

AIMnet

Asset Management Solution for Smaller
Communities





Atlantic Infrastructure Management Network

Who we are

- A not-for-profit organization
- A network of individuals committed to asset management planning and practice
- *Our mandate:* To guide and support infrastructure management planning for municipalities in Atlantic Canada by facilitating opportunities for knowledge-sharing, collaboration and providing resources



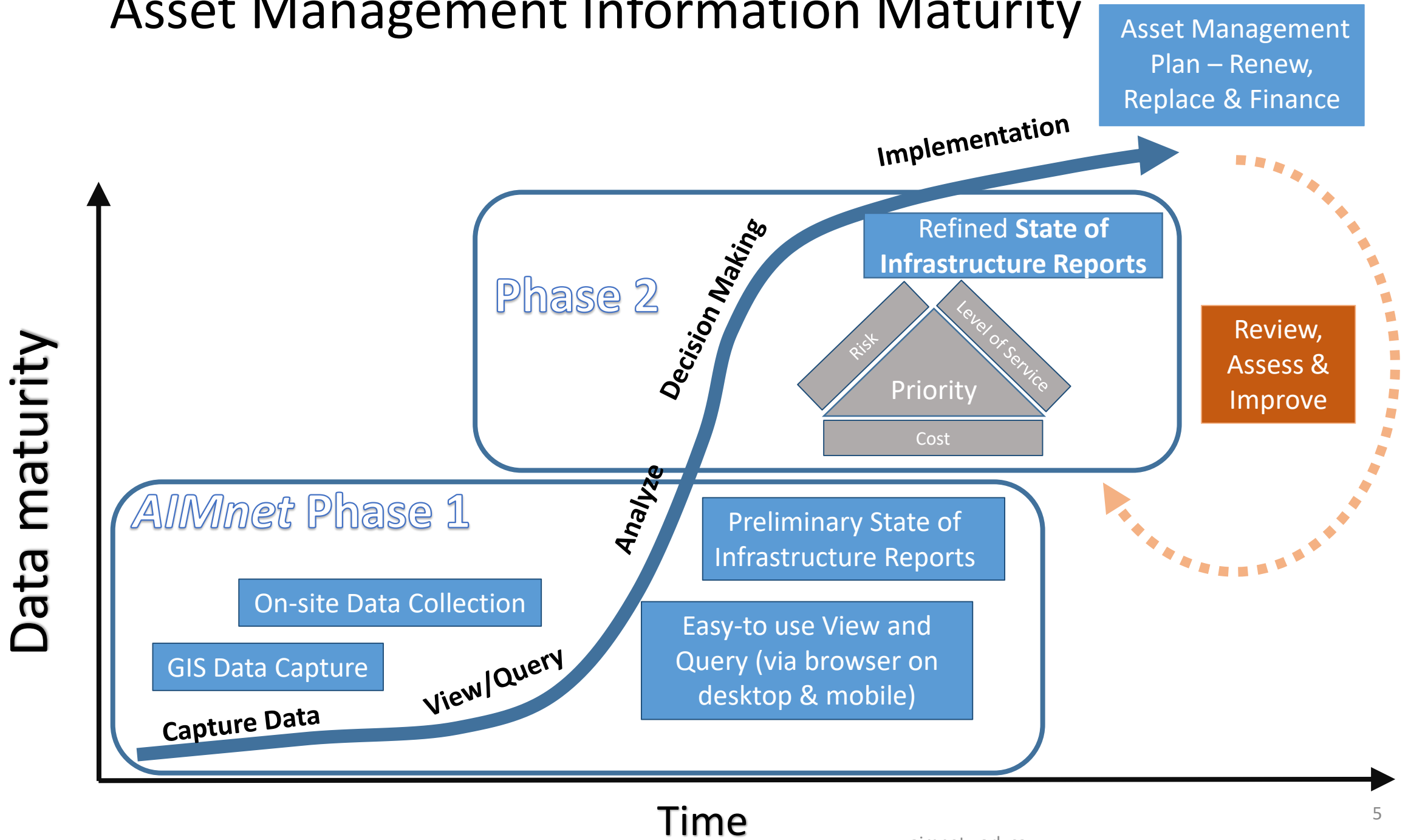
Asset Management challenges for smaller communities:

- Limited funding
- Limited in-house technical staff and expertise
- Infrastructure data not maintained
- Software and IT requirements expensive and difficult to use

AIMnet – AM software tools for smaller communities

- Easy to use:
 - Simplified user interface
 - Use spreadsheets
- Inexpensive
 - Developed on free (open source) software
- Standardization
 - Data structures and formats
 - Reports
- Hop-on, Hop-off – flexibility.
 - Select only the required component(s)
 - Easy to integrate with commercial software

Asset Management Information Maturity



AIMnet GIS Data Capture

- Capture infrastructure in a ***AIMnet*** data structure
- Produce hard copy maps
- Full functional GIS:
 - View, Query, Report and Analyse data in GIS Desktop
 - Uses QGIS Open source - May use ArcGIS

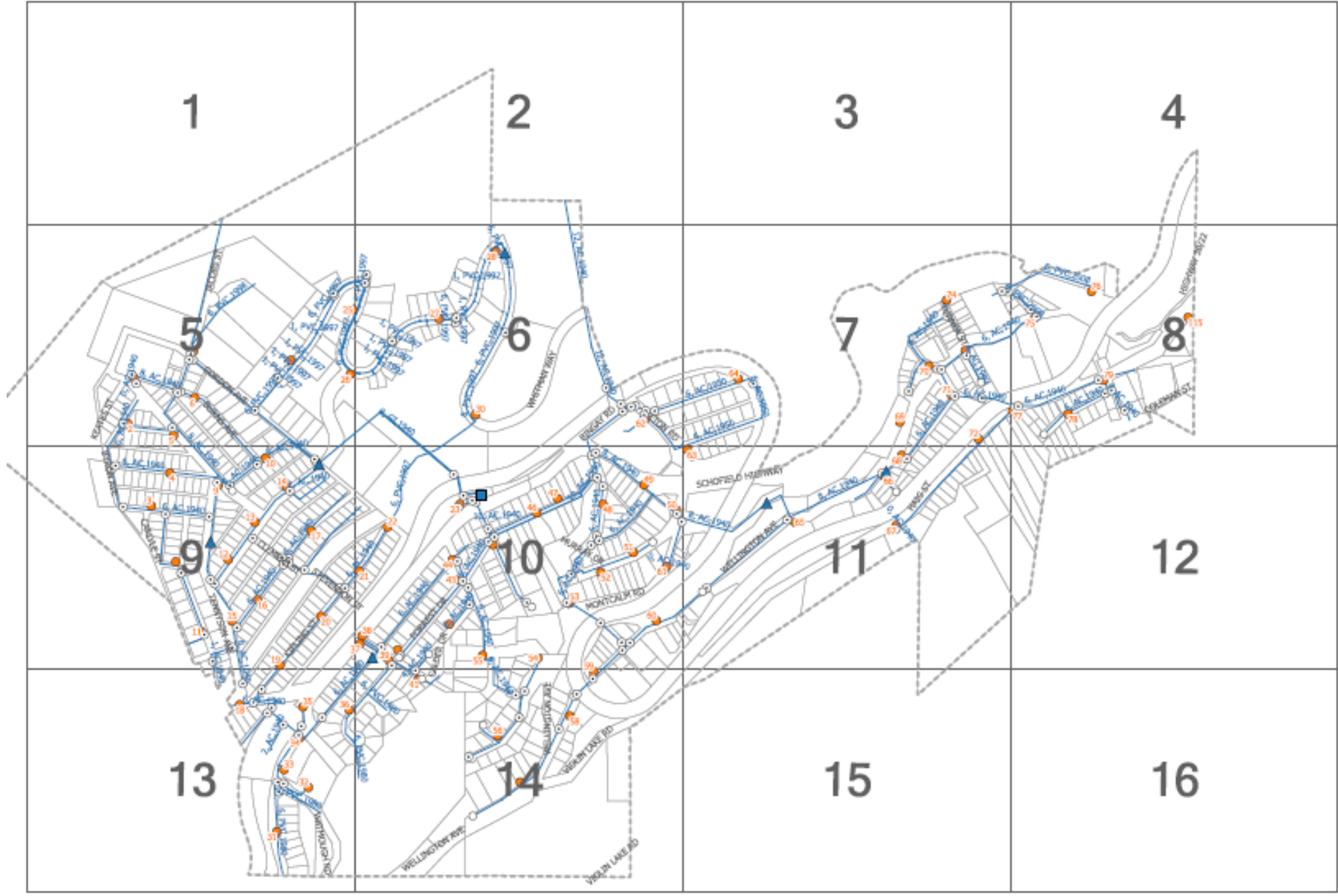
QGIS Desktop

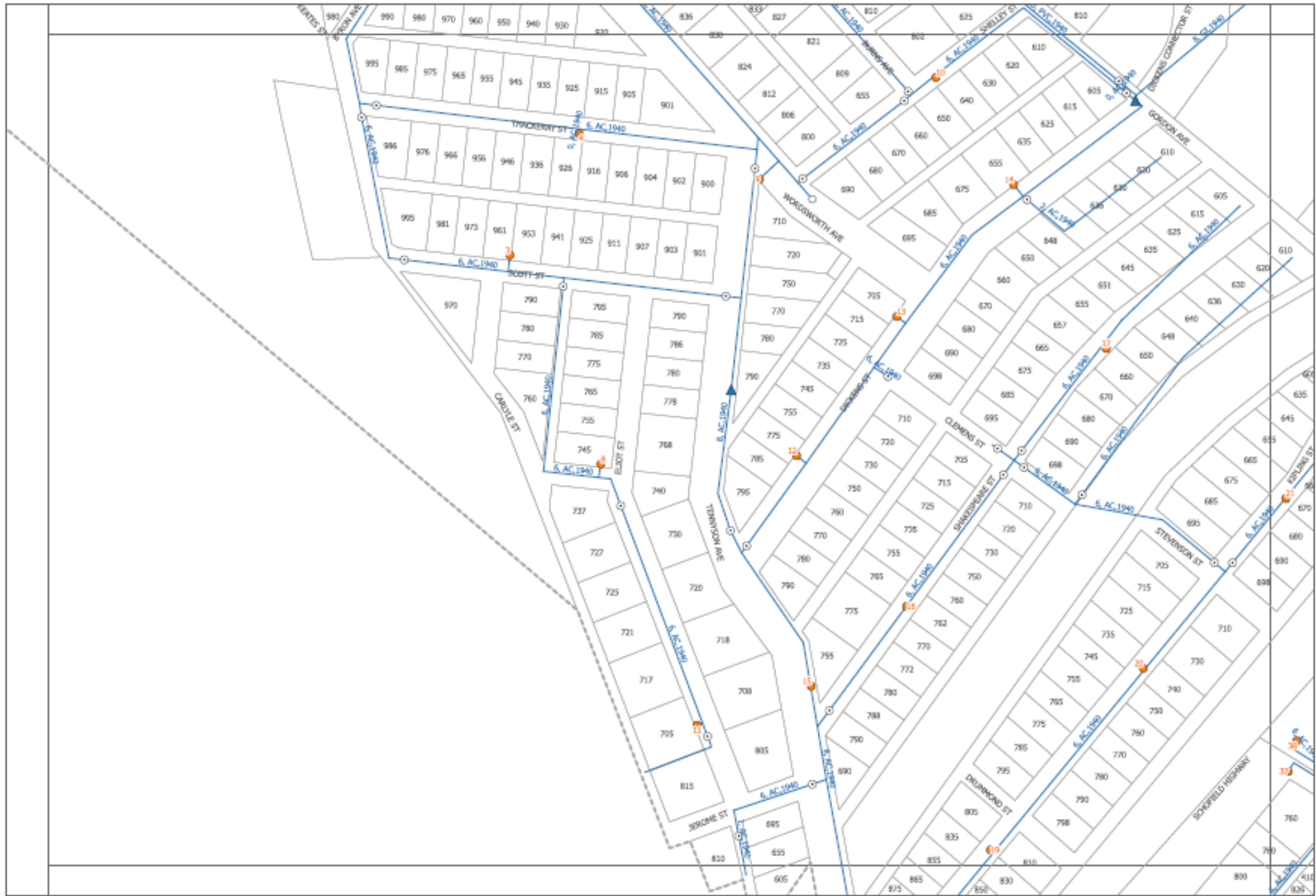
The screenshot displays the QGIS Desktop interface with a water network map. The map shows a grid of streets with water lines overlaid. A red line segment is highlighted on a water line. A dialog box titled 'Wat_lines - Feature Attributes' is open, showing the following data:

Field	Value
Ass_ID	Wat_L_186
Status	Active
Yr_Install	1968
Owner	VON
Length	25.56
Diam	150
Matl	AC
Ass_Grp	Wat
Ass_Type	Main
Ass_SType	NULL

The Layers Panel on the left shows the following layers:

- Basemap
- Streets any
- Municipal_Boundary ...
- Cadastre any
- Planning
- Infrastructure
- Storm
- Roads
- Water
 - Wat_points
 - Hydrant
 - Valve
 - PRV
 - Well_Building
 - Wat_lines
 - 200mm and larger
 - 150mm - 200mm
 - 100mm
 - 50 mm and less
 - Wat_Reservoir
- San
- WMS
- Google Satellite
- OpenStreetMap
- Other
- Hydrant 150m
- BlkAnno any
- PlanAnno any
- LotAnno any





Village of Warfield Water network

www.landinfotech.com
2016-11-09



Legend

- Water
- Wat_Points
 - Cap
 - Hydr
 - ▲ PRStation
 - Pumpstat
 - Valv
- Wat_Lines
 - MAIN
 - - - S_Con

Map No:
9

Preliminary State of Infrastructure Report

- Report and summarize infrastructure data for AM decision making
 - Condition assessment
 - Life expectancy
 - Annual renewal cost
- Reports generated in an Excel spreadsheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	AIMnet Renewal cost calculation:																		
2	Version	2																	
3																			
4	Year	2016																	
5	GIS data													Remaining life data				Condition	
6	Uniq_ID	Ass_ID	Status	Yr_Install	Owner	Length	Diam	κ_Size_Val	κ_Size_Unt	Matl	Ass_Grp	Ass_Type	Ass_Stype	LookUp	ExpectedLife_Yrs	EndOfLife_Date	RemainingLife_Yrs	RemaingLife_Perc	ConditionRating
7	1	San_L_1	Active	1995	VON	14.27	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
8	10	San_L_10	Active	1995	VON	32.13	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
9	100	San_L_100	Active	1995	VON	7.34	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
10	101	San_L_101	Active	1995	VON	3.38	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
11	102	San_L_102	Active	1995	VON	3.34	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
12	103	San_L_103	Active	1995	VON	3.32	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
13	104	San_L_104	Active	1995	VON	2.67	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
14	105	San_L_105	Active	1995	VON	7.34	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
15	106	San_L_106	Active	1995	VON	6.55	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
16	107	San_L_107	Active	1995	VON	8.01	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
17	108	San_L_108	Active	1995	VON	9.81	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
18	109	San_L_109	Active	1995	VON	9.85	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
19	11	San_L_11	Active	1995	VON	26.23	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
20	110	San_L_110	Active	1995	VON	9.79	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
21	111	San_L_111	Active	1995	VON	5.92	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
22	112	San_L_112	Active	1995	VON	18.63	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
23	113	San_L_113	Active	1995	VON	7.31	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
24	114	San_L_114	Active	1995	VON	9.74	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
25	115	San_L_115	Active	1995	VON	9.88	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
26	116	San_L_116	Active	1995	VON	9.99	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6
27	117	San_L_117	Active	1995	VON	9.62	150			PVC	San	Lateral	Connection	SanLateralPVC150	50	2045	29	58%	6

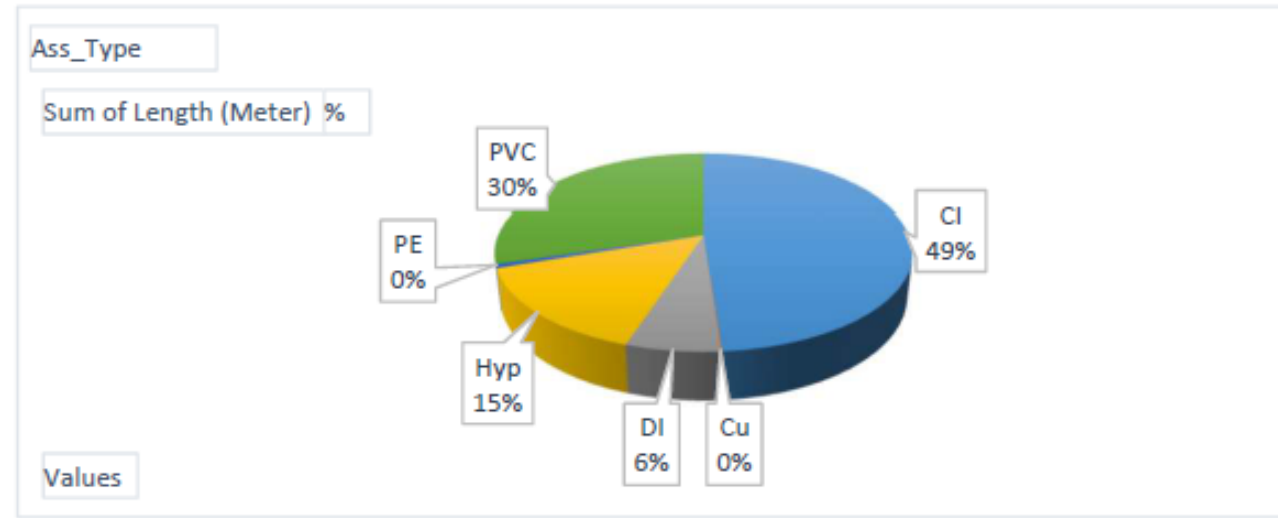
Asset Group	Asset Type	Diameter	Material	Expected Lifetime of Installed Asset (Years)	Expected Lifetime of Replacement Asset (Years) See note (1)	Cost of Asset Replacement	Units
Wat	Main	50	AC	70	80	100	\$ per lineal metre
Wat	Main	100	AC	70	80	100	\$ per lineal metre
Wat	Main	150	AC	70	80	125	\$ per lineal metre
Wat	Main	200	AC	65	80	150	\$ per lineal metre
Wat	Main	100	CI	60	80	100	\$ per lineal metre
Wat	Main	150	CI	60	80	125	\$ per lineal metre
Wat	Main	200	CI	60	80	150	\$ per lineal metre
Wat	Main	250	CI	60	80	175	\$ per lineal metre
Wat	Main	300	CI	60	80	200	\$ per lineal metre
Wat	Main	38	Cu	80	80	100	\$ per lineal metre
Wat	Main	200	DI	50	80	150	\$ per lineal metre
Wat	Main	250	DI	50	80	175	\$ per lineal metre
Wat	Main	300	DI	50	80	200	\$ per lineal metre
Wat	Main	450	DI	50	80	250	\$ per lineal metre
Wat	Main	600	DI	50	80	500	\$ per lineal metre
Wat	Main	50	GAL	40	80	100	\$ per lineal metre
Wat	Main	20	HDPE	80	80	100	\$ per lineal metre
Wat	Main	50	HDPE	80	80	100	\$ per lineal metre
Wat	Main	600	Hyp	80	80	250	\$ per lineal metre
Wat	Main	800	Hyp	80	80	300	\$ per lineal metre
Wat	Main	25	PE	80	80	100	\$ per lineal metre
Wat	Main	38	PE	80	80	100	\$ per lineal metre
Wat	Main	50	PE	80	80	100	\$ per lineal metre
Wat	Main	25	PVC	80	80	100	\$ per lineal metre

1. Water Mains by Material, Length & Diameter

Table 1a: Water Main Length by Material

Material	Sum of Length (Meter)	%
CI	46,231	48.82%
Cu	67	0.07%
DI	5,828	6.15%
Hyp	13,877	14.65%
PE	612	0.65%
PVC	28,084	29.66%
Total (m)	94,700	100.00%

Figure 1a: Water Main Length by Material



2. Number of Hydrants and Valves

Table 2: Count of Hydrants and Valves

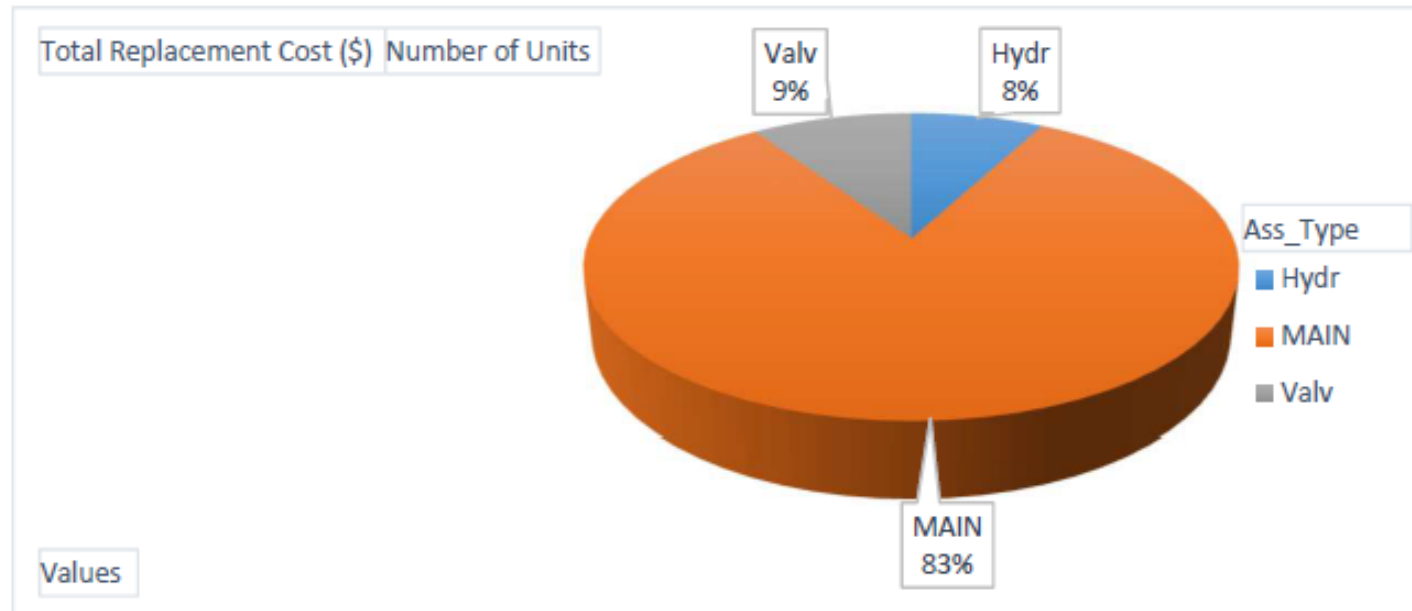
Asset Type	Number of Units
Valv	735
Hydr	339
Grand Total	1074

3. Total Replacement Costs

Table 3: Replacement Cost of Hydrants, Mains and Valves

Asset Type	Total Replacement Cost (\$)	Number of Units
Hydr	1,525,500	339
MAIN	16,107,260	209
Valv	1,837,500	735
Grand Total	19,470,260	1283

Figure 3: Replacement Cost of Hydrants, Mains and Valves

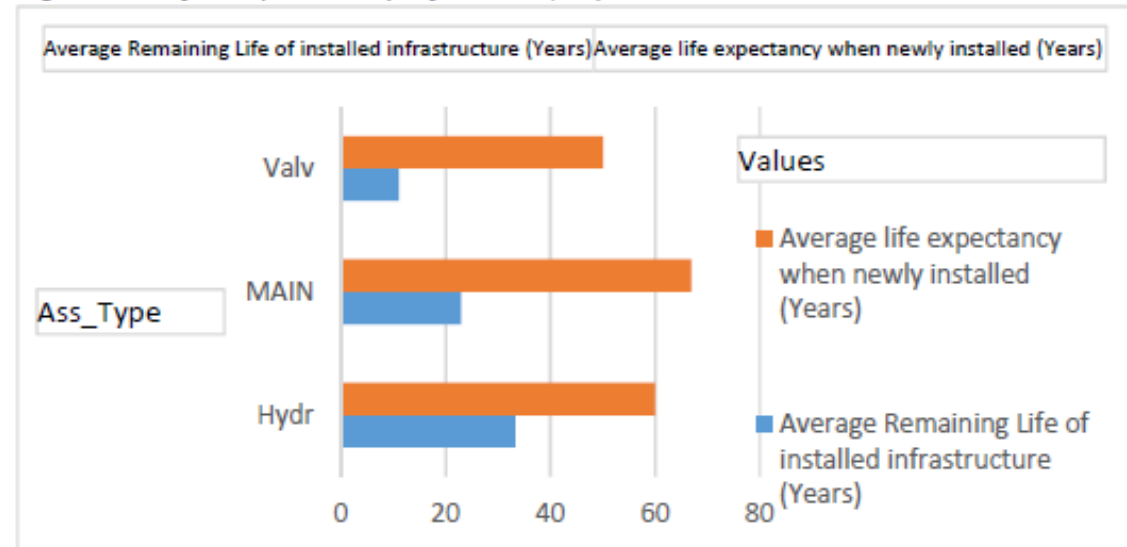


4. Remaining Life vs Life Expectancy

Table 4: Life Expectancy of Mains, Hydrants and Valves

Asset Type	Average Remaining Life of installed infrastructure (Years)	Average life expectancy when newly installed (Years)
Hydr	33	60
MAIN	23	67
Valv	11	50
Total (Avg.)	19	55

Figure 4: Life Expectancy of Mains, Hydrants and Valves



5. Condition Rating

Table 5: Condition Rating of Mains, Hydrants and Valves

Asset type	Average of ConditionRating
Hydr	5.6
MAIN	3.0
Valv	2.2
Over all Average	3.2

Note:

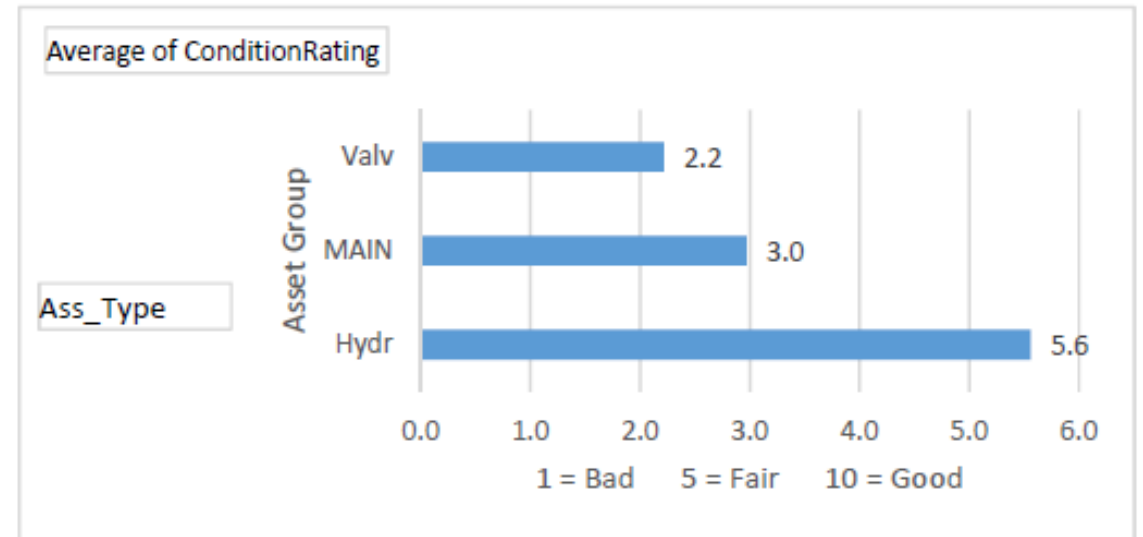
Condition rated on a scale of 1 - 10

1 = Bad

5 = Fair

10 = Good

Figure 5: Condition Rating of Mains, Hydrants and Valves



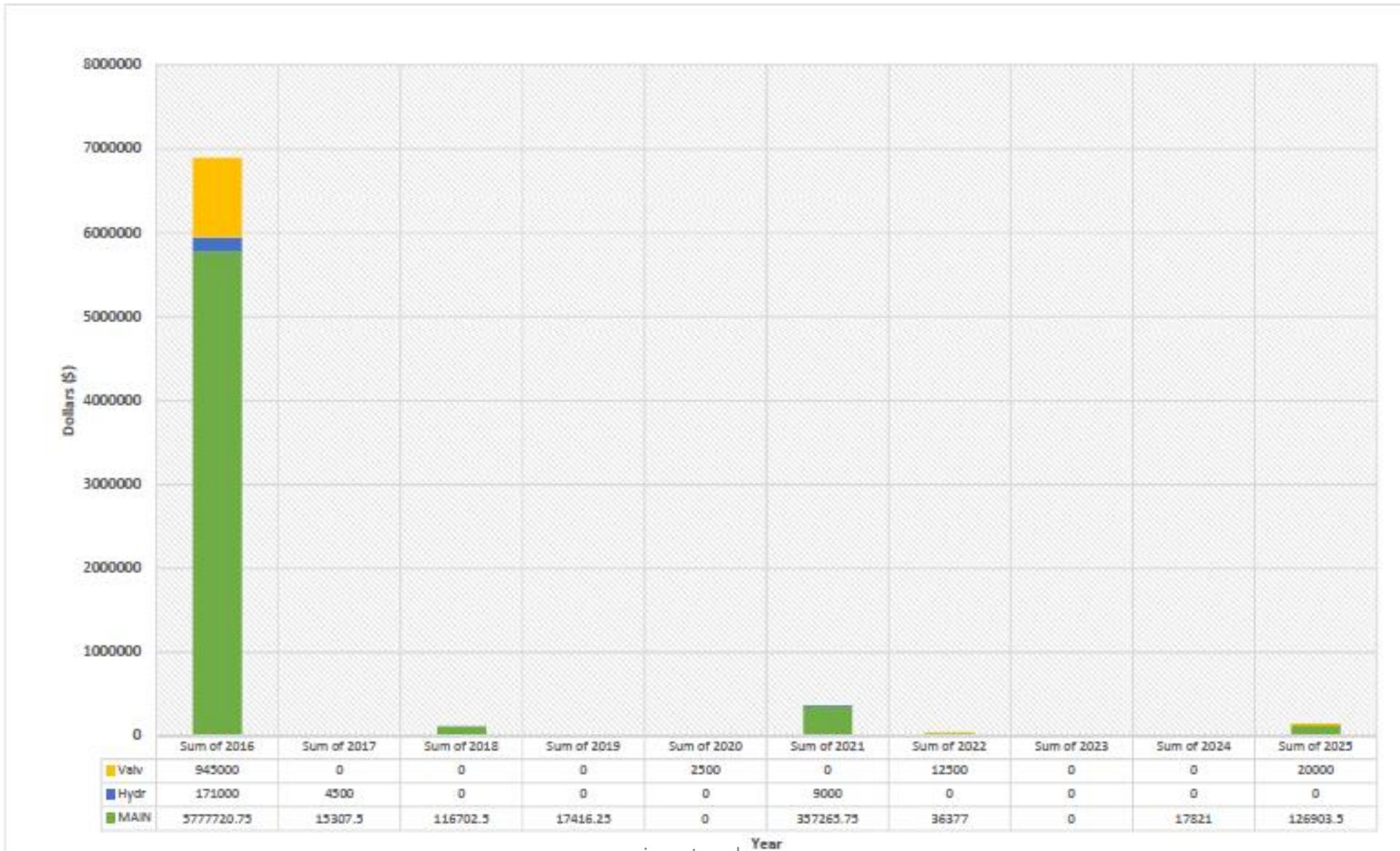
6. Annual Projected Renewal Cost (10 years) - continued

Table 6: Annual Projected Renewal Costs for Mains, Hydrants and Valves (10 Years)

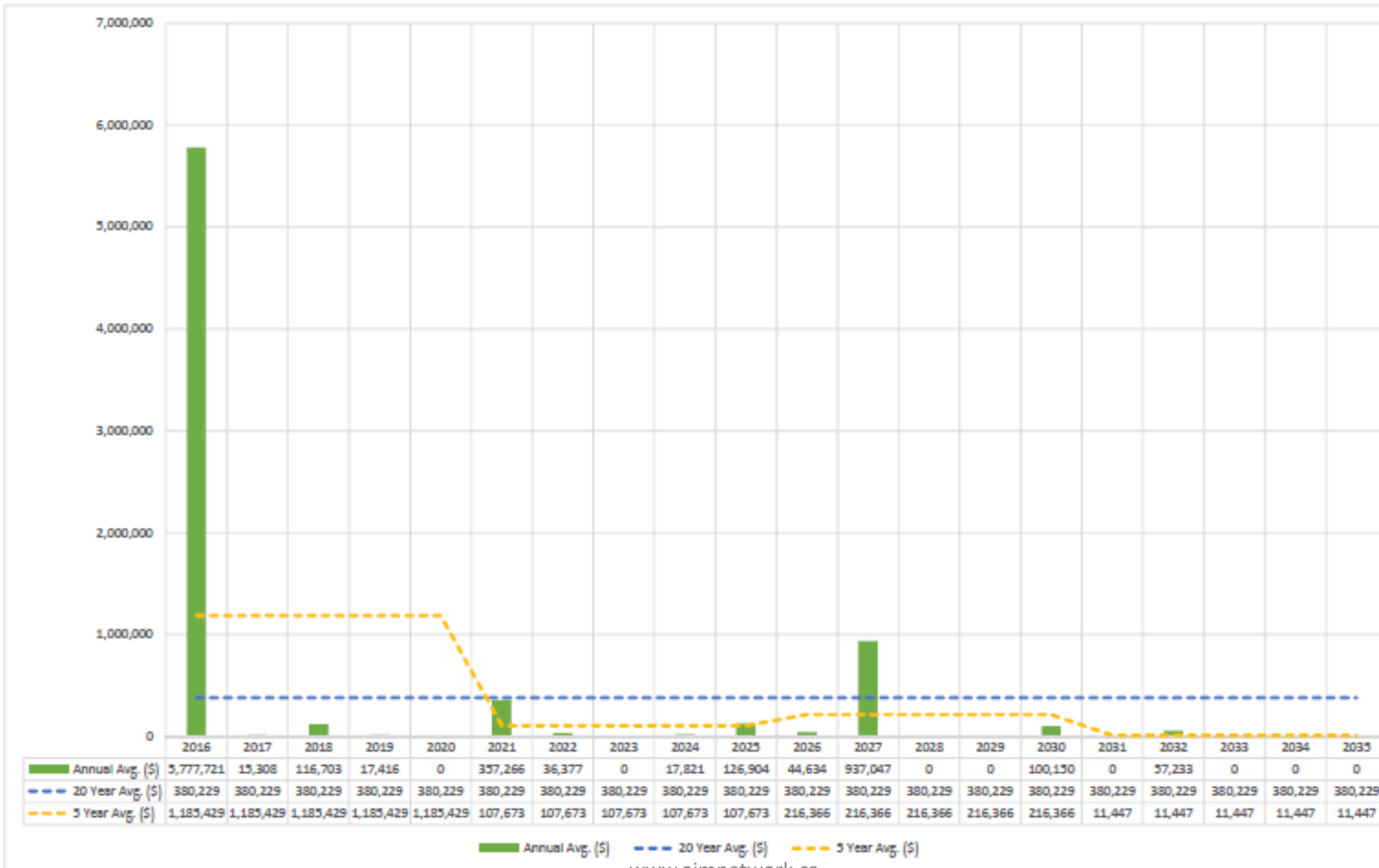
Asset Types				
Year	MAIN	Hydr	Valv	Total (\$)
Sum of 2016	5,777,721	171,000	945,000	6,893,721
Sum of 2017	15,308	4,500	0	19,808
Sum of 2018	116,703	0	0	116,703
Sum of 2019	17,416	0	0	17,416
Sum of 2020	0	0	2,500	2,500
Sum of 2021	357,266	9,000	0	366,266
Sum of 2022	36,377	0	12,500	48,877
Sum of 2023	0	0	0	0
Sum of 2024	17,821	0	0	17,821
Sum of 2025	126,904	0	20,000	146,904

6. Annual Projected Renewal Cost (10 Years)

Figure 6: Annual Projected Renewal Costs for Mains, Hydrants and Valves (10 Years)



7. Distributed Renewal Cost (20 Years)



8. Projected Average Annual Life Cycle Replacement Cost

Asset Group	Projected avg. annual cost (Note (1))
MAIN	\$238,455
Valv	\$36,750
Hydr	\$25,425
All over avg.	\$300,630

Note:

This average is derived from the funds required each year to replace each infrastructure item at end of expected life.



Refined State of Infrastructure Reports

- Prioritize:
 - Level of Service Analysis
 - Risk Assessment
 - Cost
- Refined State of Infrastructure Reports (In process)

AIMnet On-site Data Collection

- Capture and Maintain data in the field
 - Capture location
 - Capture attribute data
 - Photo functionality
- Use a Windows based tablet with external GPS
- Intramaps ROAM open source software

On-site Data Collection Tablet - GPS



Map

Home Imagery Pan Zoom In Zoom Out Select Water Point Digitize GPS Point Enable GPS

Legend

Projects

Sync

GPS

Settings

Quit

Snapping: On

GPS: Not active

1:1,585

Wat_Lines

1 of 1

Record

uniq_id	87
ass_id	wat_L87
yr_inst	0
owner	Kaleden
length	0.0
diam	200
matl	NULL
ass_grp	NULL
ass_type	NULL


Map Legend Projects Sync GPS Settings Quit

Home Imagery Pan Zoom In Zoom Out Select Water Point Digitize GPS Point Enable GPS

122 124 130 119 200 100 -140

Ponderosa Avenue Ponderosa Av

1 of 1

diam	0
matl	NULL
ass_grp	Wat
ass_type	hydrant
ass_stype	NULL
status	Active
hydr_nr	130
surveydate	Mon Feb 20 2017
image	

Snapping: On GPS: Not active 1:396

Easy-to-use View and Query tool

- View and Query web browser/mobile tool for non-GIS user
- Provides on-line access to data via the cloud
- Easy-to use interface to:
 - Search, locate and query and print maps
- Accessible on Desktop or Mobile devices

AIMnet – Web Mapping Services

Village of Lumby

search

1 of 1

Map theme

- Parcel
- Planning
- Infrastructure**

Layers

- Municipal boundary
- Sanitary
- Water
- Storm
- Labels
- Roads
- Parcels
- Ortho Photos

10m

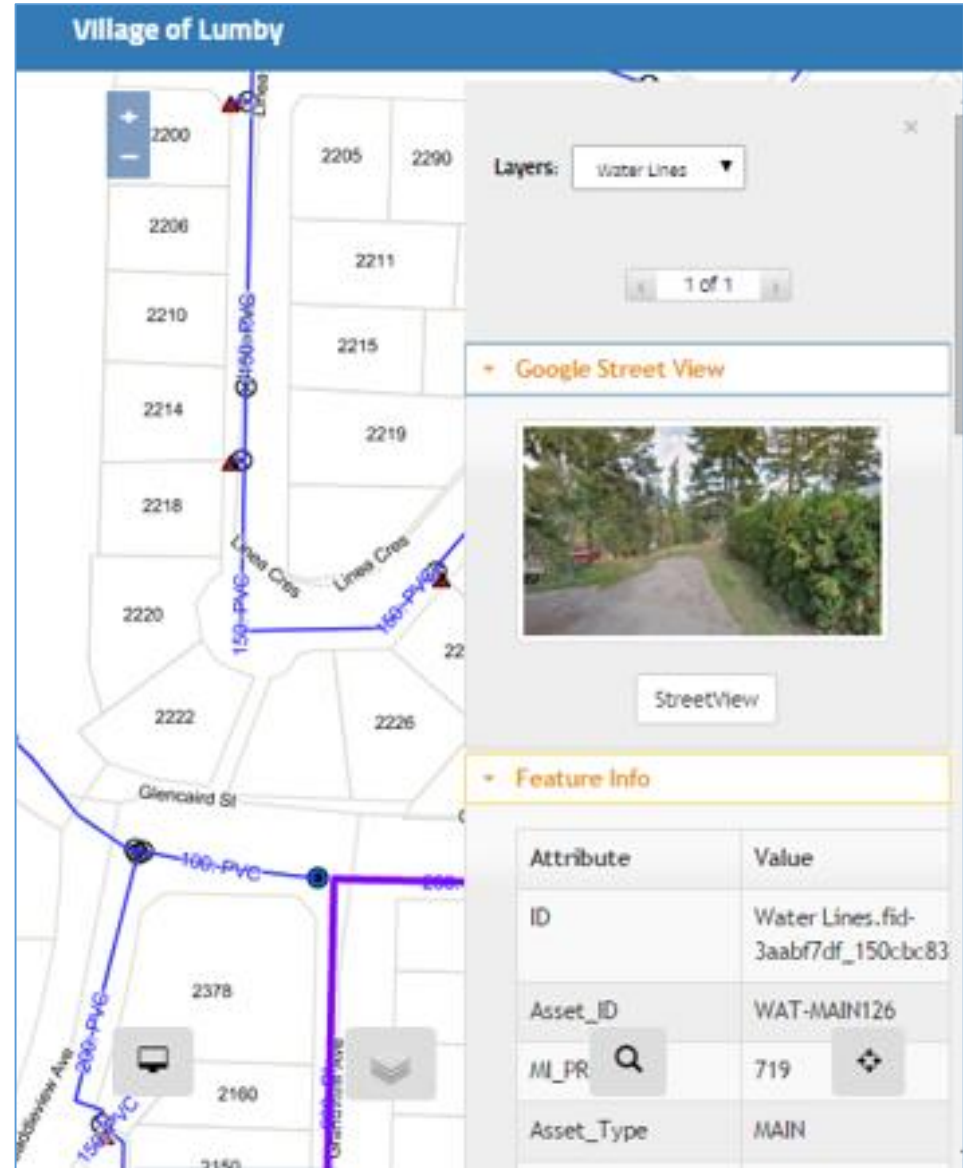
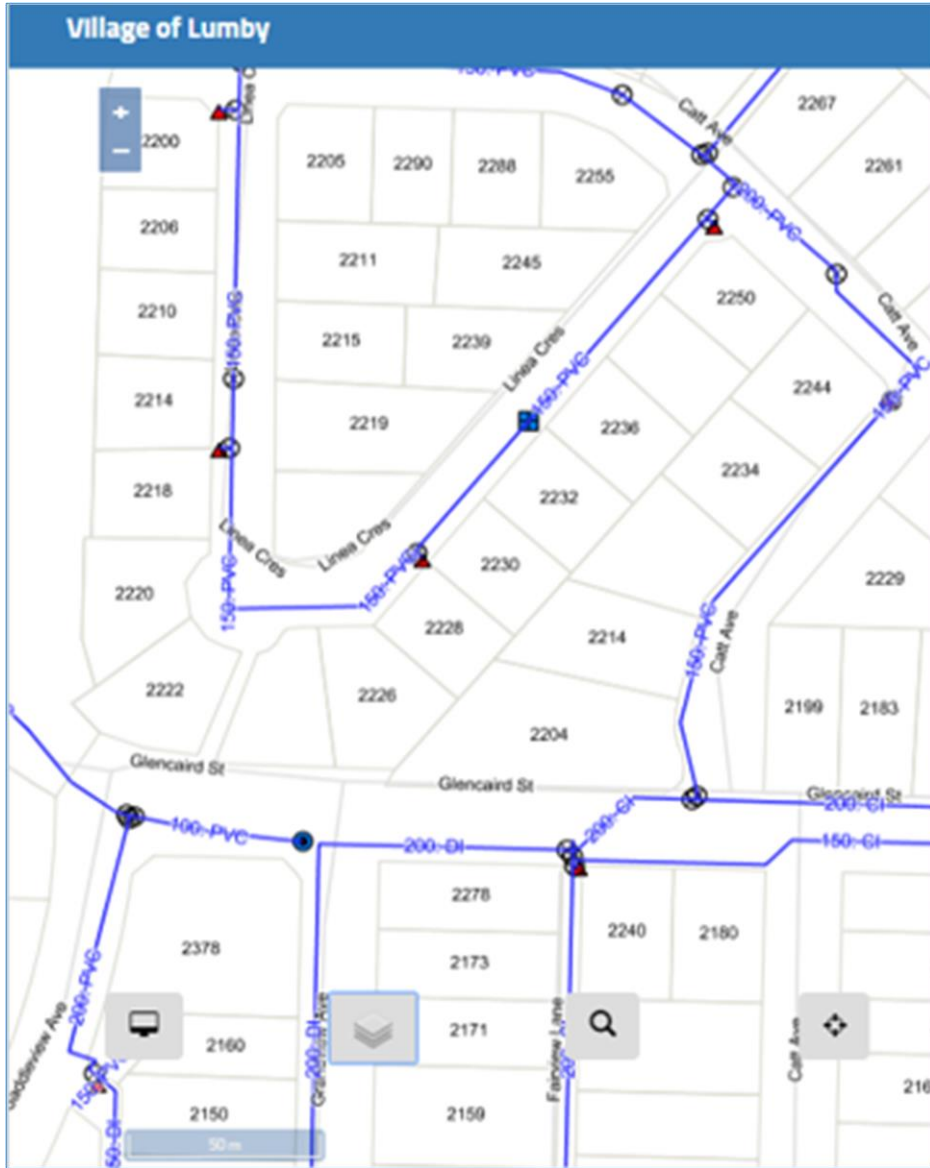
Google Street View

StreetView

Feature Info

Attribute	Value
ID	Water Lines.fid-179d338a_1571a
Asset_ID	WAT-MAIN111
MI_PRINX	2721
Asset_Type	MAIN
MATERIAL	PVC
DIAMETER	150
HEIGHT	0

28



GIS/Asset Management Components

