Leveraging your GIS Program to Meet Compliance Challenges

May 22, 2019

Great Lakes RCAP GIS Team

Introductions

Laura Schuch, PhD - GIS Analyst

Sam Eitner - GIS Specialist

Great Lakes
COMMUNITY ACTION
PARTNERSHIP

Great Lakes
RCAP
Rural Community Assistance Program

Great Lakes RCAP GIS Team

We work alongside communities to achieve goals related to the collection, mapping and maintenance of utility assets

GIS Cooperative Services

Provides access to GIS experts and affordable pricing to 50+ communities.

Services include:

- GIS data hosting
- Web and Mobile applications (ESRI platform)
- Site visits
- O&M training (on-site)
- Scanning of plans, as-builts and historical maps

Asset Management Support

- Customized inventory database/applications
- Preventive maintenance recording and tracking
- Monitoring of compliance through Dashboards

GIS Fee For Service

- Assisted over 100 communities with locating and mapping assets
- Surveyor-grade GPS equipment, 1-cm accuracy
- Work with utility staff to ensure sustainability of product
- Inventory for Asset Management
- Consulting services

Objective

Learners will be able to describe three ways GIS can aid in compliance with recent regulatory requirements

New Regulatory Requirements

Image: The Birdbox, Netflix

Is this how YOU feel?

Challenge:
Mapping Lead Service Line Materials

June 2016, HB 512 was passed to enact section 6109.121 of the Ohio Revised Code (ORC).

The law requires community water systems to identify and map areas of their distribution systems that are known or likely to contain lead service lines.

Challenge:
Mapping & Updating Line Material

- Lead and copper sampling
- Map distribution systems
- Identify all potential lead sources
- Map public and private service lines
- Description of buildings
- Protection of residents

All public water systems were required to submit lead service line probability maps in March 2017, and updates will be required ***every five years****.*

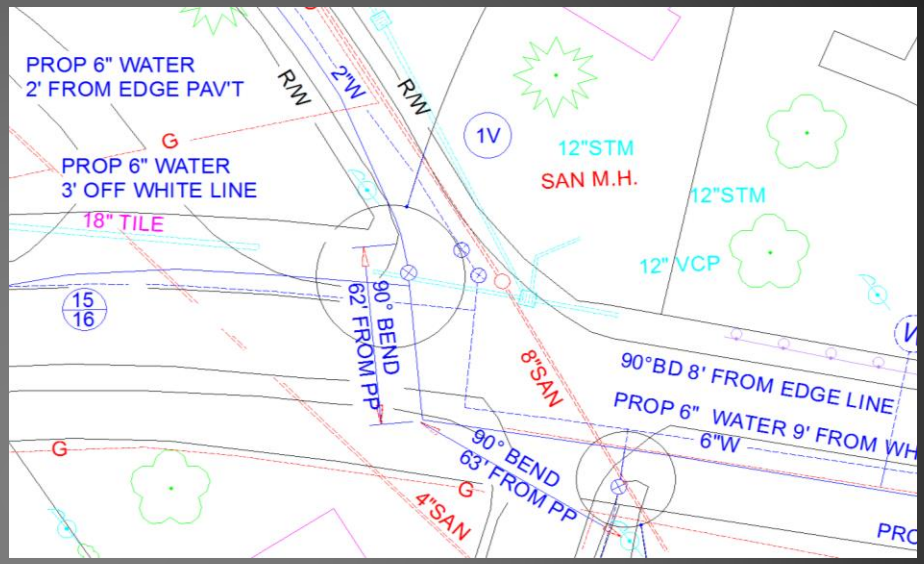
Challenge: The Data Dilemma

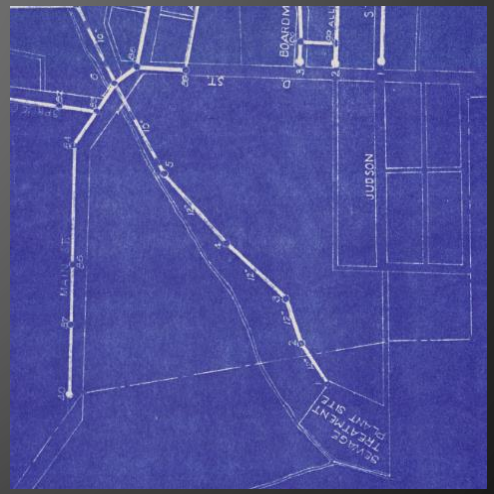
Sources:

- As-builts/drawings
- Tap cards
- Operator knowledge
- Building permits
- Auditor Data

Reality:

- No records kept
- Operators are gone
- Plans are outdated
- Plans are destroyed





GIS Solution: Lead Mapping

Pipe material
and
age identification

GIS Solution: Filling in the Gaps

1. Find Data
2. Join data to GIS
3. Symbolize by year built
4. Assign value to known
5. Assign probability value to unknown

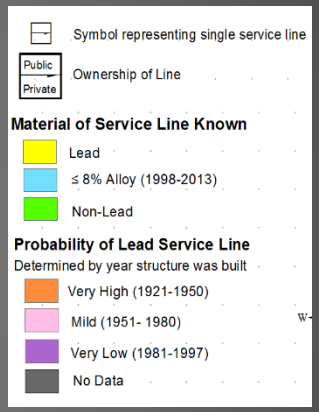
Table

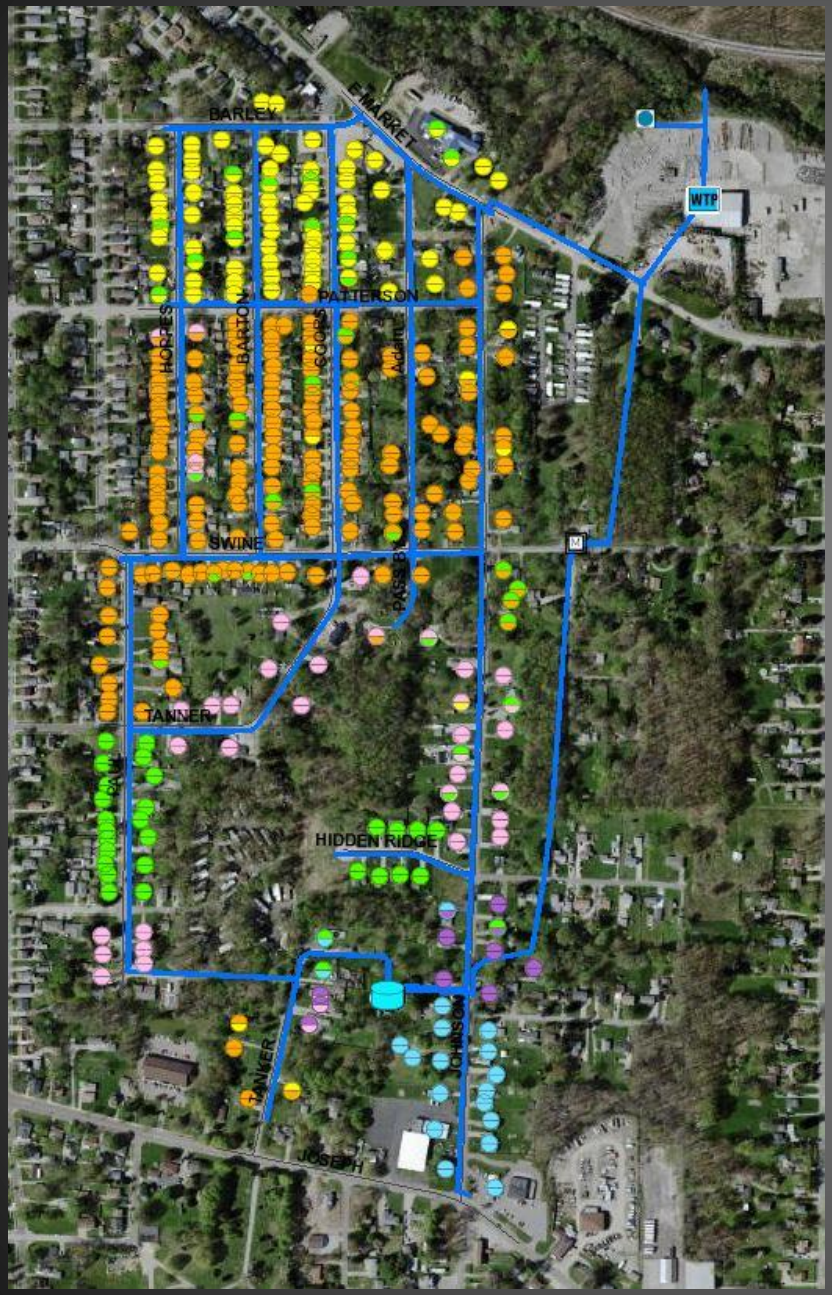
POINTS_EDITED_BELLAIRE_BB

Year Built	Private	Public	LEAD Score	ParcelNumber	ADDR	SUBDIV
1900	6	6	66	26-00399.000	57618 PINCH RUN	
1920	6	6	66	26-00773.000	62778 CEMENT MILL	
1920	6	6	66	26-01438.000	62790 CEMENT MILL	
1900	6	6	66	26-00513.000	62820 CEMENT MILL	
	77	77	7777	26-00543.000	62860 CEMENT HILL	
1993	3	3	33	29-03353.000	399 QUINCE LANE	N/A
1900	6	6	66	29-00721.000	393 12TH	FLORENCE PLAT
1900	6	6	66	29-01290.000	385 FLORENCE	FLORENCE PLAT
1900	6	6	66	29-02395.000	381 12TH	FLORENCE PLAT
	77	77	7777	29-02894.000	377 FLORENCE	FLORENCE PLAT
1900	6	6	66	29-02424.000	373 12TH	FLORENCE PLAT
1900	6	6	66	29-03008.000	369 12TH	FLORENCE PLAT
1900	6	6	66	29-00803.000	365 12TH	FLORENCE PLAT
	77	77	7777	29-02797.000	12 TH	N/A
	77	77	7777	29-00401.000	12 TH	FLORENCE PLAT
1900	6	6	66	29-00400.000	357 12TH	FLORENCE PLAT
1908	6	6	66	29-00921.000	353 FLORENCE	FLORENCE PLAT
1900	6	6	66	29-02052.000	349 12TH	FLORENCE PLAT
1900	6	6	66	29-01986.001		N/A
1948	1	1	11	29-02729.000	345 12TH	FLORENCE PLAT
1900	6	6	66	29-02248.000	341 12TH	FLORENCE PLAT
1900	6	6	66	29-01849.000	337 12TH	FLORENCE PLAT
	77	77	7777	29-01851.000	12 TH	FLORENCE PLAT
	77	77	7777	29-03893.000	12 TH	
1950	1	1	11	29-01850.000	329 12TH	FLORENCE PLAT
1944	1	1	11	29-01587.000	12 TH	
1900	6	6	66	29-02817.000	325 12TH	FLORENCE PLAT
1944	1	1	11	29-01587.000	12 TH	N/A
	77	77	7777	29-01943.000	323 12TH	FLORENCE PLAT
1944	1	1	11	29-01587.000	12 TH	N/A
1900	6	6	66	29-02425.000	1361 BELMONT	HEATHERINGTONS FOURTH
1900	6	6	66	29-01110.000	1395 BELMONT	HEATHERINGTONS FOURTH
1900	6	6	66	29-03358.000	1475 BELMONT	HEATHERINGTONS FOURTH
1924	1	1	11	29-00536.000	1477 BELMONT ST-1479 BELMONT	HEATHERINGTONS FOURTH
1915	6	6	66	29-03129.000	1483 BELMONT	HEATHERINGTONS FOURTH
1961	2	2	22	29-01164.000	1485 BELMONT	HEATHERINGTONS FOURTH
1900	6	6	66	29-02432.000	1499 GUERNSEY	N/A
1900	6	6	66	29-01313.000	1487 BELMONT	HEATHERINGTONS FOURTH
	77	77	7777	29-01314.000	1487 BELMONT	HEATHERINGTONS FOURTH
1916	6	6	66	29-01174.000	1495 BELMONT	HEATHERINGTONS FOURTH
	77	77	7777	29-01173.000	1495 BELMONT	N/A
1998	4	4	44	29-00225.000	15 TH	HEATHERINGTONS FOURTH

0 (0 out of 2169 Selected)

POINTS_EDITED_BELLAIRE_BB





Lead Probability

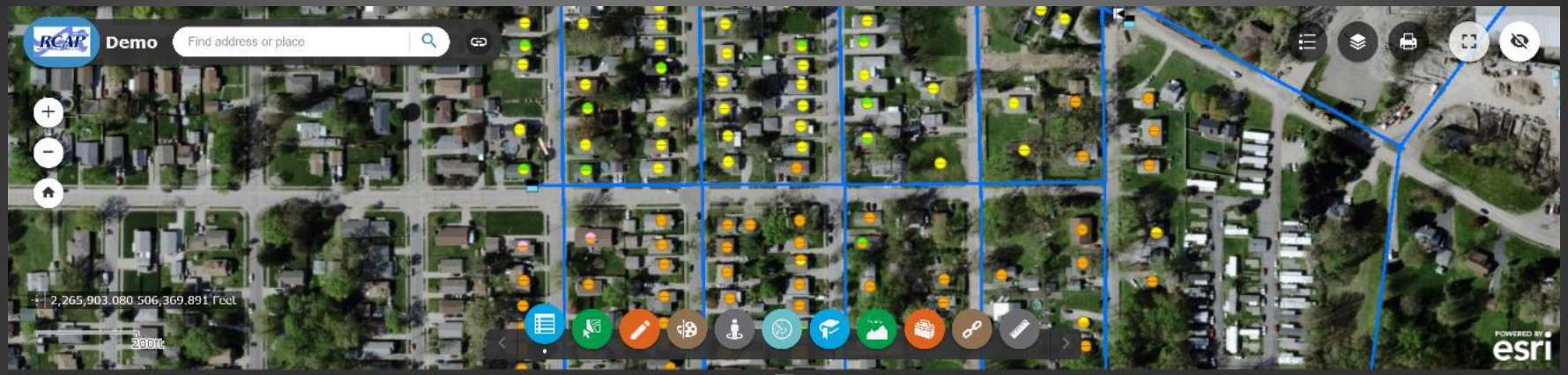
PublicSide

- High
- Lead
- Less than or equal to 8%
- Low
- Moderate
- No Lead
- Unknown

PrivateSide

- High
- Lead
- Less than or equal to 8%
- Low
- Moderate
- No Lead
- Unknown

GIS Solution: Record-keeping/Reporting



PublicSide | PrivateSide | Water Network Structure | Water Curb Stop Valve | Water System Valve | Water Hydrant | Water Fitting | Water Control Valve | Water Lateral Line | Water Main | S

Options | Filter by map extent | Zoom to | Clear selection | Refresh

Last_Editor	Last_Update	Address	Lead_Values	Known_Material	Date_Changed	Replaced_By	Comments	YearBuilt	ParcelNumber
kse	11/29/2018, 7:00 PM	Johnson	Less than or equal to 8%					1999	
kse	11/29/2018, 7:00 PM	Johnson	Less than or equal to 8%					1999	
kse	11/29/2018, 7:00 PM	Johnson	Less than or equal to 8%					1999	
kse	11/29/2018, 7:00 PM	Johnson	Less than or equal to 8%					1999	
kse	11/29/2018, 7:00 PM	Johnson	Less than or equal to 8%					1999	
kse	11/29/2018, 7:00 PM	Johnson	Less than or equal to 8%					1999	

324 features 0 selected

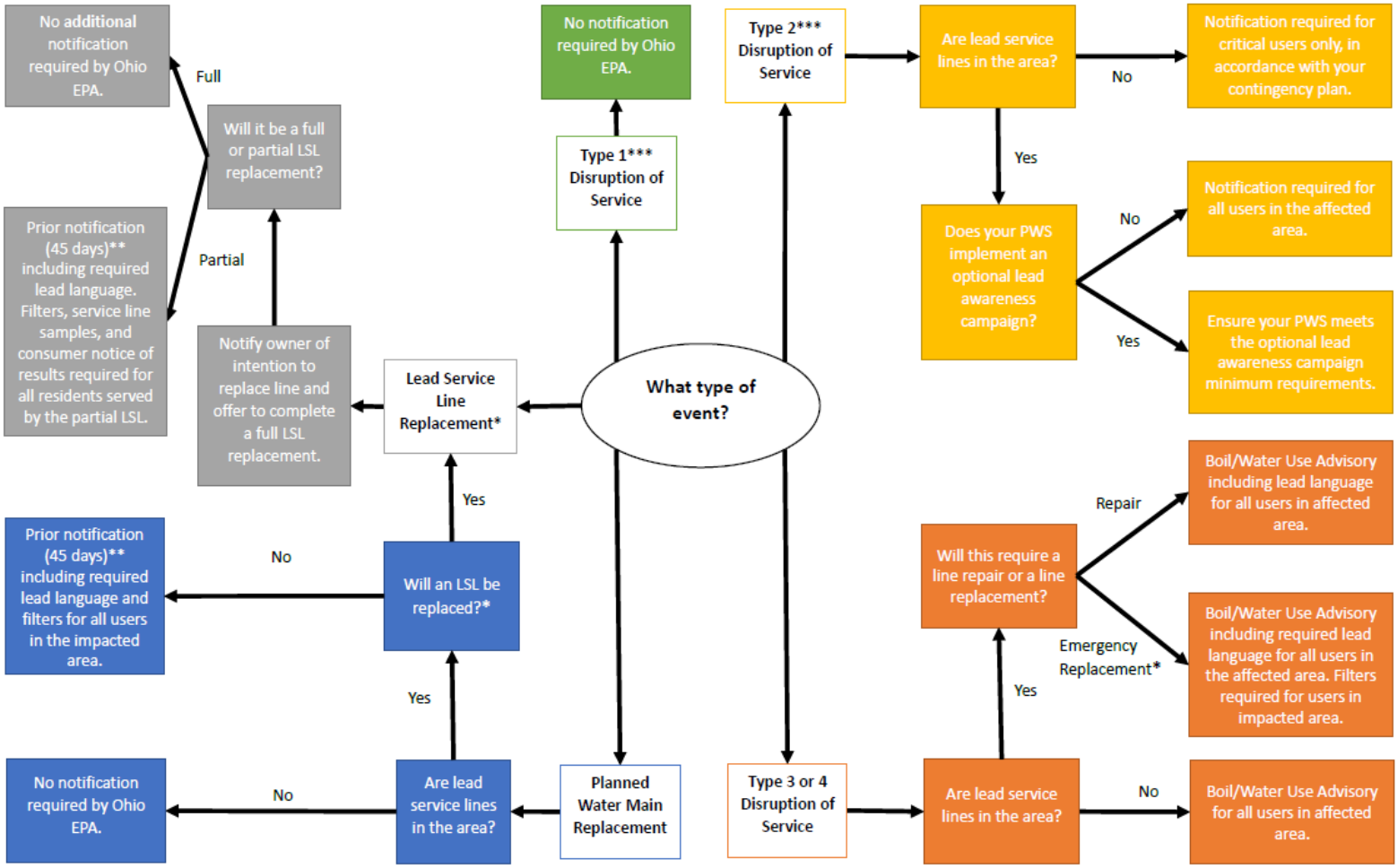
Challenge:
Water Line Disruptions Lead Service Lines

Ohio Administrative Code

- Rule 3745-81-84 – Lead Service Line Requirements
- Rule 3745-83-02 – Disruption of Service

Each of the rules have specific lead notification requirements, as well as other required actions involving water line work of various types

Challenge:
Water Line Disruptions Lead Service Lines



*If an LSL is replaced in conjunction with a disruption of service event, LSL replacement requirements must be met for those served by the line.
**Less than 45 days' notice is allowed in instances of emergency repairs, emergency replacements, or other mitigating circumstances.
*** If pressure is not monitored during what would otherwise be considered a Type 1 or Type 2 repair, a Type 3 response must be conducted as a precaution, including Type 3 notification requirements.

Figure 1: Disruption of Service Summary Flowchart

GIS Solution: Database Design

Details About the Break
Unique Identifier
Date recorded
Location Description
Date of break
Date of repair
Fitting Type
Line diameter
Pipe material
Duration of break
Estimated water loss
Break type
Disruption type
Population Affected
Incident type
Lead Impact
Incident description
Pictures

Incident Description

Select the incident type *

Type 1

Incident Types

Type 1 -
Controlled pipe repair.
Positive pressure is continuously maintained.
No signs of contamination intrusion.

Type 2 -
Controlled component repair.
Positive pressure maintained until controlled shutdown of affected area completed.
No signs of contamination intrusion.
Failure to complete the event response for a Type 1 disruption of service.

Type 3 -
A loss of positive pressure at the repair site.
Depressurization adjacent to the repair. Uncontrolled shutdown.
Signs of possible contamination intrusion.
Failure to complete the event response for a Type 2 disruption of service.

Type 4 -
Catastrophic failure with widespread depressurization.
Contamination intrusion
Failure to meet the event response for a Type 3 disruption of service.

Date and military time the incident occurred *

04/22/2019 09:00

GIS Solution: Database Design

Activities During the Break

Pressure maintained
Pressure monitored
Incident response
Pit excavated
Water Level Maintained
Line Disinfected
Pressure positive
Chlorine Tested
Alternate source of water
Satellite system affected
Satellite system notified
Comments

Disruption Type 3

Type 3 or 4 <------- Type 3 or 4 have identical questions on the form

Did you activate the notification procedure in your contingency plan? *
(●) Yes ( ) No ( ) N/A

Did you document actual or possible contamination? *
(●) Yes ( ) No ( ) N/A <- If "YES" the following asks:

What was the potential or actual contamination? *

Were critical users in the affected area notified in accordance with the contingency plan? *
(●) Yes ( ) No ( ) No Critical users in the area

What is a boil advisory was issued? *
(●) Yes ( ) No ( ) N/A

Was a controlled shutdown of the affected area completed? *
(●) Yes ( ) No ( ) N/A

Was the pit excavated to below the repair? *
(●) Yes ( ) No ( ) N/A

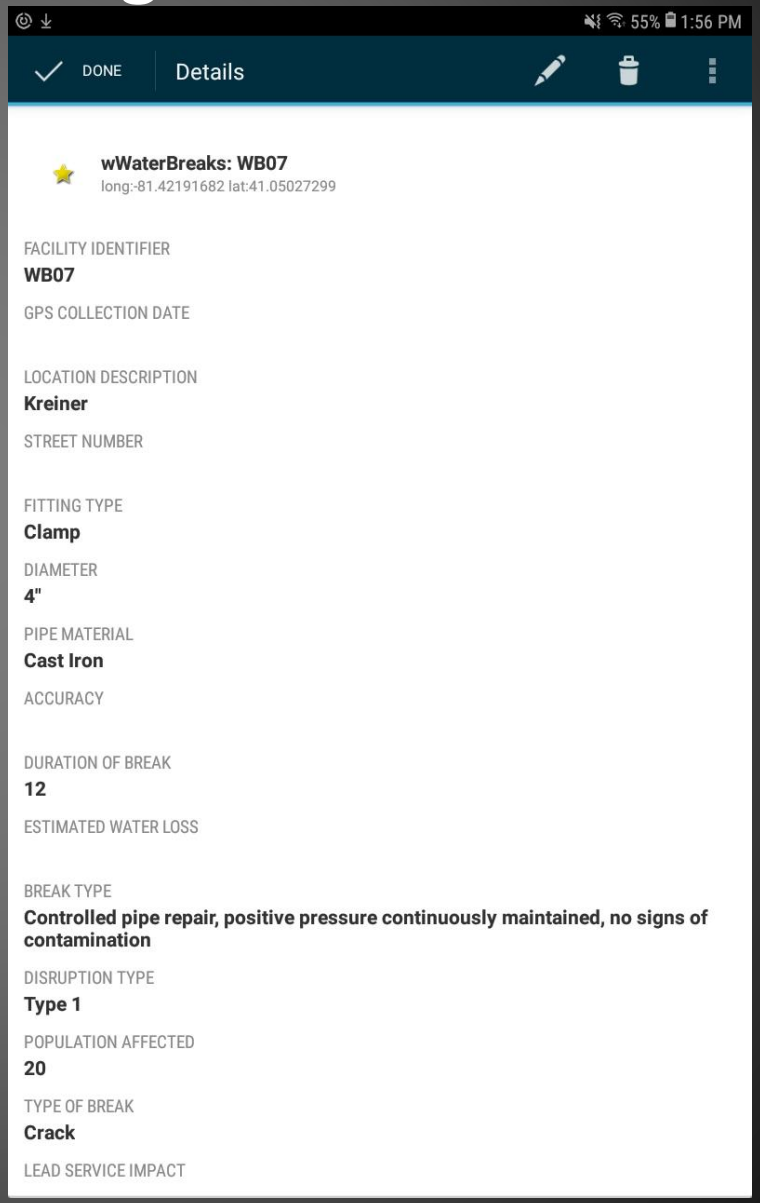
Was the water level maintained below the area of the repair? *
(●) Yes ( ) No ( ) N/A

Was the line disinfected in accordance with AWWA C651-14 section 4.11.3.3? *
(●) Yes ( ) No ( ) N/A

Was the line repaired? *
(●) Yes ( ) No ( ) N/A

Did the chlorine residual meet regulatory standards? *
(●) Yes ( ) No ( ) N/A <- If "YES" the following is asked:

GIS Solution: Recording the Event



GIS Solution: Monitoring and Tracking

Challenge: Water System Valve Exercising

Ohio Environmental Protection Agency

Valve Exercising Program Guidance
Division of Drinking and Ground Waters

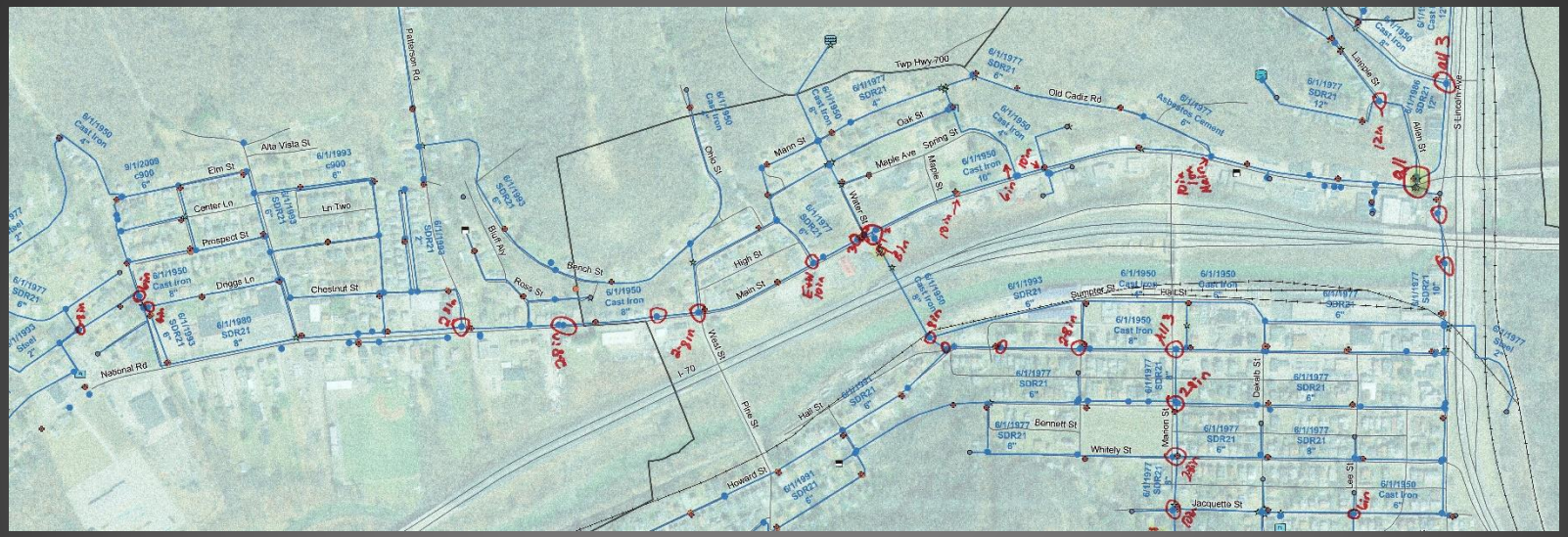
Per AWWA G200-15 Distribution Systems Operation and Management, section 4.2.5, a valve exercising program is to follow AWWA Manual M44 and the manufacturer's recommended procedure and include at least the following elements:

1) A goal for the number of transmission valves to be exercised annually based on the percentage of the total valves in the system.
2) A goal for the number of distribution valves to be exercised annually.
3) A goal that 100% of the valves are tested within a certain time frame (recommend 1x/5 years).
4) Measures to verify that the goals are met and written procedures for action if the goals are not attained.
5) Critical valves in the distribution system shall be identified for exercising on a regular basis. Potential water quality and isolation concerns shall be recognized. The program shall track the annual results and set goals to reduce the percent of inoperable valves.
6) The valve-exercising program may be implemented in conjunction with the systematic flushing program.
7) A goal of replacing the inoperable valves identified during the operation and maintenance process shall be established as part of the exercising program.

Determining which valves are critical

- Transmission mains affecting service to large groups of customers
- Distribution valves necessary to maintain service to critical customers such as: hospitals, dialysis centers, nursing homes, medical facilities, manufacturing facilities, downtown/high density areas, and service connections where loss of flow could impact human health due to catastrophic events (Waste water treatment plant critical processes or loss of cooling water to processes where it is critical)
- Areas prone to main breaks
- Areas of infrastructure approaching the end of its useful life
- Areas around road or other utility re-construction areas

GIS Solution: Database Design – Critical Valves



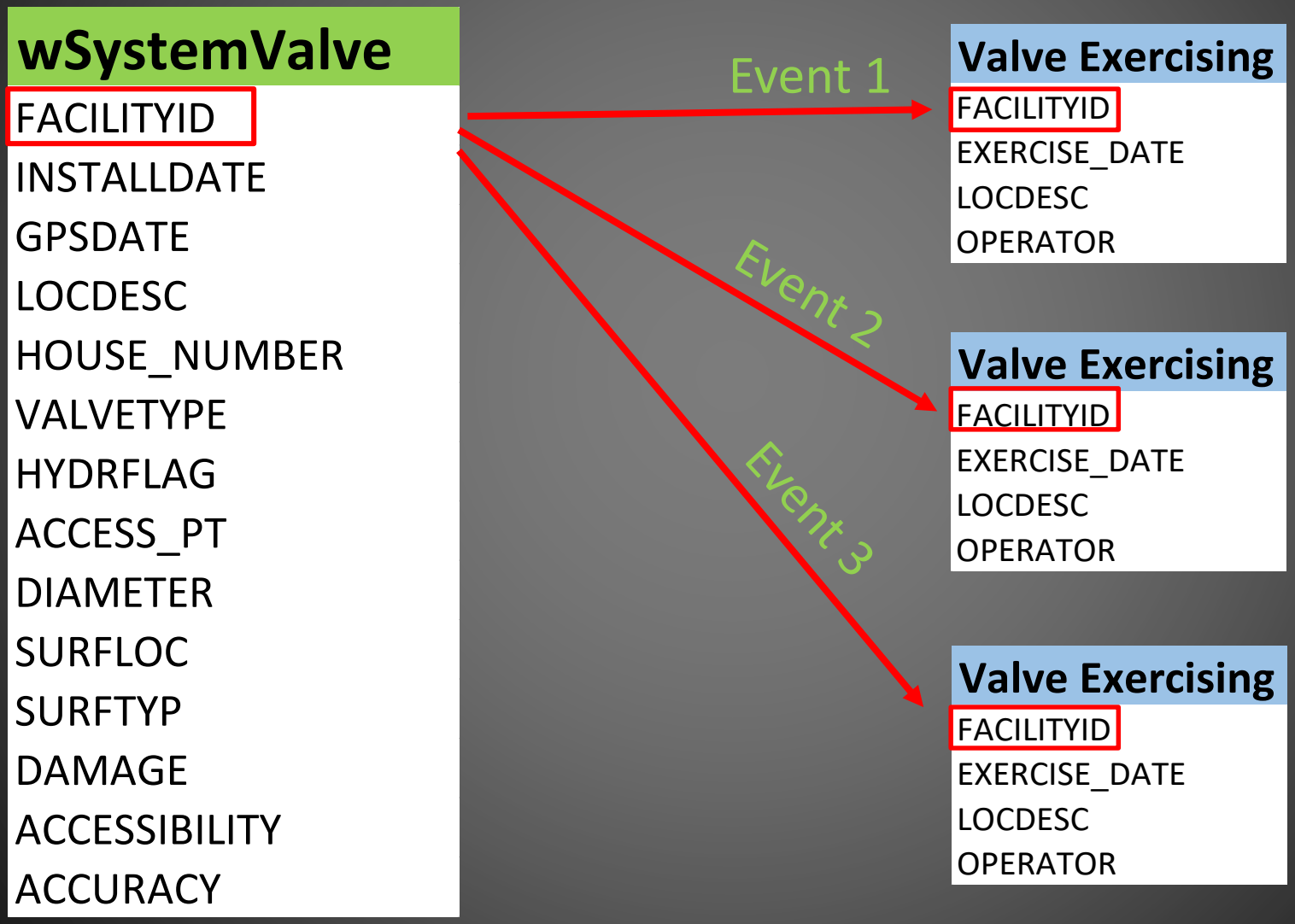
Field Name	
LASTUPDATE	Date
LASTEDITOR	Text
ATTACHMENT	Text
WSV_PIC	Text
COMMENTS	Text
EXERCISED	Text
LASTEXERCISED	Date
SYSTEM	Text
CRITICALVALVE	Text
ASSET_CATEGORY	Text
ASSET_SUB_CATEGORY	Text

Click any field to see its properties.

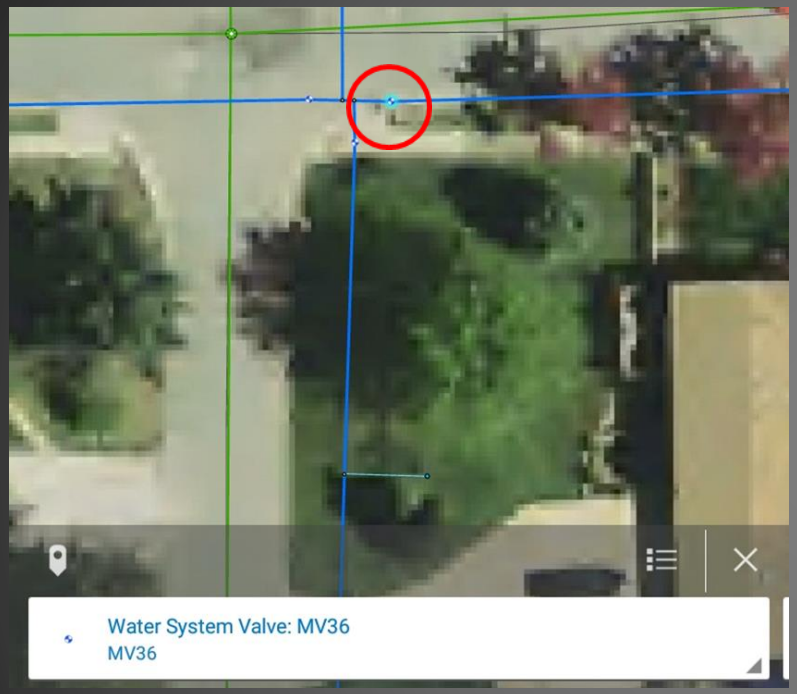
Field Properties

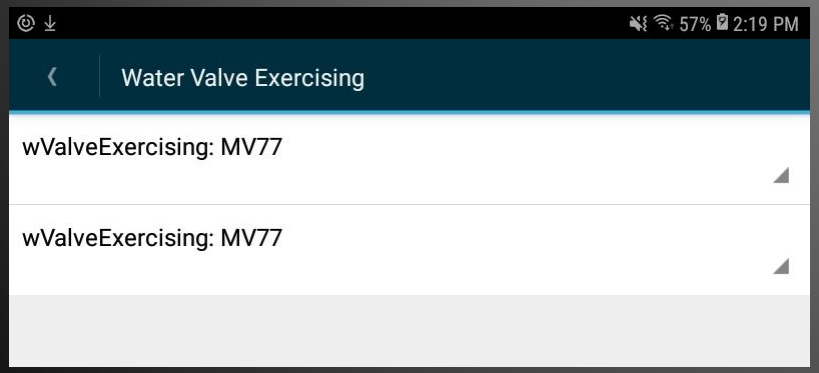
Alias	Critical Valve
Allow NULL values	Yes
Default Value	
Domain	YesNo
Length	10

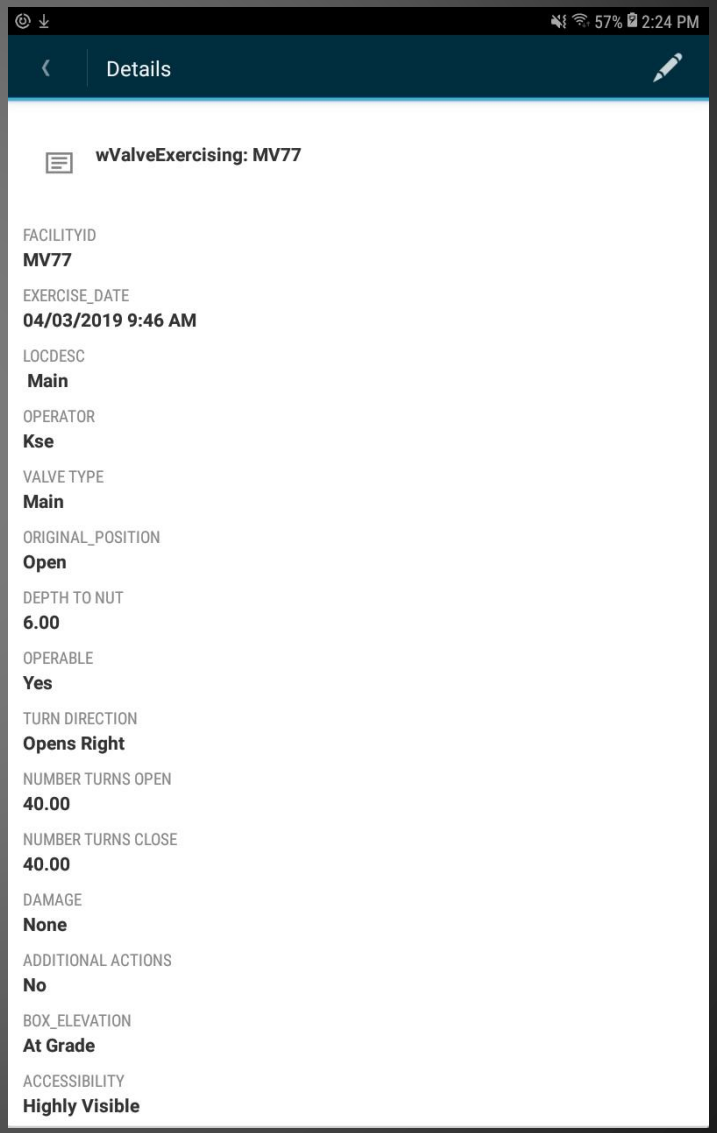
GIS Solution: Database Design – Related Tables



GIS Solution: Updating Data – In the Field







GIS Solution: Record-keeping

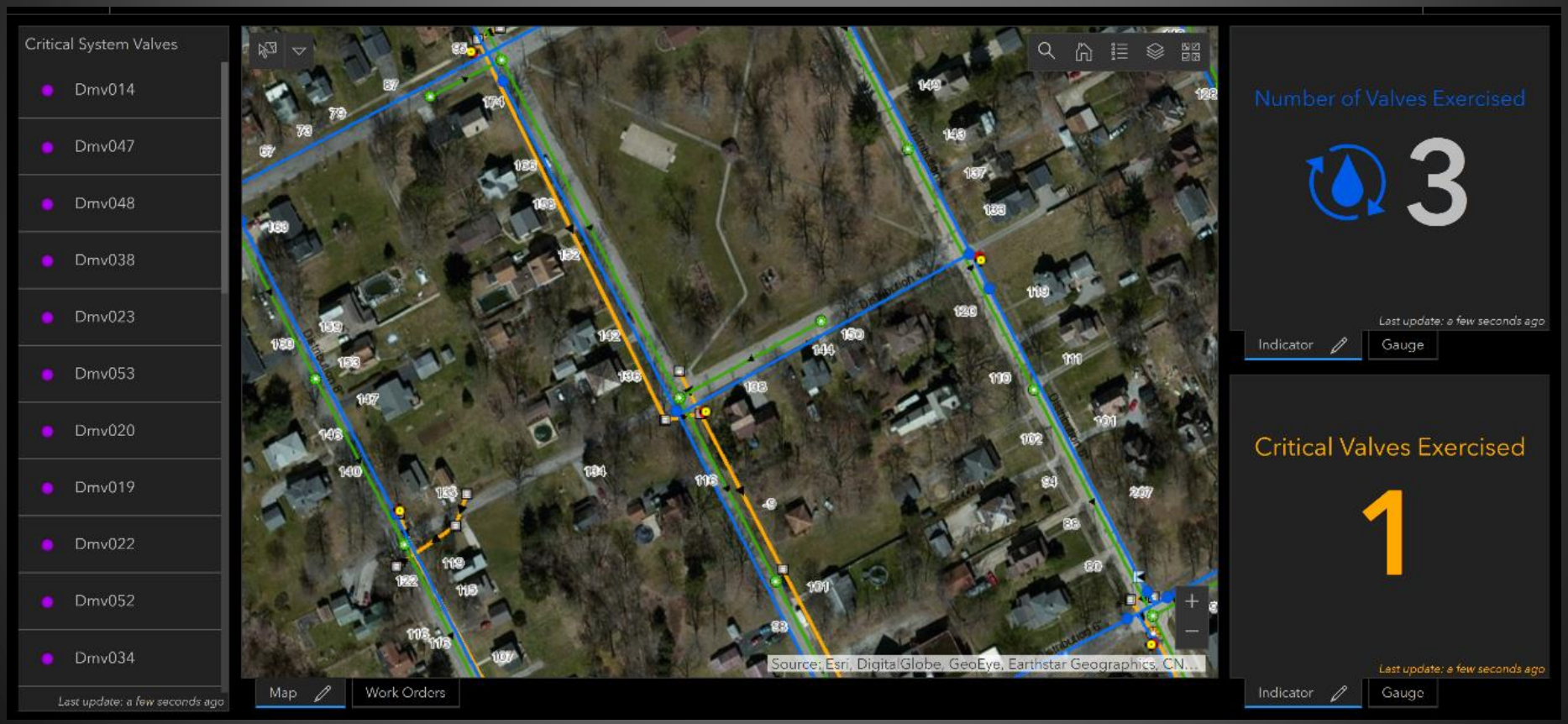
Test | Water Hydrant Inspection | Storage Tank Inspection | Water Treatment Plant Inspection | Water Valve Exercising | Water Valve Maintenance | Vehicle Maintenance | Water Storage Tank Inspections

Options | Filter by map extent | Zoom to | Clear selection | Refresh

FACILITYID	EXERCISE_DAT	LOCDESC	OPERATOR	ORIGINAL_POS	DEPTH TO NUT	TURN DIRECTION	NUMBER TURNS OPEN	NUMBER TURNS CLOSE	DAMAGE	ADDITIONAL ACTIONS	BOX_ELEVATIC	ACCESSIBILIT	FUNCTION_O_	TORQUE	COMMENTS	VALVE_EX_PIC
MV7	12/29/1899, 7:00 PM	Albrecht / N Columbiane	kse	Open		Opens Right	20.00	20.00	None	No	At Grade	Highly Visible	Stiff			
MV59	12/29/1899, 7:00 PM	N Columbine / Albrecht		Open		Opens Right	20.00	20.00	None	No	Box Needs Raised	Covered With Pavement	Stiff			
HV81	12/29/1899, 7:00 PM	N Columbine	kse	Closed		Opens Left	20.00	20.00	Missing Cap	No	Box Needs Lowered	Highly Visible	Stiff		Valve Worked fine	
MV41	12/29/1899, 7:00 PM			Open	5.00	Opens Left	5.00	7.00	None	No	At Grade	Covered with Bushes	Incomplete			
MV25	12/11/2018, 2:40 PM			Open		Opens Left	18.00	18.00	None	No	At Grade	Highly Visible	Stiff			
HV93	12/29/1899, 7:00 PM	Smith rd	kmp	Closed	12.00	Opens Left	26.00	26.00	Valve Stem Broke	Yes	Box Needs Raised	Covered With Pavement	Stiff			
MV49	12/29/1899, 7:00 PM			Open	5.00	Opens Right	80.00	0.00	Box Needs Aligned	No	At Grade	Highly Visible	Stiff			
MV36	12/29/1899, 7:00 PM			Closed		Opens Right	20.00	20.00	Valve Stem Broke	Yes	At Grade	Otherwise Inaccessible	Do Not Disturb	need hammer		
MV71	12/11/2018, 2:44 PM	test	Frank D	Open	5.00	Opens Right	6.00	6.00	None	No	At Grade	Highly Visible	Do Not Disturb		none	
MV35	12/11/2018,			Open		Opens Left	0.00	0.00	None	No	At Grade	Highly	Do Not			

25 records 0 selected

GIS Solution: Operations Dashboard



Thank you!

Brian Beyeler – GIS Coordinator bdbeyeler@glcap.org

David Garretson – Database Administrator dkgarretson@glcap.org

Laura Schuch - GIS Analyst lmschuch@glcap.org

Sam Eitner - GIS Specialist kseitner@glcap.org

Amanda Preslicka – GIS Technician alpreslicka@glcap.org

Great Lakes RCAP GIS website: http:www.rcapgis.org