

How Does a Small Utility Use GIS?

Ryan Wendt, GISP
Systems Integration
Coordinator

MMU



Marshall Municipal Utilities

- Marshall Population is 13,421 people
 - College town but we don't serve the College with electricity. We serve them with water, but they own the infrastructure on their property.
- 6500 Electric Meters and 4000 Water Meters
- 148 Miles of Underground Electric Cable, 10 Miles of Overhead Electric Cable
- 95 Miles of Potable Watermain, 52 Miles of Raw Watermain



Mapping History

- Operations Center maintained the electric and water maps using AutoCAD. Field staff were provided mapbooks.
- AutoCAD conversion to GIS by United Services Group (GRE) around 2010
- GIS Datasets maintained by MMU
 - Electric
 - Water
 - Fiber
 - Easements
 - We also maintain Zoning, Stormwater, Sanitary and some Transportation data for the City of Marshall Engineering Department



GIS Software, Hardware History

- Pre-2013
 - A few ArcMap Desktop Licenses
 - ArcReader on Toughbook laptops for Water and Electric field staff
- 2013
 - Added more ArcMap Desktop Licenses for editing and viewing
- 2014
 - Added a Webserver and ArcGIS Server
 - Started ArcGIS Online maps
 - Purchased our first iPads
- 2019
 - Signed an ELA with ESRI.
 - Licensing for Desktop, Server/Enterprise, Online



GIS Software, Hardware History

- 2021
 - Migrated all File Geodatabases to Enterprise Geodatabases
 - Purchased a Trimble R2 GNSS Receiver and iPad for GPS fieldwork. We are using ESRI Field Maps for field mapping.



Let's Talk About Data!

- Attributes For All Datasets
 - Location
 - GPS vs. Air Photo vs. Aesthetic
 - Installation Date
 - Material
 - Type
 - Ownership
 - Attachments
 - Pictures
 - Documents
 - Links to other systems



Let's Talk About Data!

- Keeping Data Updated
 - Access to CIS data
 - Good Communication between field staff and GIS staff
 - An understanding of how the data can benefit their job
 - An understanding of how the data will be used at MMU and beyond
 - I am very lucky to have managers and co-workers who care about keeping the data updated and accurate



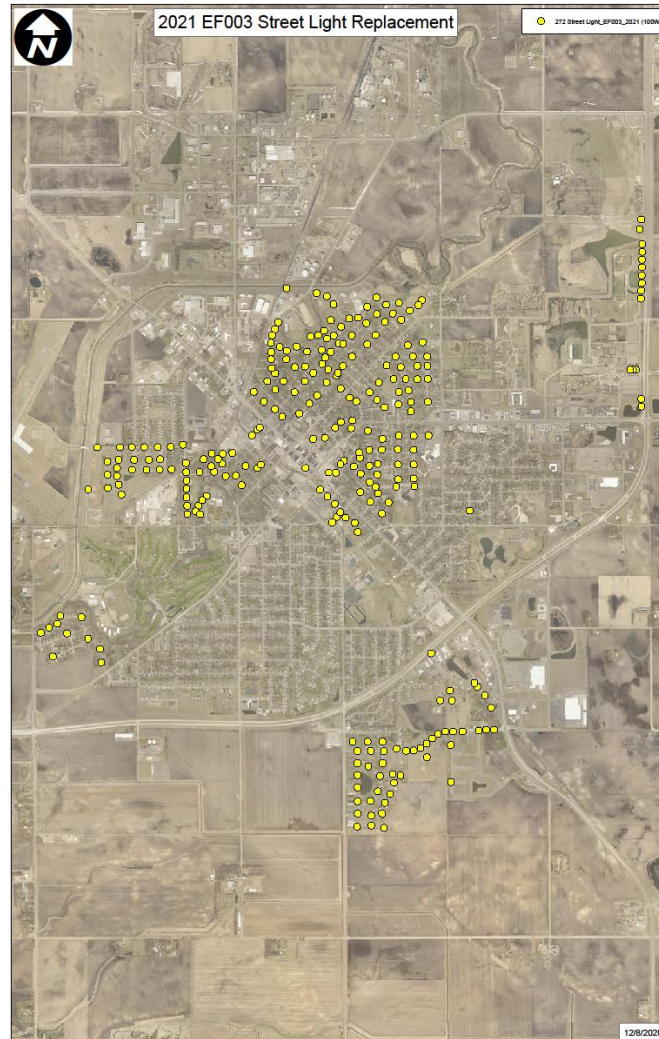
Electric

- Street Light Maintenance
 - HPS to LED conversion
 - Billing System accuracy
 - Security Lighting
 - Watt Summary
- Underground Cable Replacement
 - Replacement Planning by Age and Type
 - List Creation
 - Large Maps and Map Books
- Duct Banks



Electric

- Street Light Maintenance – HPS to LED Conversion



Electric

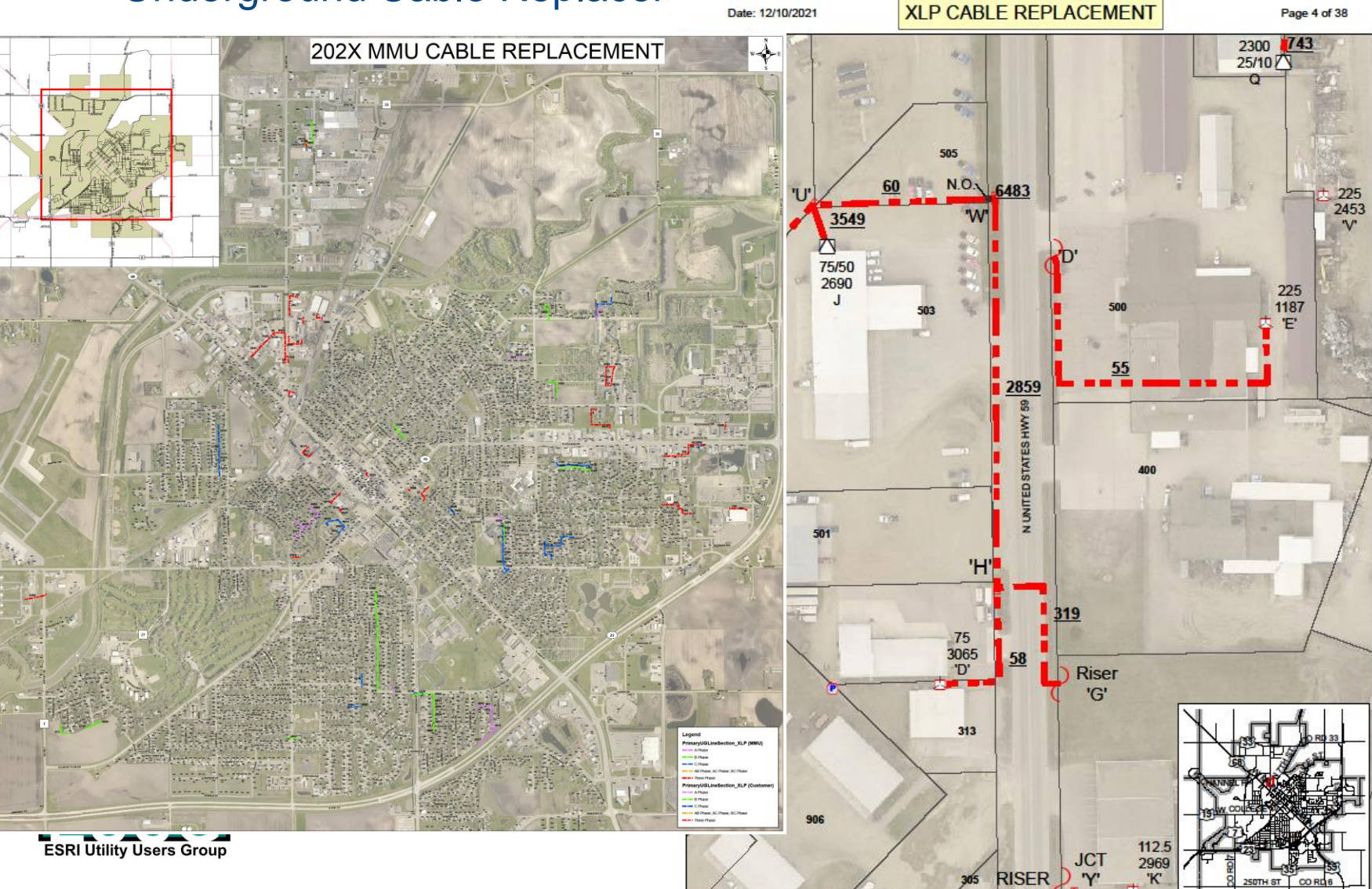
- Underground Cable
 - Replacement Planning by Year and Type - List Creation

XLP Jacketed Underground Cable Replacement List
3/15/2022

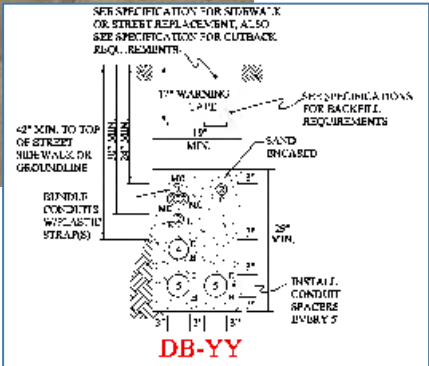
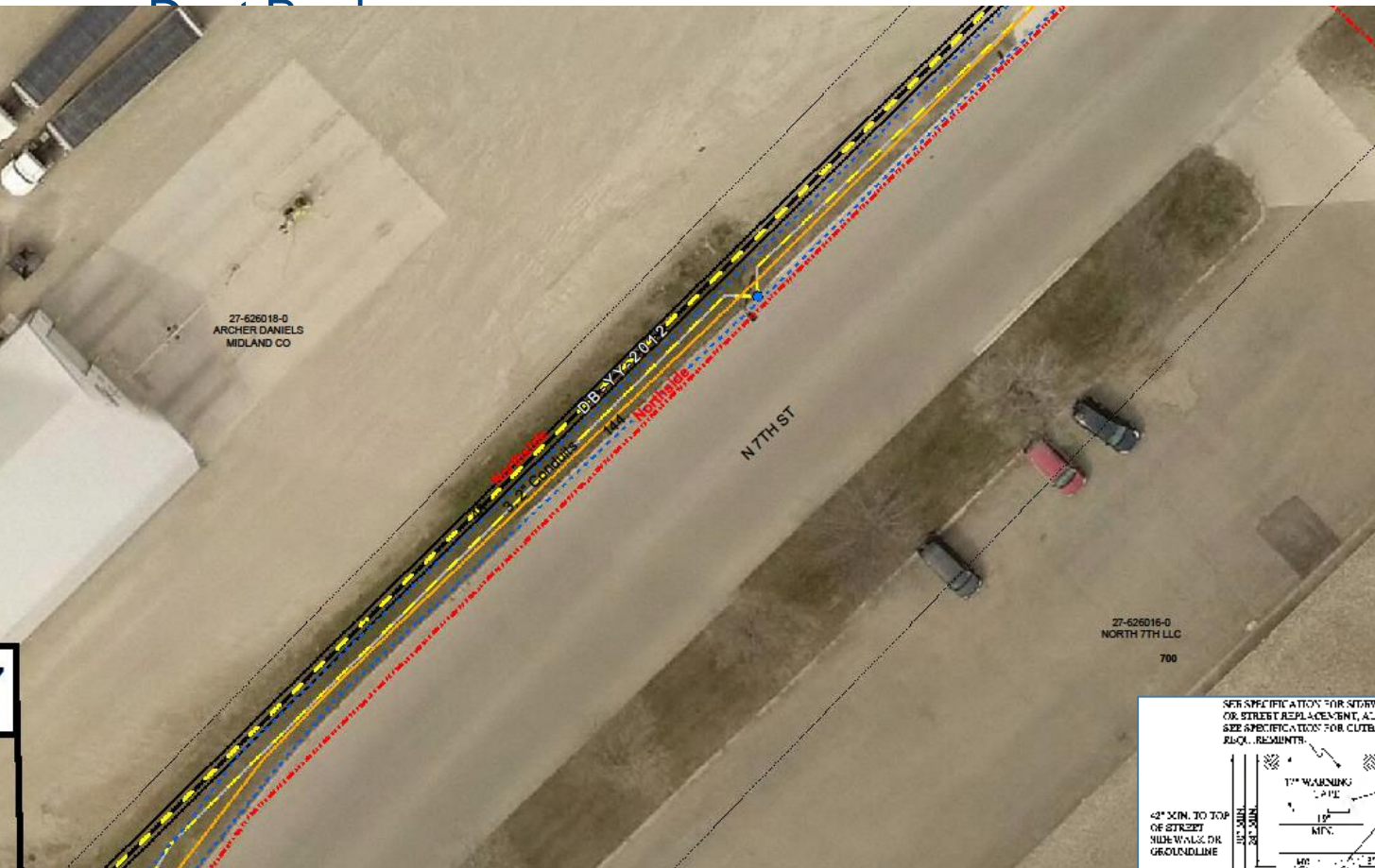
ID	Page #	Year	Address	Total Trench Length (ft)	Total Wire Length (ft)	Coet	Phase	Phasing	Install Date	Replace Date	Spliced or Faulted
25	22	2022	1401 PETERSON ST	216	3483	\$ 52,388.06	Three Phase	ABC	1988-07-01		
26	22	2022	200 PETERSON ST	194			Three Phase	ABC	1988-07-01		
188	22	2022	1406 E COLLEGE DR	162			Three Phase	ABC	1989-07-01		
746	22	2022	1410 E COLLEGE DR	424			Three Phase	ABC	1989-07-01		
6532	23	2022	1410 E COLLEGE DR	18			Three Phase	ABC	1989-07-01		
189	23	2022	1414 E COLLEGE DR	150			Three Phase	ABC	1993-06-02		YES
207	23	2022	11414 E COLLEGE DR	103	103	\$ 5,128.20	C Phase	C	1989-07-01		
749	28	2022	1001 N HWY 23	333	1000	\$ 15,005.74	Three Phase	ABC	1989-07-01		
1863	26	2022	1103 WASHINGTON AVE	434	1379	\$ 68,858.53	C Phase	C	1989-07-01		
4278	26	2022	1103 WASHINGTON AVE	446			C Phase	C	1989-07-01		
4279	26	2022	1103 WASHINGTON AVE	17			C Phase	C	1989-07-01		
1770	26	2022	606 JEFFERSON CIR	128			C Phase	C	1989-07-01		
1768	26	2022	604 VAN BUREN ST	354			C Phase	C	1989-07-01		
311	24	2022	501 S WHITNEY ST	307	2440	\$ 109,800.00	A Phase to Three Phase	A	1989-07-01		YES
8058	24	2022	501 S WHITNEY ST	43			A Phase to Three Phase	A	1989-07-01		
1280	25	2022	501 S WHITNEY ST	12			C Phase to Three Phase	C	1992-07-01		
1281	25	2022	501 S WHITNEY ST	19			C Phase to Three Phase	C	1992-07-01		
1584	24	2022	501 S WHITNEY ST	32			C Phase to Three Phase	C	1990-07-01		
1585	24	2022	501 S WHITNEY ST	393			C Phase to Three Phase	C	1990-07-01		
1588	25	2022	501 S WHITNEY ST	388			C Phase to Three Phase	C	1990-07-01		
1290	24	2022	500 KENNEDY ST	173			B Phase to Three Phase	B	1990-07-01		
916	24	2022	504 KENNEDY ST	78			B Phase to Three Phase	B	1990-07-01		
871	24	2022	506 KENNEDY ST	173			B Phase to Three Phase	B	1990-07-01		
1566	25	2022	104 CIRCLE DR	250	250	\$ 12,500.00	C Phase	C	1992-07-01		
1412	21	2022	1104 SKYLINE DR	502	1513	\$ 75,848.71	B Phase	B	1992-07-08		YES
6720	21	2022	1104 SKYLINE DR	17			B Phase	B	1992-07-08		YES
1791	21	2022	1109 SKYLINE DR	262			C Phase	C	1992-07-01		YES
8003	21	2022	1109 SKYLINE DR	47			C Phase	C	1990-07-01		YES
613	21	2022	1113 SKYLINE DR	228			C Phase	C	1992-07-01		
5418	21	2022	1115 SKYLINE DR	293			C Phase	C	1992-07-08		
5394	21	2022	1118 SKYLINE DR	10			C Phase	C	1992-07-08		
5420	21	2022	1114 SKYLINE DR	154			C Phase	C	1992-07-08		
695	27	2022	400 JEWETT ST	527	1580	\$ 23,701.83	Three Phase	ABC	1989-07-01		
931	8	2022	1002 DANO CIR	4	415	\$ 20,738.78	A Phase	A	1990-07-01		
1057	8	2022	1002 DANO CIR	204			A Phase	A	1990-07-01		
1073	8	2022	1004 DANO CIR	206			A Phase	A	1990-07-01		
911	6	2022	805 COLT ST	139	496	\$ 24,817.44	B Phase	B	1990-07-01		
5803	6	2022	1005 E FAIRVIEW ST	358			B Phase	B	1990-07-01		YES
4552	40	2022	305 N A ST	33	194	\$ 9,699.82	C Phase	C	1992-07-01		
8048	40	2022	305 N A ST	181			C Phase	C	1992-07-01		
			Year 1 Total	7565	12863	\$ 418,385.10					

Electric

- Underground Cable Replacement - Large Map and Map Books



Electric



Water

- Hydrant Flushing
- Valve Turning
- System Pressure Modeling
- Lead Services



Water

- Hydrant Flushing

Home ▾ Hydrant Flushing ✎

Open in new Map Viewer New Map ▾ Create Presentation Ryan ▾

Details Add ▾ Edit Basemap Analysis Save ▾ Share Print ▾ Directions Measure Bookmarks Find address or place 🔍

About Content Legend

Contents

- HydrantFlushing (Fall 2021)
- WaterPhotos
- Water Layers
- AddressPoints
- SandnesRawWaterPhotos
- Roads
- Parcels
- YMCountyLayers
- AirPhotos Countywide

Hydrant Flushing

MAKE_MODEL	WATEROUS 59
YEAR	1999
FLUSHED	Yes
FLUSH_DATE	
PUMPED_OUT	
NEEDS_PAINT	
NEEDS_EXT	

[Zoom to](#) [Edit](#) [Get Directions](#)

0 0.3 0.6mi

POWERED BY ESRI

Water

- Valve Turning

Home ▾ Valve Turning ✎

Open in new Map Viewer New Map ▾ Create Presentation Ryan ▾

Details Add ▾ Edit Basemap Analysis

Save ▾ Share Print ▾ Directions Measure Bookmarks Find address or place 🔍

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- YMCountyLayers
- AirPhotos Countywide

1 of 2

Active

STATUS	Active
TURNED	Y
NEEDS REPAIR	
FIELD NOTES	
OTHER NOTES	
# OF TURNS	

Attachments:
No attachments found

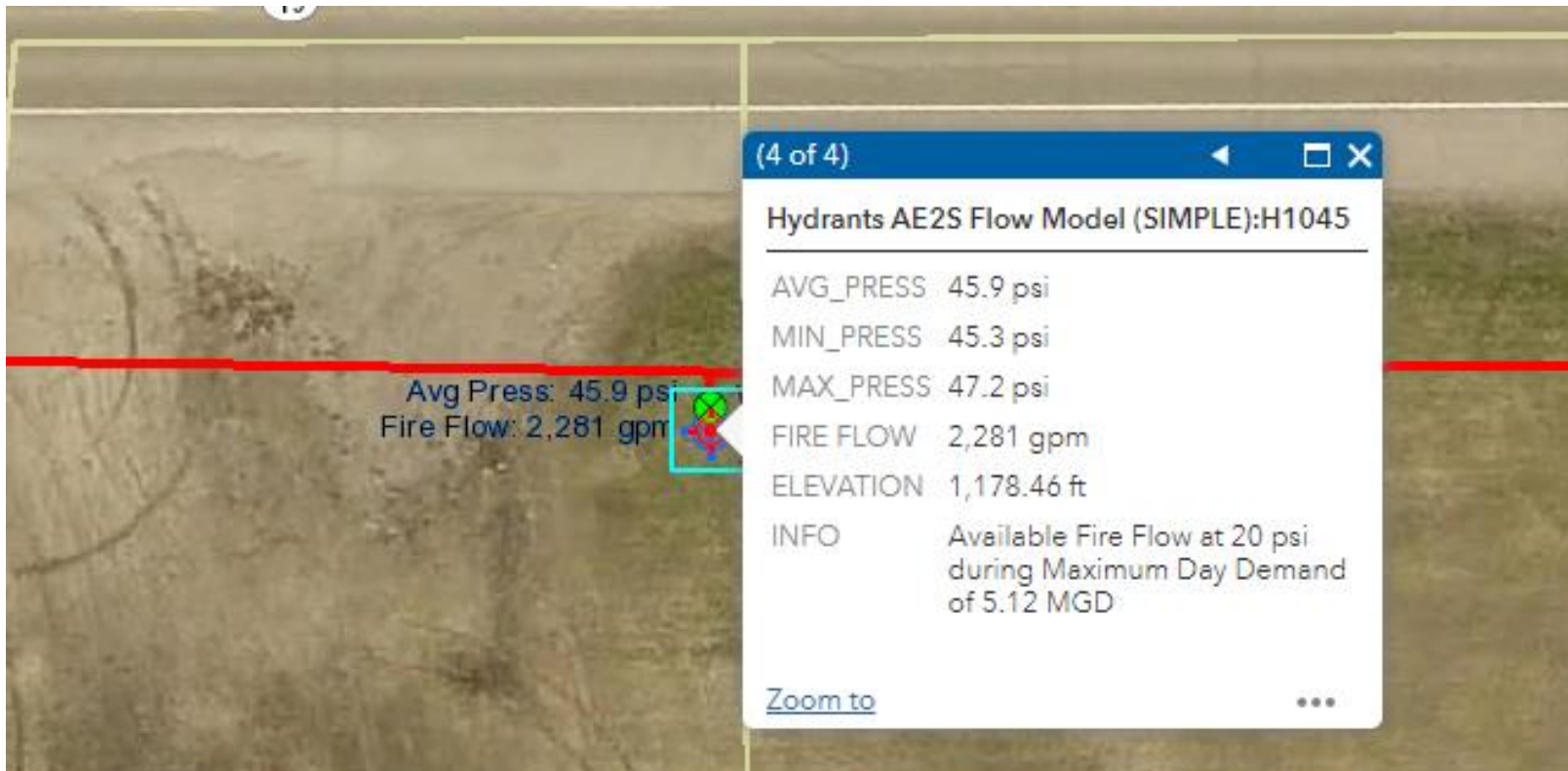
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esri

Water

- System Pressure Modeling



Water

- Lead Water Service

The screenshot displays an aerial map view in ArcGIS with several utility features overlaid. A prominent green line represents a 'Lead Pipe Service' running diagonally across the map. Other features include purple dashed lines for '4" Main Cast Iron' and yellow markers for 'WaterMeter'. A data popup window is open, showing the following details for the selected 'Lead Pipe Service':

Field	Value
PLACE	
LOCATION	
NewPropertyAddress	118 3RD ST N
Name_1	COLEMAN MANAGEMENT I
AccountNumber	77-0061-00
MeterID	18683990
Lead_Service	Y
LAT	44.44814167
LONG	-95.78898044
ERT_NUM	0120214187
Lead_Verified_By	MMU

The interface also includes a search bar at the top left with the text 'Lead Pipe Service', an 'Edit' window at the top right, and various map navigation controls. The map shows surrounding properties with labels such as 'SHILOH CO COMMERCIAL PROP LLC', 'LYON COUNTY & MUNICIPAL CORP', and 'HILLER, JOHN SCOTT/FRUIT'.

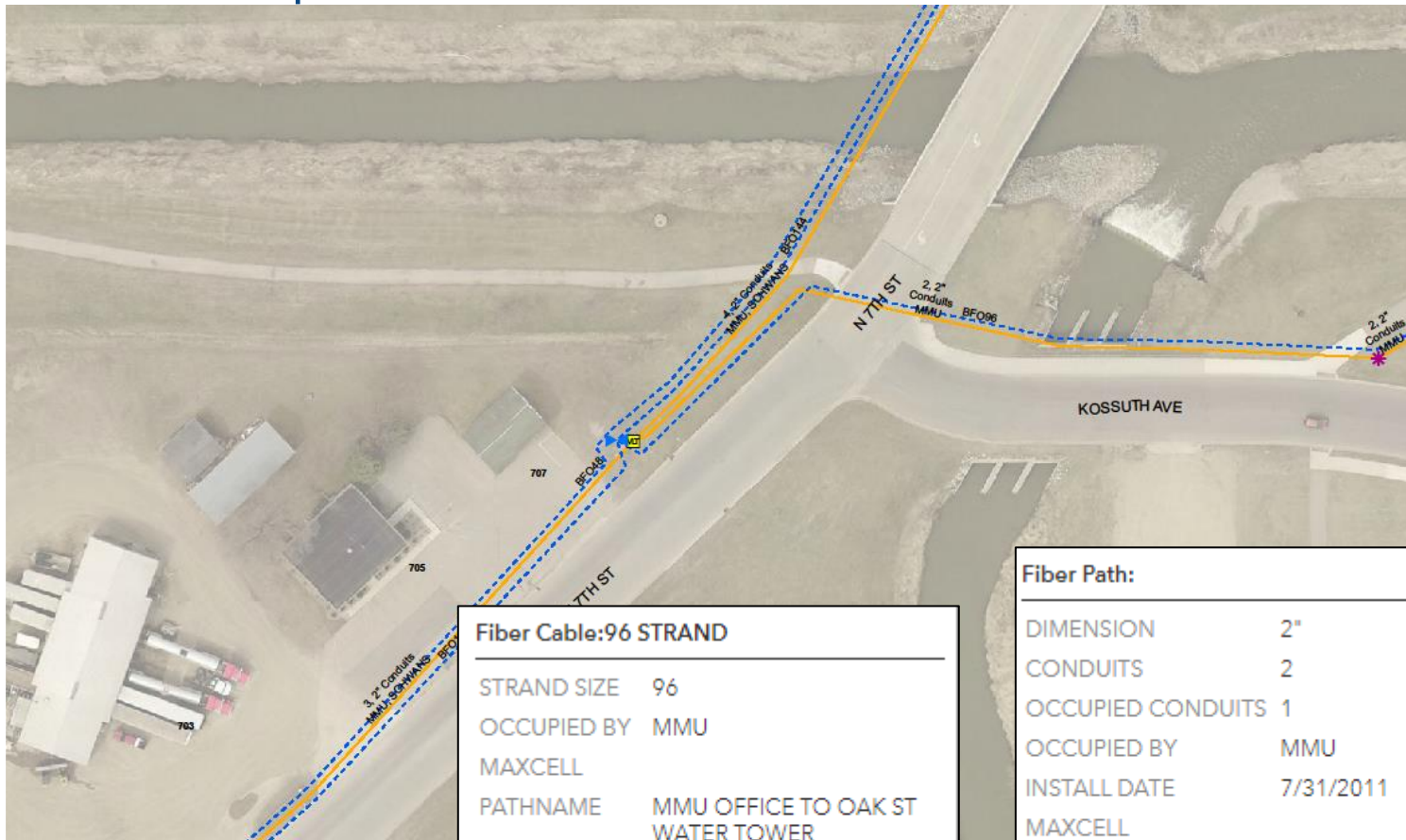
Fiber

- Fiber Connection to all MMU Buildings
 - Main Office, Substations, Water Plant, Warehouse
- Who occupies the conduit and/or fiber
- Splicing
- Patch Panel Documentation



Fiber

- Who occupies the conduit and fiber



Fiber Cable:96 STRAND	
STRAND SIZE	96
OCCUPIED BY	MMU
MAXCELL	
PATHNAME	MMU OFFICE TO OAK ST WATER TOWER
INSTALL_DATE	4/30/2016
COMMENTS	
GPS_LOCATED	

Fiber Path:	
DIMENSION	2"
CONDUITS	2
OCCUPIED CONDUITS	1
OCCUPIED BY	MMU
INSTALL DATE	7/31/2011
MAXCELL	
TYPE	
GPS LOCATED	
comments	



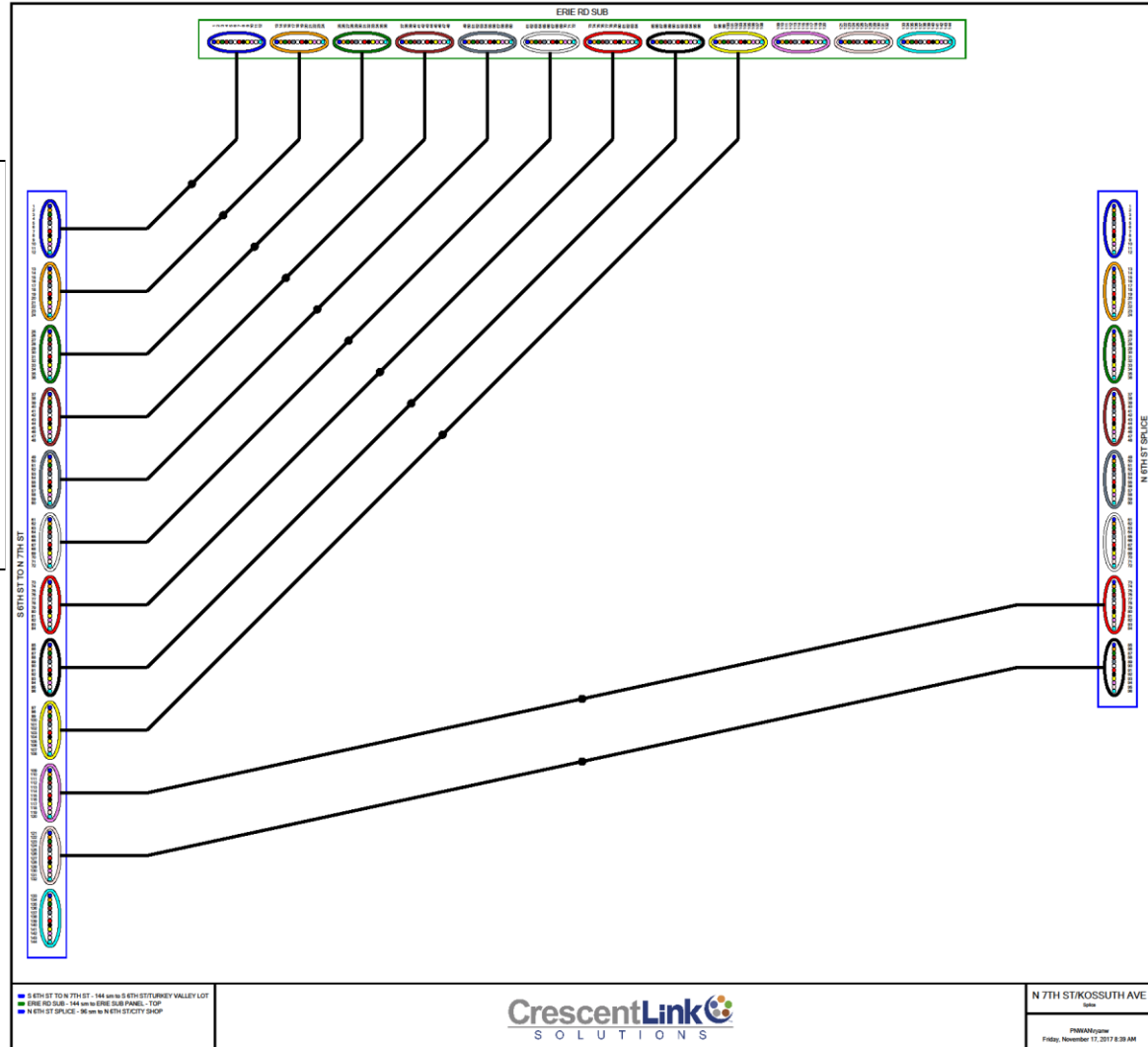
Fiber

- Splicing

Fiber Splice Point:

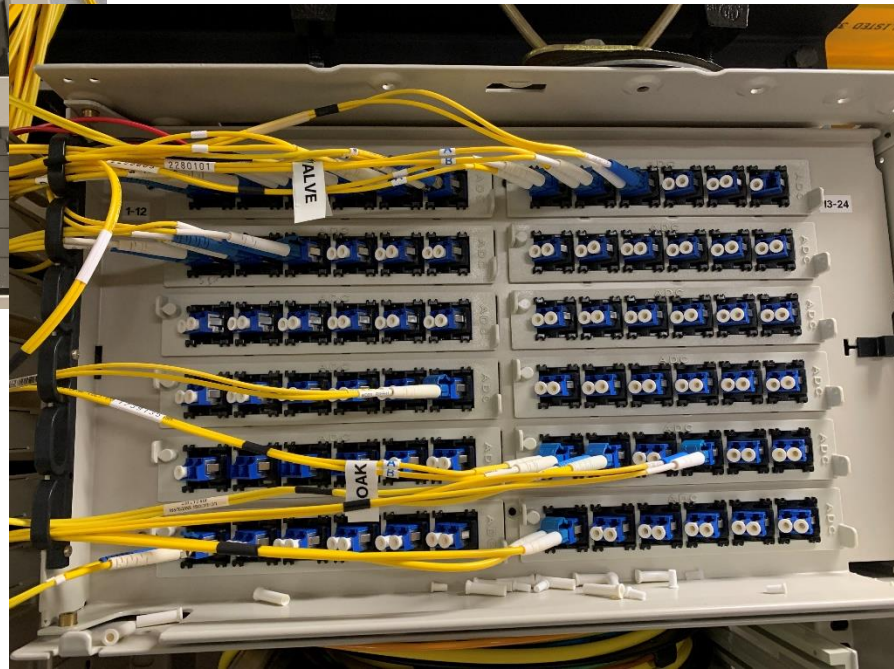
Subtype Splice
Station ID N 7TH ST/KOSSUTH AVE
Status Existing
Type
Install Date
comments

Attachments:
[CLSD N 7TH ST KOSSUTH AVE \(47\).pdf](#)



Fiber

- Patch Panel Documentation



Fiber

- Patch Panel documentation

MMU DC Patch Panel "MUOCPP06" (to Erie Road Substation)																														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
port 1,2 to R5500 port 1	port 1,2 to R5500 port 2	WWTP	WWTP	Fiber Data	Fiber Data	GCADA Data	GCADA Data	WEST Center	WEST Center	Patched From MUOCPP06 11,12 (Oak St. Lift)	Patched From MUOCPP06 12,13 (Oak St. Lift)	R5500	R5500	SPM Value to Port 123 on MUOCPP06	SPM Value to Port 123 on MUOCPP06	ROOM Value to Port 123 on MUOCPP06	ROOM Value to Port 123 on MUOCPP06													
WWTP 1st Street Lift Station - Jumped to MUOCPP07 27,28	WWTP 1st Street Lift Station - Jumped to MUOCPP07 27,28	Patched to MUOCPP02 15,16 (WWTP Oak St. Lift)	Patched to MUOCPP02 15,16 (WWTP Oak St. Lift)	Patched to MUOCPP01 13,14 (WWTP Tiger Lake Lift)	Patched to MUOCPP01 13,14 (WWTP Tiger Lake Lift)																									
49	50	51	52	53	54	55	56	57	58	59	60																			
61	62	63	64	65	66	67	68	69	70	71	72																			
73	74	75	76	77	78	79	80	81	82	83	84																			
87	88	89	90	91	92	93	94	95	96	97	98																			
Patched to MUOCPP06 11,12 (WWTP Oak St. Lift)	Patched to MUOCPP06 11,12 (WWTP Oak St. Lift)																													

13
 14
 15
 WWTP Oak street lift
 Oak Water Tower and street shop



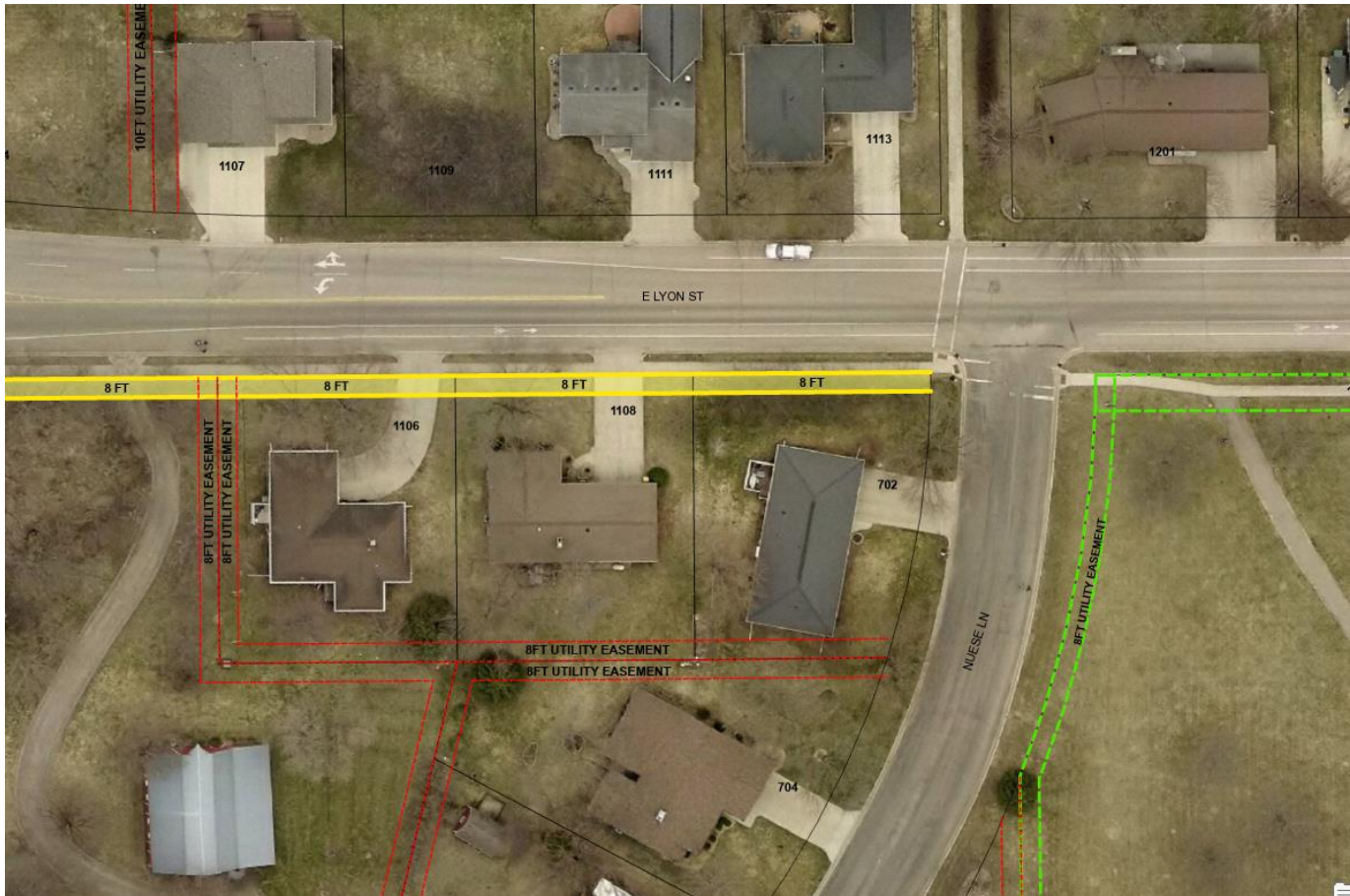
Easements

- Create New Easements
 - Size
 - Location
 - Description
- Link Legal Documents
- Lot Pins
 - Locate
 - Mark Approximate Locations



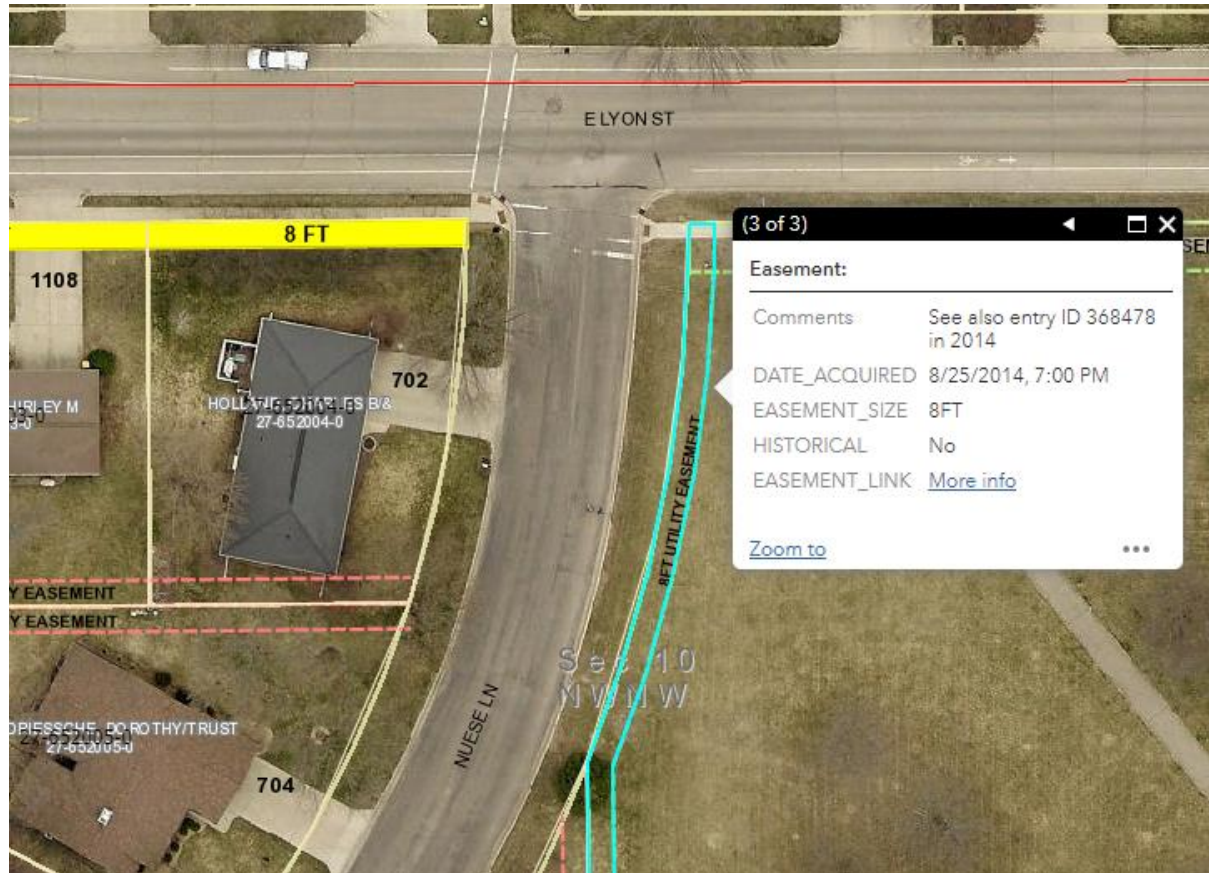
Easements

- Create New Easements - Size, Location, Description



Easements

- Link Legal Documents



Easements

- Link Legal Documents

1200 Lyon St E Independence Park - 27-819012-0 (Read Only)

GRANT OF EASEMENT

THIS AGREEMENT, made and entered into this 26th day of August, 2014, between City of Marshall, a municipal corporation

As Grantor, and:
Marshall Municipal Utilities, a Municipal Corporation, as grantee.

The above named parties are collectively and individually, referred to as the Grantees.

WITNESSETH:
For and in consideration of One and no/100 (\$1.00) Dollar and other valuable consideration, the receipt of which is hereby acknowledged by the Grantor, the Grantor gives and grants to the Grantee, its successors and assigns, the right to enter upon and occupy, the right of ingress and egress, the right to construct, install, repair, maintain, operate, use and replace utility facilities owned by the Grantee on the following described property in Lyon County, Minnesota:

The Westerly Eight (8) feet and the Southerly Eight (8) feet of the following described property: That part of the Northwest Quarter (NW¼) of Section Ten (10), Township One Hundred Eleven North (111N), Range Forty-one West (41), described as follows: Beginning at a point 662.35 feet East of the Northwest corner of said Section 10; thence South approximately 1,471 feet to the North line of the Holy Redeemer Cemetery; thence East and on the extension of the North line of said cemetery to the Northwestern right-of-way line of Trunk Highway No. 23; thence Northwesterly on the Northwestern right-of-way line of Trunk Highway No. 23 to the

GRANT OF EASEMENT
THIS AGREEMENT, made and entered into this day of 2014, between City of Marshall a municipal corporation As Grantor, and: Marshall Municipal Utilities, a Municipal Corporation, as grantee. The above named parties are collectively and individually, referred to as the Grantees. WITNESSETH: For and in consideration of One and no /100 (\$1.00) Dollar and other valuable consideration, the receipt of which is hereby acknowledged by the Grantor, the Grantor gives and grants to the Grantee, its successors and assigns, the right to enter upon and occupy, the right of ingress and egress, the right to construct, install, repair, maintain, operate, use and replace utility facilities owned by the Grantee on the following described property in Lyon County, Minnesota: The Westerly Eight (8) feet and the Southerly Eight (8) feet of the following described property: That part of the

1200 Lyon St E Independence ... ☆

Details Fields Annotations More ▾

Template
EASEMENTS ▾

HOUSE
1200

STREET
Lyon St E Independence Park

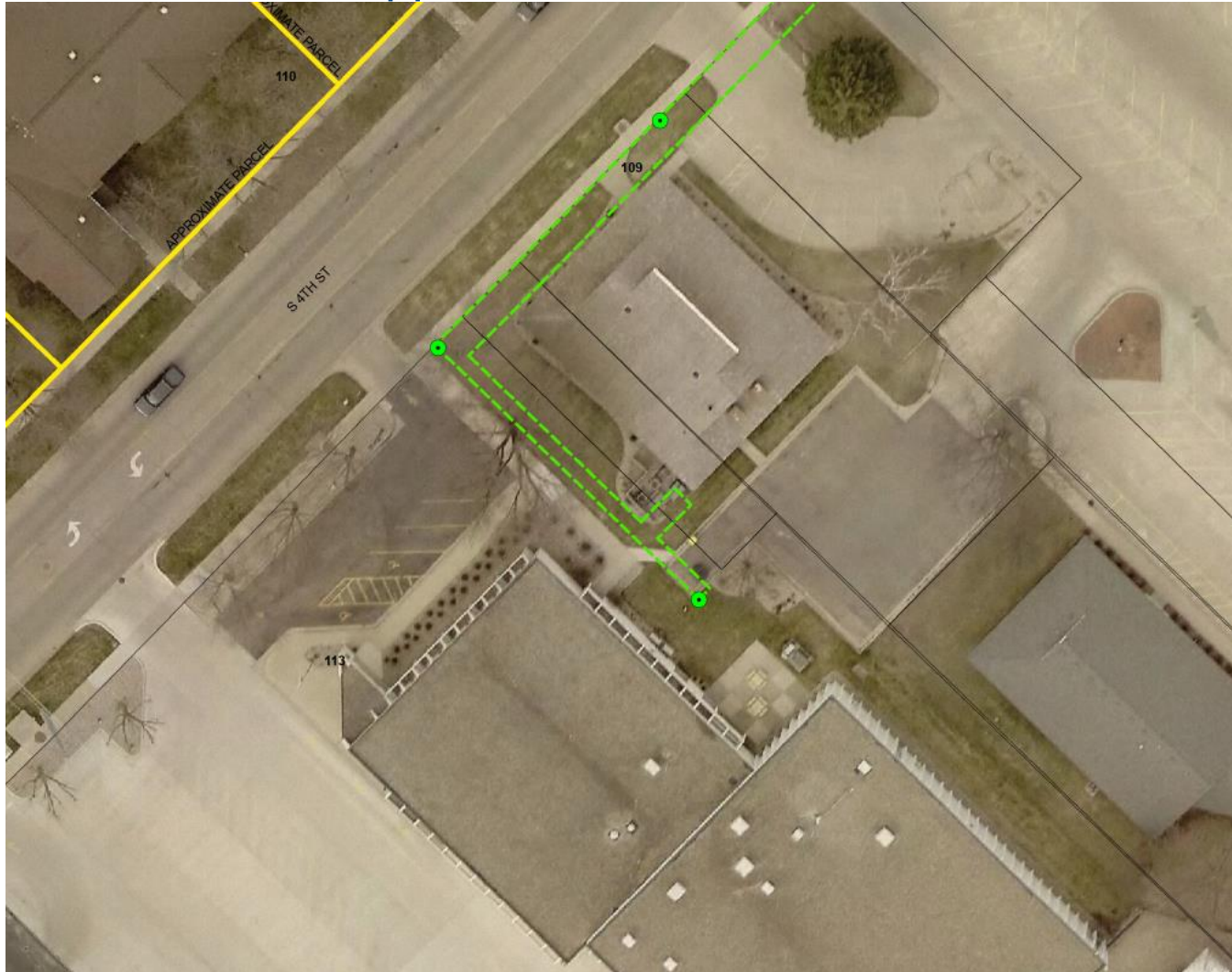
PARCEL
27-819012-0

GIS LINKED
YES ▾

Fields
No additional fields assigned

Easements

- Lot Pins – Locate, Mark Approximate Locations



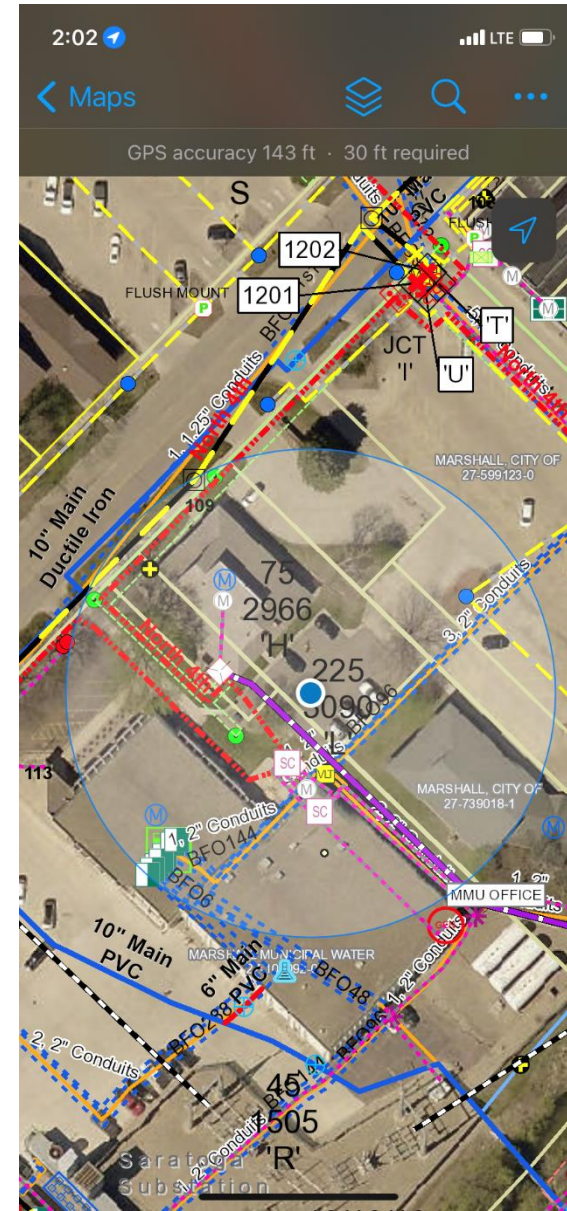
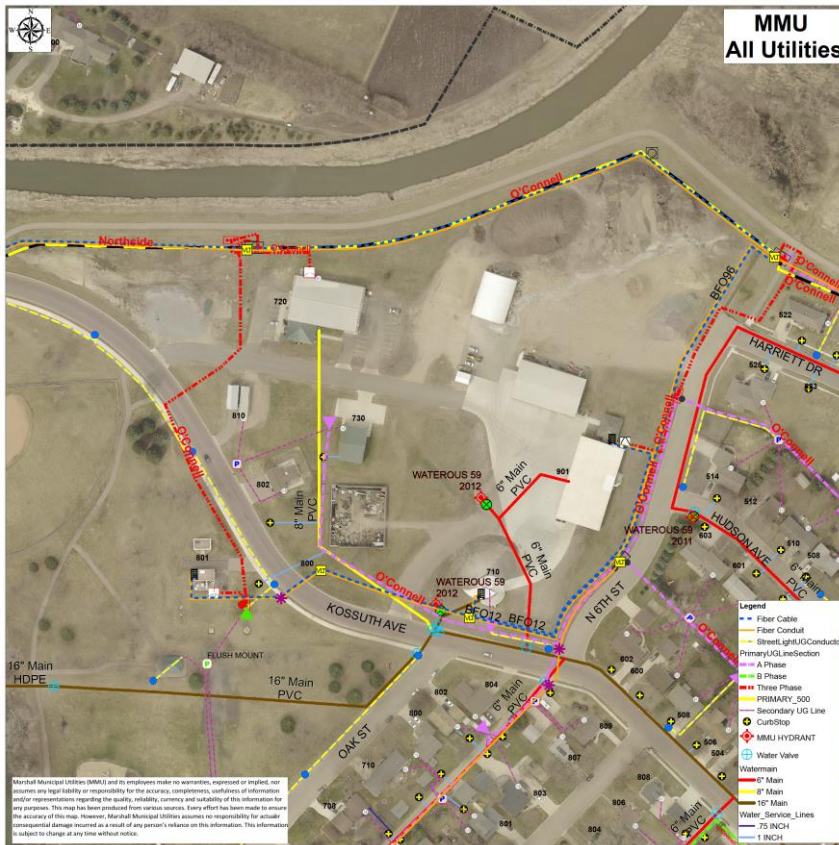
What else do we do with all this data?

- Daily Project Meetings
- Electric System Switching Procedures
- Weekly Meetings With City Engineers
- Monthly Meeting with City Engineers and Local Utilities
- Locating and Locate Tickets
- Operations Dashboards



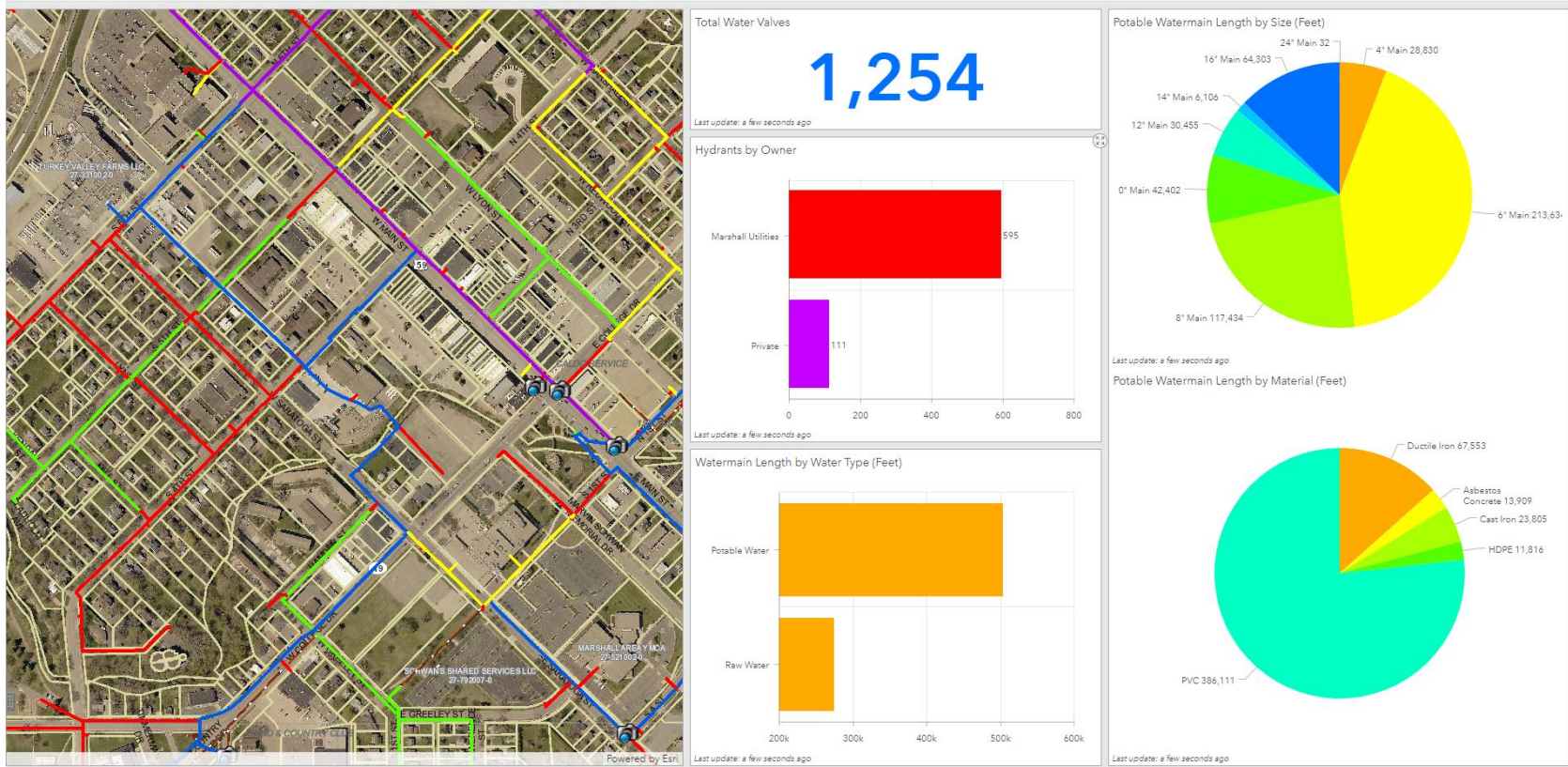
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- Locating and Locate Tickets



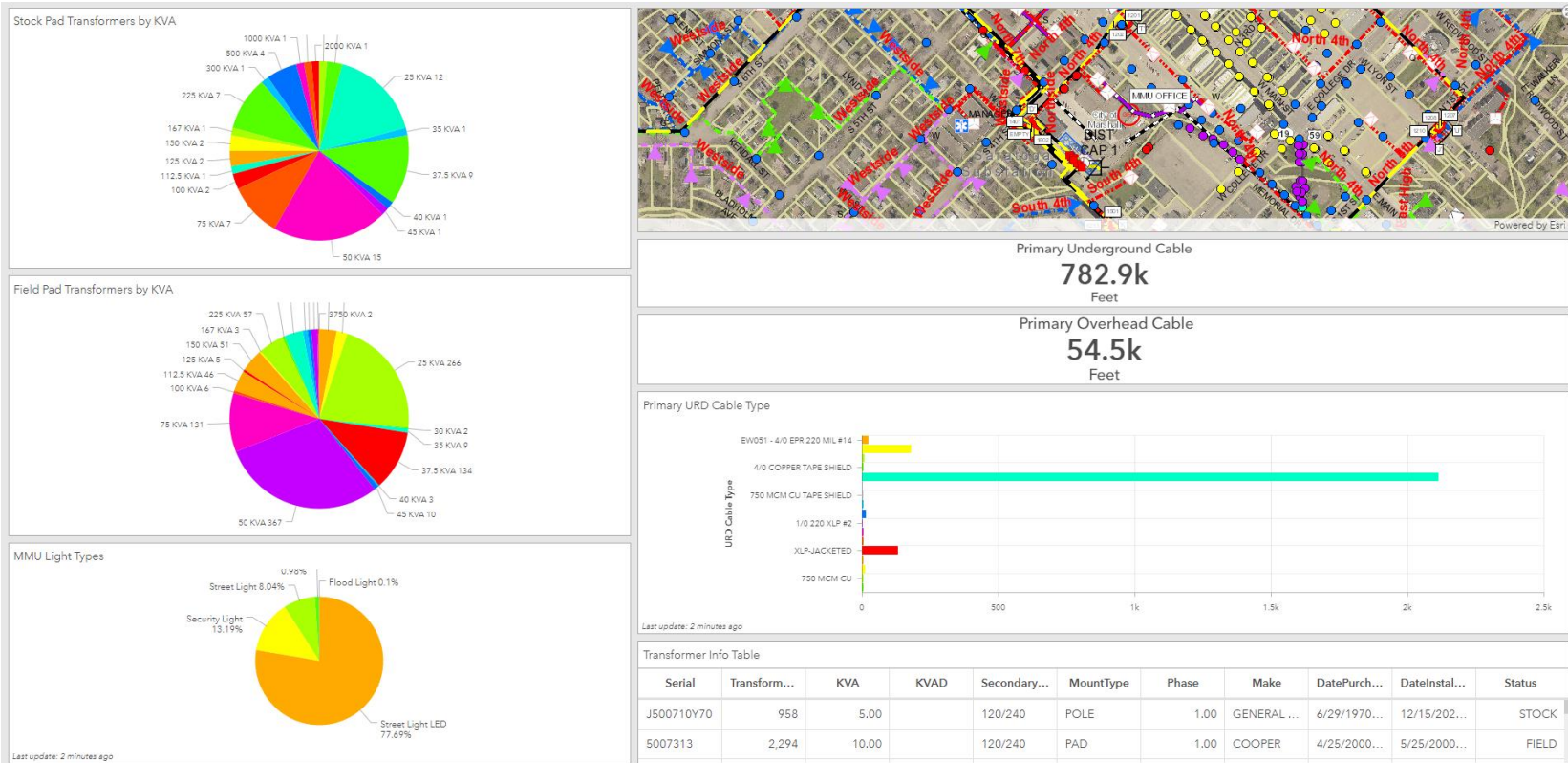
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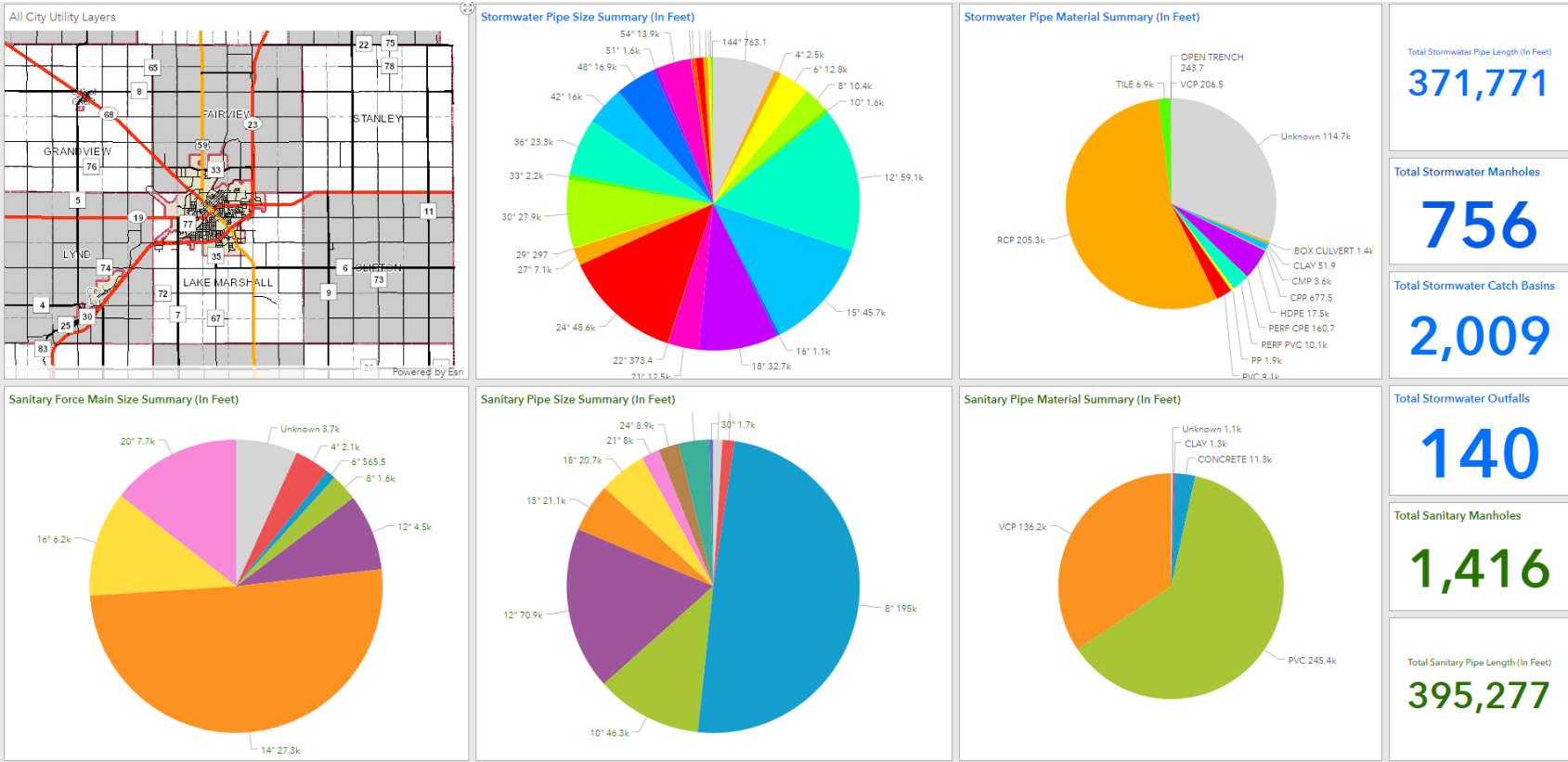
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What else do we do with all this data?

- Operations Dashboards



In Conclusion

- Be Patient, Be Available
- Work towards accurate, reliable data
- Implement the obvious and simple uses of GIS first
- Be prepared to explain your needs for software, licensing, technology. Don't expect to get it right away.
- Set some feasible goals



Questions?



Thank You!

Ryan Wendt, GISP

Systems Integration Coordinator

Marshall Municipal Utilities

ryanw@marshallutilities.com

