ASSET MANAGEMENT:
Developing an Asset Management Program

Presented by
James Gaertner, PE, CPM

August 22, 2024

Many cities are reactionary since there are many things competing for the money available.

- Economic Development
- Staff
- Services
- Infrastructure for Growth
- Infrastructure Maintenance

What am I supposed to do?

Start with the Vision

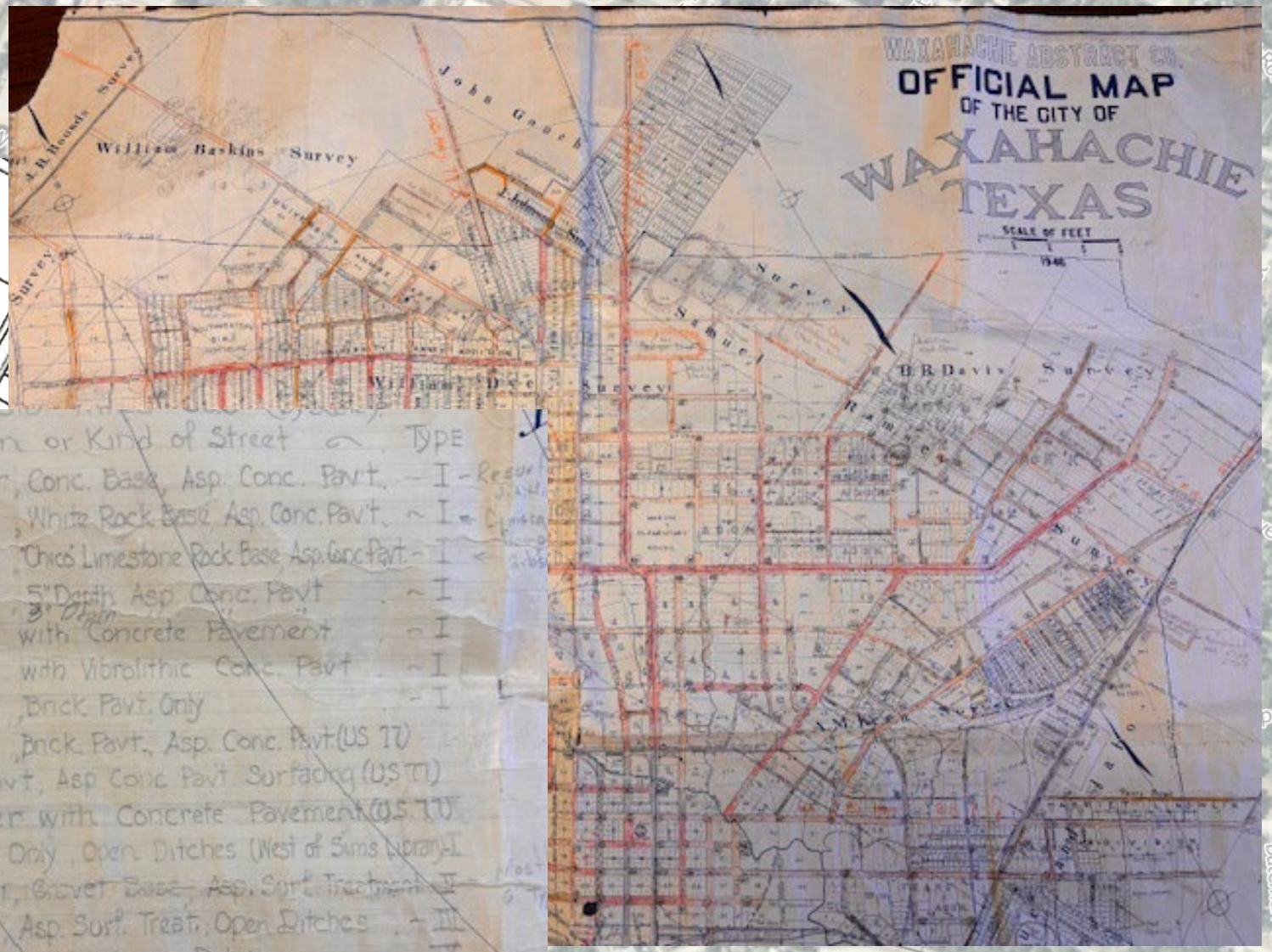
- Set a Plan to Accomplish it
- Get Buy in from Team
- Have the Team set Achievable yearly Goals
- Follow up and Adjust as Necessary

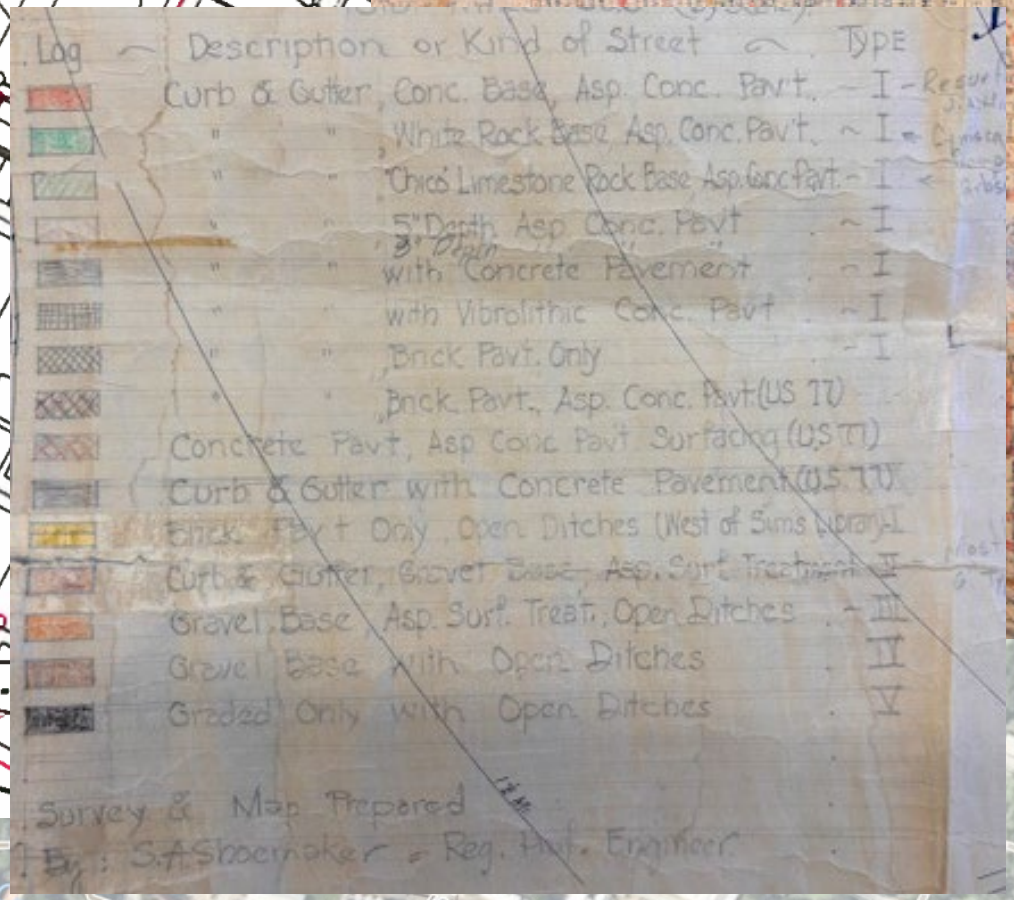
Public Works BHAGs

Big Hairy Audacious Goals

- APWA Accredited Department
- Intelligent CIP Planning & Implementation (Asset History and Data)
- Internal Project Design & Construction
- Go Digital
- Training to Empower

Why Go Digital?

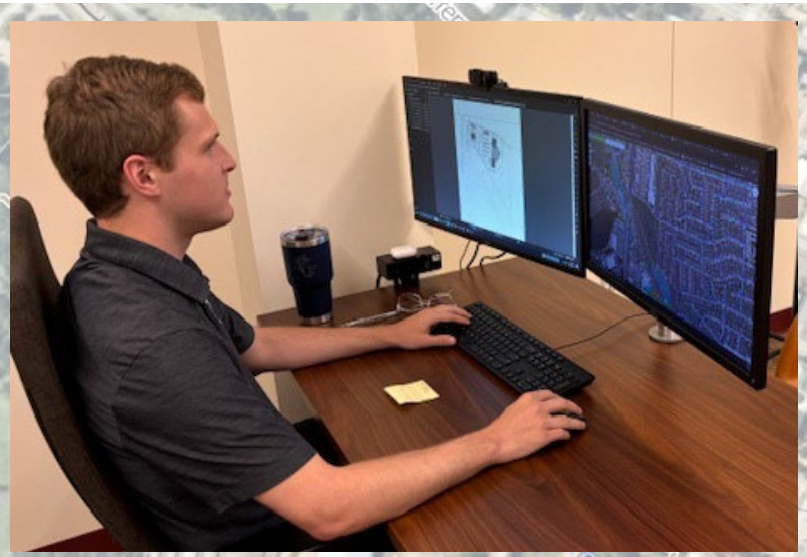




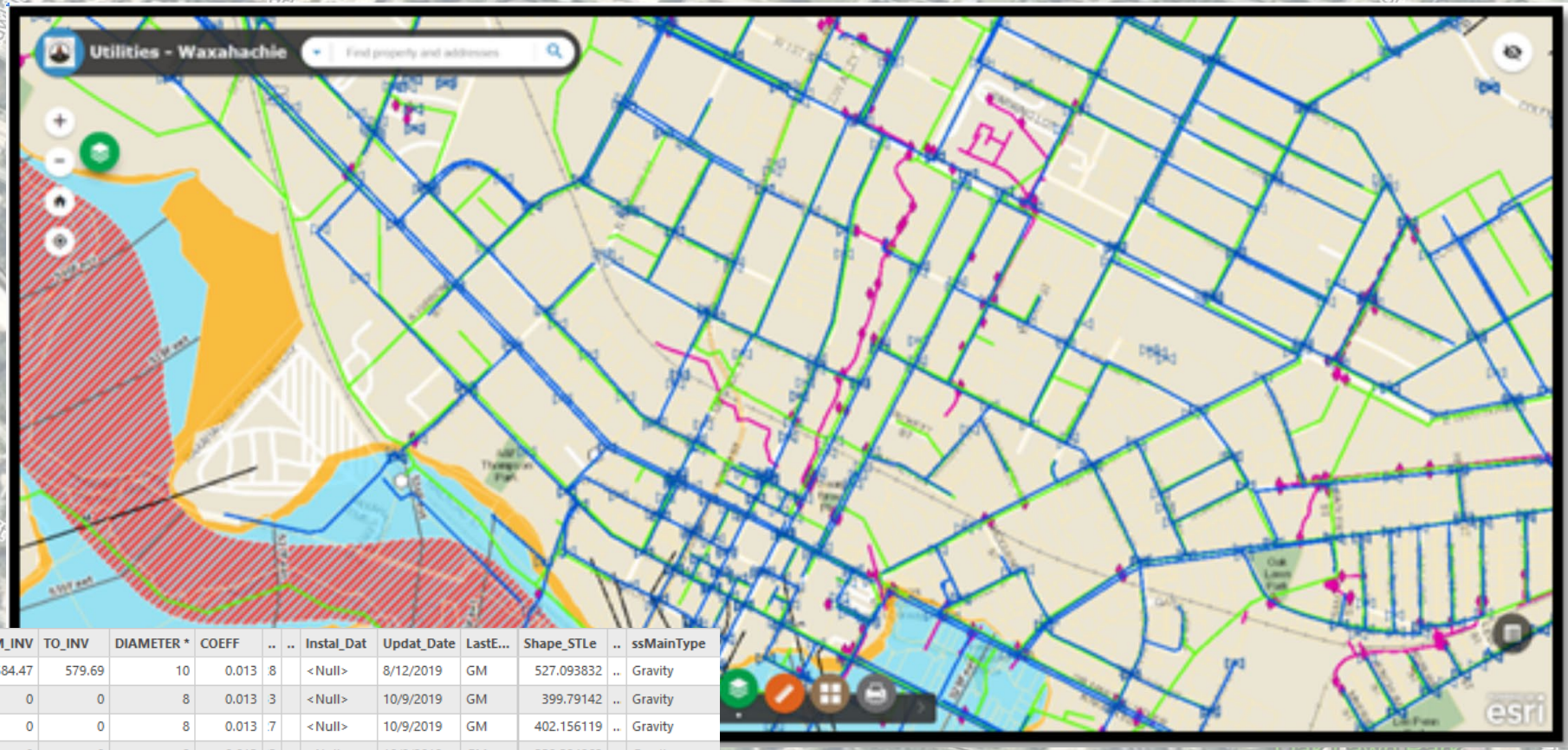
“Go Digital”

Digitize Everything

- Data in a System available to the Team
- Get info out of Team Members' heads
- Data Management Training to Key Staff
- Work as a Regional Team to share Data
  - Bids Tabulations, Ideas, Training, etc.



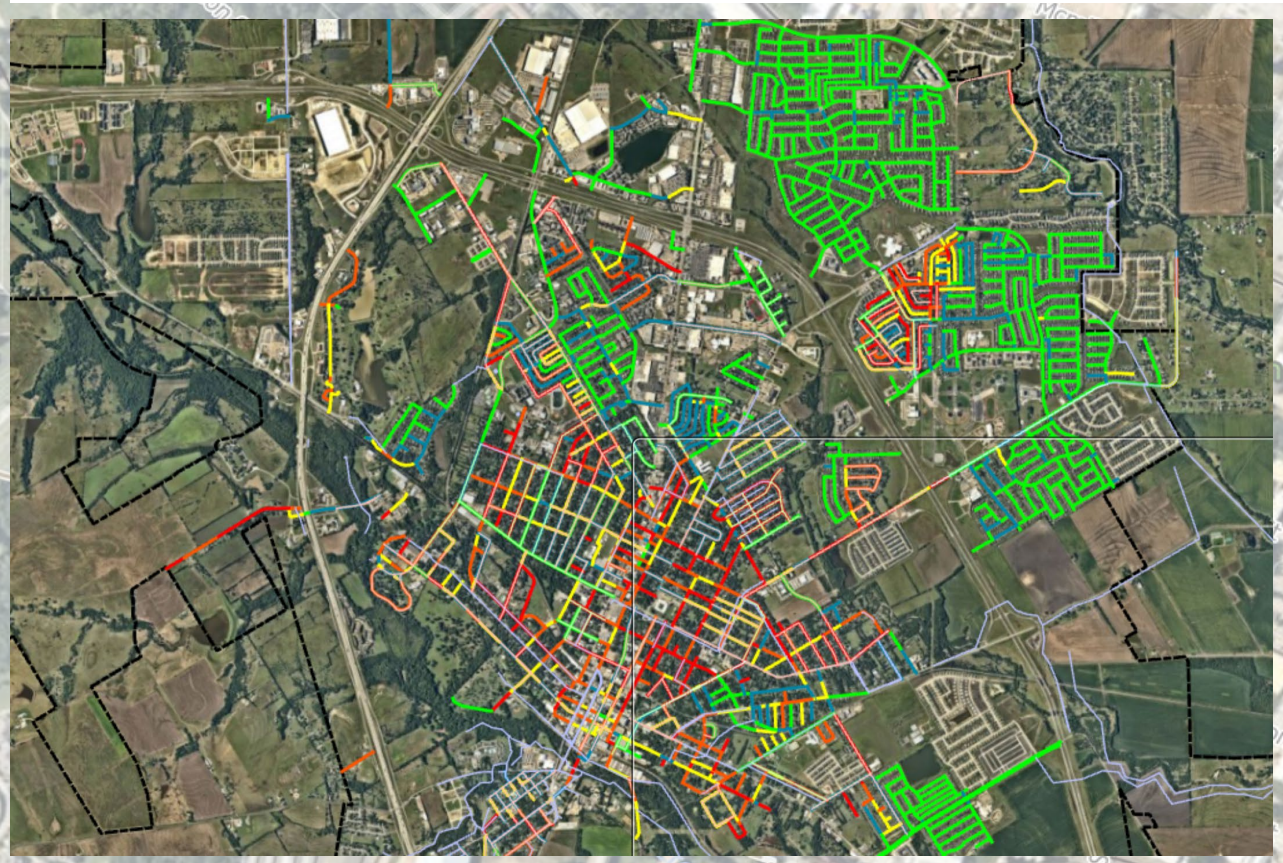
Updating GIS Mapping and Database



	OBJECTID *	Shape *	..	DESCRIPT	YR_INST *	Status	MAT...	..	FROM_INV	TO_INV	DIAMETER *	COEFF	..	..	Instal_Dat	Updat_Date	LastE...	Shape_STLe	..	ssMainType
1	1	Polyline ZM	0	Util Imp 5 Pts Rd	1986	Active	PVC	..	584.47	579.69	10	0.013	8		<Null>	8/12/2019	GM	527.093832	..	Gravity
2	2	Polyline ZM	0	Pine Meadows	1983	Active	PVC		0	0	8	0.013	3		<Null>	10/9/2019	GM	399.79142	..	Gravity
3	3	Polyline ZM	0	Pine Meadows	1983	Active	PVC		0	0	8	0.013	7		<Null>	10/9/2019	GM	402.156119	..	Gravity
4	4	Polyline ZM	0	Pine Meadows	1983	Active	PVC		0	0	8	0.013	3		<Null>	10/9/2019	GM	339.324962	..	Gravity
5	5	Polyline ZM	0	Ellis Street Sanitary Se...	1999	Active	PVC		595.53	589.4	6	0.013	5		3/16/1999	9/11/2019	ZK	394.060297	..	GravityMain
6	6	Polyline ZM	0	Ellis Street Sanitary Se...	1999	Active	PVC		589.36	585.58	6	0.013	8		3/16/1999	9/11/2019	ZK	386.966638	..	GravityMain
7	7	Polyline ZM	0	Ellis Street Sanitary Se...	1999	Active	PVC		584.2	583.47	6	0.013	9		3/16/1999	9/11/2019	ZK	320.524719	..	GravityMain
8	8	Polyline ZM	0	Referenced 1999	1950	Active	VCP		583.24	0	8	0	7		<Null>	9/11/2019	ZK	442.567704	..	GravityMain
9	9	Polyline ZM	0	Casa Linda	1978	Active	VCP		594.73	591.95	6	0	6		<Null>	10/9/2019	GM	374.544356	..	Gravity
10	10	Polyline ZM	0	Casa Linda	1978	Active	VCP		591.95	584.6	6	0	9		<Null>	10/9/2019	GM	577.332169	..	Gravity
11	11	Polyline ZM	0	Casa Linda	1978	Active	VCP		584.6	583.54	6	0	9		<Null>	10/9/2019	GM	281.239629	..	Gravity
12	12	Polyline ZM	0	Casa Linda	1978	Active	VCP		595.75	591.95	6	0	7		<Null>	10/9/2019	GM	395.990292	..	Gravity
13	13	Polyline ZM	0	Casa Linda	1958	Active	VCP		584	583.24	6	0	1		<Null>	9/11/2019	ZK	185.80253	..	GravityMain

"Go Digital"

- Record Drawings Scanned & in GIS
- Street Condition Assessment
  - Scanned City Roads (IMS)
  - PCI Scores and other Data



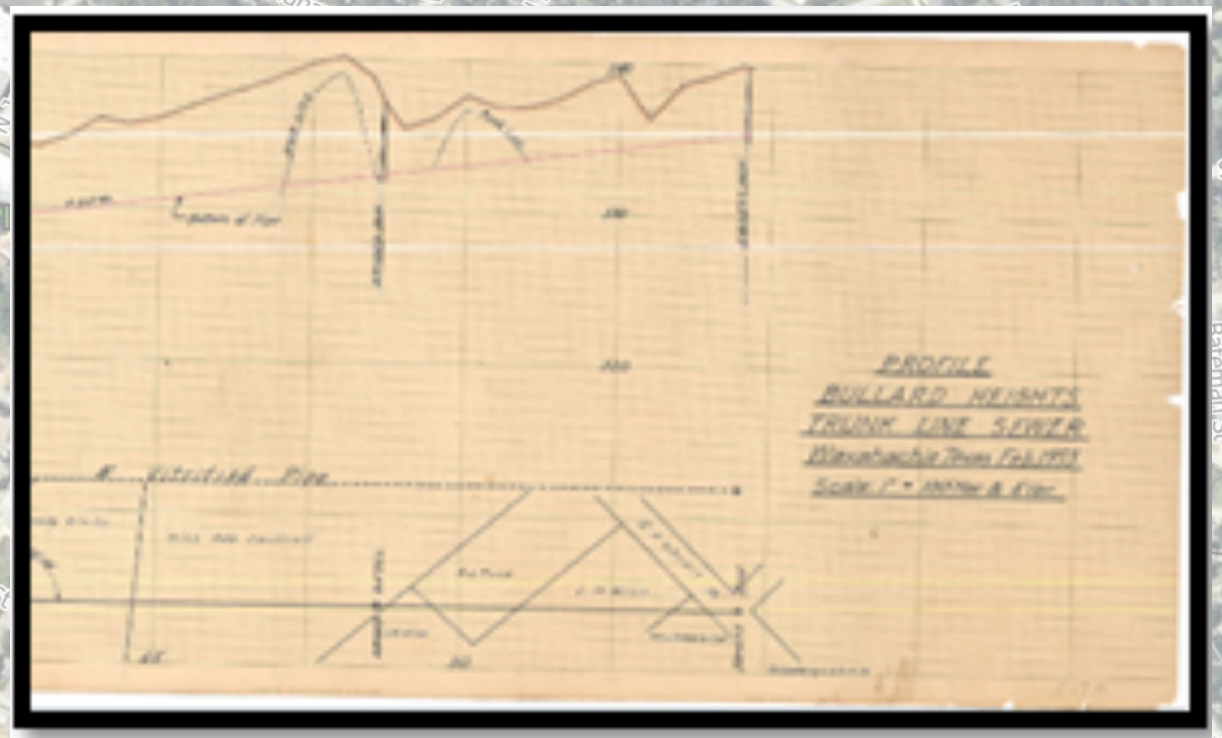

CITY OF WAXAHACHIE, TEXAS

CONSTRUCTION PLANS FOR:

TEXAS COMMUNITY DEVELOPMENT PROGRAM

JEFFERSON STREET SANITARY SEWER REHABILITATION

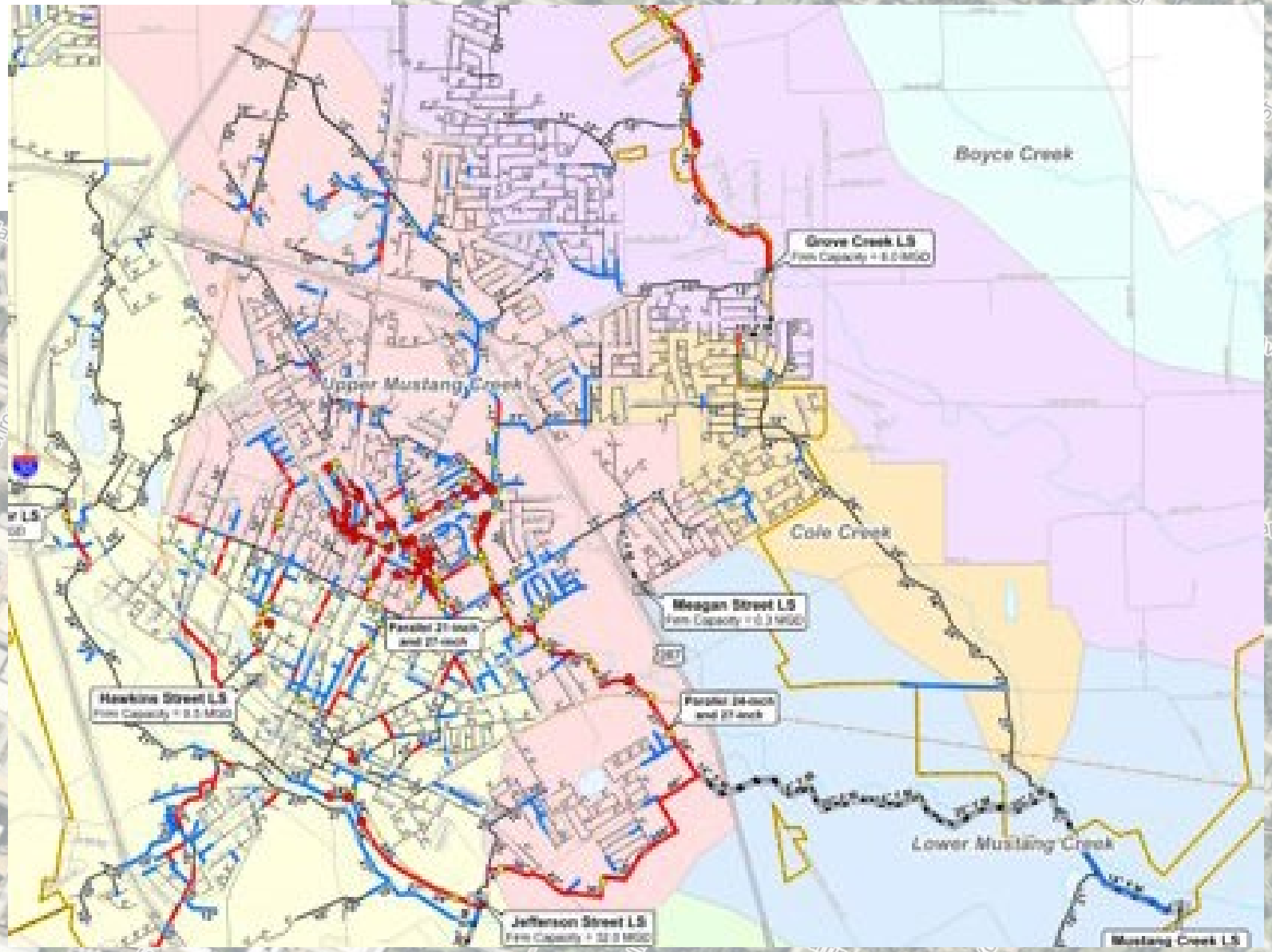
T.C.D.P. NO. 702881



“Go Digital”

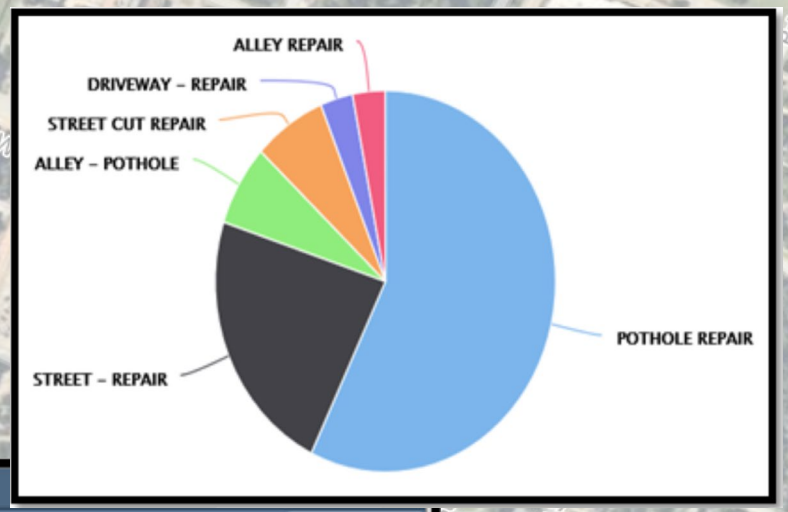
Master Plans

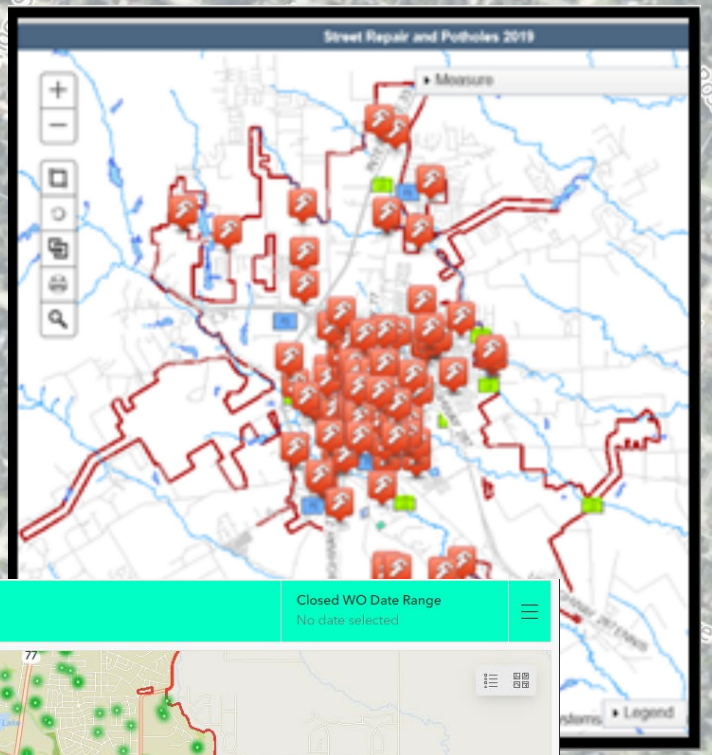
- Models
- Data in GIS



“Go Digital”

- Cityworks
  - Asset Management
  - Work Orders



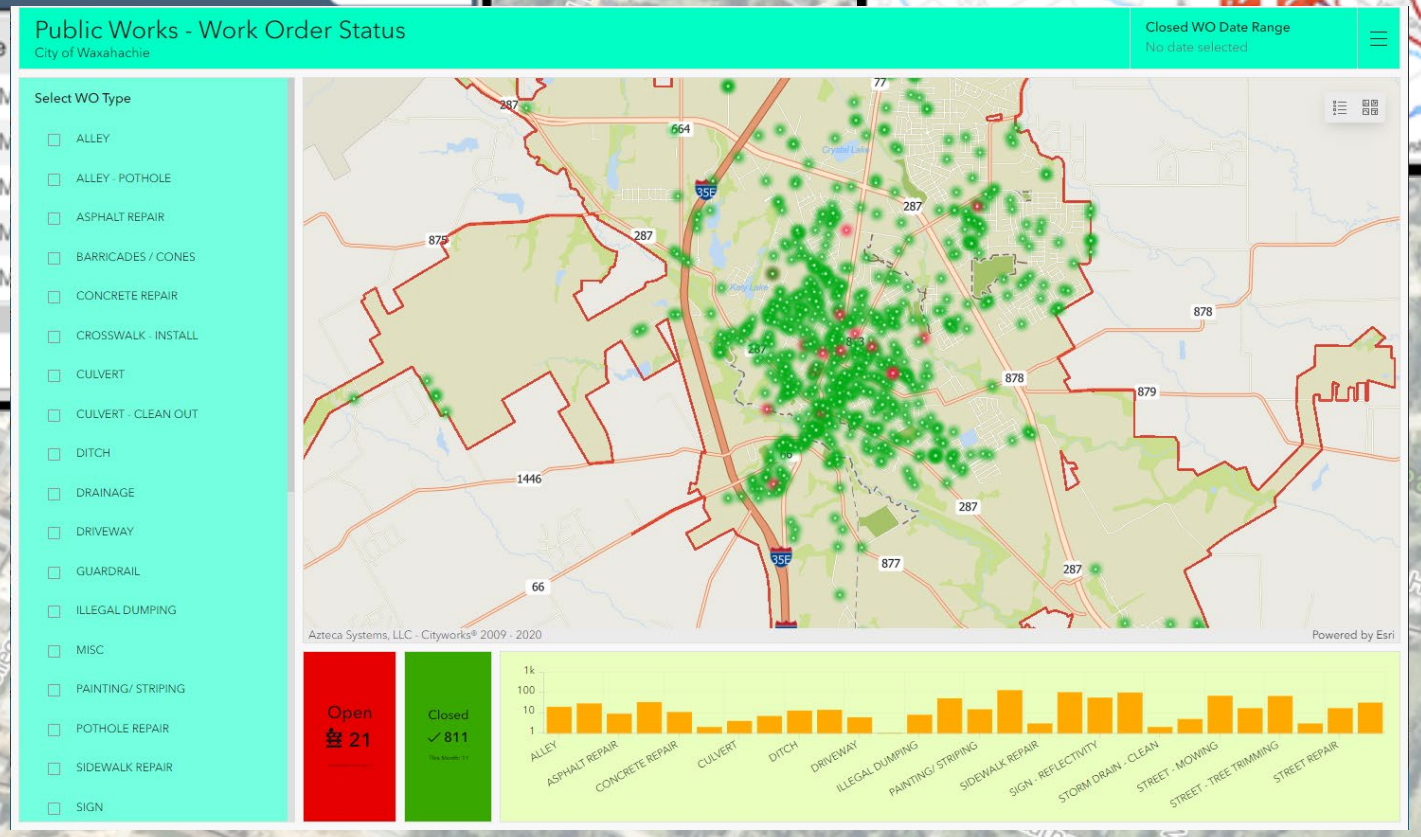


2019 Street Repair and Potholes

Open | Print | Expand | Configure | Map | Search

Wo	Description	Priority	Status	Proj Start Date	Proj Finish Date
3517	POTHOLE REPAIR	3	CLOSED	2019-01-08 4:50 PM	2019-01-08 4:50 PM
3535	POTHOLE REPAIR	3	CLOSED	2019-01-10 3:24 PM	2019-01-10 3:24 PM
3564	POTHOLE REPAIR	3	CLOSED	2019-01-15 9:57 AM	2019-01-15 9:57 AM
3576	POTHOLE REPAIR	3	CLOSED	2019-01-15 4:42 PM	2019-01-15 4:42 PM
3578	POTHOLE REPAIR	3	CLOSED	2019-01-15 4:47 PM	2019-01-15 4:47 PM

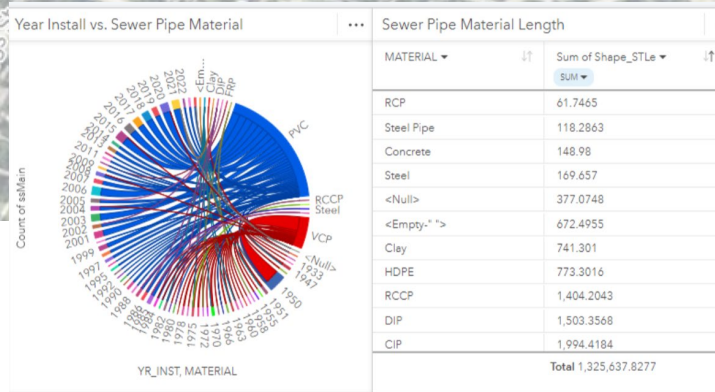
Rows 5 | 1 – 5 of 131



Intelligent CIP Planning

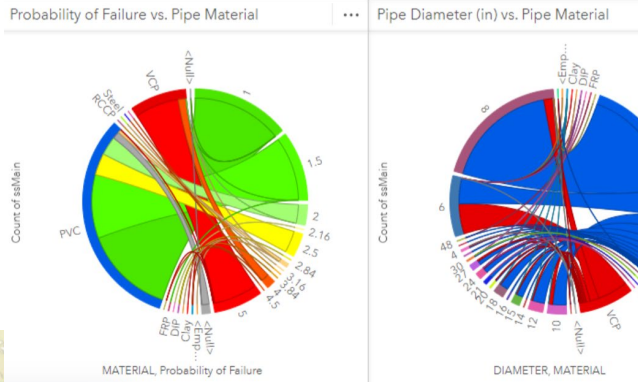
Analyze the Data to Establish CIP

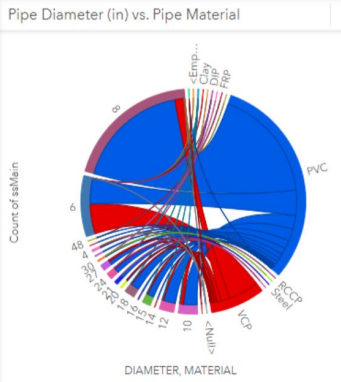
- Age, Material, Diameter, Capacity, Pressure, Life Expectancy, Anticipated Growth
- Probability of Failure, Consequence of Failure
- Over Maintaining or Under Maintaining



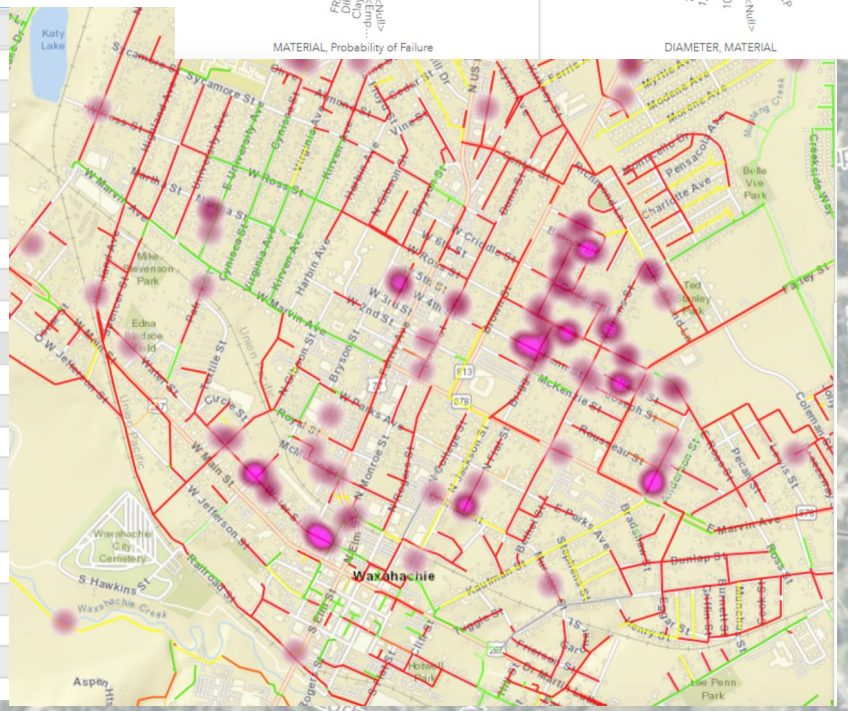
Sewer Pipe Material Length

MATERIAL	Sum of Shape_STLe SUM
RCP	61.7465
Steel Pipe	118.2863
Concrete	148.98
Steel	169.657
<Null>	377.0748
<Empty-" ">	672.4955
Clay	741.301
HDPE	773.3016
RCCP	1,404.2043
DIP	1,503.3568
CIP	1,994.4184
Total	1,325,637.8277





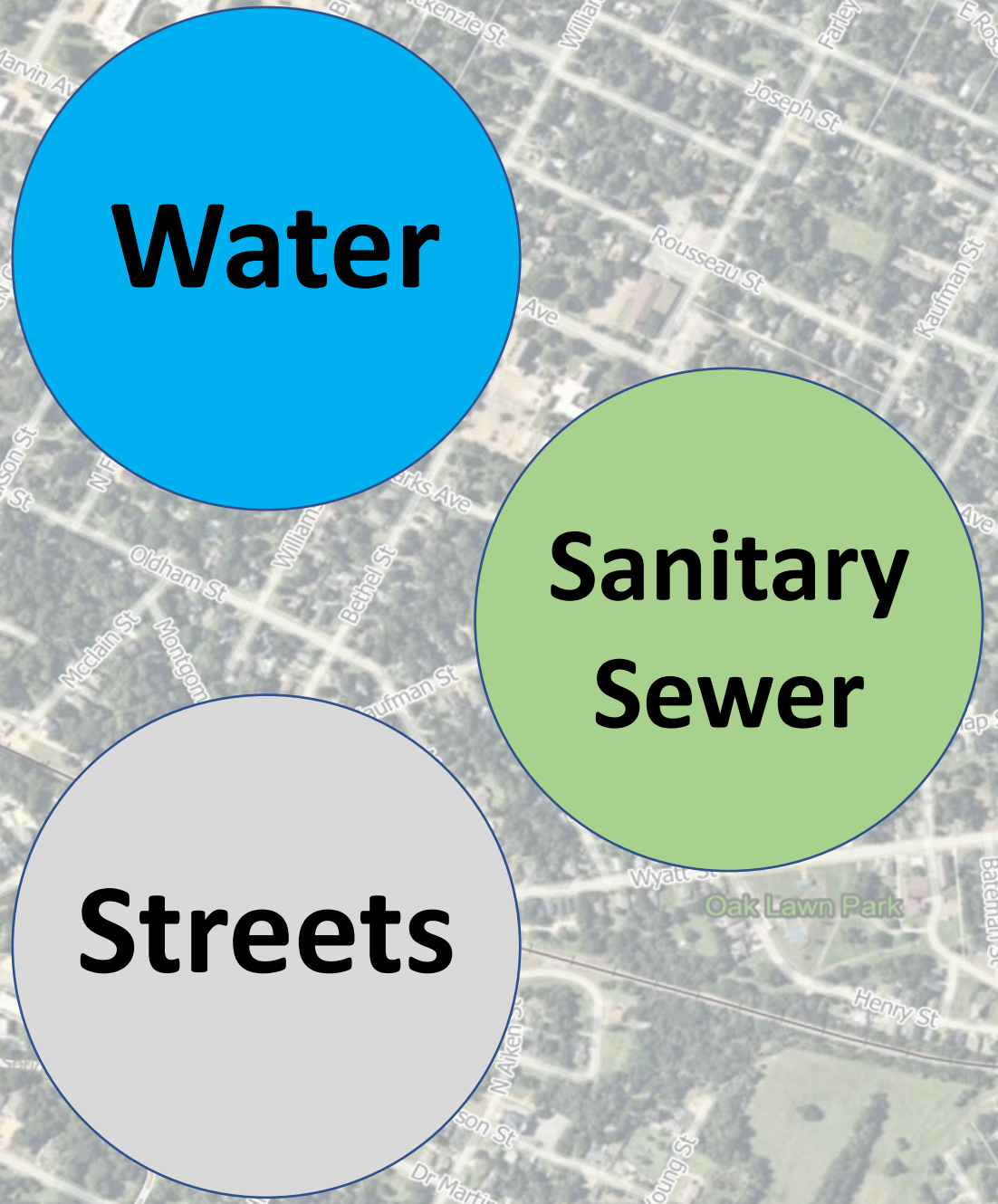
	YEARINSTAL *	ZONE	MATERIAL *	LINING	Status	LENGTH	DIAMETER *	FROM_	TO_	SEG_LENGTH *	WaterType
29	1974	715	ACP	None	Active	191.048619	14	7590	1499	191.048619	Potable
30	1974	715	ACP	None	Active	99.194759	14	7590	1499	99.194759	Potable
31	1974	715	ACP	None	Active	769.409542	14	7590	1499	769.409542	Potable
32	1950	715	ACP	None	Active	113.764688	14	7590	1499	113.764688	Potable
33	1974	715	ACP	None	Active	6.306745	14	7590	1499	6.306745	Potable
34	1950	791	ACP	None	Active	465.833079	6	5214	5085	512.810351	Potable
35	1983	791	ACP	None	Active	327.481144	6	5096	5050	327.481144	Potable
36	1950	791	ACP	None	Active	0.114085	6	5101	5102	0.114085	Unknown
37	1950	791	ACP	None	Active	3.383084	6	5101	5102	3.383084	Unknown
38	1984	791	ACP	None	Active	1088.981147	6	5101	5102	1088.981147	Potable
39	1950	791	ACP	None	Active	3.484112	6	5101	5102	3.484112	Unknown
40	1977	791	ACP	None	Active	256.176021	6	5113	5114	256.176021	Potable
41	1977	791	ACP	None	Active	149.809691	6	5113	5114	149.809691	Potable
42	1977	791	ACP	None	Active	59.463918	6	5113	5114	59.463918	Potable
43	1950	791	ACP	None	Active	2.248646	6	5113	5114	2.248646	Unknown
44	1977	791	ACP	None	Active	141.062155	6	5115	5120	141.062155	Potable
45	1977	791	ACP	None	Active	492.335992	6	5115	5120	492.335992	Potable
46	1983	791	ACP	None	Active	907.780178	8	5114	5113	907.780178	Potable
47	1950	791	ACP	None	Active	2.496975	8	5114	5120	2.496975	Unknown
48	1977	791	ACP	None	Active	289.786876	6	5114	5120	289.786876	Potable
49	1973	791	ACP	None	Active	88.919091	12	5123	5124	88.919091	Potable



The City of Waxahachie has the following assets:

- Staff
- Services
- Water
- Sanitary Sewer
- Drainage
- Streets
- Equipment
- Buildings
- Others

We will focus on assets to the right

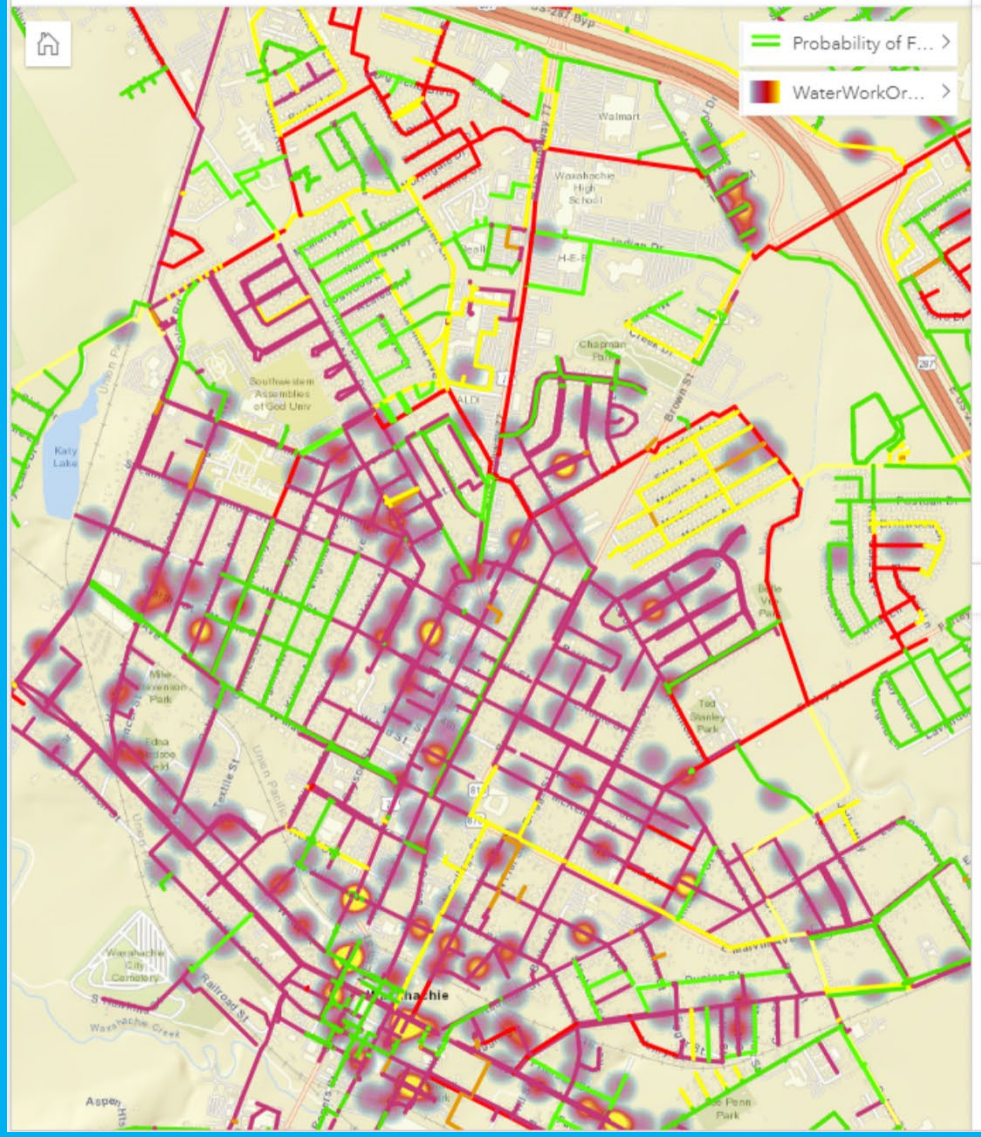


Water

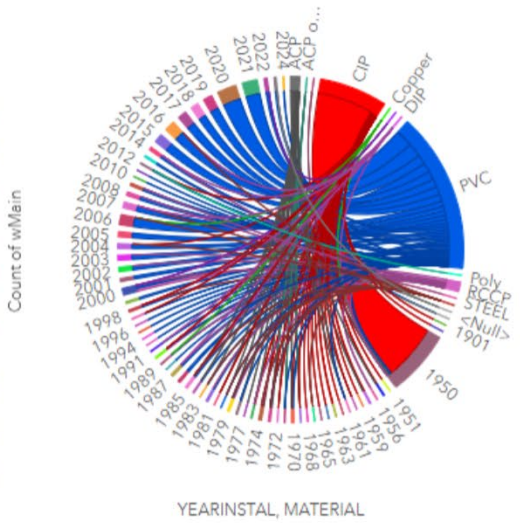
- Approximately 1,775,000 feet of water lines (336 miles)
- Installation Data since 1901
- Currently there are approximately:
  - 1,010,000 Feet of PVC Water Lines
  - 120,000 Feet Asbestos Water Lines
  - 420,000 Feet Cast Iron Water Lines

Water Data

Water Probability of Failure and Water Repair Heat Map



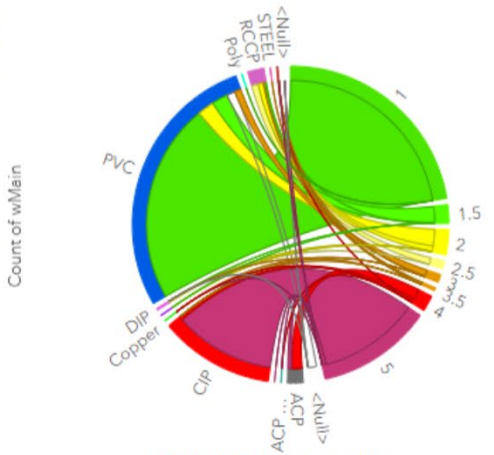
Year Install vs. Water Pipe Material



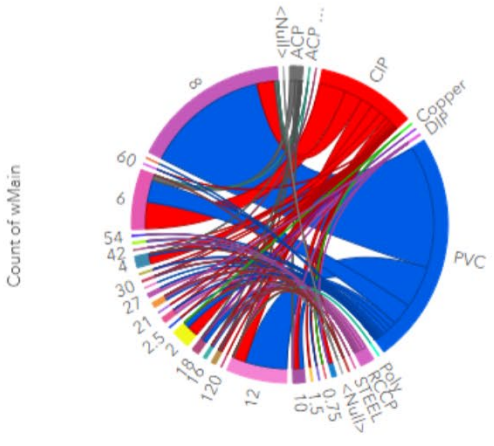
Water Pipe Material Length (Feet)

MATERIAL	Sum of LENGTH (SUM)
STEEL	83.696
CI/RCCP	147.2996
Poly	360.2663
Copper	1,227.704
Unknown	2,411.4543
ACP or CIP	4,374.3984
DIP	18,153.1358
ACP	116,839.5534
RCCP	204,107.6472
CIP	418,088.7862
PVC	1,008,654.5296
Total	1,774,488.3285

Probability of Failure vs. Pipe Material



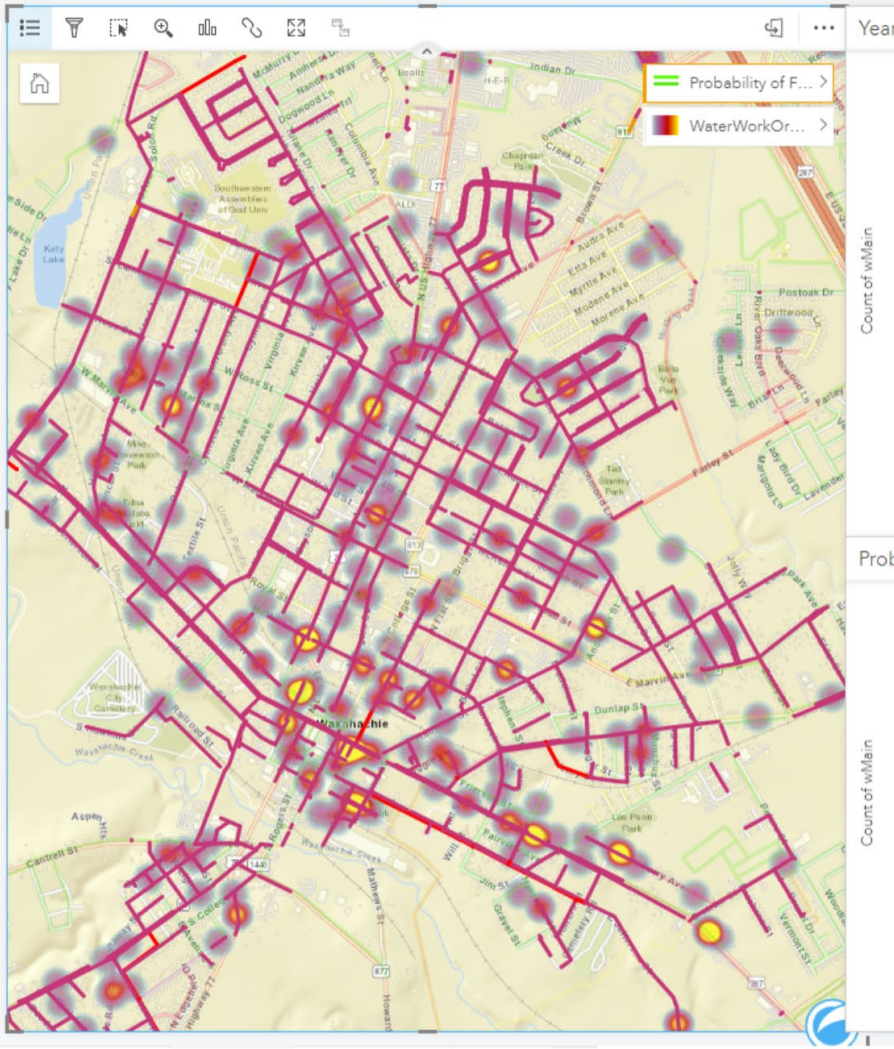
Pipe Diameter (in) vs. Pipe Material

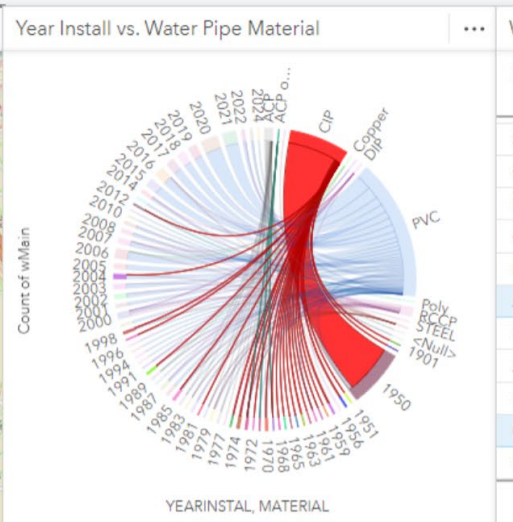


Water - Cast Iron Pipe

CIP Installed from 1901 to 1975 (45-70 yr old).

91% of CIP Exceeds 50-yr Life Expectancy





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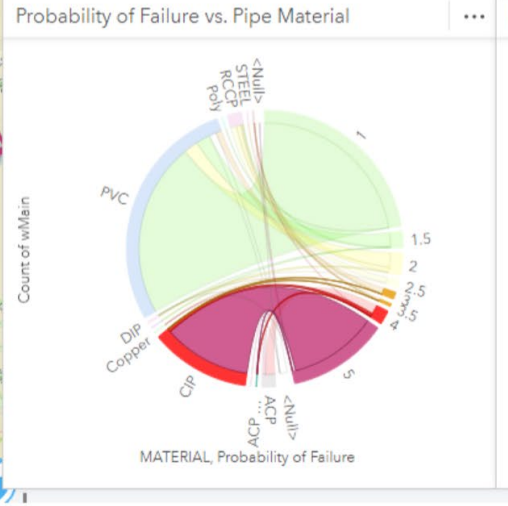
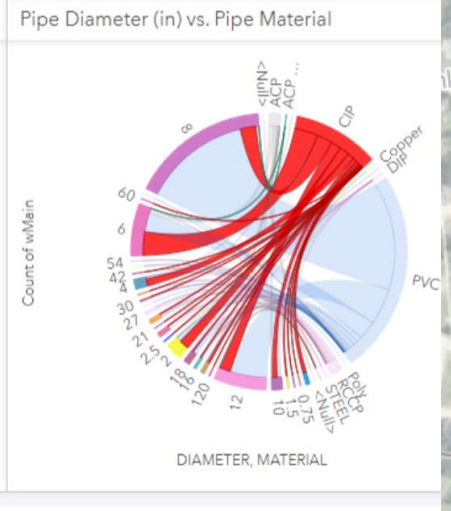




More Work Orders were performed on CIP - Focus Replacement

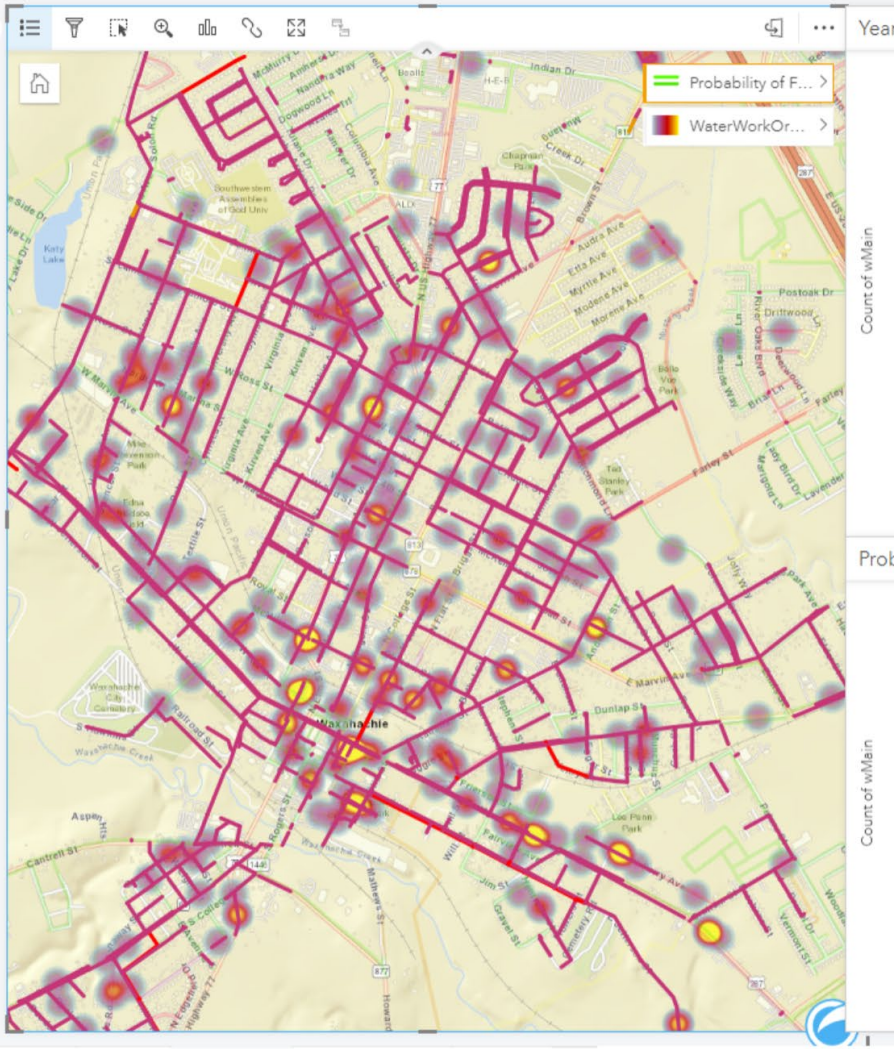
Water ACP & CIP Replacement

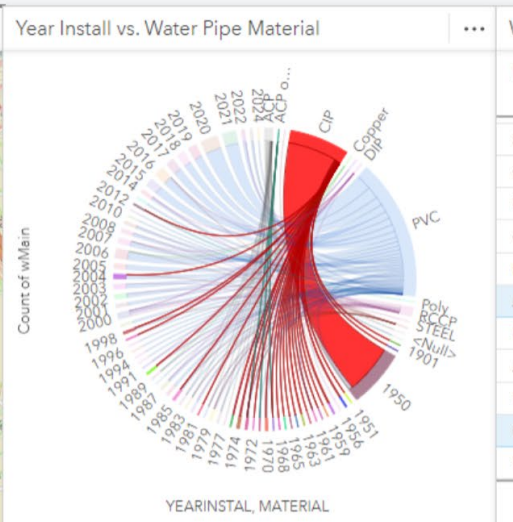
	Diameter	Subtotal Cost	Replacement Plan
Water	2.5" Replaced w/ 8"	$ 28,000,000	Replacing ACP and CIP pipes
	4" Replaced w/ 8"	$ 18,000,000	
	6" Replaced w/ 8"	$ 47,000,000	
	8" Water =	$ 24,000,000	
	10" Water =	$ 14,910,000	
	12" Water =	$ 17,900,000	
	18" Water =	$ 9,015,000	
	24" Water =	$ 484,000	
	30" Water =	$ 115,000	
	36" Water =	$ 16,000	
	Total Water =	**$ 159,440,000**	
	Probability of Failure of 5 Cost =	**$ 102,500,000**	

Water - Cast Iron Pipe

CIP Installed from 1901 to 1975 (45-70 yr old).

91% of CIP Exceeds 50-yr Life Expectancy





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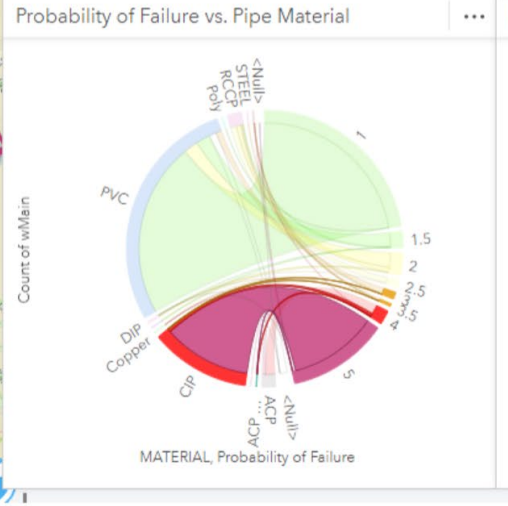
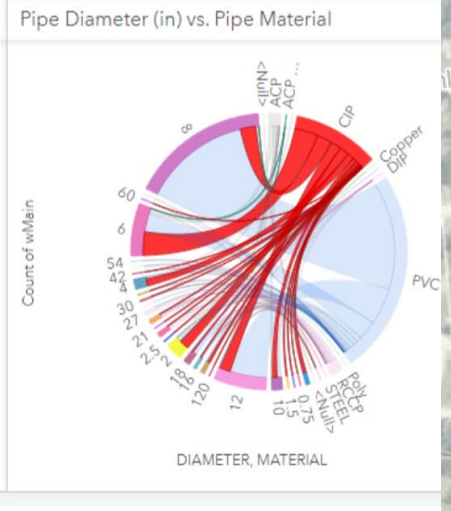




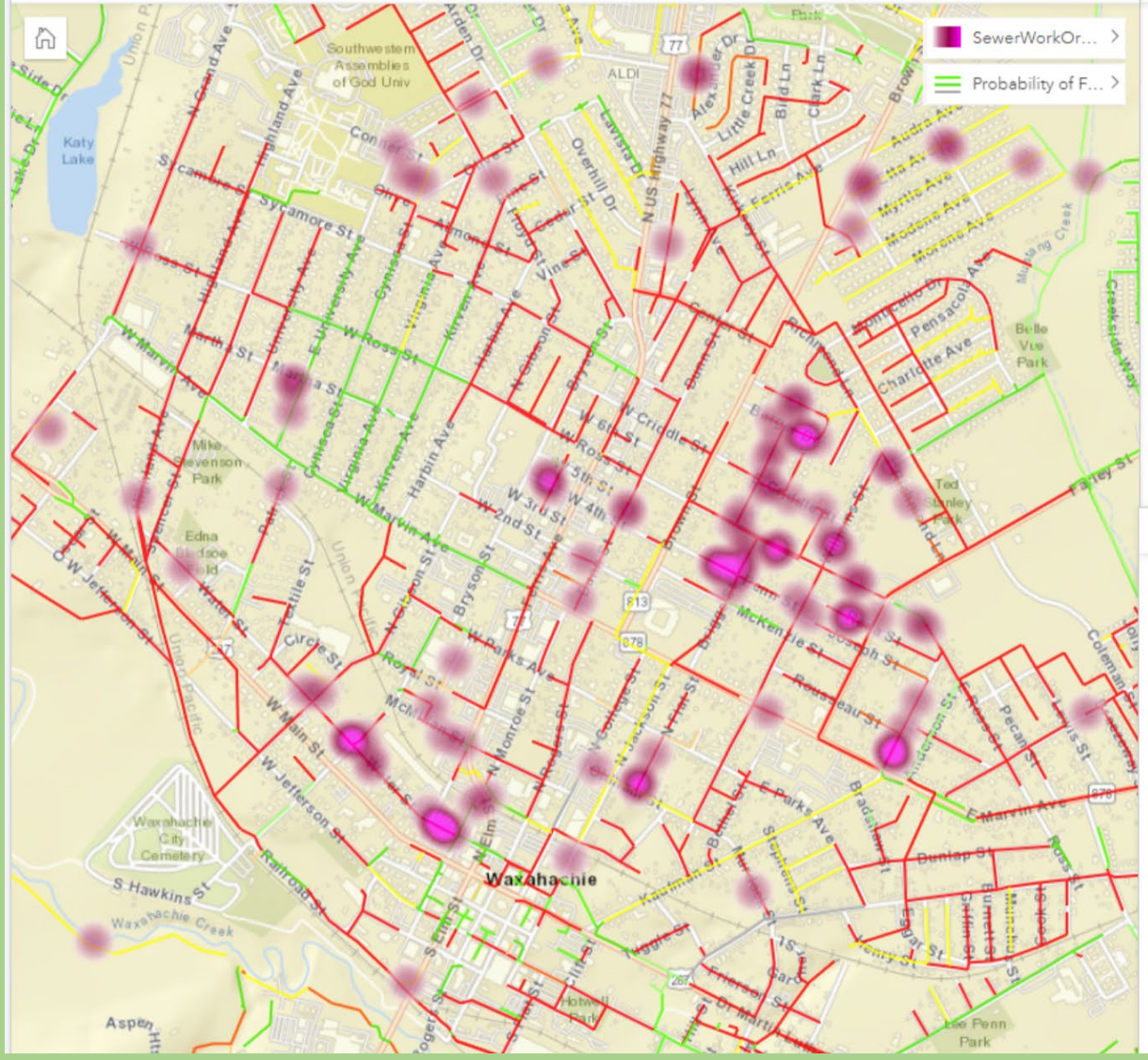
More Work Orders were performed on CIP - Focus Replacement

Sanitary Sewer

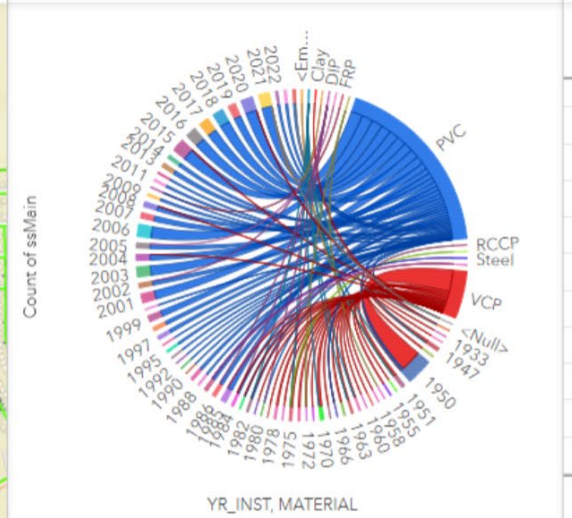
- Approximately 251 miles of sewer lines
- Installation data since 1933
- 323,000 feet of active Clay Pipe (1933 to 1985)
- 1964 started using PVC, and became the standard pipe material after 1985

Sanitary Sewer Visual Data

Probability of Failure & Sewer Repair Heat Map



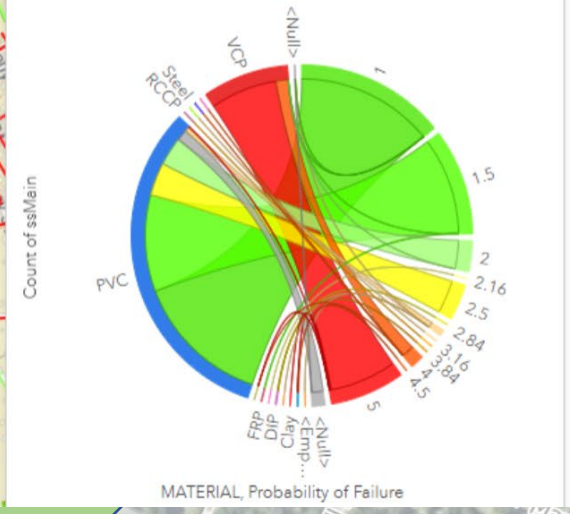
Year Install vs. Sewer Pipe Material



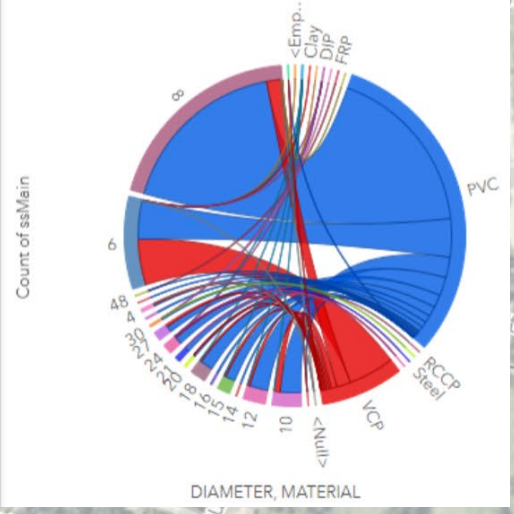
Sewer Pipe Material Length

MATERIAL	Sum of Shape_STLe (SUM)
<Null>	377.0748
<Empty-" ">	672.4955
Clay	741.301
HDPE	773.3016
RCCP	1,404.2043
DIP	1,503.3568
CIP	1,994.4184
FRP	3,431.2878
Epoxy Coated DIP	4,666.6003
VCP	322,488.2205
PVC	987,086.8968
	Total 1,325,637.8277

Probability of Failure vs. Pipe Material



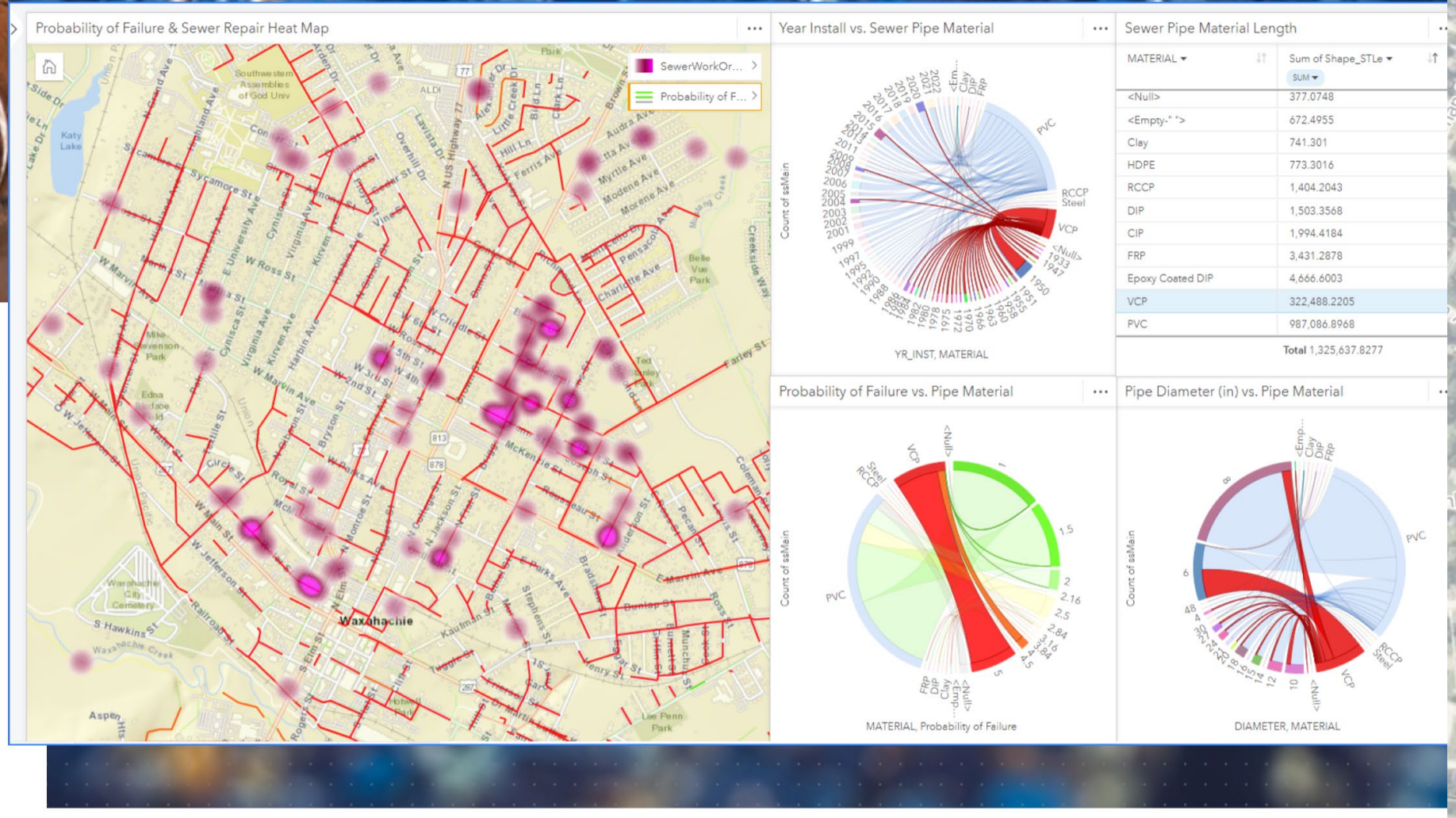
Pipe Diameter (in) vs. Pipe Material



Sewer - Vitrified Clay Pipe

VCP Installed from 1955 to 1985 (35-65 yr old).

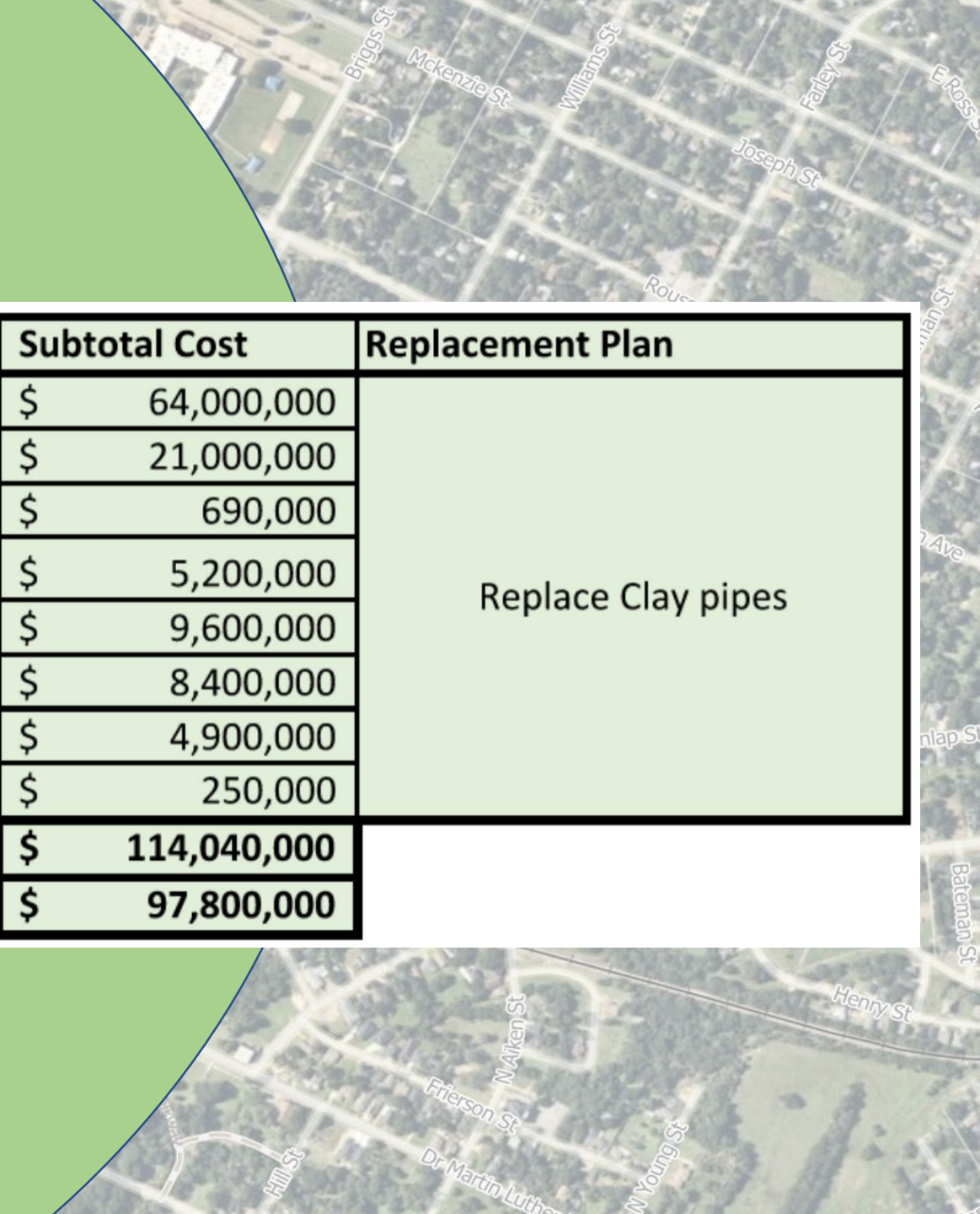
0% of ACP Exceeds 100-yr + Life Expectancy, but clay soils and roots cause cracking and infiltration



Most Work Orders with ACP Pipes & large amounts of Infiltration

Clay Pipe Replacement

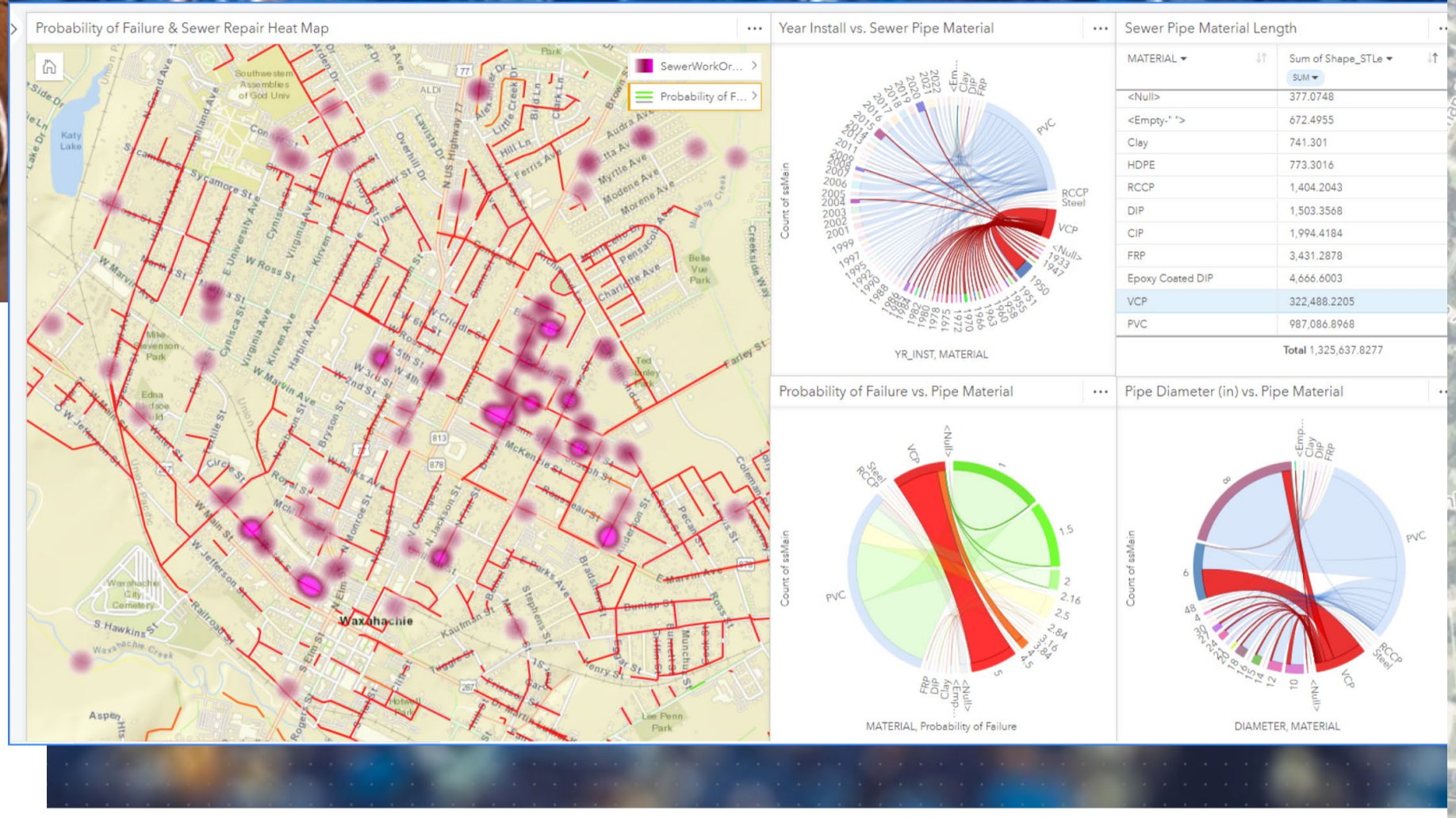
	Diameter	Subtotal Cost	Replacement Plan
Sewer	6" Replaced w/ 8"	$ 64,000,000	Replace Clay pipes
	8" Sewer =	$ 21,000,000	
	10" Sewer =	$ 690,000	
	12" Sewer	$ 5,200,000	
	18" Sewer	$ 9,600,000	
	24" Sewer	$ 8,400,000	
	27" Sewer	$ 4,900,000	
	30" Sewer	$ 250,000	
	Total Sewer =	**$ 114,040,000**	
	Probability of Failure of 5 Cost =	**$ 97,800,000**	



Sewer - Vitrified Clay Pipe

VCP Installed from 1955 to 1985 (35-65 yr old).

0% of ACP Exceeds 100-yr + Life Expectancy, but clay soils and roots cause cracking and infiltration

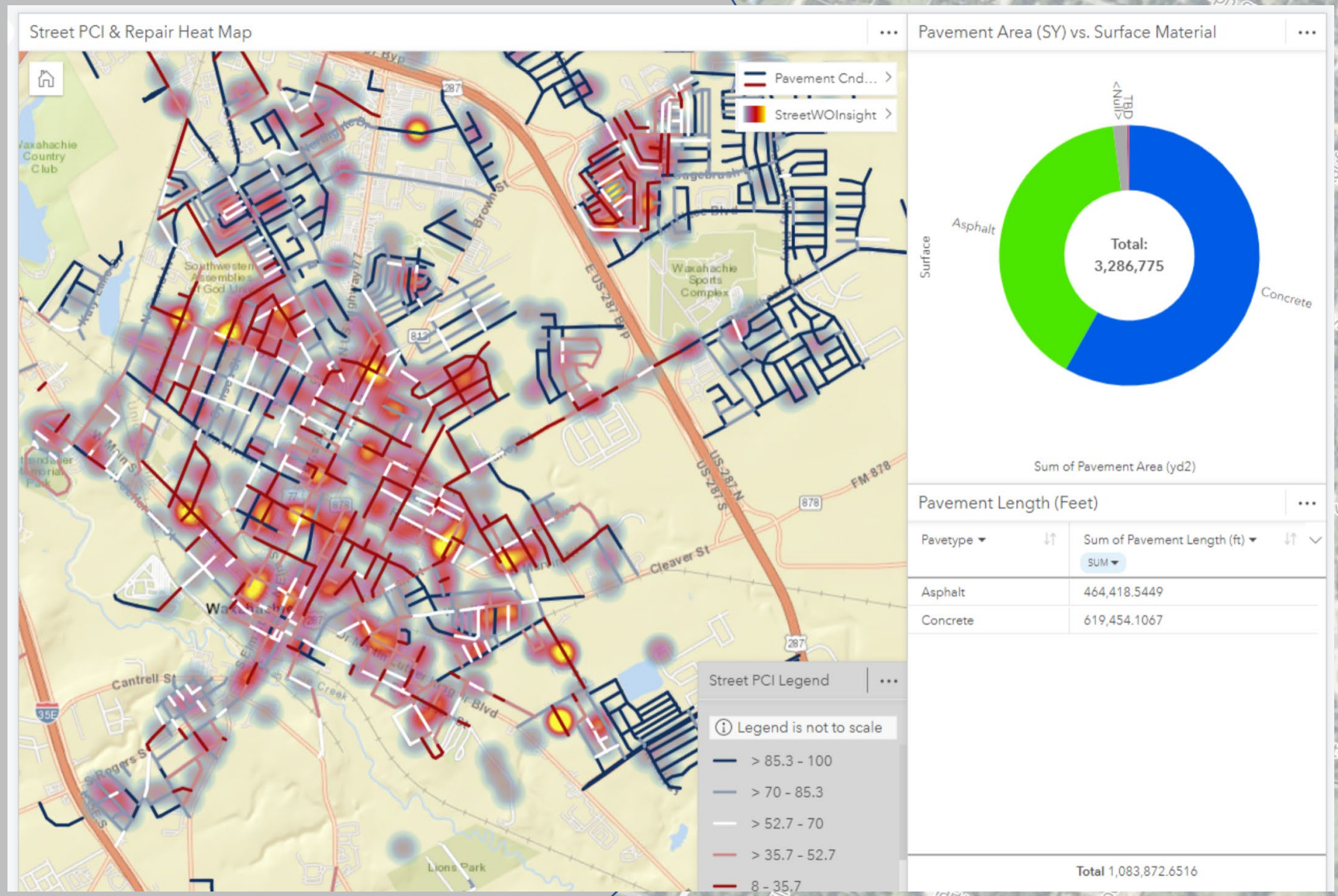


Most Work Orders with ACP Pipes & large amounts of Infiltration

Streets

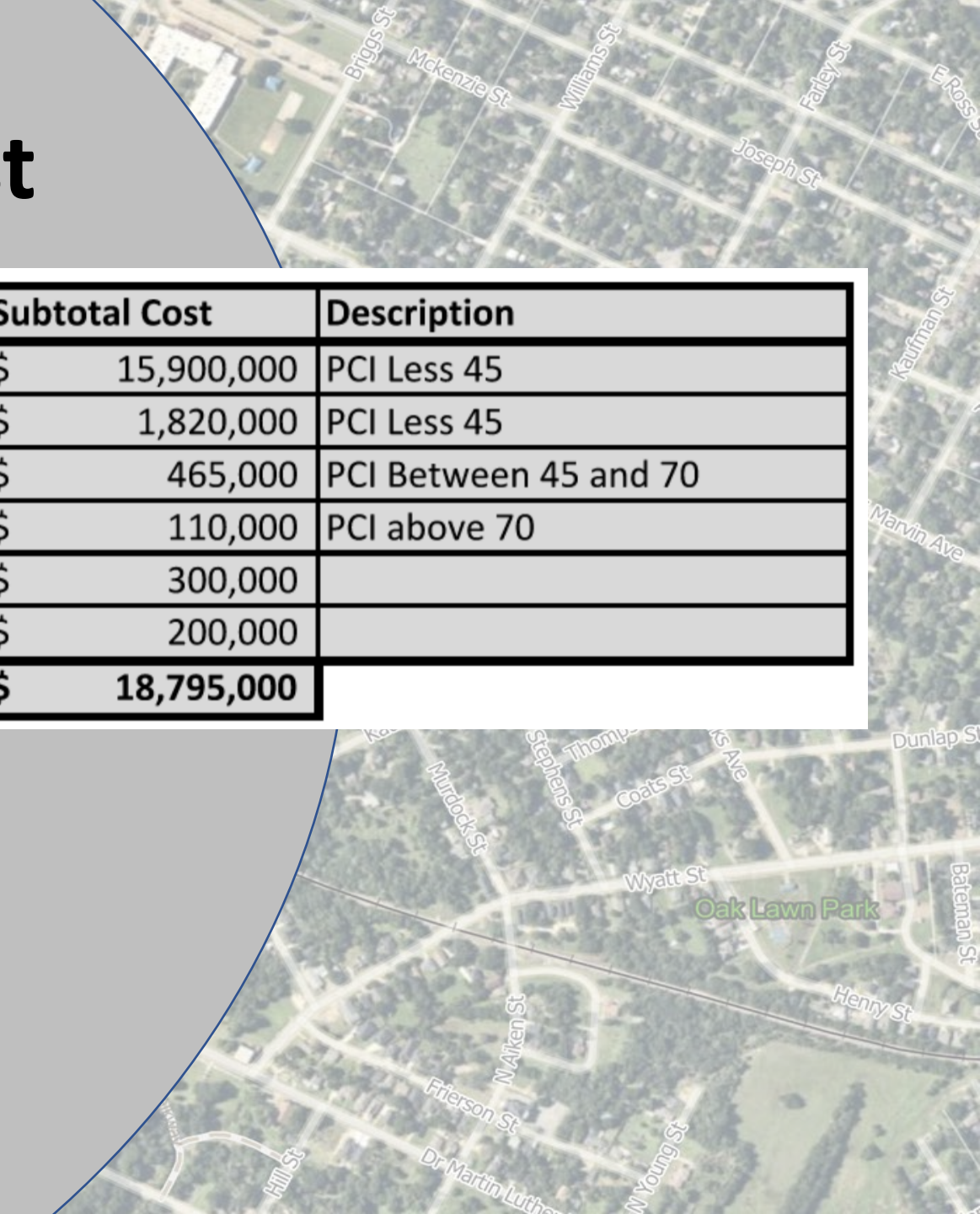
- Approx. 211 Miles of City Maintained Streets
- 117 Miles of Concrete Roads
- 94 Miles of Asphalt Roads

Streets Visual Data

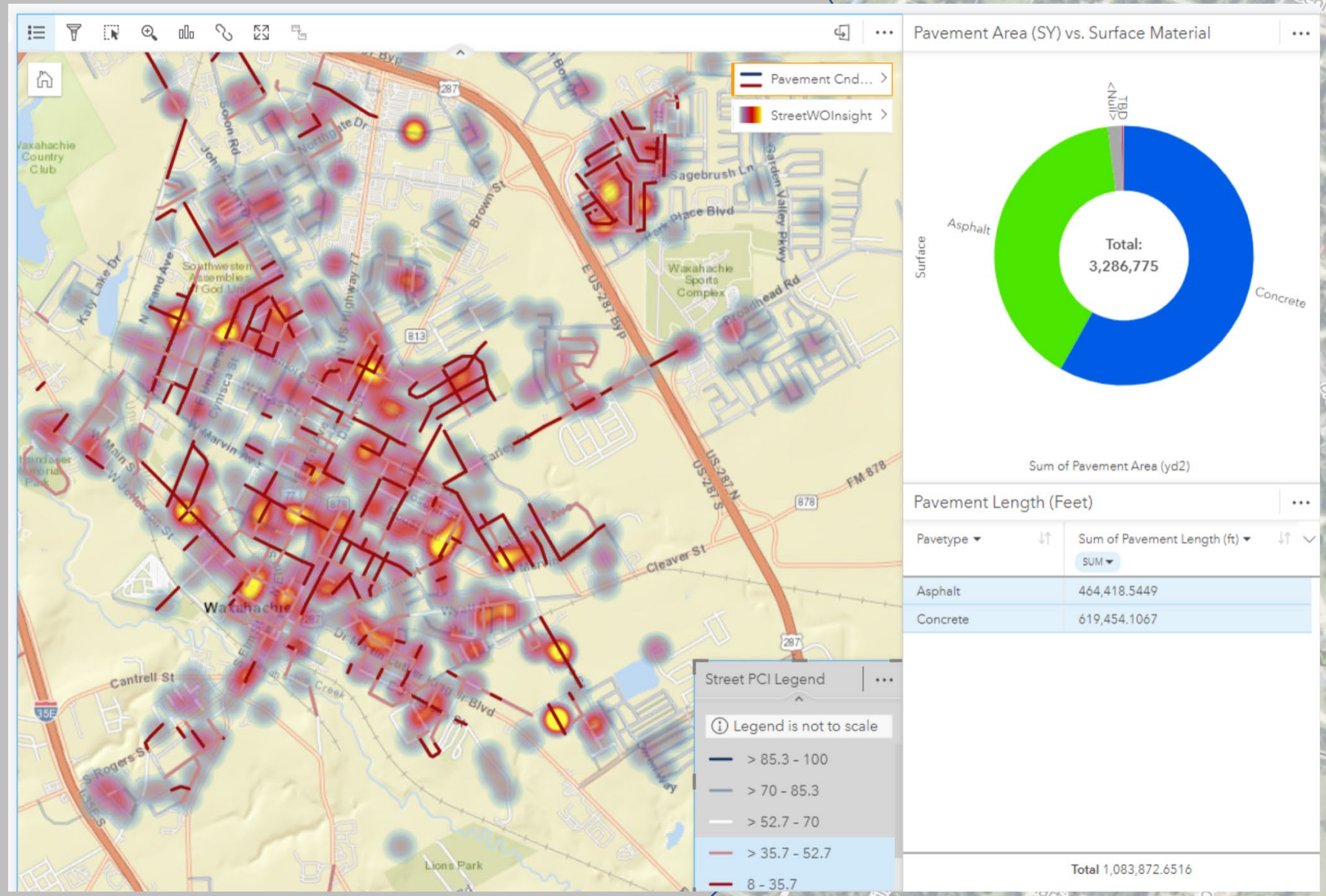


Streets Maintenance Cost

	Maintenance Type	Subtotal Cost	Description
Paving	Concrete	$ 15,900,000	PCI Less 45
	Asphalt Scarification	$ 1,820,000	PCI Less 45
	Pressure Pave	$ 465,000	PCI Between 45 and 70
	HA5	$ 110,000	PCI above 70
	Concrete Panel Replacement	$ 300,000	
	Crack Seal	$ 200,000	
	Total Paving =	**$ 18,795,000**	



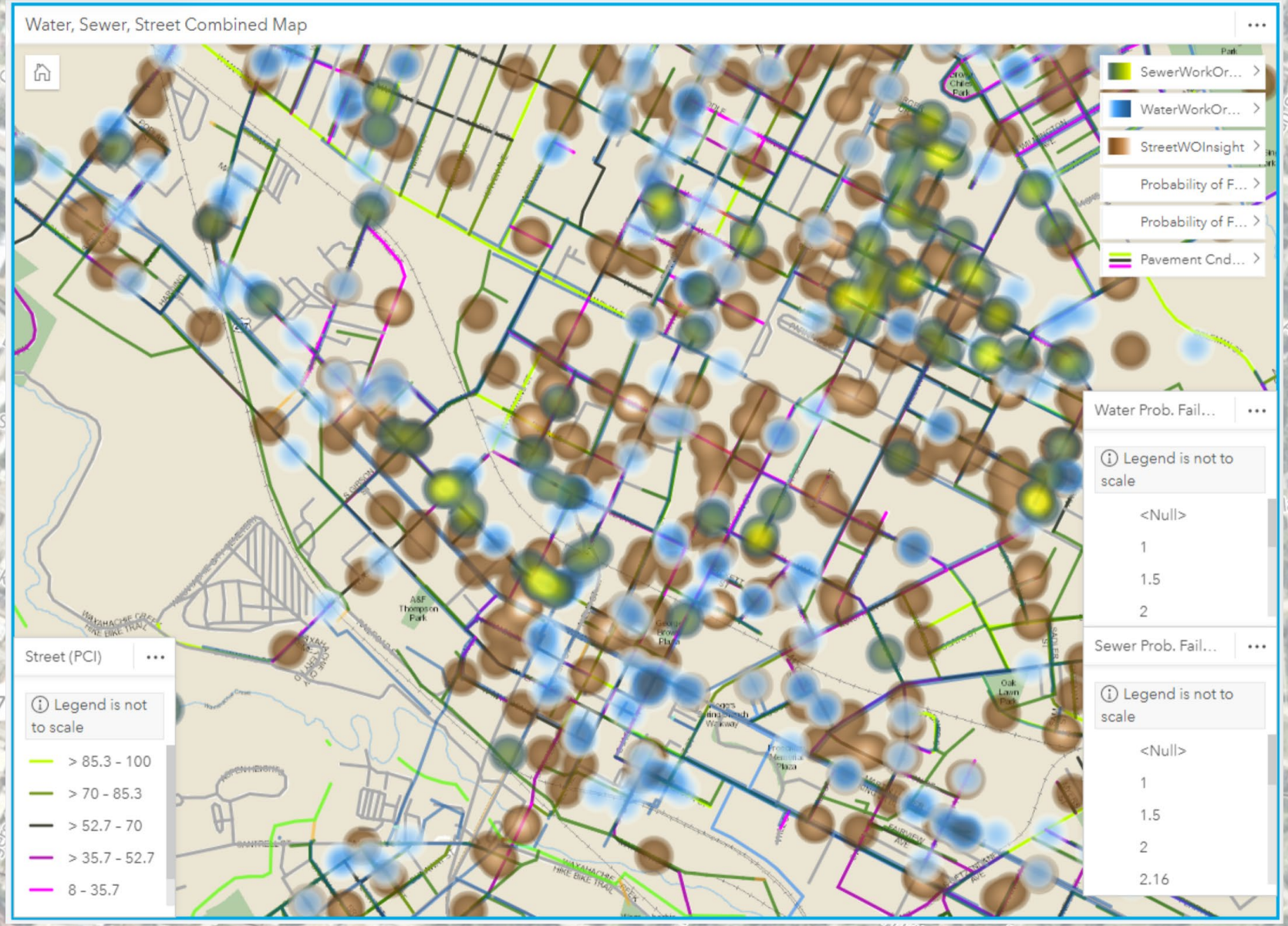
Streets PCI 50 or Less



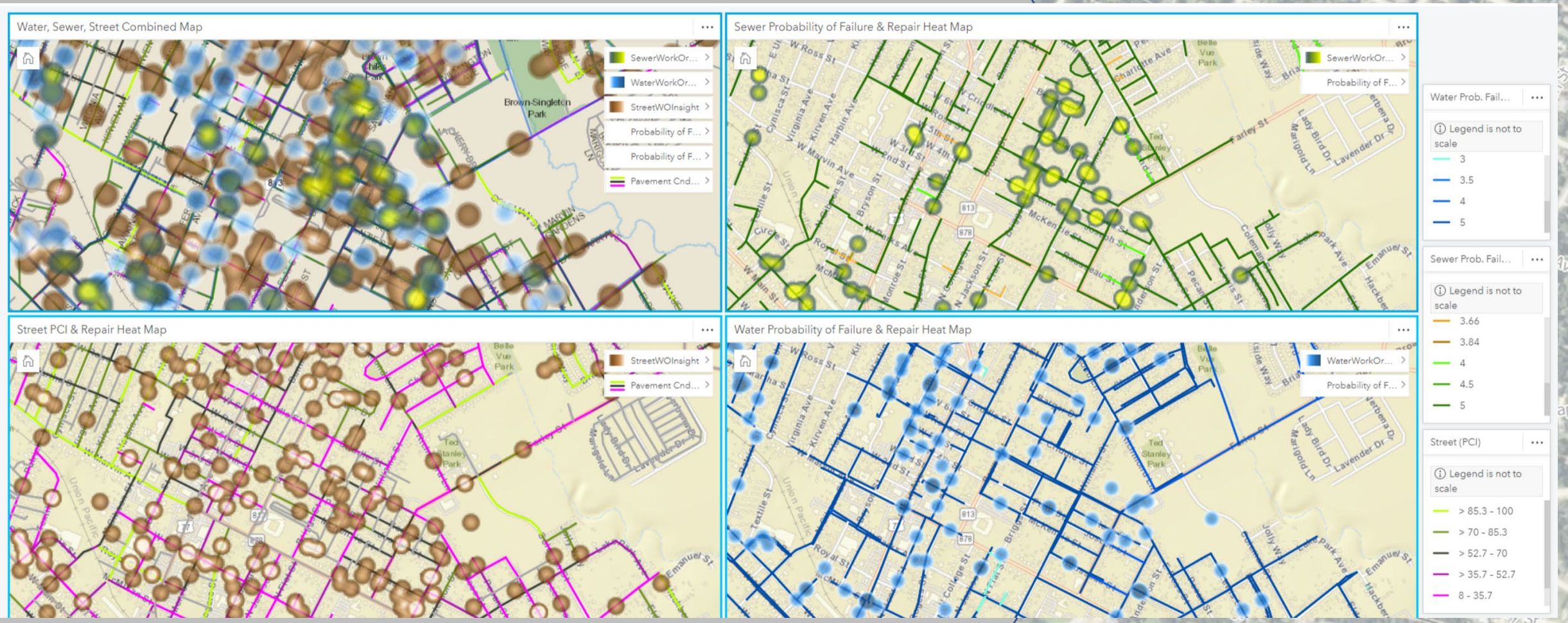
CIP Implementation

Combined

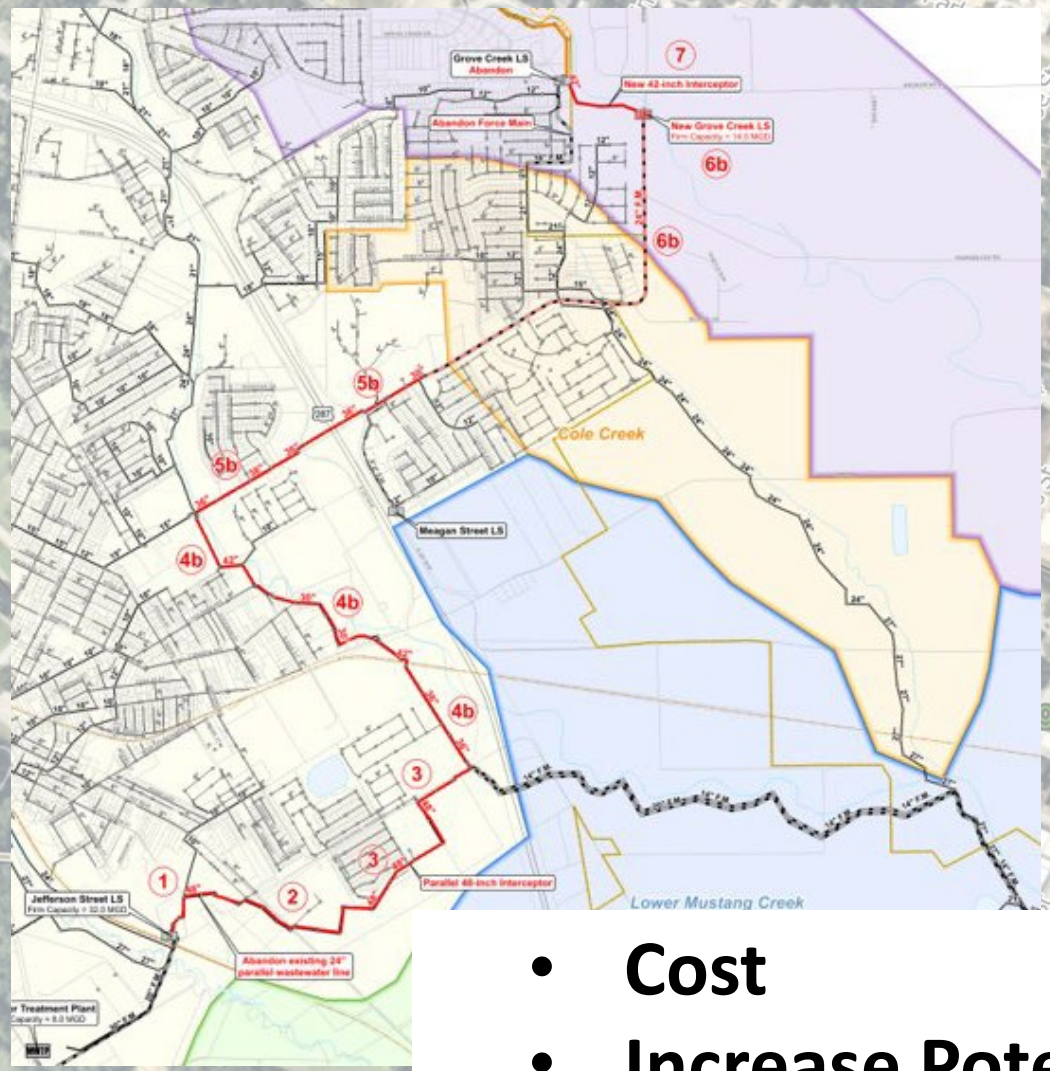
- Water
- Sewer
- Streets



Combined & Side by Side Data



Look at Alternatives



- Cost
- Increase Potential for Growth
- Planning for Future or Now?

Road Map for CIP:

- Establish the Plan (up to 5 years)
  - Educate Management and Council
- Present in a Clear and Concise Manner
  - Easier CIP Planning for Future Years Once:
    - <u>Have Buy In and Gain Trust</u>

Capital Improvement Program Dashboard

Public Works 5 - Year CIP Projects
Public Works & Engineering Department

Fiscal Year

2010 | 2011 | 2013 | 2014
2015 | 2016 | 2017 | 2018
2019 | 2020 | 2021 | 2022
2023 | 2024 | 2025 | 2026
2028

Project Type

- [ ] Sidewalk Program
- [ ] CIP
- [ ] Asphalt Street Rehabilitation
- [ ] Asphalt Preservation

Reset | Select all

Project Status

Active Construction | Completed
Design Phase | Future Projects

Select Project

Search

Total Projects	Total Linear Foot	Total Estd. Cost
95	397,129.9	82.9M

Public Works Projects

- 5-Year CIP
- Asphalt Street Rehabilitation
- Asphalt Preservation
- Sidewalk Program

Total Est. Eng. Cost

Total Est. Cons. Cost

CAPITAL PROJECTS SUMMARY

STREETS, SIDEWALKS & DRAINAGE

Number	Project Name	Prior Years	FY 2023	FY 2024-2027	Total
432	Charlotte Avenue Reconstruction	0	350,000	2,000,000	2,350,000
TBD	Chieftain	0	0	1,080,000	1,080,000
TBD	College Hills Addition Alleys	0	0	750,000	750,000
372	College Street Tunnel Bypass	3,168,945	0	0	3,168,945
TBD	Corridor Program	0	0	3,100,000	3,100,000
403	Creek Stabilization on Wax Creek at S. Rogers St	1,733,290	0	0	1,733,290
379	Drainage Improvements - S. College & BNSF Railroa	285,120	0	0	285,120
TBD	Farley St	0	0	4,025,000	4,025,000
TBD	Future Alleys	0	0	750,000	750,000
TBD	Gradall Excavator	0	0	415,000	415,000
392	Graham Street Improv-MLK to Peters	4,029,850	0	0	4,029,850
TBD	Indian Addition Alleys	0	0	750,000	750,000
389	Monticello Drive Reconst Ph 1 & 2	4,928,777	0	0	4,928,777
442	Northgate Dr Left Turn Lane	0	90,000	300,000	390,000
TBD	Pensacola	0	0	2,560,000	2,560,000
433	Perry Avenue Reconstruction	0	400,000	2,200,000	2,600,000
TBD	Ross and Kaufman Phase 3 (includes drainage)	0	0	2,900,000	2,900,000
TBD	Sagebrush	0	0	900,000	900,000
TBD	Street Equipment Yard	0	0	3,000,000	3,000,000
352	Street Recon-Clift, Flat, Madison	2,118,808	0	0	2,118,808
424	University Avenue Reconstruction	500,000	3,000,000	0	3,500,000
TBD	West Parks and Grace	0	0	2,350,000	2,350,000
425	Wilmington Avenue Reconstruction	330,000	2,200,000	0	2,530,000
	Total Streets, Sidewalks & Drainage	**17,094,790**	**6,040,000**	**27,080,000**	**50,214,790**

Summary:

- Establish the Vision
  - Get Buy In from Team
- Digitize Everything
  - Get info out of Team Members' heads
- Analyze the Data & Put a Plan Together
  - Get Buy In from Team, Management, & Council

So when residents or council want to react to some small items, we can either panic at the request ….

Or, we can….

provide direction with the plan, and explain the effects of moving things ahead or behind the agreed plan