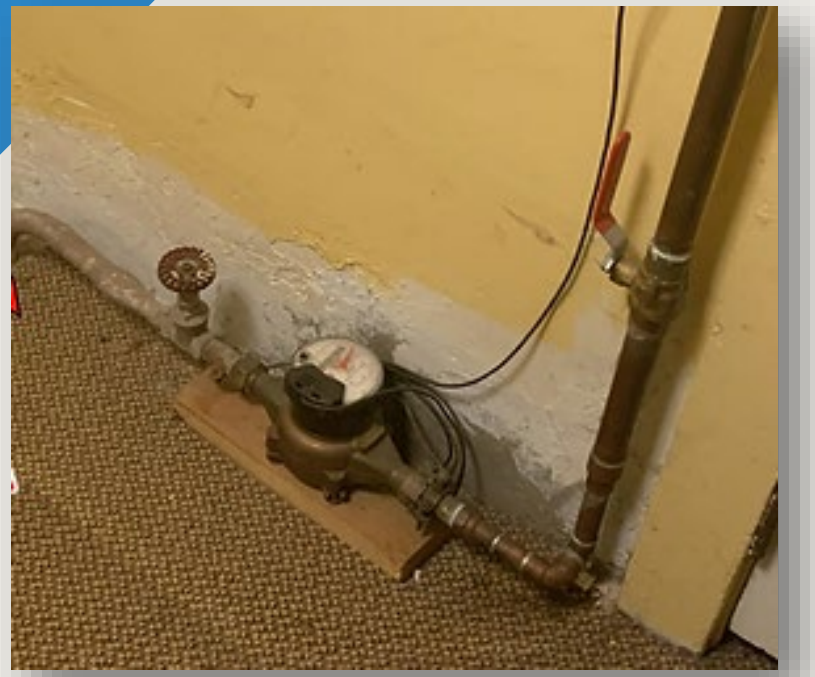
Service Line Category	Suspected to be lead? (Y/N) (Complete if answered UL for column L)	Public Service Line Materials	Public Service Line - Other Materials (Provide only if Column N is indicated as O)	Customer Service Line Materials	Customer Service Line - Other Materials (Only provide if Column P is indicated as O)

PCWS Service Line - Verification Source	PCWS Service Line - Other Source (Provide only if Column U is indicated as O)	PCWS Service Line - Reasoning	PCWS Service Line - Steps to be Taken to ID	Customer Service Line - Verification Source	Customer Service Line - Other Source (Provide only if Column Y is indicated as O)

Data Gaps

Meter Change-out Programs

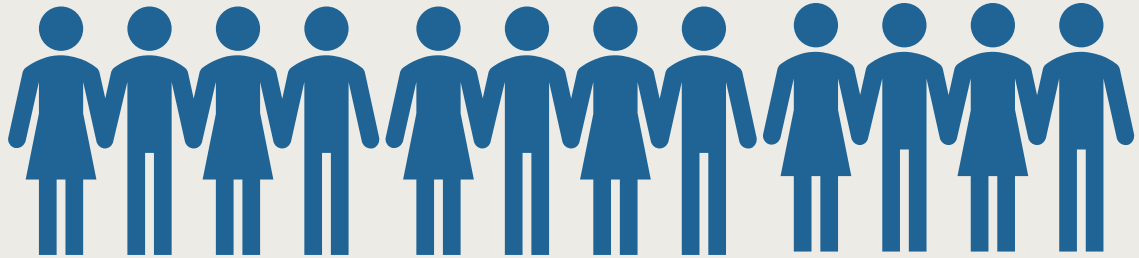
- Meter change-outs give an opportunity to observe the point of entry
  - Train crews to identify service line material
  - Record the material and take a photo
- When the utility or its representatives enter a home, the service line material should be observed and recorded



Data Gaps

Customer Owned Services

- **Engage** the customer to assist in identifying service materials
  - Self-reporting of point of entry
  - Proof of previous replacements
- The easier it is for customers to provide information the more likely they are to respond
- Customer engagement **early** and **often** leads to successful LSR programs



Summary

Lessons Learned

1. Apply 1 to 2 year buffer to lead ban dates
2. Use both tap and construction year
3. Know your submittal requirements

Data Gaps

4. Record internal material when conducting meter change-outs
5. Encourage customer to provide internal material

MOTT MACDONALD

Thank you

Jacobs Challenging today. Reinventing tomorrow.

T-Minus 12 Months: Lessons Learned and Information Gaps for Initial Lead Service Line Inventories

ASDWA Webinar

October 16, 2023

LSL Inventory: Key Themes & Lessons Learned

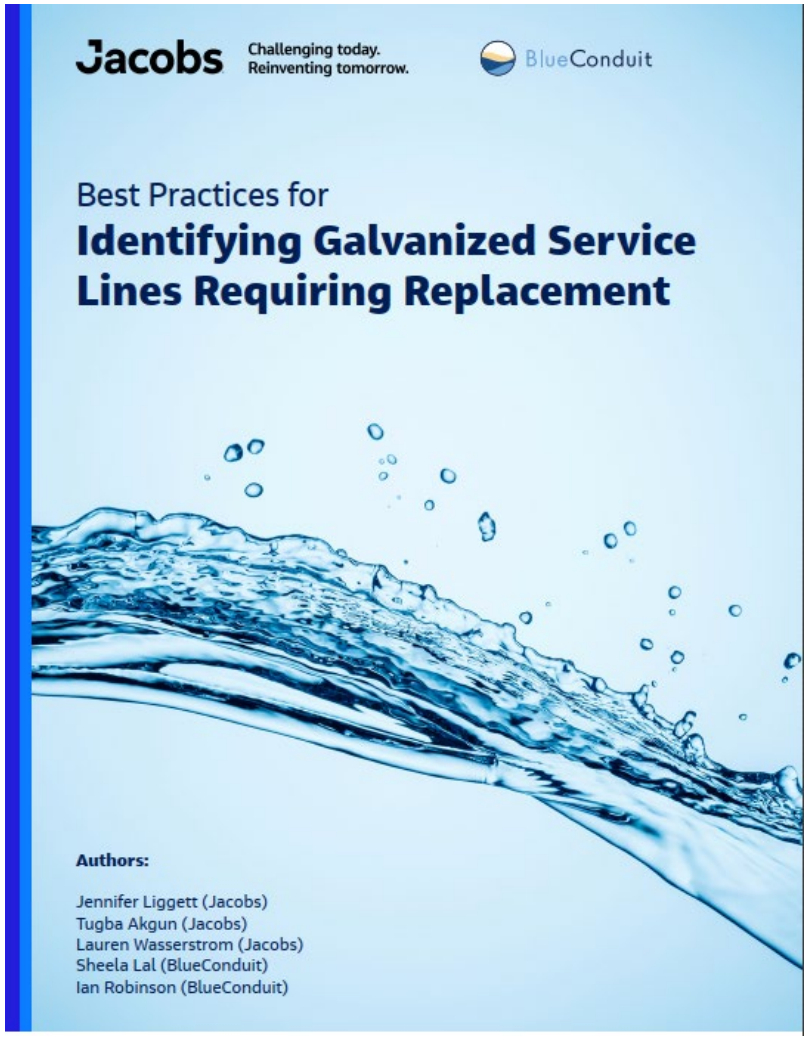
Understand Federal & State-Specific Requirements

Establish Plans Early On & Update/Refine Overtime

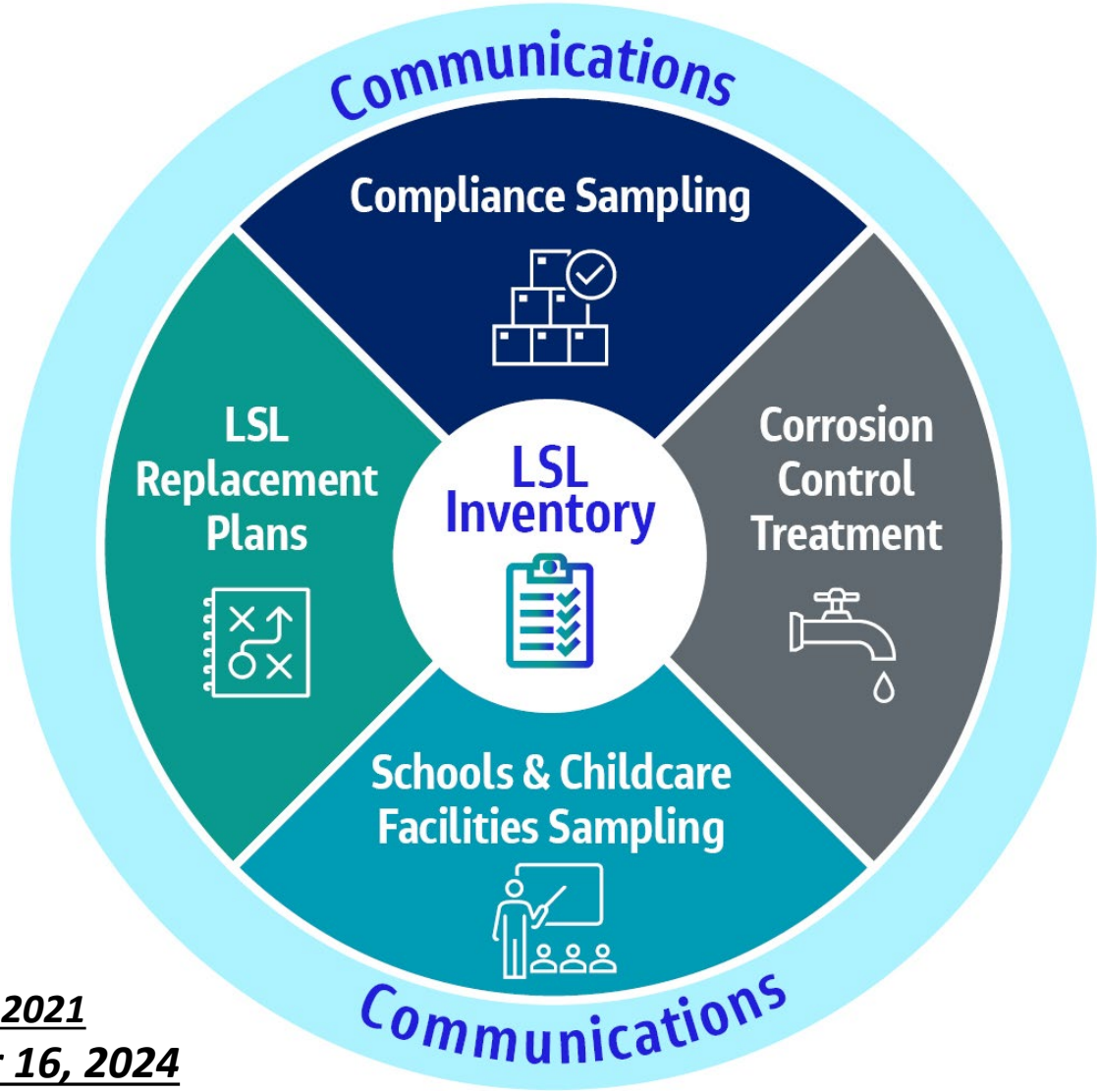
Proactive Public Outreach & Communication

LSL Inventory: Common Challenges & Information Gaps

- Incomplete or missing records, particularly on customer side
  - Proving lead was never upstream from galvanized
- Effective strategies to engage and educate the community
- Evolving regulatory landscape



Key Aspects of the LCRR: Beyond LSL Inventory



Effective Date: ***December 16, 2021***

Compliance Date: ***October 16, 2024***

**Lead and Copper Rule Improvements (LCRI) will be promulgated by October 16, 2024, and may impact requirements of the LCRR, including compliance dates and other key aspects of the rule, excluding the initial LSL Inventory requirements.*

Thank You

Lauren Wasserstrom

National Practice Leader for Lead and Copper Rule Compliance

lauren.wasserstrom@jacobs.com

Jacobs

Challenging today.
Reinventing tomorrow.

Hazen & Sawyer

Becki Rosenfeldt and
Rusty Nigro

Hazen

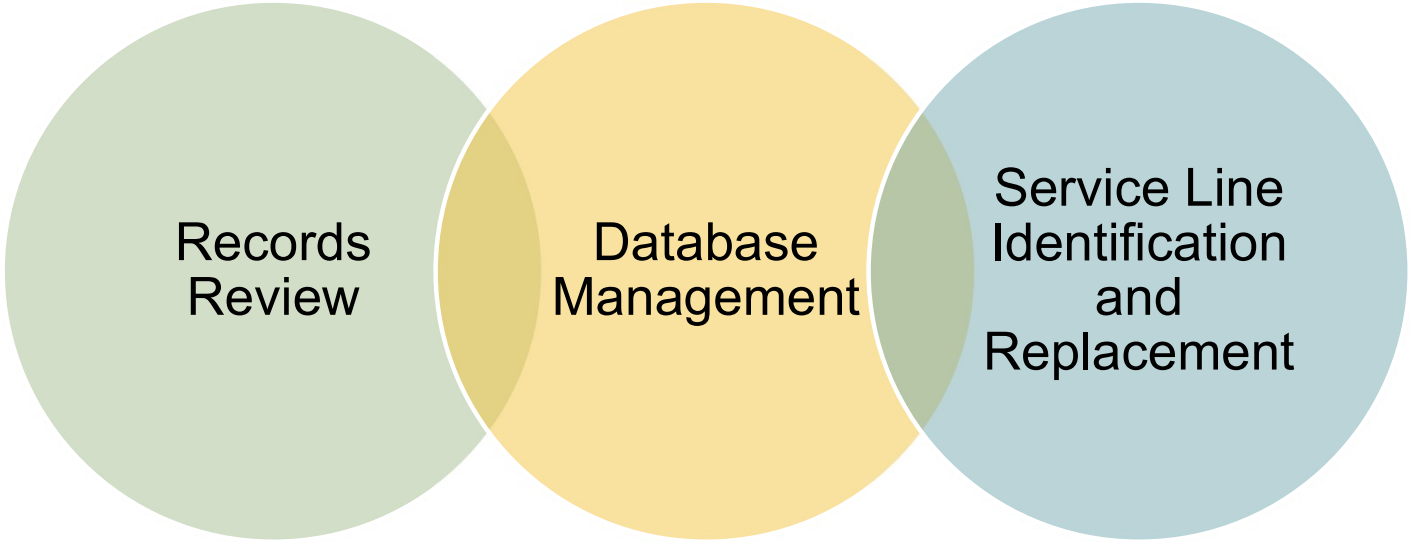
Hazen

ASWDA Monthly LSLI/LSLR Webinar Series

LSLI - T-Minus 12 Months:
Lessons Learned and Information Gaps for Initial Lead Service Line Inventories

October 16, 2023

Lessons Learned



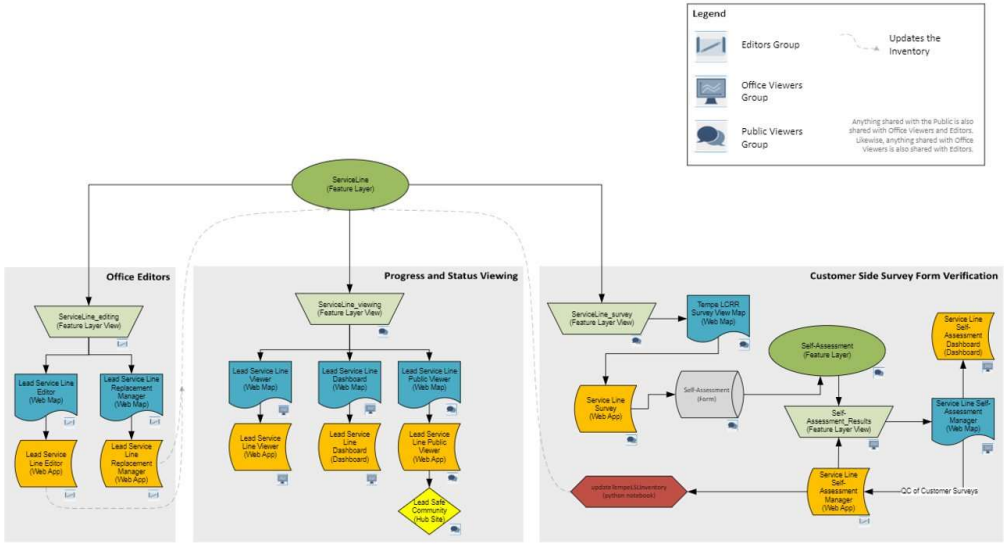
Records Review

- Complete a **thorough records review** (possibly establish multiple eras where lead was banned).

Municipality	LSL Likelihood Eras							
	1895- 1925	1925-1931	1932-1943	1944-1949	1950-1956	1957-1975	1976-1988	1988-2021
Coral Gables	Allowed*	LSL Not Allowed	LSL Not Allowed*	LSL Not Allowed	Allowed	Allowed	LSL Not Allowed	LSL Not Allowed
Miami	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Miami Beach	LSL Not Allowed*	LSL Not Allowed	LSL Not Allowed*	LSL Not Allowed	LSL Not Allowed	Allowed	LSL Not Allowed	LSL Not Allowed
Miami Shores	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Hialeah	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Florida City	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Biscayne Park	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
El Portal	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Golden Beach	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Pinecrest	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Indian Creek	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Medley	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
North Bay Village	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Key Biscayne	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Sweetwater	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Virginia Gardens	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Hialeah Gardens	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Aventura	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Islandia	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Unincorporated	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Sunny Isles Beach	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Miami Lakes	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Palmetto Bay	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Miami Gardens	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Doral	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed
Cutler Bay	Allowed*	Allowed*	Allowed*	Allowed*	Allowed*	Allowed	LSL Not Allowed	LSL Not Allowed

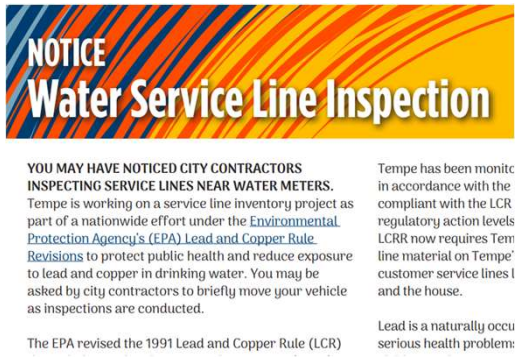
Database Management Plan

- **Create a Data Management Plan-**
  - Establishes a roadmap for managing the inventory database
  - Sets schema prior to launching inventory
  - Streamlines population of Inventory Template
  - Reduces time needed to review data and populate the service line inventory
  - Build a data dictionary



Service Line Identification and Replacement

- High lead likelihood or disadvantaged areas may present challenges requiring an alternate approach.
  - Language Barriers (tailored communication)
  - Crime
- Material Survey: photo is valuable in QC process
  - Photo quality is important for QC
  - Need to have clear messaging on how they need to be taken and what information is trying to be obtained.
- Cases where bylaws and ordinances need to amended to gain access to private property
- Providing funding to private homeowners.
- Machine Learning is not always the answer.
- Not all pitcher filters are created equal.


NOTICE
Water Service Line Inspection

YOU MAY HAVE NOTICED CITY CONTRACTORS INSPECTING SERVICE LINES NEAR WATER METERS. Tempe is working on a service line inventory project as part of a nationwide effort under the Environmental Protection Agency's (EPA) Lead and Copper Rule Revisions to protect public health and reduce exposure to lead and copper in drinking water. You may be asked by city contractors to briefly move your vehicle as inspections are conducted.

The EPA revised the 1991 Lead and Copper Rule (LCR)

Tempe has been monitc
in accordance with the
compliant with the LCR
regulatory action levels
LCRR now requires Tem
line material on Tempe'
customer service lines l
and the house.

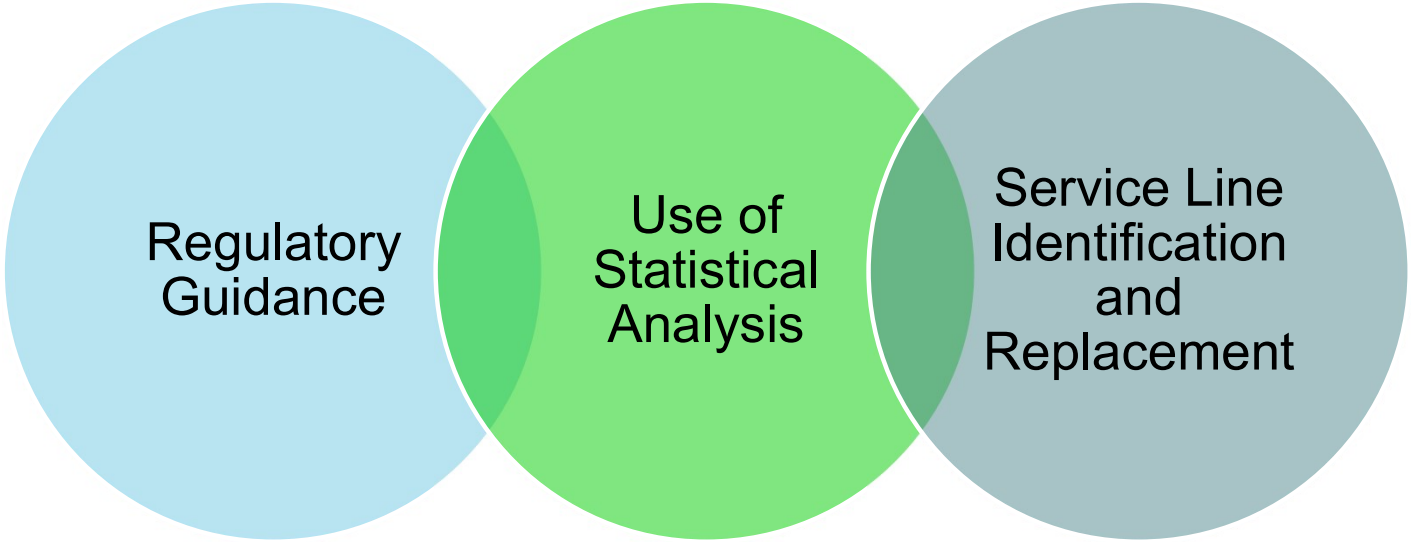
Lead is a naturally occu
serious health problem


AVISO
Inspección de la Línea de Servicio de Agua

ES POSIBLE QUE HAYA NOTADO CONTRATISTAS DE LA CIUDAD INSPECCIONANDO LAS LÍNEAS DE SERVICIO CERCA DE LOS MEDIDORES DE AGUA. Tempe está trabajando en un proyecto de inventario de líneas de servicio, como parte de un esfuerzo a nivel nacional bajo las Revisiones de la Regla de Plomo y Cobre de la Agencia de Protección Ambiental (EPA), para proteger la salud pública y reducir la exposición al plomo y cobre en el agua potable. Es posible que los contratistas de la ciudad le pidan que mueva brevemente su vehículo mientras se realizan las inspecciones.

La EPA modifico la Regla de Plomo y C
a través de las Revisiones de la Regla
(LCRR) para proteger la salud pública
la exposición al plomo y cobre en el a
ha estado monitoreando el plomo y el
de acuerdo con la LCR desde 1992, ha
y no ha excedido los niveles regulator
plomo ni el cobre. La LCRR requiere q
material de la línea de servicio de agu
de los medidores de agua, y las líneas
(ubicadas entre el medidor de agua y

Identified Gaps



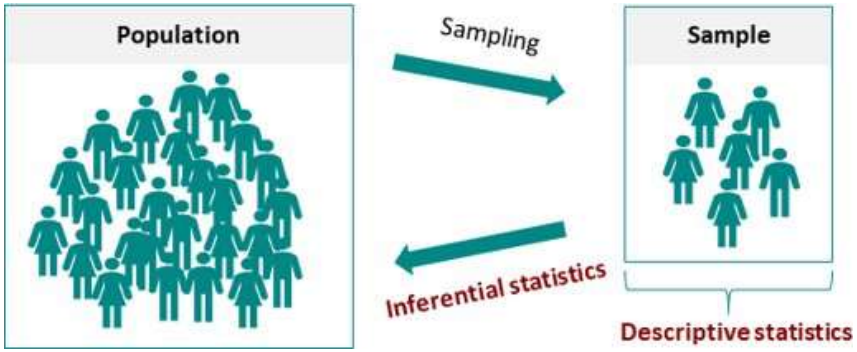
Regulatory Guidance

- State Regulatory Guidance:
  - Inconsistences
  - Understanding approaches to compliance
  - Additional training/understanding of options is required prior to making decisions.
- More Guidance is Needed on:
  - Use of statistical analysis
  - Identification and replacement
- Lead and Copper Rule Improvements
  - The unknown is a challenge for utilities and consultants

State	Formal Guidance Available	State-Specific LSL Inventory Template Available	LSL Inventory Template Required	Machine Learning or Statistical Analysis Accepted	Misc. Updates:
Arizona	X (corrosion control)	ADEQ doesn't want a detailed inventory		X (needs approval)	
California	X	X		X (needs approval)	No additional ID required after modeling
Colorado	comment period done end of July	X		X (needs approval)	considering sequential sampling for designation of "Non-Lead"
Connecticut	waiting for EPA	X		X (needs approval)	30-day notification following posting of LSL inventory (not necessarily oct 2024)
Florida	No- but coming soon	No- Using EPA	X	Not Approved for Material Verification	FDEP is considering sequential sampling for designation of "Non-Lead" Requiring all GRR and LSLs to be replaced (no timeline yet)
Georgia	x	x	X	X (needs approval)	120Water is developing a software for GA-EPD for Templat Submission. Minimum # of verification points= 1 on each side.
Maryland	X	X	X	X (needs approval)	interpolation accepted, but ML needs approval- materials c be designated as non-lead Requiring 18"pothole on BOTH sides of meter box
Massachussetts		X	X	X (needs approval)	
Michigan	X- New LSLR guidance available and Inventory Guidance	X	X	X	Complete inventory due Jan. 1, 2025.
New Hampshire		X	X	X (needs approval)	GRR- Galvanize Line Downstream of Any Lead (LSL or Lead Connector)
New Jersey	X	X	X	X (needs approval)	
New Mexico	X				
North Carolina		X	X	?	
Oregon	X	X	X	X (interpolation accepted)	Only 95% confidence required for interpolation- materials designated as non-lead
Virginia	X (short)	in the works	X (EPA may be accepted) X (EPA template	?	Requiring the Use of 1988 for Non-Lead Designation

Use of Machine Learning and Statistical Analysis

- Appropriate use of Machine Learning
  - Training on appropriate use of statistical modeling is needed
  - Use of Machine Learning generally requires 5% positive (LSL/ GRR) in population.
  - Significant field verification is usually needed to develop an accurate model with a high recall rate.
- Alternative Statistical Analysis- needs to be better understood (Interpolation, Extrapolation, Inferential)
  - Approach varies widely.
  - When it is appropriate to apply statistical analysis?
  - Requirements for both confidence level (CL) and margin of error (MoE) need to be established
  - Population size makes a big difference. What is the maximum allowable population size for statistical analysis?



Service Line Identification and Replacement

- Utilities need guidance on options for obtaining private property access.
- Additional guidance is needed on how utilities can get private property owners to replace service lines.
  - **Federal/ State Mandate?**
- Identification and replacement at homes with tenants and short-term rentals (Airbnbs) can present challenges. More guidance is needed.
- Additional resources may be needed for LCRI
  - **Funding/ mechanisms/ programs**
- More guidance and utility-specific testing is needed on appropriate use and effectiveness of point of use filters.

Thank you

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Hazen

Lessons Learned and Information Gaps for Initial LSL Inventories

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206-826-4735

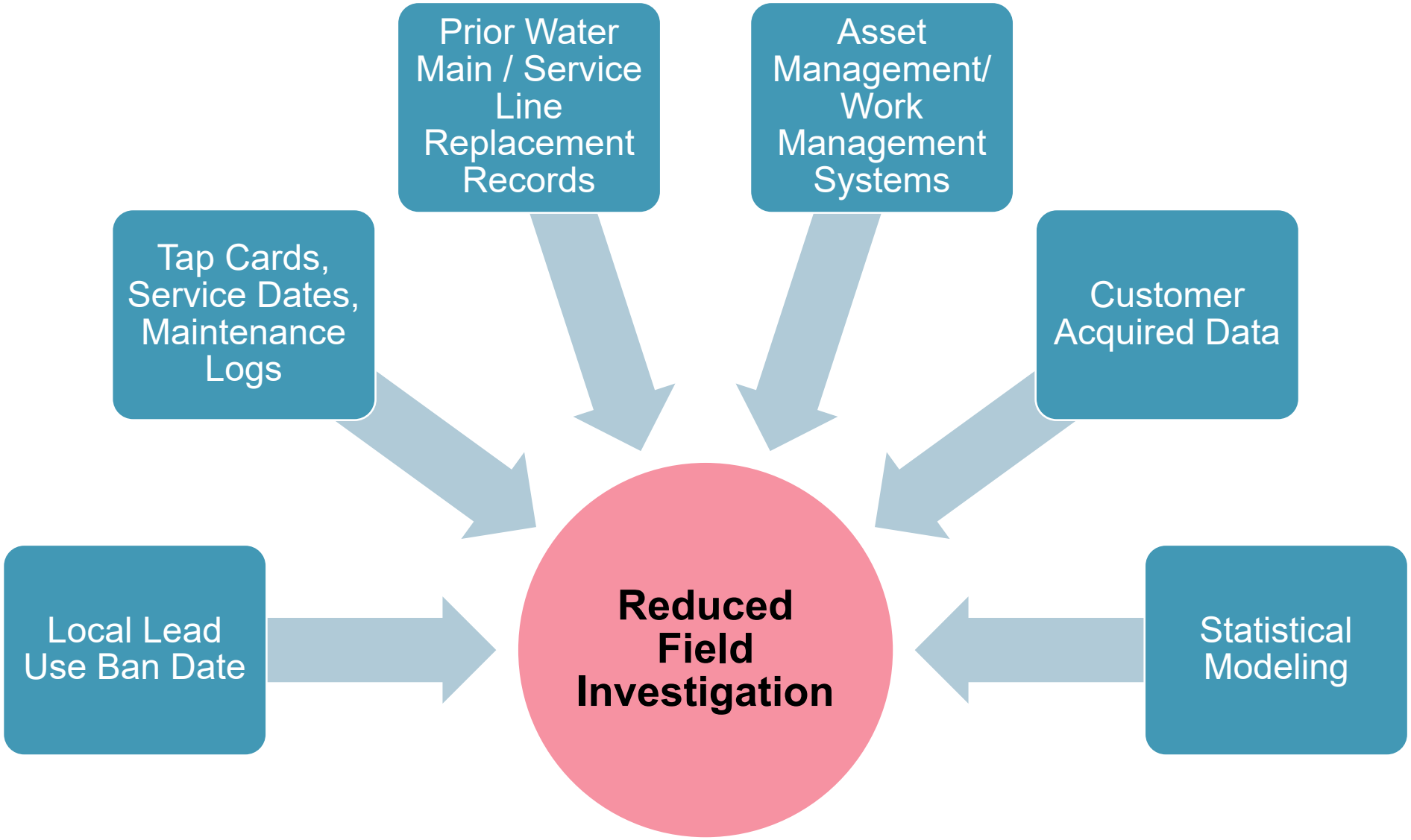
October 16, 2023
ASDWA Webinar

Inventory Preparation

- Carefully review your primacy agency's inventory template – may deviate from EPA template.
- Plan your collection and recording strategy to gather information in one pass.
- Avoid going back for additional data gathering or rework.
- "Living" document submitted annually – make it easy to update

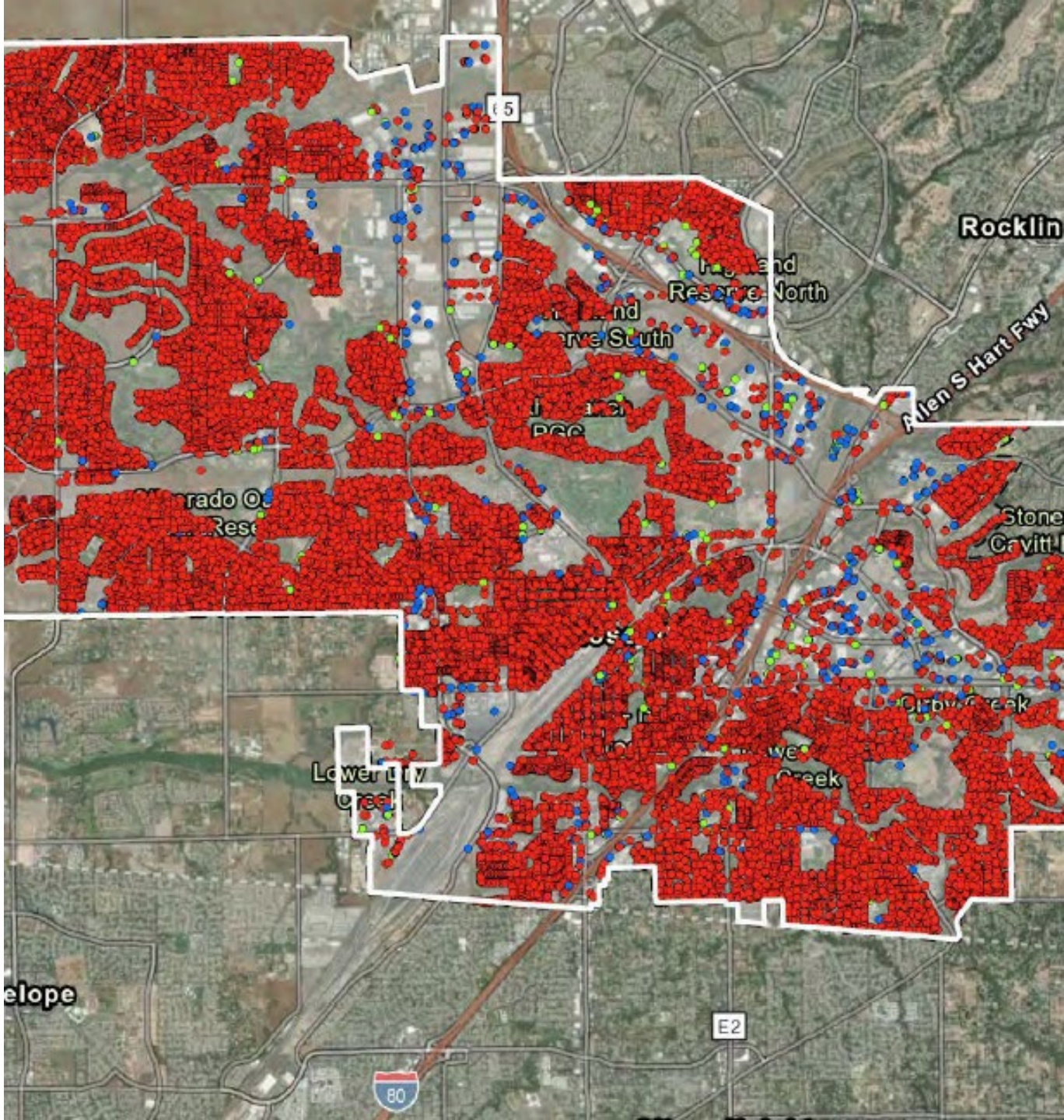
Location Information					System-Owned Portion									
Unique Service Line ID	Location Identifier		Sensitive Population? (Yes/No)	Disadvantaged Neighborhood? (Yes/No)	System-Owned Portion Service Line Material Classification	If Non-Lead in Column G, Was Material Ever Previously Lead?	Service Line Installation Date	Service Line Size	Basis of Material Classification	Was the Service Line Material Field Verified?	If "Yes" Service Line Material Was Field Verified:		Notes	Customer-Owned Portion Service Line Material Classification
	Street Address	Other Location Identifier									Describe the Field Verification Method	Enter the Date of Field Verification		
A Unique ID is recommended for each service line.	Water systems must track addresses of all service lines in their internal inventory. For the publicly accessible version, location identifiers are required for lead and galvanized requiring replacement. If the system does not use addresses for their location identifier, other options could include GPS coordinates, landmark, intersection, block, or other details to specify service line locations.		Select Yes if sensitive subpopulation, e.g., day care, school, multifamily home. If Yes-Other, describe in the Notes field.	Does location meet state affordability guidelines or other measures?	Dropdown list includes recommended subclassifications. If "Non-Lead Other", describe in Notes field	Select Yes, No, or Don't know. Important for determining if downstream/ customer-owned galvanized service line requires replacement	Date, year, or estimated date range when the service line was installed or replaced	Diameter in inches	Select option from drop down list. If "Other," describe in the Notes field	Select Yes or No	Select option from drop down list. If "Other," describe in the Notes field	Enter approximate date of field verification or date that the record was updated	Can use this field for documenting additional relevant information, including when classification changes.	Dropdown list includes recommended subclassifications. If non-le other, describe in Notes fie
Example 1	1234 Test St., City, State, Zip Code	Intersection of Test and Elm St.	No	No	Non-Lead - Plastic	Yes	1997	2	Installation date after lead ban	Yes	Visual inspection at the meter pit	5/1/2019		Non-Lead - Plastic
Example 2	4321 Test St., City, State, Zip Code	Intersection of Test and Main St.	No	No	Non-Lead - Plastic	No	Fall 1980	2	Installation record (e.g., tap card)	Yes	Mechanical excavation at one location	9/10/2020		Galvanized
Example 3	16 Capital St., City, State, Zip Code		No	No	Non-Lead - Copper	Don't know	1985	1 1/2	Service line repair or replacement record	No				Galvanized
Example 4	1 Water Avenue, City, State, Zip Code		No	No	Unknown - Likely Lead		1940's	2		No				Galvanized
Example 5	67 Children's Place, City, State, Zip Code		Yes - Day Care	No	Unknown - Material Unknown		1950-1960	3/4		No				Unknown - Material Unkno
Example 6	30 Price Street, City, State, Zip Code		No	No	Lead-lined galvanized		1955	2	Installation record (e.g., tap card)	Yes	CCTV investigation at curb stop - interna	8/8/2020		Lead-lined galvanized

Prioritize Low-Cost Methods to Reduce Field Investigations



GIS Software Integration

- Collected data typically has to go into a GIS model → except small/very small systems.
- Major mapping coordination.
- Does your GIS staff have the bandwidth and training to accomplish this?
- If not, set aside funds in 2024 to immediately hire and train staff, or hire consultants.



Communication Requirements for Unknown Services

- All customers with unknown service line materials must be notified of status within 30 days after each inventory submission.
- Some customers would be notified annually.
- Potential public relations “penalty” for submitting inventory with many unknowns.
- Be prepared for questions, especially from Realtors, HOAs, and activist/environmental groups.

CORONA | ENVIRONMENTAL CONSULTING

T-Minus 12 Months:

Lessons Learned and Information Gaps for Initial LSL Inventories

October 16, 2023

Chad Seidel, Ph.D., P.E.
Nathan MacAurthur
Brittany Gregory, P.Eng
Shonnie Cline

No records, or records are difficult to access

- Inventories require collaborations between utility and city departments that don't often interact
  - It is important to get the right people together from the start to ensure all valuable data is obtained and to determine how the data can be paired together

No records, or records are difficult to access

- Utilities, asset management, meter billing, GIS, etc. often have incomplete datasets with missing meter and service lines identifiers, addresses and parcels that can be difficult to pair and QC

Duplicated data requiring further QAQC:

FullAddr	CommonAddr	GISMeter_Year	GISMeterType	GISMeterSize	GISMeterPlan_G	ServiceLineID
3018 E LONGHORN DR	3018 LONGHORN	2012	Service Meter	0.75	1-0940	68846
3017 E LONGHORN DR	3017 LONGHORN	2012	Service Meter	0.75	1-0940	68846
3026 E LONGHORN DR	3026 LONGHORN	2012	Service Meter	0.75	1-0940	68847
3029 E LONGHORN DR	3029 LONGHORN	2012	Service Meter	0.75	1-0940	68847
4915 S LEISURE	4915 LEISURE	2014	Service Meter	1	1-0973	71133
4912 S LEISURE	4912 LEISURE	2014	Service Meter	1	1-0973	71133

Mismatched addresses for a given service line between data sources :

ServiceLineID	CommonAddr_L	CommonAddr_Meter	CommonAddr_MC	CommonAddr_G	FullAddr_L	FullAddr_Meter
122764	510 MONDEL	510 ACACIA	515 ACACIA	510 ACACIA	510 N MONDEL DR	510 N ACACIA DR
122764	510 MONDEL	510 ACACIA	1431 COMMERCE	510 ACACIA	510 N MONDEL DR	510 N ACACIA DR

Communication

- Many utilities do not have legal authority to access water service lines on private property
- Challenges in some community participation due to lack of trust in government and other factors
- Failure to communicate effectively within water system often results in breakdown in communication with customers and property owners

Regulatory Implementation Clarity

- Primacy agencies hold the keys to answer what will comprise accepted inventories
- Standardizing menu of acceptable approaches is needed across states
- e.g. Colorado Water Quality Control Division developed an initial service line inventory policy to ensure an accurate inventory that meets minimum requirements

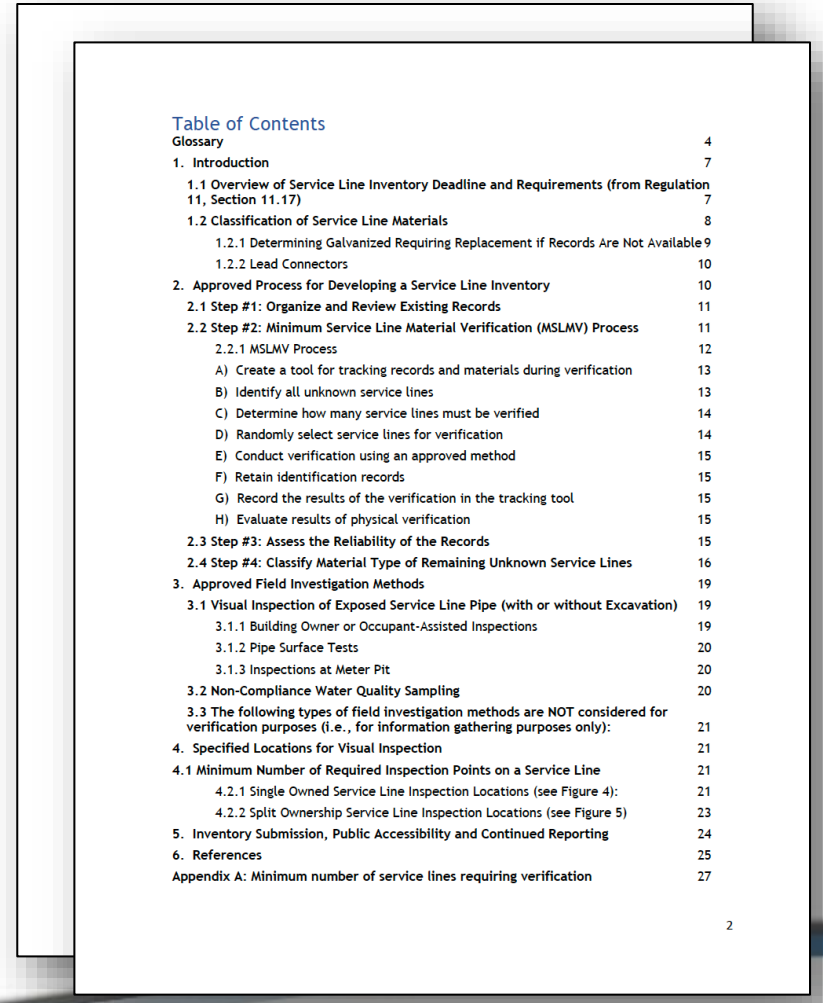
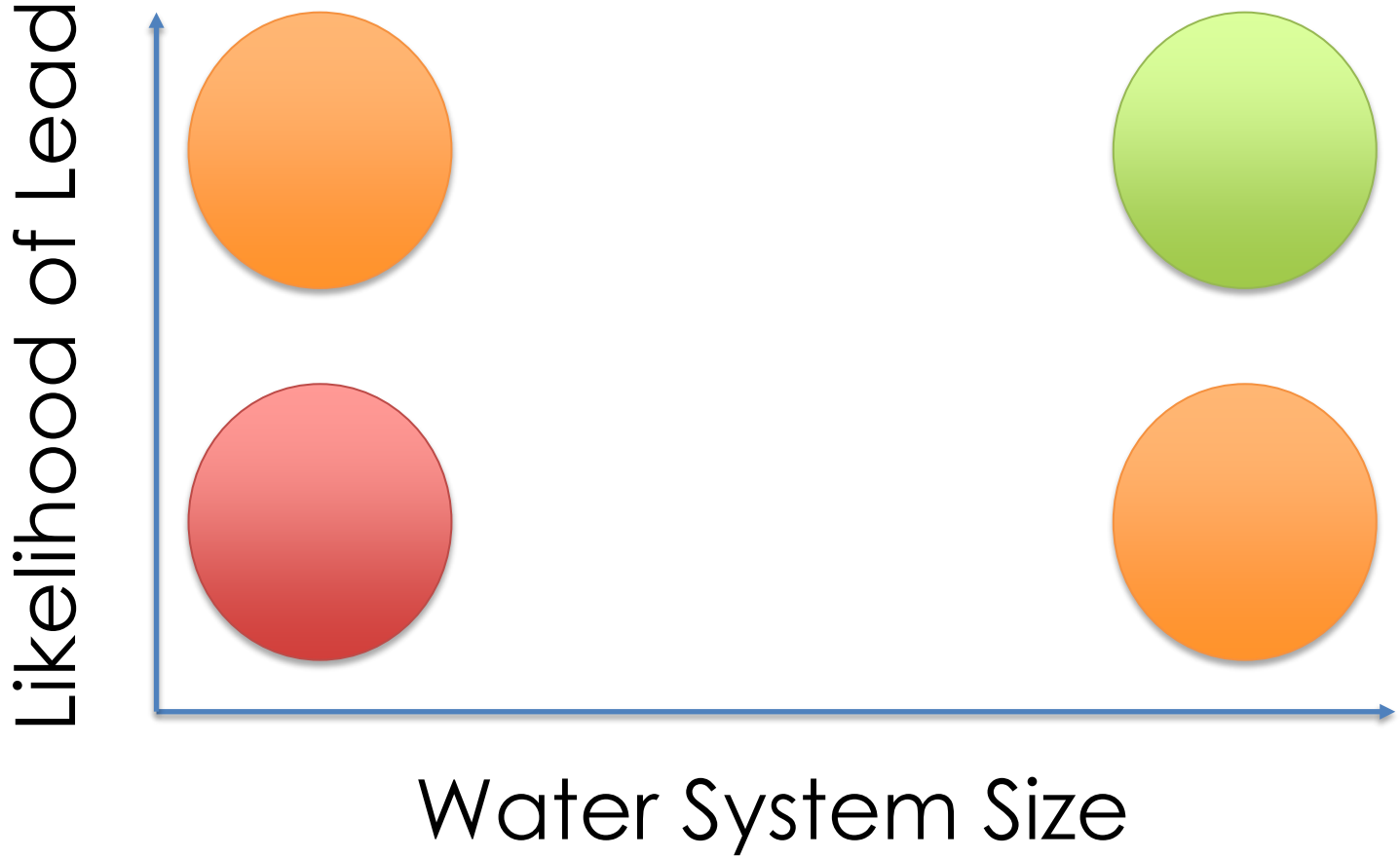


Table of Contents

2

https://cdphe.colorado.gov/lcr

Universe of LSL Inventories…



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Spooky Inventory Scenarios

How to Add These to the Inventory Spreadsheet

Sandra Kutzing, P.E.

October 16, 2023

Lessons Learned and Gaps

Lessons Learned

1. A 3D network of piping does not fit neatly in the state inventory templates
2. Inventories are dynamic and it will be a long time before they are “final” – Need a good data management system in place
3. Never overwrite data – keep sources in individual fields (i.e. record data, test pit inspections, customer provided information, etc.)

Gaps

1. Private side configuration knowledge
2. Additional guidance on handling galvanized piping on the private side
3. Greater acceptance of statistical analysis and machine learning is needed….and fast

Let’s use all available tools and focus funding where it provides the most benefit!

Getting the lead out – YES!

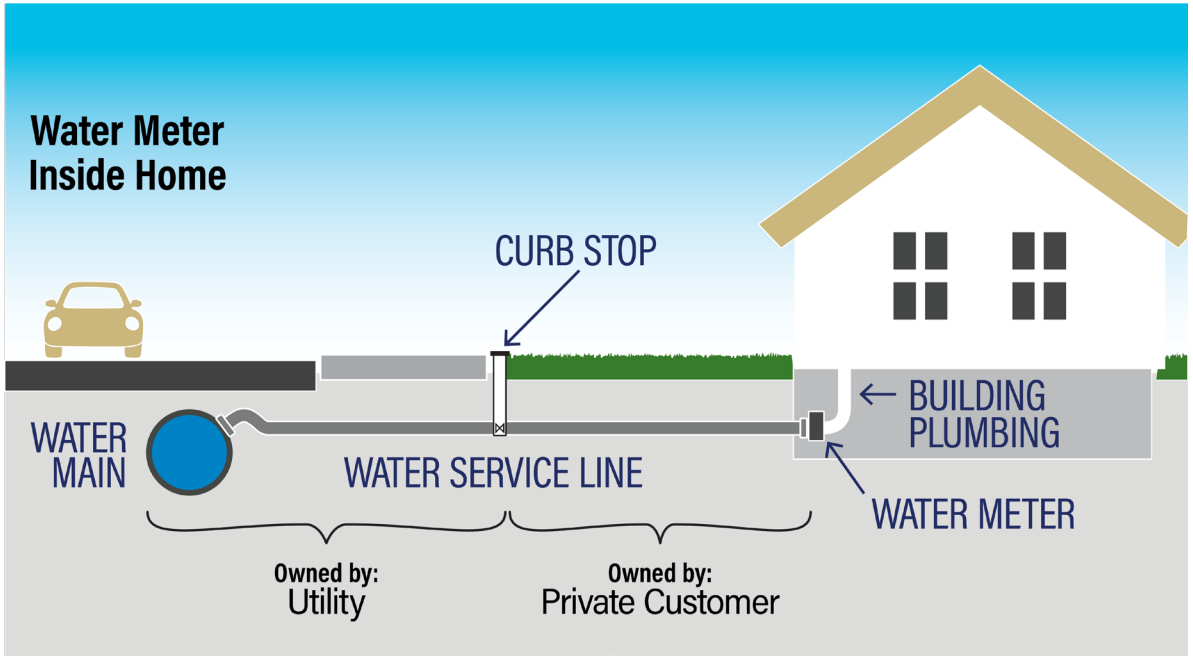
Test pitting every home where utilities have never seen lead in their system – NO!

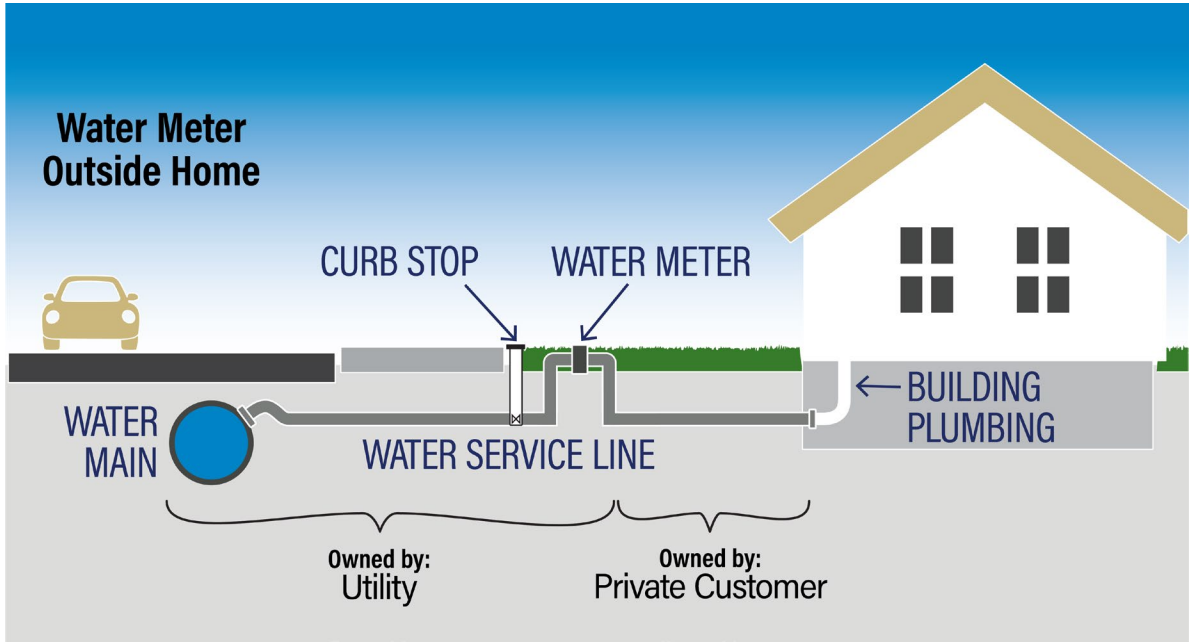
Inventory Scenarios

1. Public Main with Single Meter and Public/Private Service
2. Public Main with Multiple Facilities on a Parcel and Single Private Meter
3. TWO Public Services to Private Mains to Several Private Services (Assume Looped)
4. Public Main with Irrigation Downstream of Public Meter
5. Public Main with Individual Public Meters (single connection at main)
6. Private Main with Master Public Meter and Multiple Facilities per Parcel
7. Two Public to Three Private Service lines
8. Service Lines that Do Not Enter a Building
9. Military Base Example

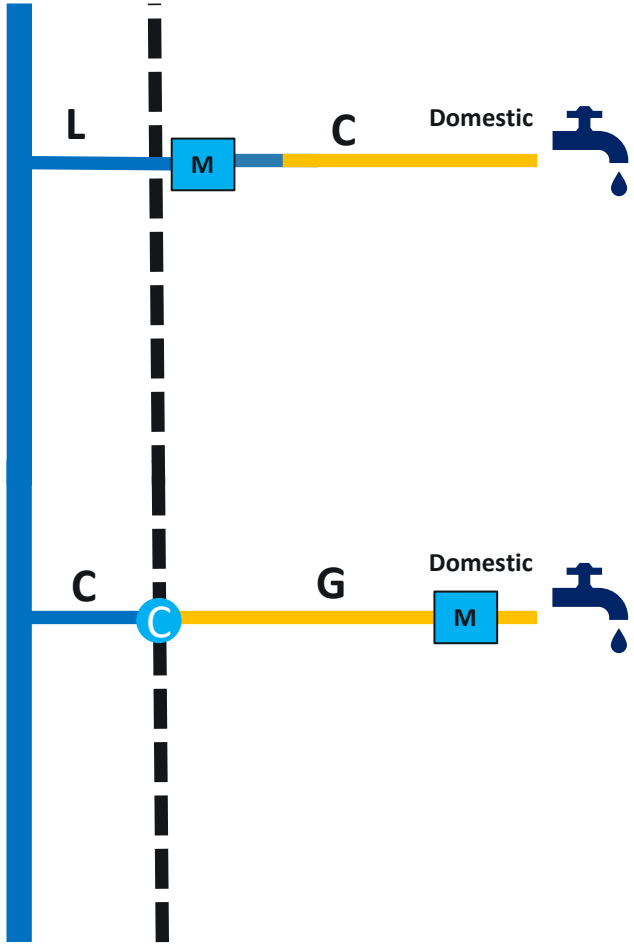
Service Line Definition

"…connects the water main to the building inlet"



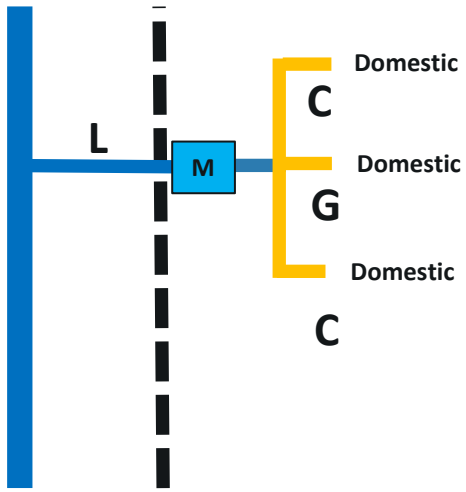


1. Public Main with Single Meter and Public/Private Service (Ideal Scenario!)



Address	ID	SL Overall	Public Material	Customer Material	Building Type
1 Main St	123	Lead	L	C	Single Fam
3 Main St	124	Galv	C	G	Commercial

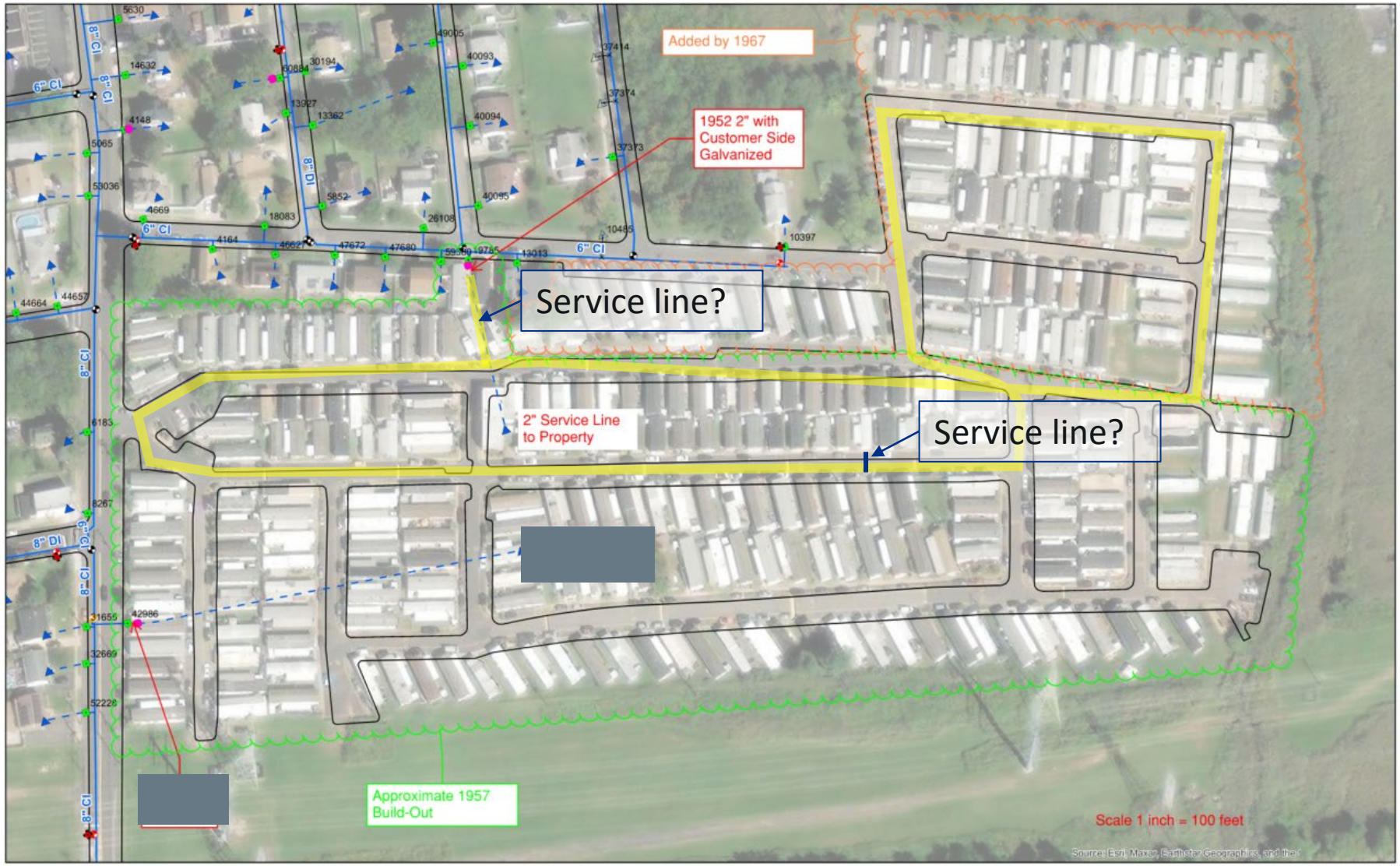
2. Public Main with Multiple Facilities on a Parcel and Single Private Meter



Proposed new fields to track common connections

Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type
1 Main St, unit A	123-1	Lead	L	123-A	C	123-B1	Mobile Home
1 Main St, unit B	123-2	Lead	L	123-A	G	123-B2	Mobile Home
1 Main St, unit C	123-3	Lead	L	123-A	C	123-B3	Mobile Home

2. Public Main with Multiple Facilities on a Parcel and Single Private Meter (One Public SL)



A service line "…connects the water main to the building inlet"

2. Public Main with Multiple Facilities on a Parcel and Single Private Meter (One Public SL) – Recommended Approach

2” galvanized is an interior main – private services are from galvanized main to inlet of house

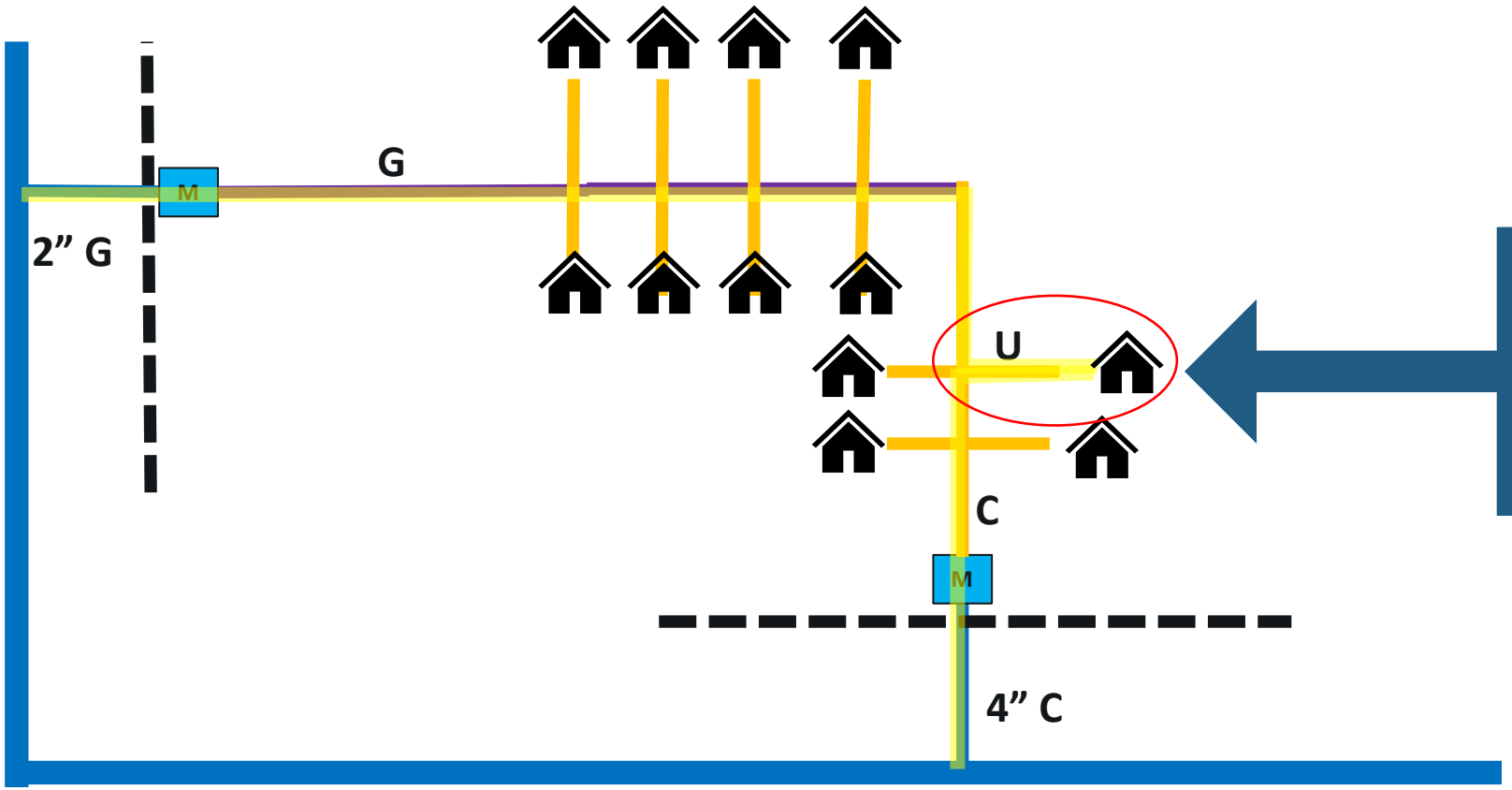
Public side = N/A or main service?

Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type
1 Main St, unit A	123-1	UX	NA		UX	123-B1	Mobile Home
1 Main St, unit B	123-2	UX	NA		UX	123-B2	Mobile Home
1 Main St, unit C	123-3	Lead	NA		L	123-B3	Mobile Home
etc							

3. TWO Public Services to Private Mains to Several Private Services (Assume Looped)

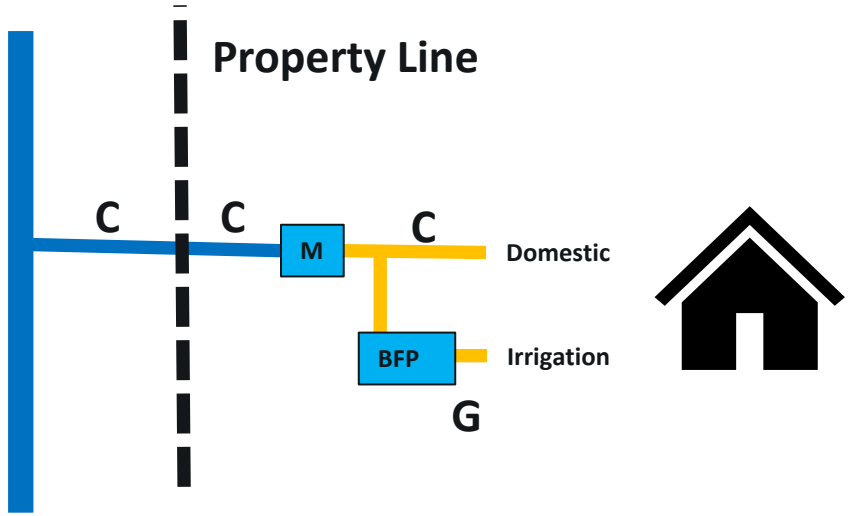
3. TWO Public Services to Private Mains to Several Private Services (Assume Looped) – Recommended Approach

Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type
1 Main St, unit B	123-2	UX	NA		UX	123-B2	Mobile Home



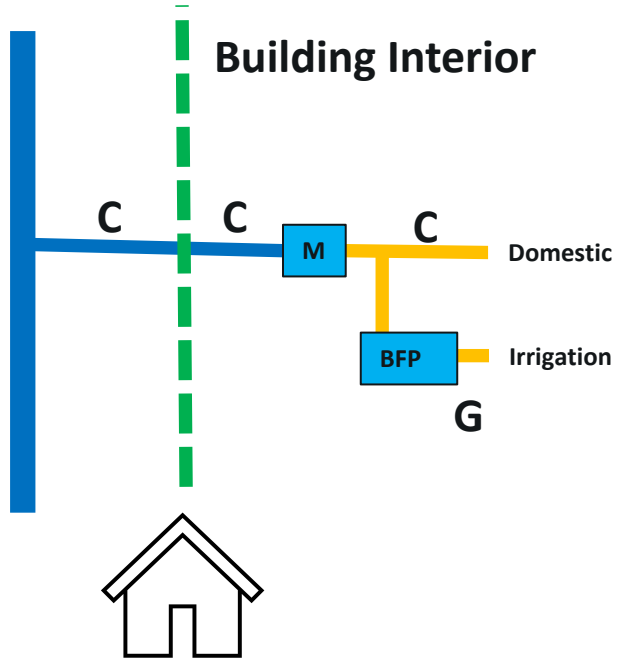
Don’t include private side mains – only private service lines with no public service line (or can show common public service)

4. Public Main with Irrigation Downstream of Public Meter



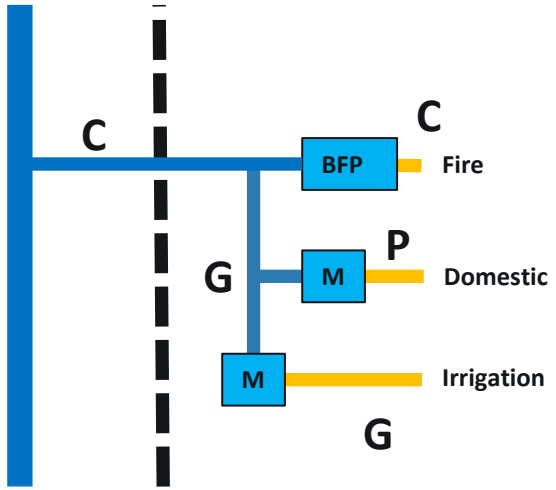
Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type
1 Main St	123-1	NL	C	123-A	C	123-B1	School
1 Main St	123-2	Galv	C	123-A	G	123-B2	School

4. Public Main with Irrigation Downstream of Public Meter



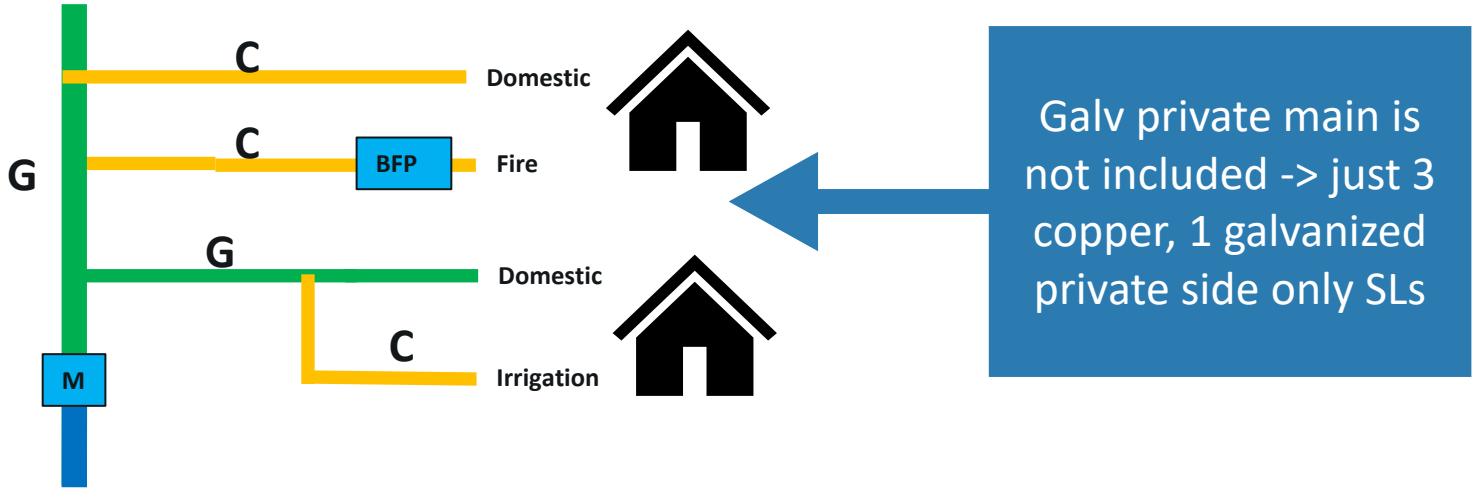
Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type
1 Main St	123	NL	C	123-A	C	123-B	School

5. Public Main with Individual Public Meters (single connection at main)



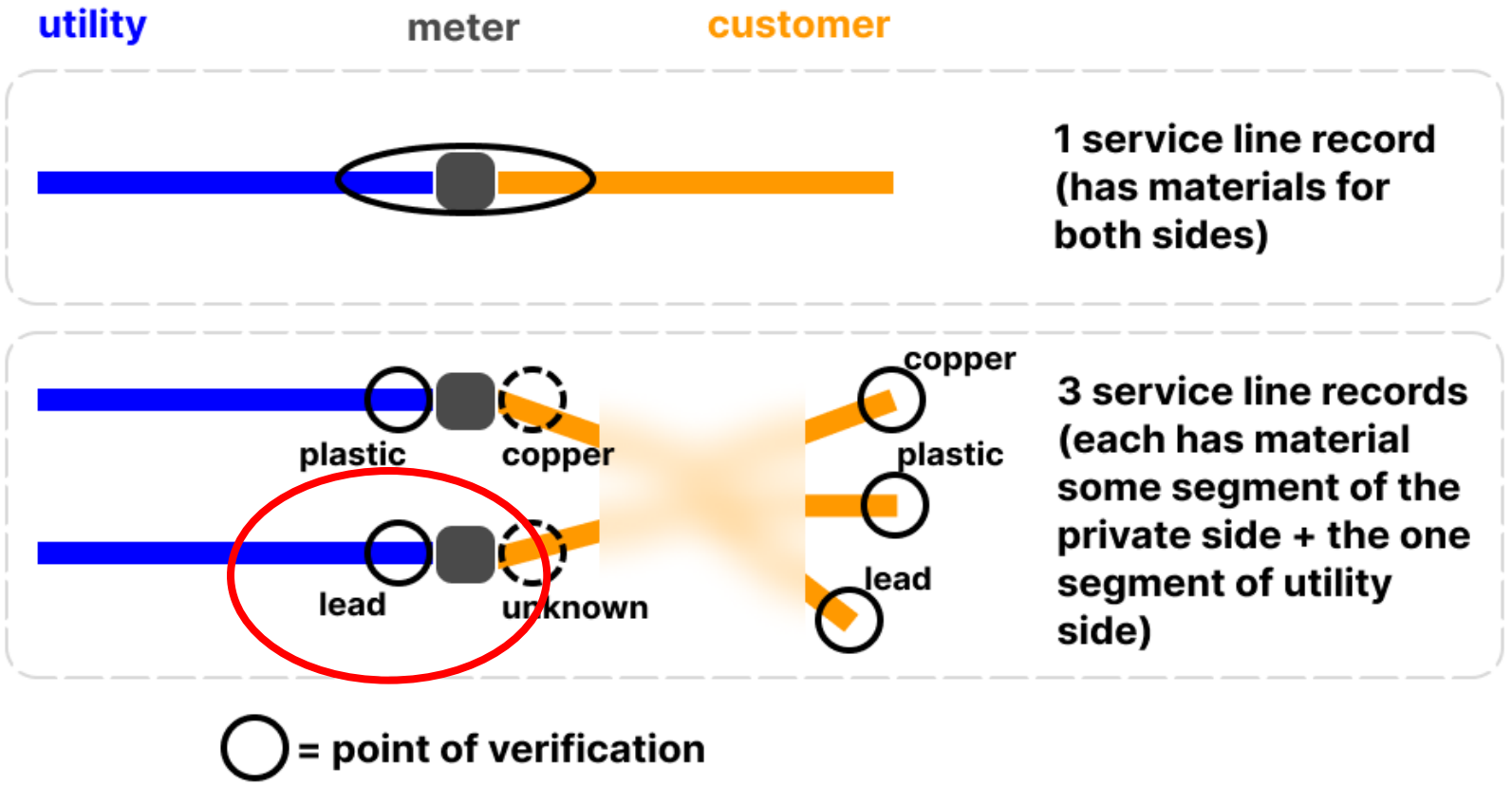
Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type
1 Main St	123-1	NL	C	123-A	C	123-B1	Commercial
1 Main St	123-2	Galv	G	123-A	P	123-B2	Commercial
1 Main St	123-3	Galv	G	123-A	G	123-B3	Commercial

6. Private Main with Master Public Meter and Multiple Facilities per Parcel – Recommended Approach



Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type
1 Main St	123-1	NL			C	123-B1	Campus
1 Main St	123-2	NL			C	123-B2	Campus
1 Main St	123-3	Galv			G	123-B3	Campus
1 Main St	123-4	NL			C	123-B4	Campus

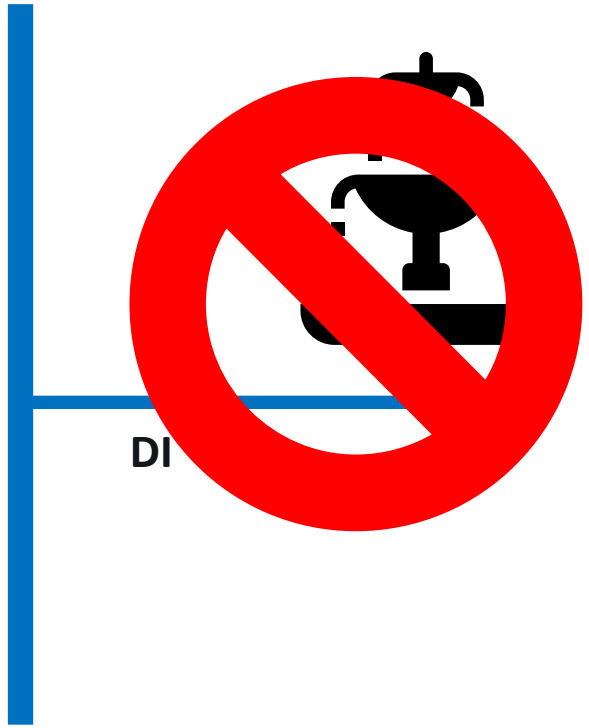
7. Two Public to Three Private Service Lines



Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type
1 Main St	123-1	NL	C	123-A	C	123-B1	Residential
1 Main St	123-2	Lead	L	123-B	P	123-B2	Residential
1 Main St	123-3	Lead	L	123-B	L	123-B3	Residential

8. Service Lines that Do Not Enter a Building

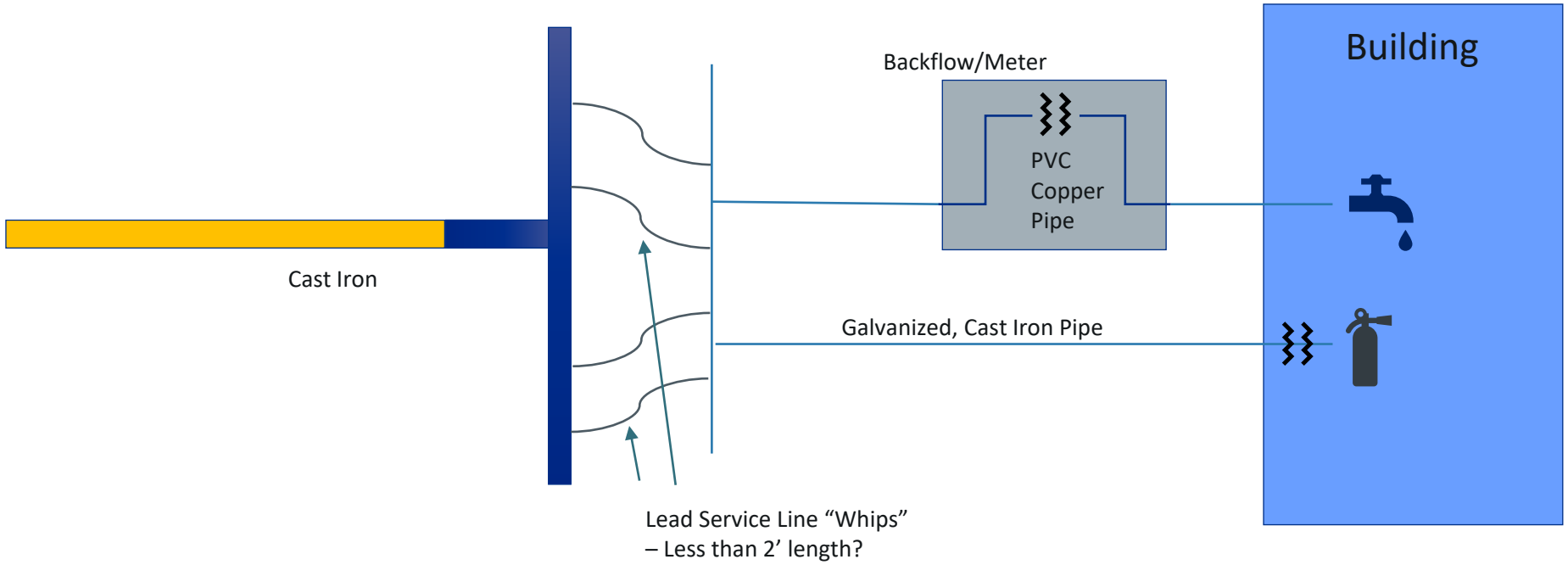
Does not meet the definition of a service line – no building inlet



- Drinking water fountains
- Pools
- Irrigation lines

Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type

9. Military Base Example



Address	ID	SL Overall	Public Material	Public Side ID	Customer Material	Customer Side ID	Building Type	Gooseneck
1 Liberty Ave	123-1		NA		NL	123-B1	Military base bldg.	Yes
1 Liberty Ave	123-2		NA		G (worst case)	123-B2	Military base bldg.	Yes

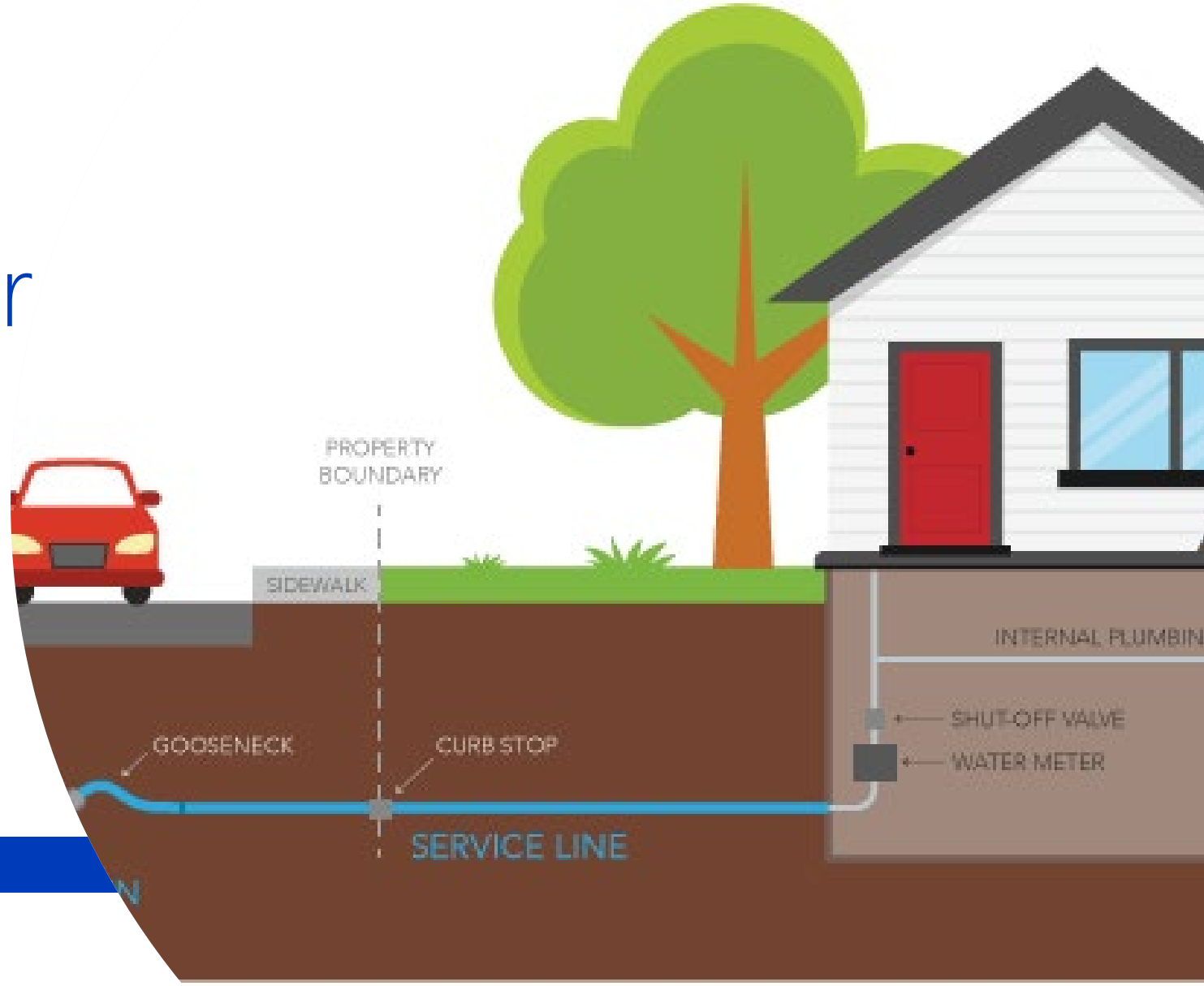
Summary

- When in doubt…remember the definition of a service line – from main to inlet of building
- Recommendations presented herein – confirm with your primacy agency
- If desire for accurate count of actual pipes on each side (public and private), track with unique IDs per side
- Add notes to inventory to make things clear to regulators
- Send a request to your regulators to add fields in the spreadsheet or add selections to dropdowns (i.e. private campus, private community, etc.)
- …but first we need to GET the data on the private side…

ASDWA Webinar

LSL Inventory: Lessons Learned and Data Gaps for 2024 Compliance

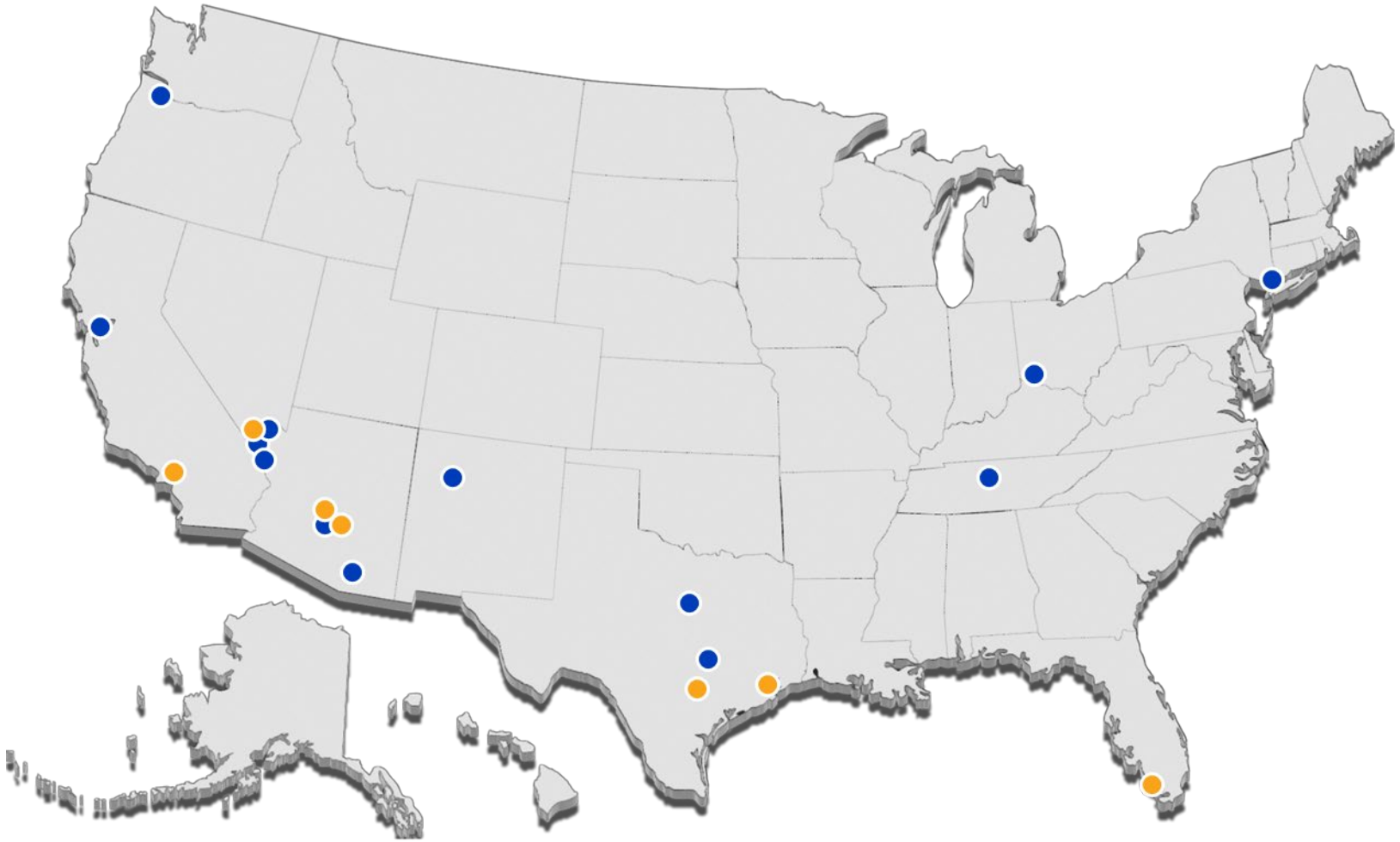
Caroline Russell, PhD, PE, BCEE



October 16, 2023

carollo 90 YEARS

Carollo Is Helping a Diverse Group of Water Systems Develop their LSL Inventory



- Carollo-lead LSL Inventory
- Surveyed Utilities

Variability in State Implementation Impacts LSL Inventory Development Approach

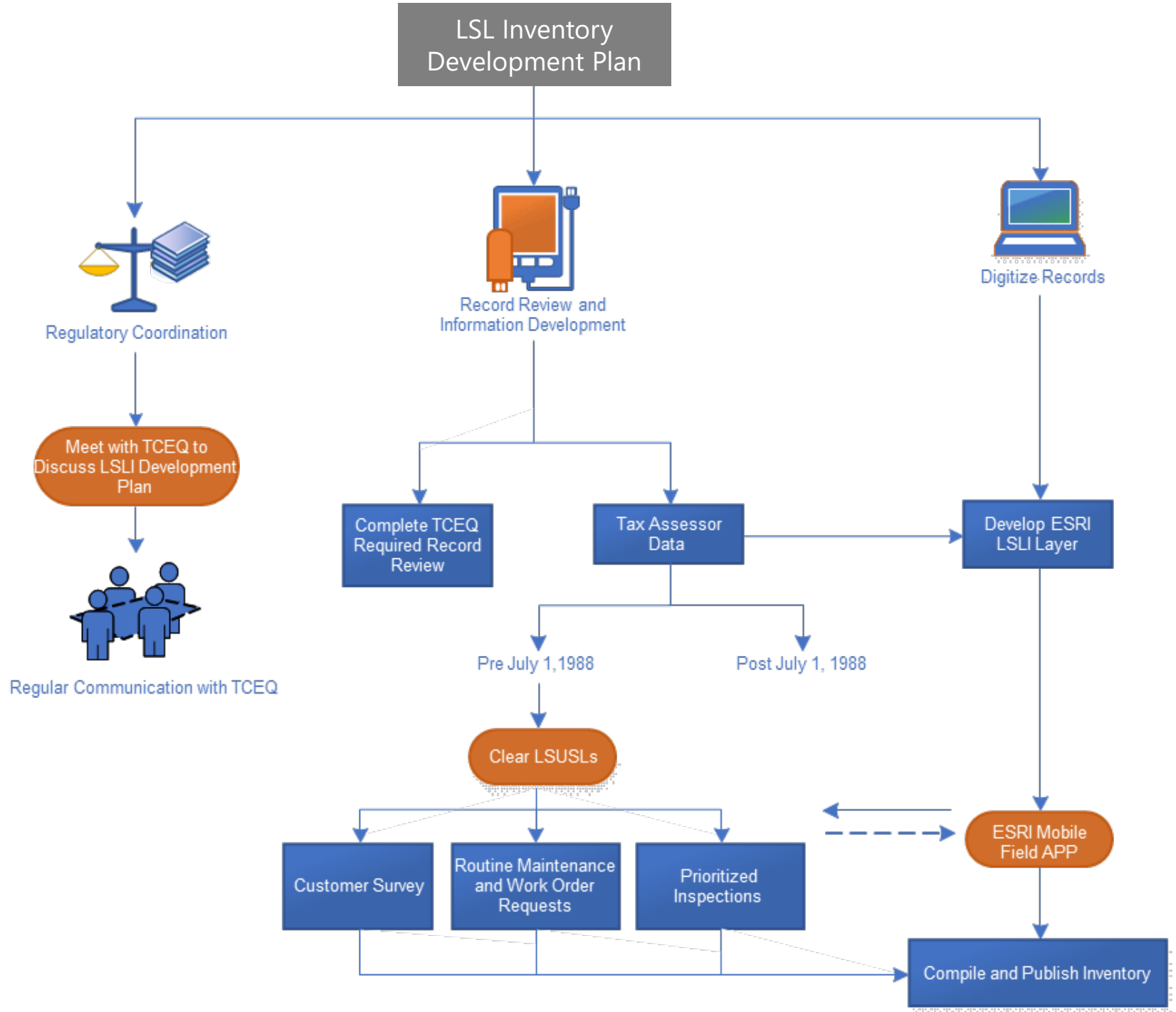
Property	AZ	CA	FL[(1)]	NV	TX
Effective Date of Lead Ban	12/31/1987	1/1/1986	1/18/1989	9/30/1989	7/1/1988
Pipe Diameter Criteria for Non-Lead	---	≥ 4 inches	---	> 2	---
Methods Allowed for SL Material Identification:					
Scratch/magnet & swab testing	●	●			
Meter box inspection	●	●			
CCTV	●	●			
Excavation	●	●	●	●	●
Sequential sampling		(●)	●	(●)	
Predictive modeling (ML)		(●)	●	(●)	
Geospatial/interpolation	●	(●)	●	(●)	
Electrical resistance		(●)	●	(●)	

Approved on a case-by-case basis. Emerging methods require pilot testing

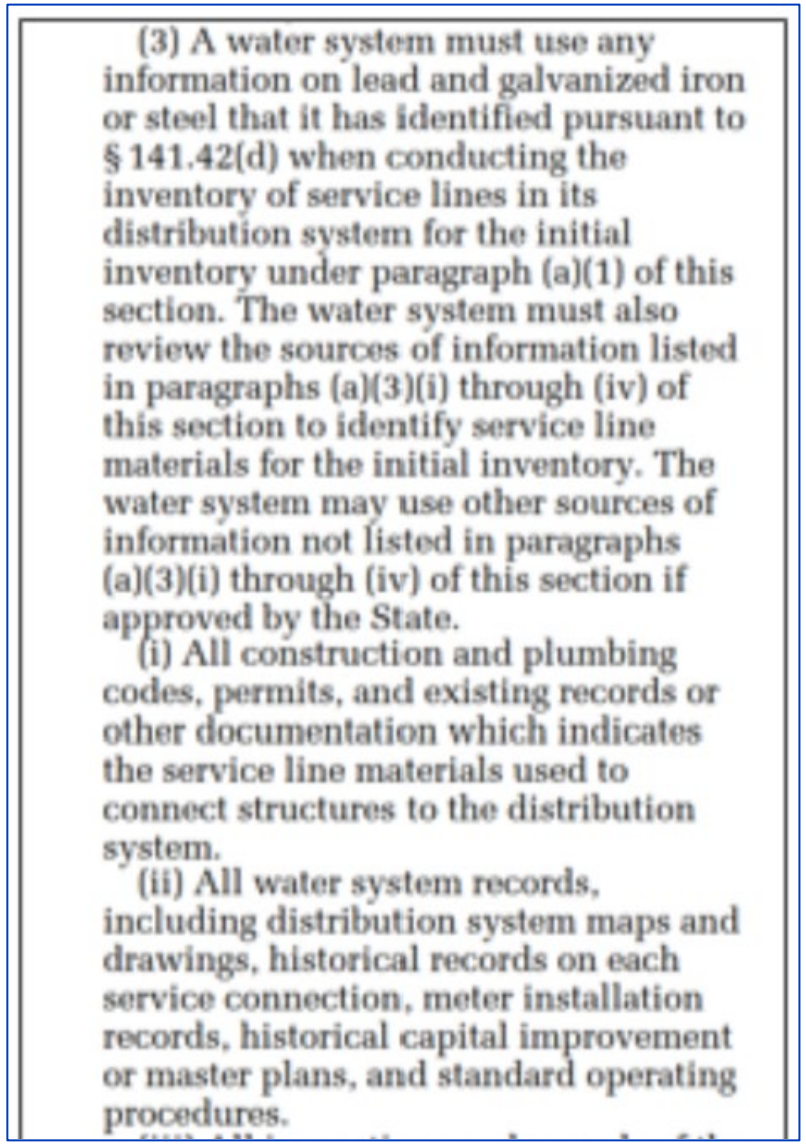
(1) FL is still developing its LCRR implementation approach; dots reflect federal guidance.

Three-Pronged LSL Inventory Development Approach

States vary on inventory submittal requirements.



EPA requires that all systems review records



(3) A water system must use any information on lead and galvanized iron or steel that it has identified pursuant to § 141.42(d) when conducting the inventory of service lines in its distribution system for the initial inventory under paragraph (a)(1) of this section. The water system must also review the sources of information listed in paragraphs (a)(3)(i) through (iv) of this section to identify service line materials for the initial inventory. The water system may use other sources of information not listed in paragraphs (a)(3)(i) through (iv) of this section if approved by the State.

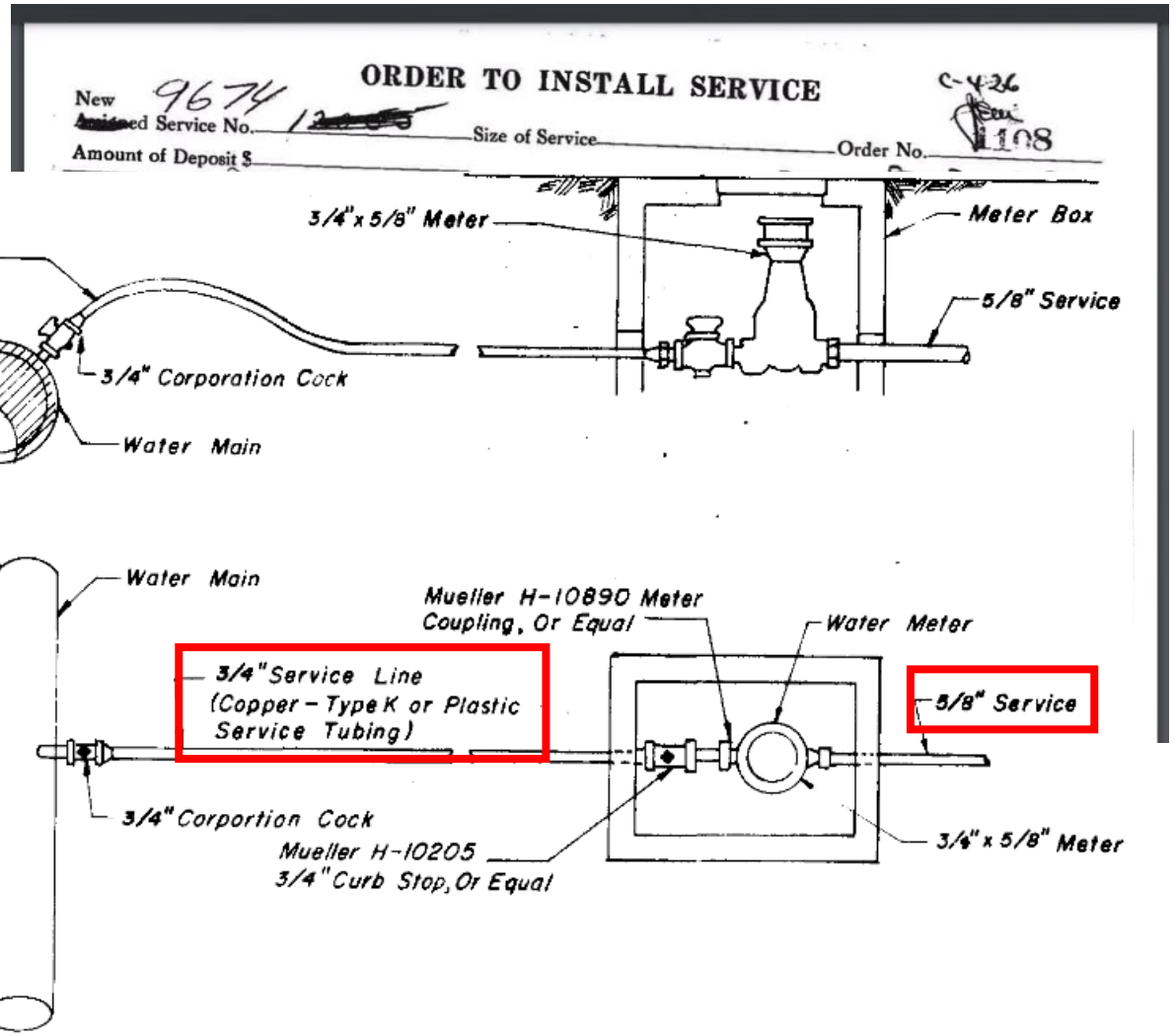
(i) All construction and plumbing codes, permits, and existing records or other documentation which indicates the service line materials used to connect structures to the distribution system.

(ii) All water system records, including distribution system maps and drawings, historical records on each service connection, meter installation records, historical capital improvement or master plans, and standard operating procedures.

- Construction/plumbing codes and permits
- Historical records including maps and drawings
- Service and meter installation records
- Other resources required or approved by the Primacy Agency

Records Identification Can Be Challenging

- Information often exists across City departments and even agencie
- Tax assessor records provide an clearing LSUSLs
  - For one county, the records w available in a consolidated fo
- Available records that provide u information vary across system
  - None of the systems we work cards



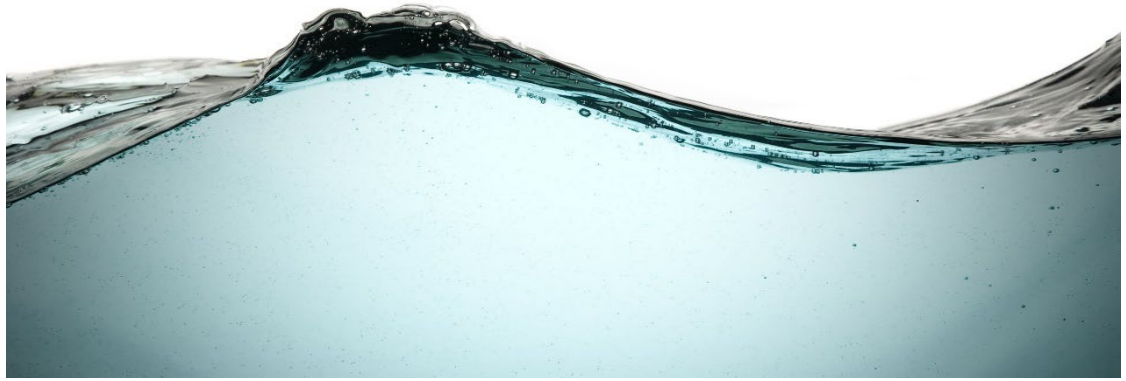
TYPICAL WATER SERVICES
NO SCALE

Recommendations

- Initiate public outreach early
  - » Many systems will have significant # of LSUSLs
- Take the time to thoroughly review records; this step checks a box for LCRR compliance and may save time in the long run
- For field inspections, start with a pilot program and meet with regulators for approval of recommended approach

October 16, 2023

Lead Service Line Inventories – Lessons Learned



Brown AND Caldwell

Katie Porter, P.E., ENV-SP

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Records Availability Varies Widely

Record Type	Utility 1	Utility 2
Plumbing code history	✓	✓
Construction and Plumbing Records (Permits)	✓	✗
Distribution system maps and drawings	✗	✓
Historical records for each service connection (tap cards)	✗	✓
Meter installation records	✗	✗
Historical CIP or master plans	✗	✗
SOPs	✗	✓
Distribution system inspections and records	✗	✗

Document Everything Reviewed For Future Reference

- If records are too inaccurate to use, document review and why they aren't used
  - Different levels of confidence in each type of record
  - Different levels of confidence for specific date ranges
- Document which records don't exist
- Some records that may not be sufficient to use on their own, could still provide evidence towards classification
- Don't wait to get started – these efforts can take time

Customer Surveys Benefit from Additional Education

- Educate customers about service line identification
  - Utilities have received photos of gas lines, dryer vents, etc
  - Swab kits - May have been tested on lead solder
- Rather than asking for service line materials, ask for photos or permission for trained utility staff to inspect.
- Keep it Simple!

Photo submitted in response to Customer survey

Obtaining Agreements Can Be Challenging

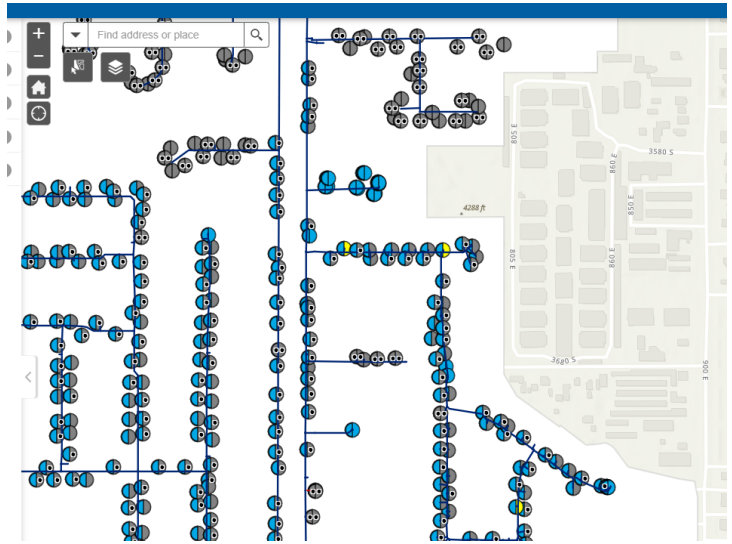
- Customer responsiveness
  - Letters < Door hangers < Utility staff going door-to-door
- Getting access agreements signed for potholing has been much slower than getting initial volunteers.
  - Minimize the need for access agreements
  - Obtain signatures during the same initial outreach to ask for permission to pothole.

Statistical Approach to Field Verification May Be Helpful for Systems with No Known LSLs

- If systems have LSLs or GRR, use of statistical selection of field verification sites may not be possible.
- If LSLs are found in the random verification, further categorization may be used to help verify that certain bins are non-lead (state dependent).

Early Planning for Data Management Can Provide a Smoother Process

- Involve GIS people early
  - Many different ways to structure data
  - Anticipate data entry methods (e.g. tablets, etc.)
- Publishing maps early provides better customer involvement
- ESRI template needs to be customized for State requirements
- Additional data fields
  - Level of confidence in classification
  - Lead goosenecks
  - Compliance site (Tier)
  - Past compliance site



Overall LCRR Approaches Will Vary

Location	No. LSL	No. Lead Status Unknown	Verification Method
Utility 1	0	10-400	Potholing
Utility 2	0	11,023	Premise plumbing investigation, statistical verification, tap cards
Utility 3	0	20,808	Meter pit inspections, statistical verification
Utility 4	28,000	72,000	Focus on good corrosion control and systematic replacements
Utility 5	64,000 - 84,000 expected LSL		Systematic potholing and replacements to maintain >7% per year schedule

Thank you.

Questions?

Brown AND Caldwell

T-Minus 12 Months: Lessons Learned & Information Gaps for Initial LSL Inventories

ASDWA Roundtable

October 16, 2023

Service Line Inventories

Lessons Learned

1. Identify Team, Roles, Goals & Responsibilities Early

2. Align Approach with Goals & Guidance

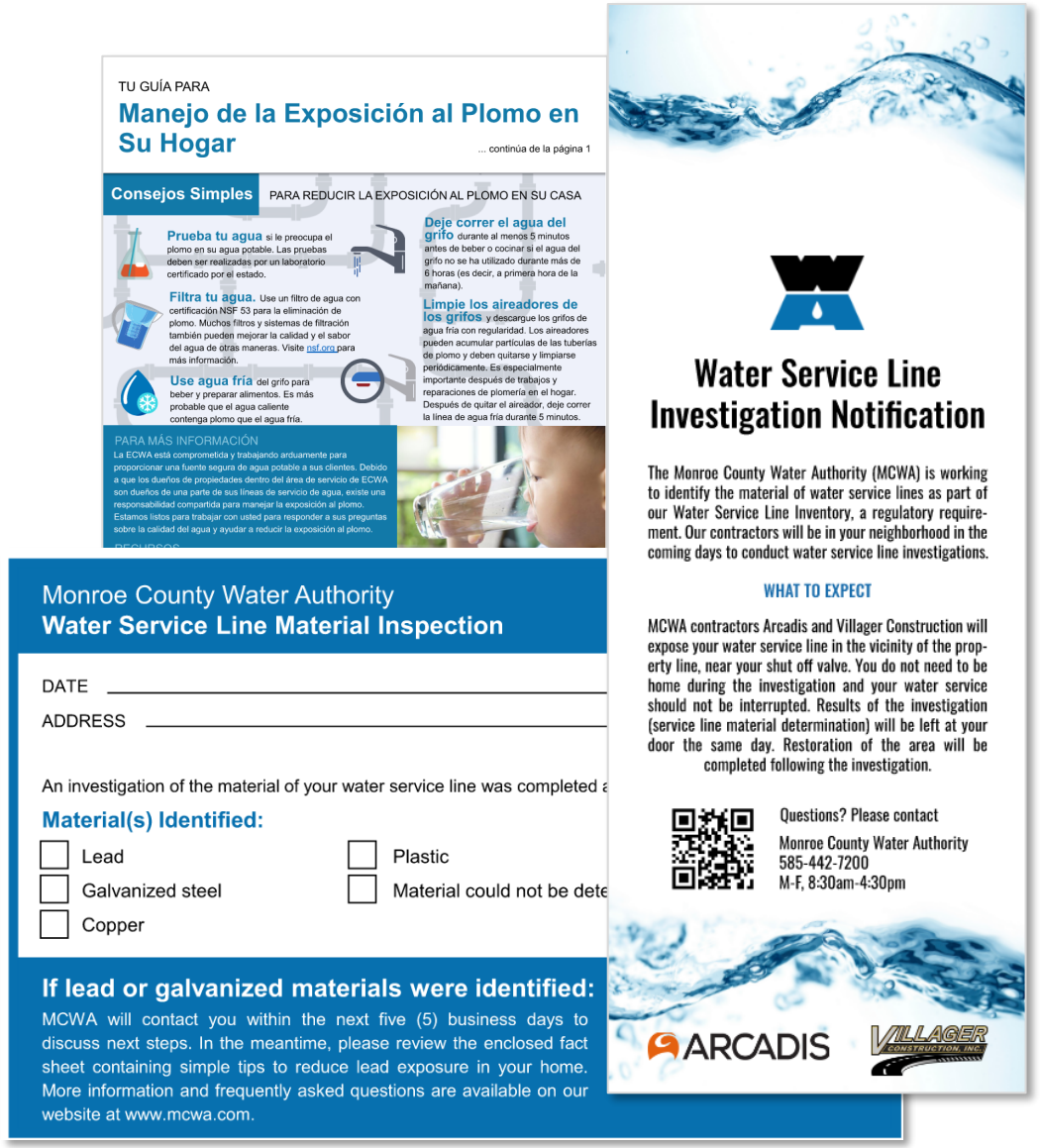
3. Document Methods & Outline Plan

Paired inspections with normal operations

Positive customer interactions

Encountering Nuances

Service Line Inventories



Current Gaps

1. How to approach inventories for systems with no suspected lead

2. Planning for unknowns: timing, communication, process

3. Funding guidance & connection with regulatory process

Thank you!

Erica Walker
Drinking Water Practice - Technical Advisor

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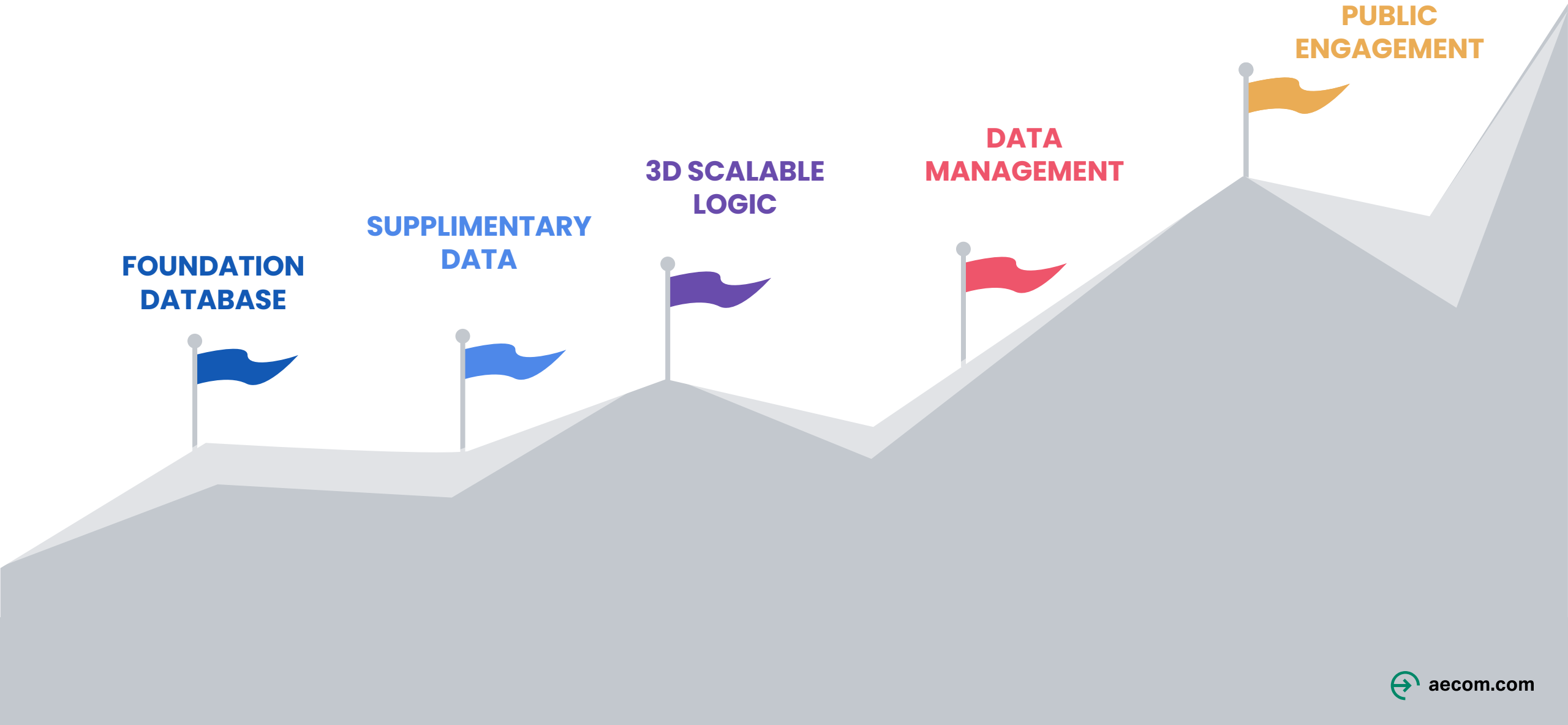
Charting the Course: A Roadmap for Lead Service Line Inventory Management

Kiran Udayakumar

LEAD SERVICE LINE INVENTORY

Milestones



LEAD SERVICE LINE INVENTORY

Lessons Learned & Data Gaps

- Physical Data
- Supplementary Data
- Data Crowdsourcing

- Digital Solutions
- Workforce & Workflow
- Data Hierarchy

- Data Dictionary
- Data Management
- Scalable Solutions

YOU HAVE MORE DATA THAN YOU THINK

Customer Billing System

Customer billing system will provide the most accurate base information of service area

Tax Parcel

County tax parcel can enhance that information with supplementary data

Data Clearinghouse

Data clearing house are available to add meta data

As-Built Information

As-built information can enhance the inventory with surrounding assets

Work Order Management

Work order management system adds QA/QC

A.I & MODELLING

Machine Learning, Modelling

PWS & COMMUNITY DATA

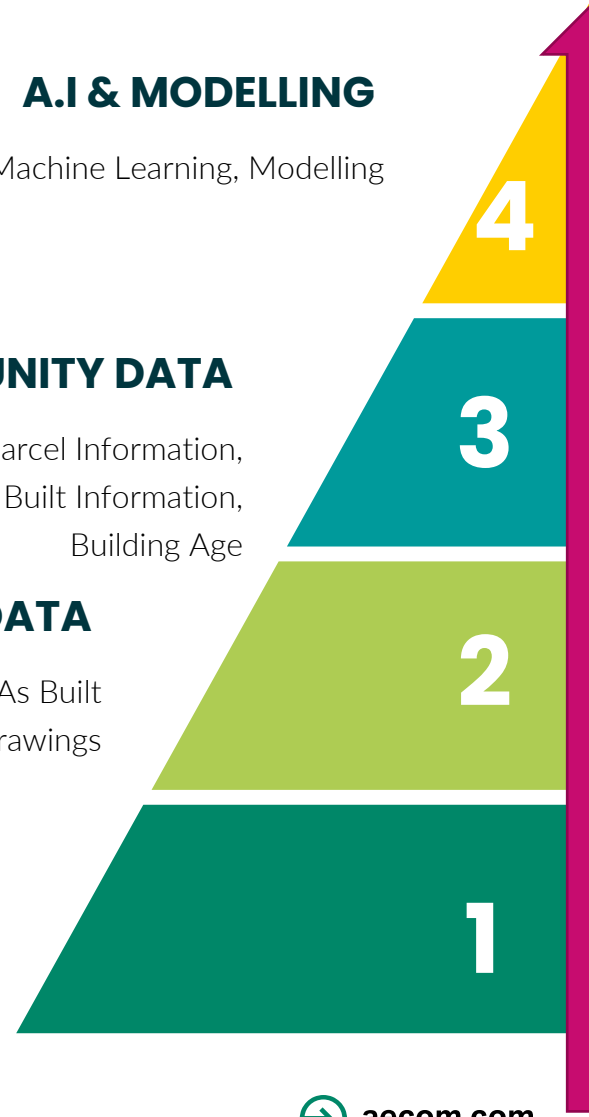
Tax Parcel Information, Community Built Information, Building Age

HISTORICAL DATA

Tap cards, Meter Cards, As Built drawings

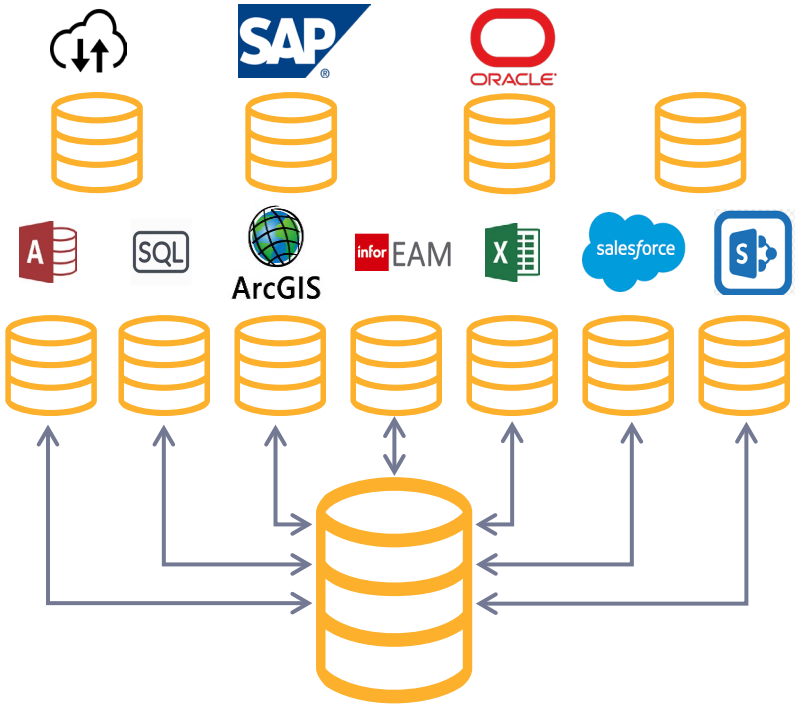
FIELD INSPECTION

Work orders, Meter Installation, Capital Projects, Customer Observed

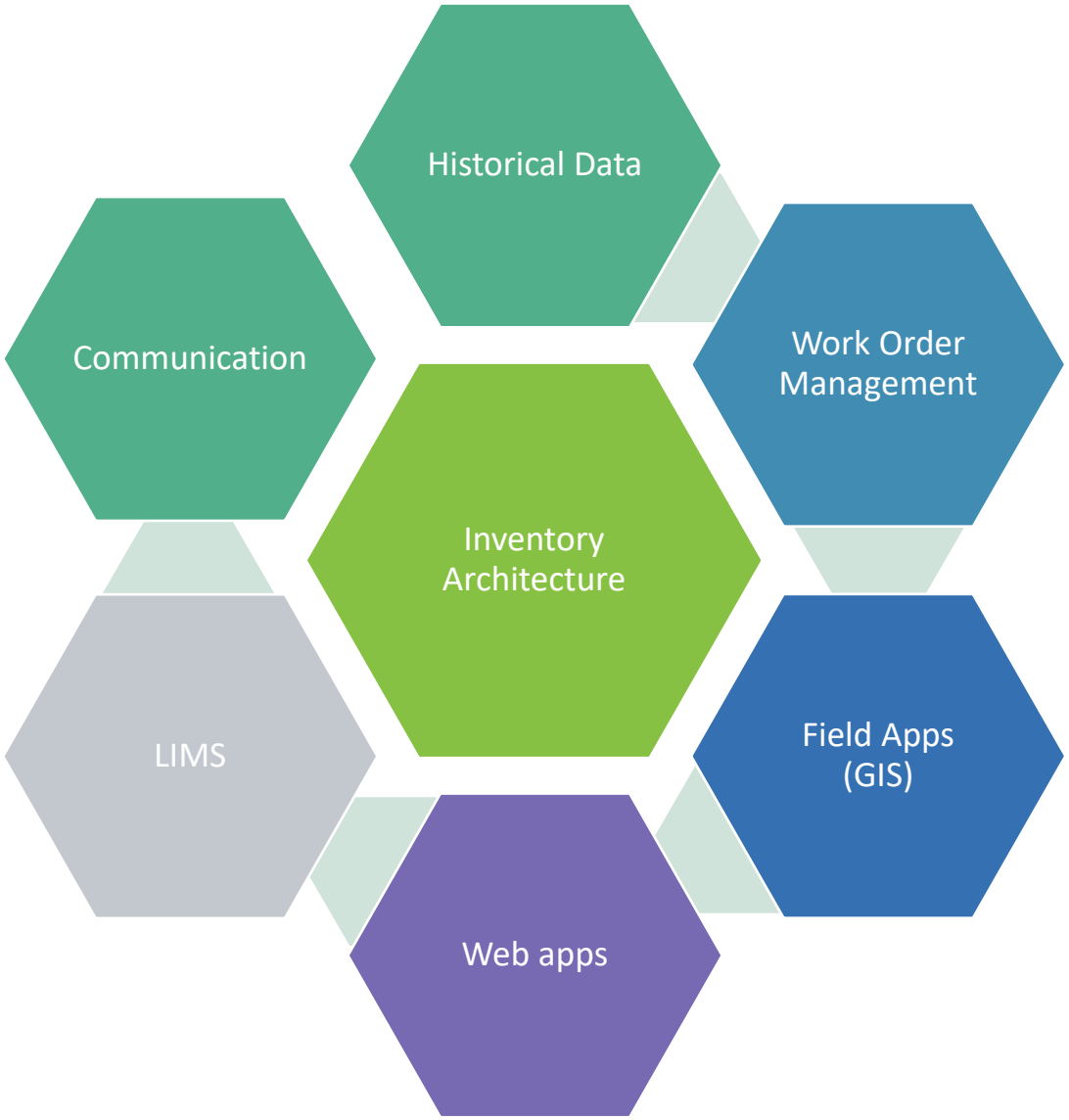


NO ONE SIZE FITS ALL

- Finding an ideal program that works is tedious
- Customized workflow adaptations with key stakeholders
- Building custom digital solutions are ideal
- Data hierarchy helps
- Scalability is key



PLAN FOR THE FUTURE



Data Dictionary

Data dictionary help you identify & supplement data

Data Management

Establishing data management protocols is key

Scalable solutions

Having solutions that can be scaled in the future

Customer Communication

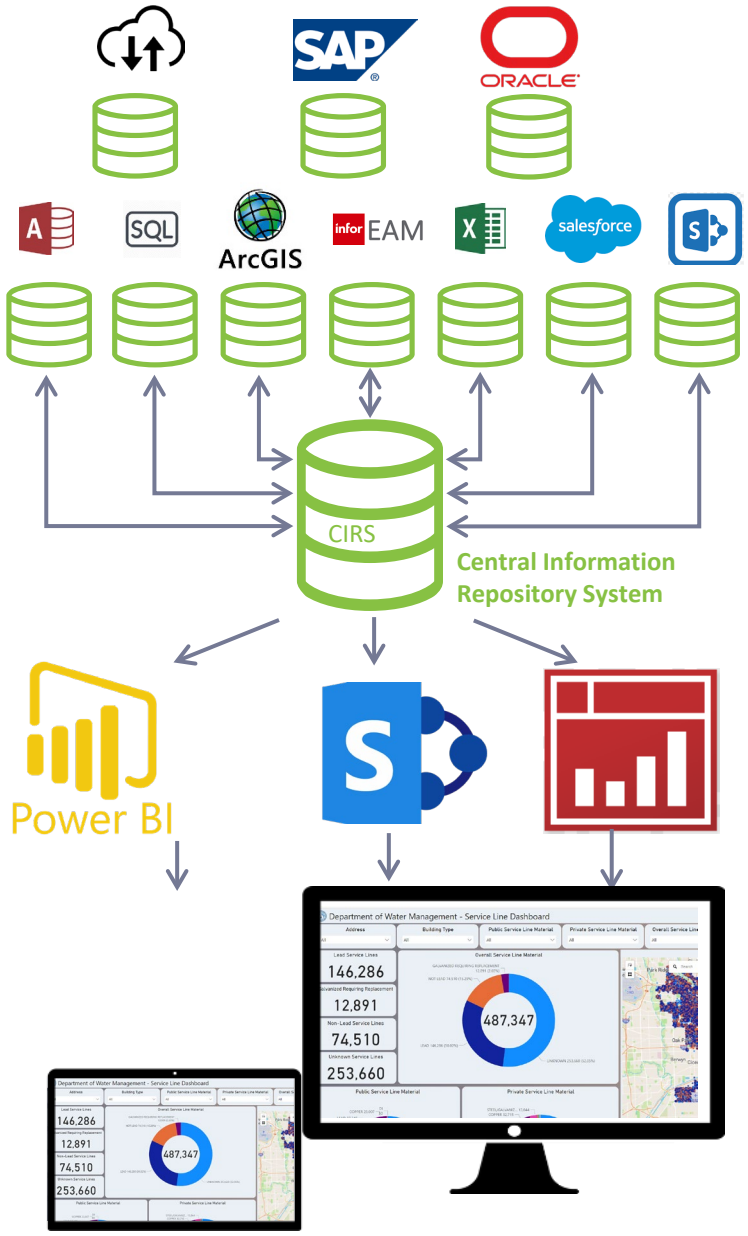
Customer communication helps improve your inventory.

Federal & State Regulations

Accounting for regulatory changes

Chicago Case Study

- ~489,000 Service lines
- Large amounts of physical & digital data
- CIRS – Central Information Repository System
  - Integration between platforms
  - Data transfer between platforms
  - Supplementary data storage
  - Customized tables & views
- On Premise System
- Private Network with Web Interface
- Customized Security & Access
- Current Data
  - Approx 12,000,000 Work Orders available digitally
  - 5,000 unique data fields
  - Over 18 different data input platforms



Chicago Data Dictionary

Category	Confidence Value	Type	Example Source(s)	Fields	Public or Private
Field Verified	100	Service Installation Records	Homeowner initiated LSLR, Equity LSLR, WSI-W601, etc.	Material, Size/Diameter, Install Date	Both, either
	101	Resident Engineer field verified with photos	CIP	Material, Size/Diameter	Both, either
	102	Meter shop field verified	Meter / Meter vault app	Material, Size/Diameter	Both, either
	103	WQ Field Verified	WQ		
	104	Plumbing inspector field verified	BAN		
	105	Foreman field verified	BOD		
Historical Data	120	Plumbing inspection (post-WSI)	GIS as premise layer (records apps)	Material, Size/Diameter	Private
	130	Customer observed	WQWCA1, WQWCA4, self-identification website	Material	Private
	200	Identified from tap permit	Historical tap cards	Material, Size/Diameter	Public
	210	Identified from meter card	Historical meter cards	Material, Size/Diameter	Private
	220	Identified from as-built drawing	GIS data	Material, Size/Diameter	Public
	230	Rehab premits	DOB EAM		
SL Install Dates	400	Identified based on applied rule - lead ban	SL installation date and lead ban	Material	Both, either
Service Size	500	Identified based on applied rule - diameter larger than 2"	If only service size, diameter > 2" as non-lead	Material	Both, either
	510	Identified based on applied rule - new service diameter less than 2"	If only WSI - W601 service size, diameter < 2" as copper	Material	Both, either
Build Dates	600	Identified based on applied rule - lead ban	Year built and lead ban	Material	Both, either
Surrounding assets	700	Based on association to surrounding features - water main installation date (original/new)	Water main GIS layer	Material	Public
	710	Based on association to surrounding features - water main material	Water main GIS layer	Material	
	720	Based on association to surrounding features - hydrant installation date	Hydrant GIS layer	Material	
	730	Based on association to surrounding features - hydrant manufacture date	Hydrant GIS layer	Material	
Building type	800	Identified based on applied rule - new service building type	W601 - If a new service SFH, 2-Flat, etc. then assume as copper	Material	Both, either

Questions?

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Thank you!

More to Come!

Managing the LCRR & LCRI Isn't Going to be Easy!

asdwa

Association of State
Drinking Water Administrators