CITY OF
PRINCE GEORGE

Asset Management & Maintenance
"Partners for Life"

Outline:

1. City of Prince George
2. AM Tools
3. Predictive & Preventative Maintenance
    a) Sanitary Sewer Main Cleaning
    b) Paved Road Condition
4. Next Steps

City of Prince George

Largest City in the region

- City population 74,000
- Regional population 320,000 who use our amenities
- Roughly 8 hours drive from Vancouver, Calgary and Edmonton

City Owned Infrastructure Inventory

1,554 lane km of Paved Roads
256 lane km of Gravel Roads
14 Bridges & Structures

65 Buildings
Approx 178,000 m^2 floor area

794km of Pipe 7,100 Valves
7 Wells 10 Boosters
15 Reservoirs 2,100 Hydrants

362 Parks & Green Spaces
273 Benches 29 Courts
100km Trails

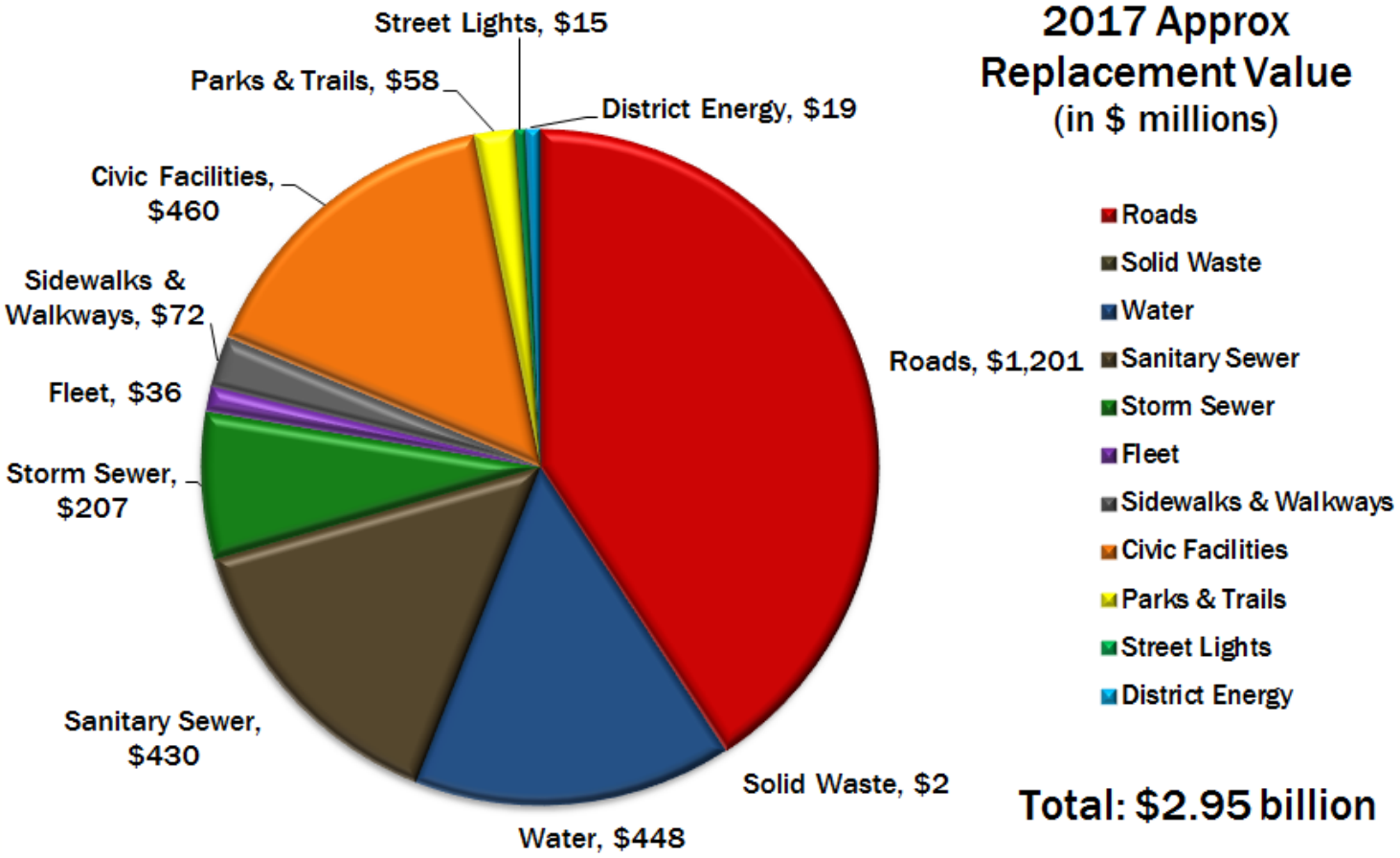
408km of Pipe 478 Structures
3,944 Manholes 6 Liftstations
5,463 Catchbasins

190 km Sidewalks
15 km Walkways (Between Roads)

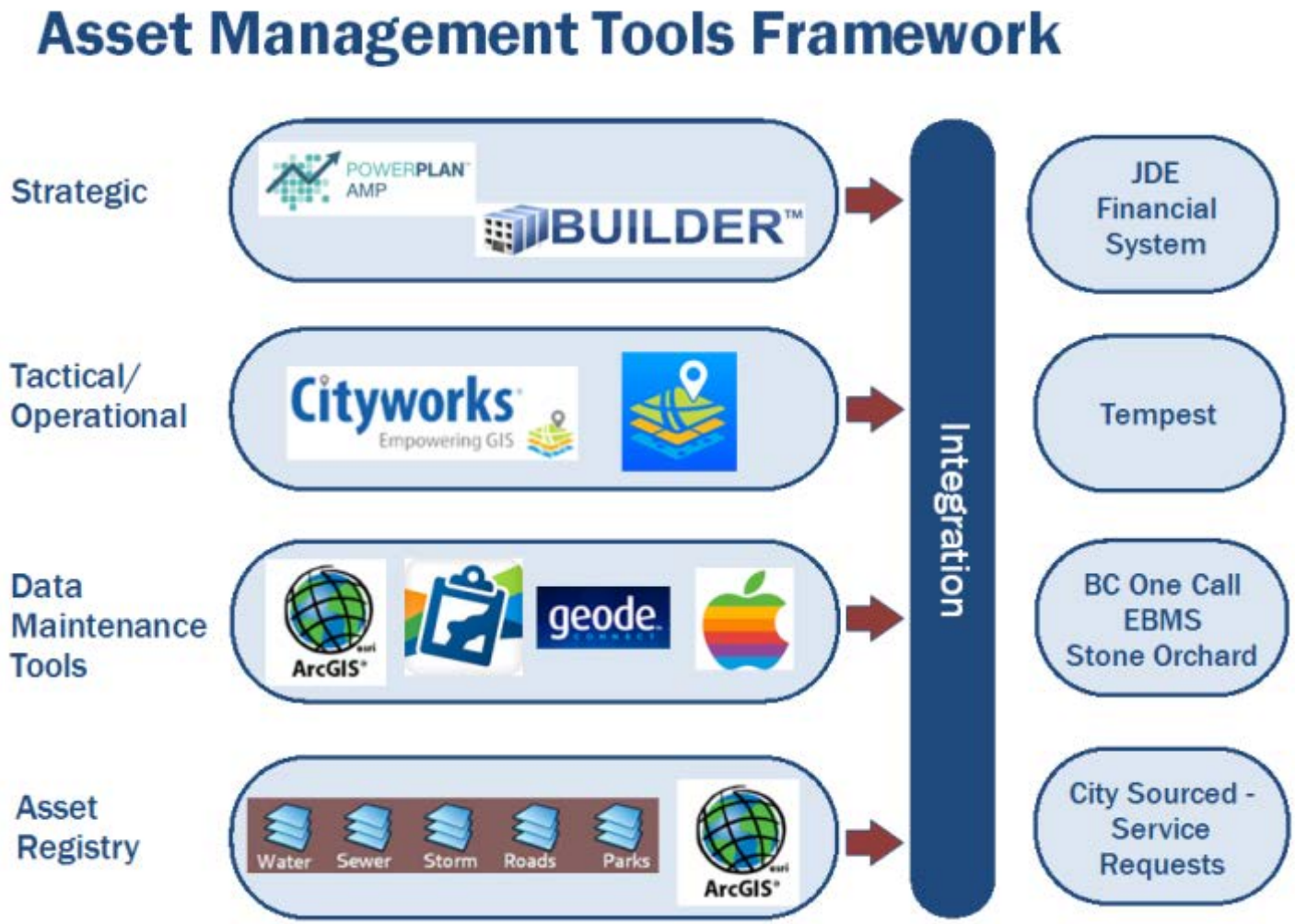
690km of Pipe 5,340 Manholes
31 Lift Stations 6 Treatment Facilities

4,115 Street Lights
43 Traffic Controlled
Intersections

The City's Asset Replacement Value



Using Technology to Advance AM....



Maintenance Types

- **Corrective Maintenance** – repairs are made after the asset has failed and can no longer perform its normal function; *Examples – fixing potholes, fixing watermain breaks.*

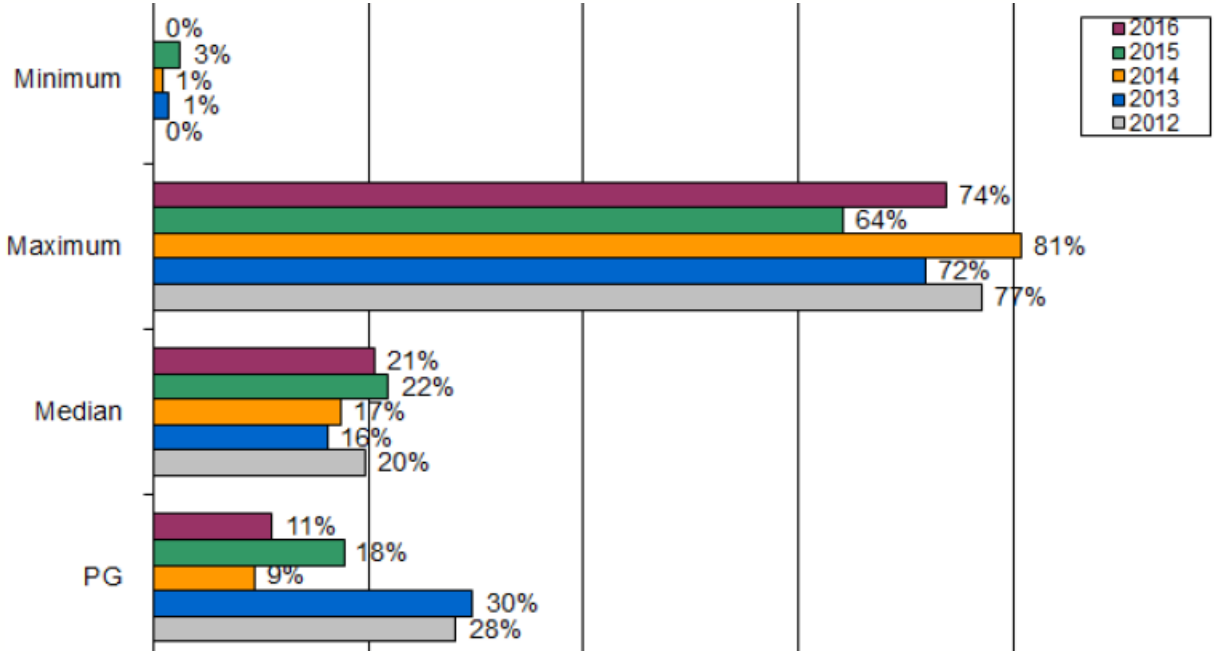
- **Preventative Maintenance** – maintenance that is regularly performed on an asset to lessen the likelihood of it failing and can be based on industry standards and manufacturers recommendations. This is also known as periodic maintenance and is necessary to ensure the reliability or to sustain the design life of the asset; *Examples – annual watermain flushing, motor lubrication*

- **Predictive Maintenance** – condition monitoring activities used to predict failure before it happens. *Examples – building condition assessments, pavement condition assessments.*

Predictive & Preventative Maintenance Example:

Sanitary Sewer Gravity Main Cleaning

Performance Indicator



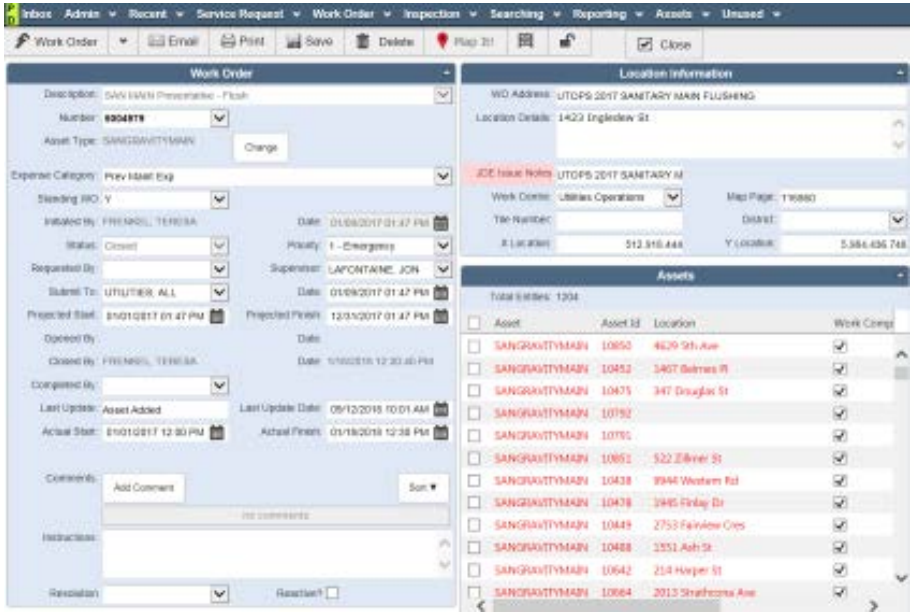
% Sewer Main Cleaned

Previous Preventative Maintenance Work Documentation

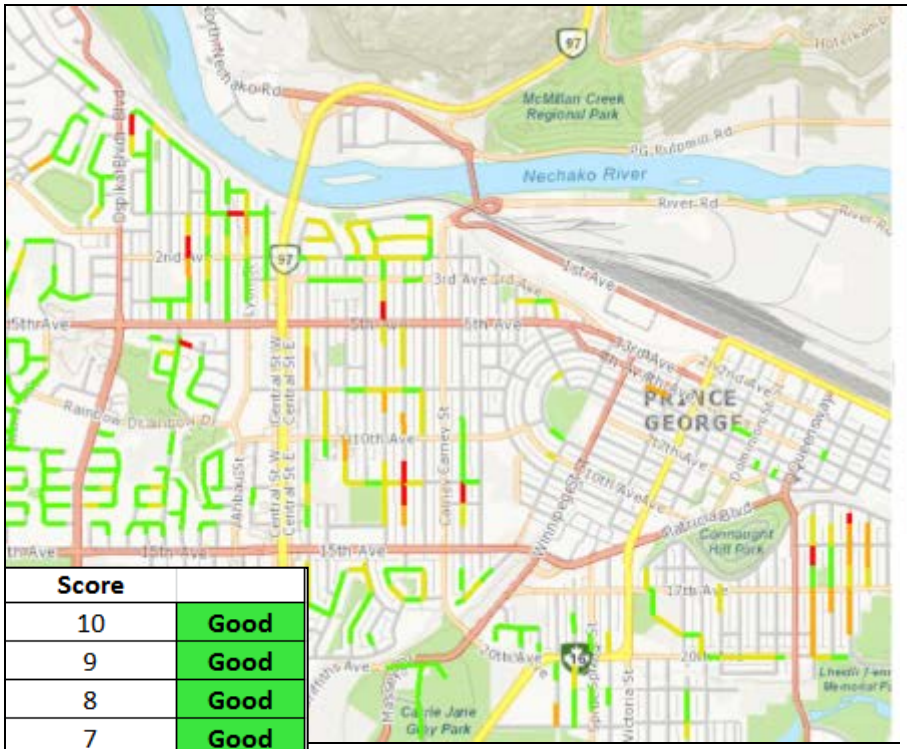
Cityworks Process

"The Sucker"

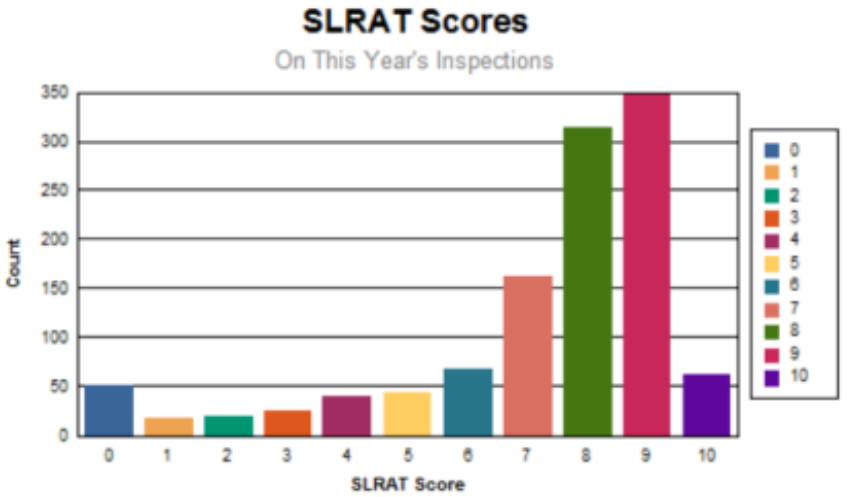
2017
Sanitary Gravity Sewer Main Flushing
(Annual Target 111,847m)



Sewer Main Inspections using SL-RAT Tool

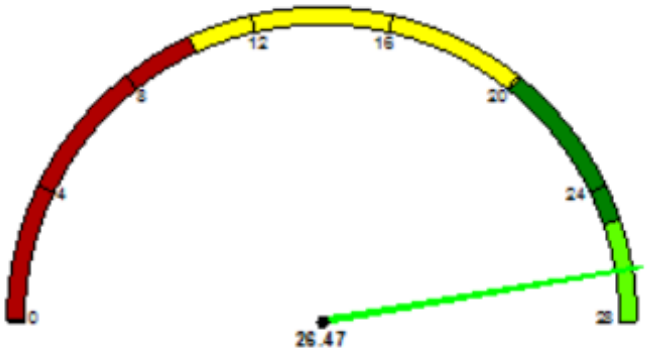


Score	
10	Good
9	Good
8	Good
7	Good
6	Fair
5	Fair
4	Fair
3	Poor
2	Poor
1	Poor
0	Block



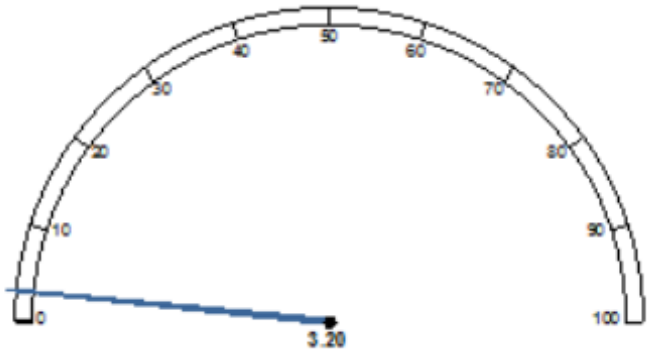
Sewer Main Inspection & Flushing Performance Metrics

Percent of Network (450km) SLRATed This Year



YTD Cost:	$30,006.31
KM Done:	119.12
Segments Done:	1,503
Cost / KM:	$251.89

Percent of Network (450km) Flushed This Year



YTD Cost:	$90,139.28
KM Done:	14.42
Segments Done:	217
Cost / KM:	$6,251.16

Predictive Maintenance Example:

Paved Road Condition

Road Condition Data Analysis Pre-Cityworks

Map ID Street ID	Street Name	Class	From Street Name	To Street Name	Road Length (m)	Ravelling Severity	Ravelling Density	Asphalt Excess Bleeding Severity	Asphalt Excess Bleeding Density	Potholes Severity	Potholes Density	Rutting Severity	Rutting Density	Distortion Severity	Distortion Density	Alligator Cracking Severity	Alligator Cracking Density	Longitudinal Meandering Crack Severity	Lo M Cra
7.00	AHBAU ST	3	FIFTEENTH	FRASER	126.5	2	1	0	0	1	4	0	0	1	2	0	0	3	
585.01	MASSEY DR	2	COYLE ST	OSPIKA BLVD	231.6	2	3	0	0	3	4	2	1	3	2	2	2	3	
690.02	NORANDA RD	2	BELLAMY	NORTHWOOD PULPMILL	557.8	2	2	0	0	3	4	2	2	1	3	3	1	3	
731.01	PACIFIC ST	3	INDUSTRIAL	BOUNDARY	2873.6	2	2	0	0	1	4	2	4	1	2	1	3	2	
243.03	DOMANO BLVD	2	MORIARTY	TRENT	458.6	3	3	0	0	3	4	1	2	2	2	1	1	3	
307.00	FERGUSON LAKE RD	3	NORTH KELLY	EDWARD	1170.6	2	4	0	0	3	3	2	2	1	2	3	1	2	
100.03	BOEING RD	3	GUNN	OLD CARIBOO HWY	788.8	2	3	0	0	3	4	1	2	2	2	1	3	2	
722.05	OSPIKA BLVD	2	5TH	REID	381.7	2	2	0	0	2	4	2	1	1	1	0	0	3	
205.05	CRANBROOK HILL RD	3	KUENG	FOOTHILLS	1455.0	3	3	0	0	2	3	2	2	2	3	2	2	3	
161.06	CENTRAL ST	3	15TH	18TH	315.6	2	1	0	0	2	4	0	0	1	3	1	2	3	
690.01	NORANDA RD	2	FEHR	BELLAMY	842.2	2	1	0	0	2	4	2	2	1	3	3	1	3	
505.03	KILLARNEY DR	3	CALVIN	CARLETON	303.7	2	2	0	0	3	4	0	0	1	2	2	3	2	
90.00	BLACKBURN RD	3	GISCOME	MIDLAND	1910.6	2	2	0	0	2	4	1	3	2	2	1	1	3	
243.04	DOMANO BLVD	2	TRENT	BERNARD	459.6	3	3	0	0	3	4	1	2	2	2	1	1	3	
100.01	BOEING RD	3	CESSNA	GUNN	419.9	2	3	0	0	3	4	2	2	1	2	1	2	2	
722.08	OSPIKA BLVD	2	QUESNEL	PARSNIP	105.0	2	2	0	0	1	4	1	2	1	1	0	0	3	
722.09	OSPIKA BLVD	2	PARSNIP	QUAW	94.7	2	2	0	0	1	4	1	2	1	1	0	0	3	
722.10	OSPIKA BLVD	2	QUAW	POWELL	91.4	2	2	0	0	1	4	1	2	1	1	0	0	3	
722.11	OSPIKA BLVD	2	POWELL	PARSNIP	90.1	2	2	0	0	1	4	1	2	1	1	0	0	3	
722.12	OSPIKA BLVD	2	PARSNIP	ALEZA	92.5	2	2	0	0	1	4	1	2	1	1	0	0	3	
997.03	22ND AVE	3	TAPPING	SHEARER	87.8	2	2	0	0	2	4	0	0	1	1	2	2	2	
997.04	22ND AVE	3	SHEARER	SHEARER	86.4	2	2	0	0	2	4	0	0	1	1	2	2	2	
722.06	OSPIKA BLVD	2	REID	RAINBOW	91.5	3	1	0	0	1	4	2	1	1	1	0	0	3	
722.07	OSPIKA BLVD	2	RAINBOW	QUESNEL	89.9	3	1	0	0	1	4	1	2	1	1	0	0	3	
243.05	DOMANO BLVD	2	BERNARD	GLADSTONE	68.9	3	3	0	0	2	4	1	2	2	2	1	1	3	
1121.04	**PG PULPMILL RD**	**2**	**WOLCZUK**	**EAST**	**3400.8**	**2**	**2**	**0**	**0**	**2**	**2**	**2**	**2**	**1**	**1**	**0**	**0**	**3**	
332.06	4TH AVE	2	VICTORIA	BRUNSWICK	113.1	3	2	0	0	2	4	2	2	1	2	0	0	3	
721.13	OSPIKA BLVD	2	MCGOWAN	OTWAY	363.9	2	2	0	0	2	4	2	1	1	2	1	3	2	
722.34	OSPIKA BLVD	2	RANGE	DAVIS	997.8	3	2	0	0	2	4	1	2	1	3	1	1	3	
722.35	OSPIKA BLVD	2	DAVIS	TYNER	1008.9	3	2	0	0	2	4	1	2	1	3	1	1	3	
309.07	FERRY AVE	2	HWY 16 W	MEMORIAL PARK LANE	147.6	3	3	0	0	3	3	3	3	1	1	0	0	3	
205.00	**CRANBROOK HILL RD**	**3**	**OTWAY**	**MELMACK**	**2389.3**	**3**	**4**	**0**	**0**	**3**	**4**	**0**	**0**	**2**	**4**	**0**	**0**	**2**	
1002.01	UNIVERSITY WAY	2	15TH AVE	CEREMONIAL RD	3058.5	2	2	0	0	2	4	1	2	1	2	1	1	3	
722.13	OSPIKA BLVD	2	ALEZA	15TH	144.6	2	2	0	0	1	4	1	2	1	1	0	0	3	

Road Condition Assessment Data

Collect Condition Data Every 3-5 yrs

Create Cityworks Inspections

Update Current Condition in GIS

Update Powerplan

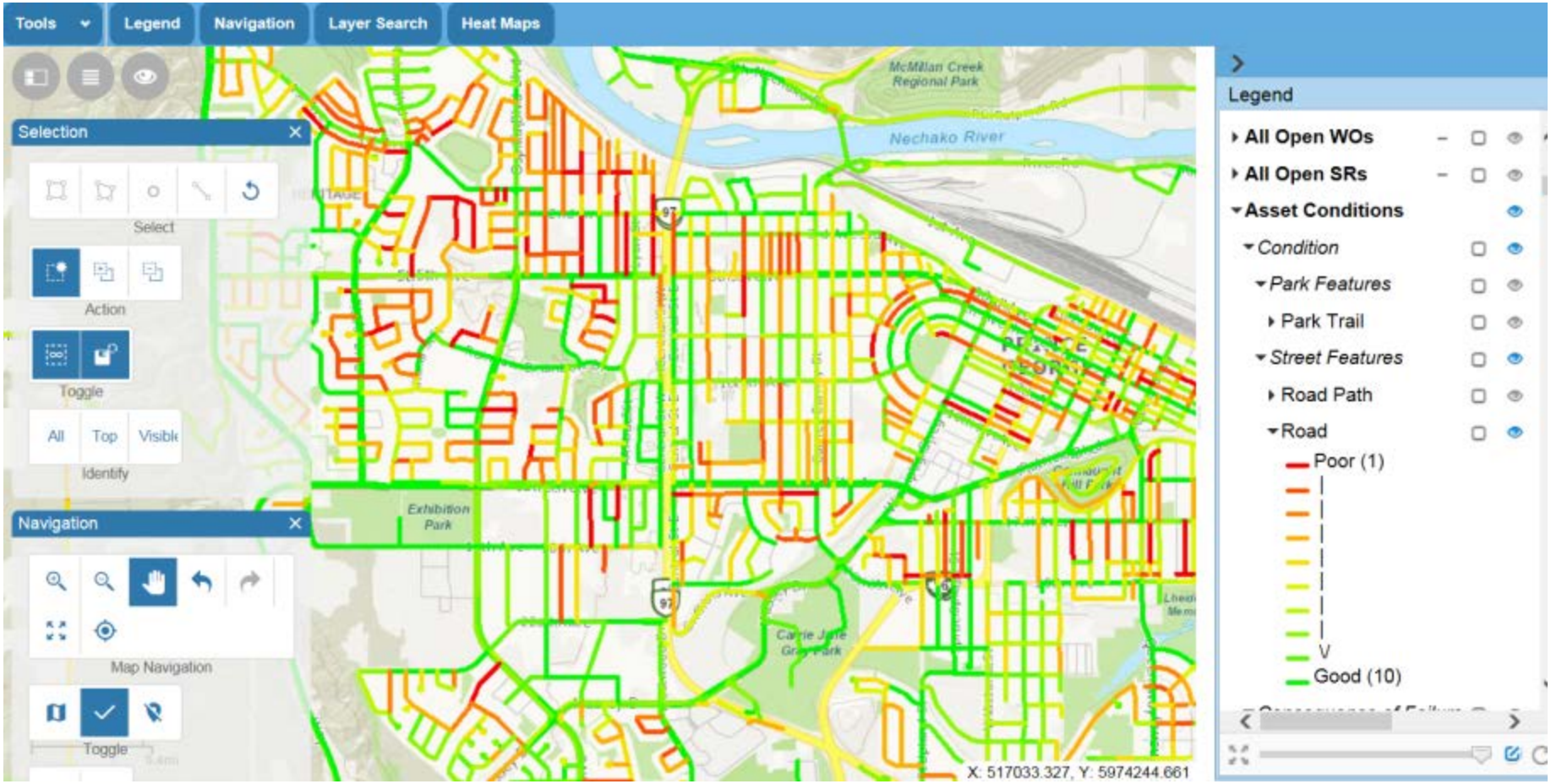
POWERPLAN™

Cityworks Empowering GIS

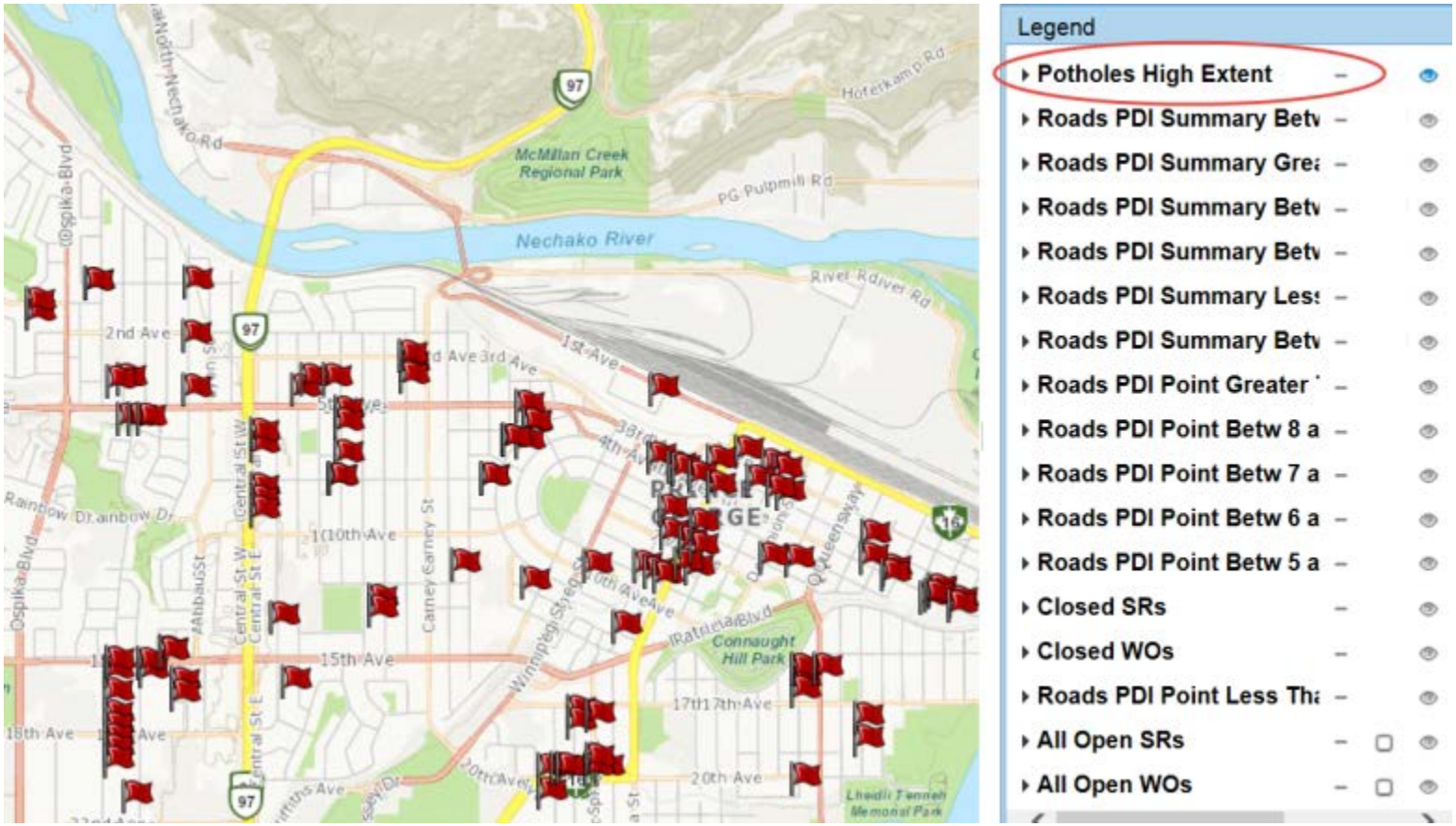
esri ArcGIS®

Road Condition Analysis in Cityworks

Using Cityworks Condition Assessment Inspections:



Query Inspections for Defects



Road Work Activities & Condition Updates

Perform Work

Create Cityworks Inspections

Update Current Condition in GIS

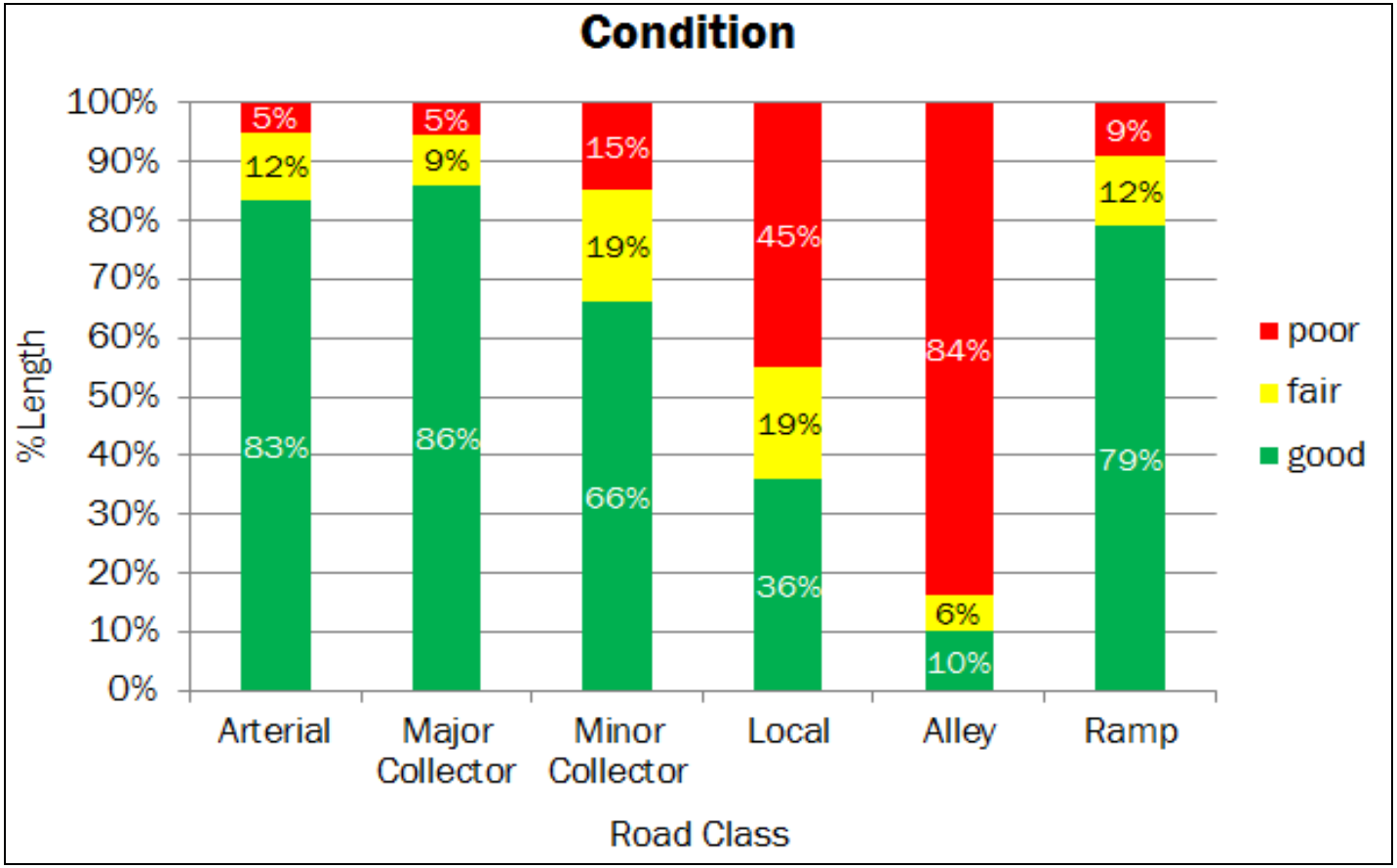
Update Powerplan

POWERPLAN™

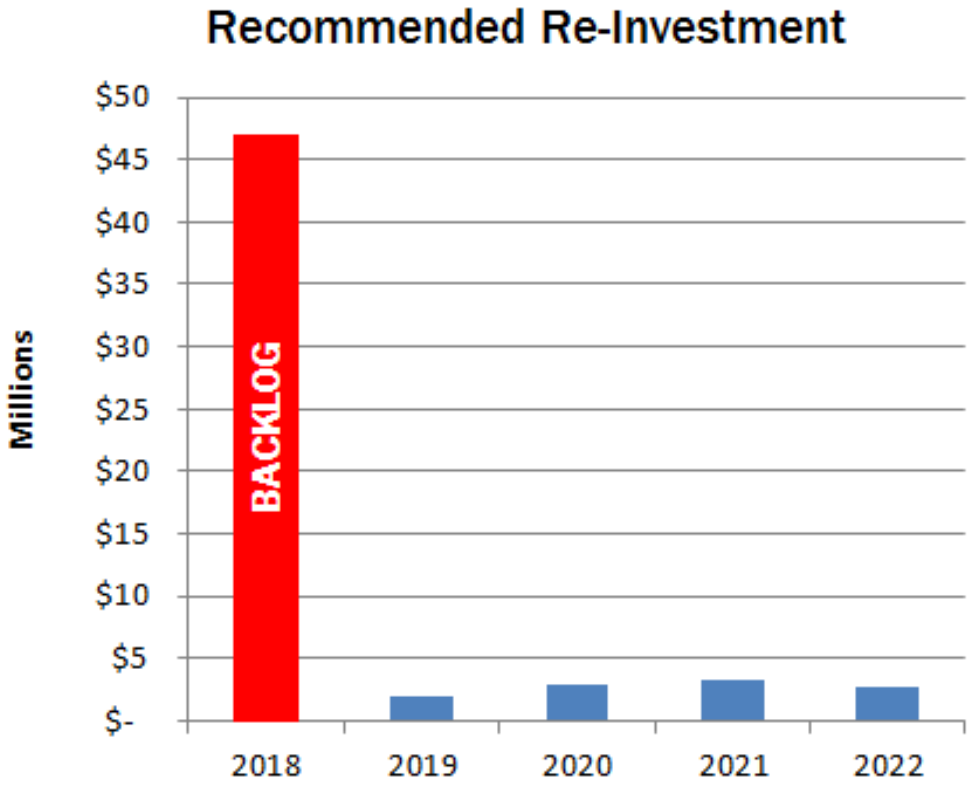
Cityworks® Empowering GIS

esri ArcGIS®

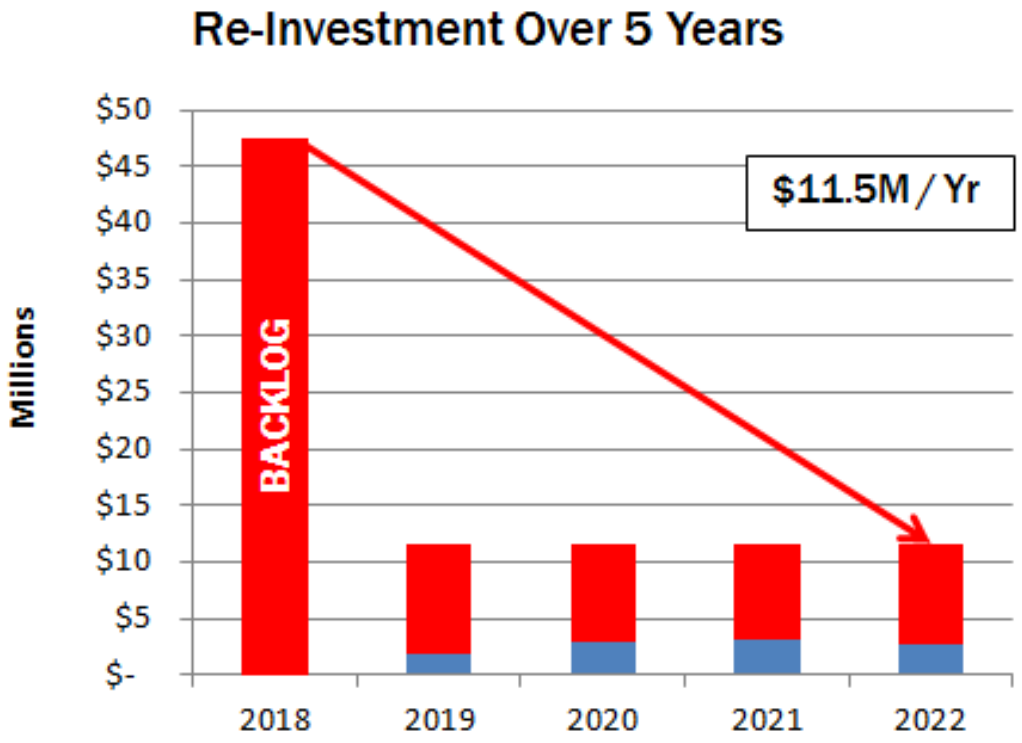
Capital Planning



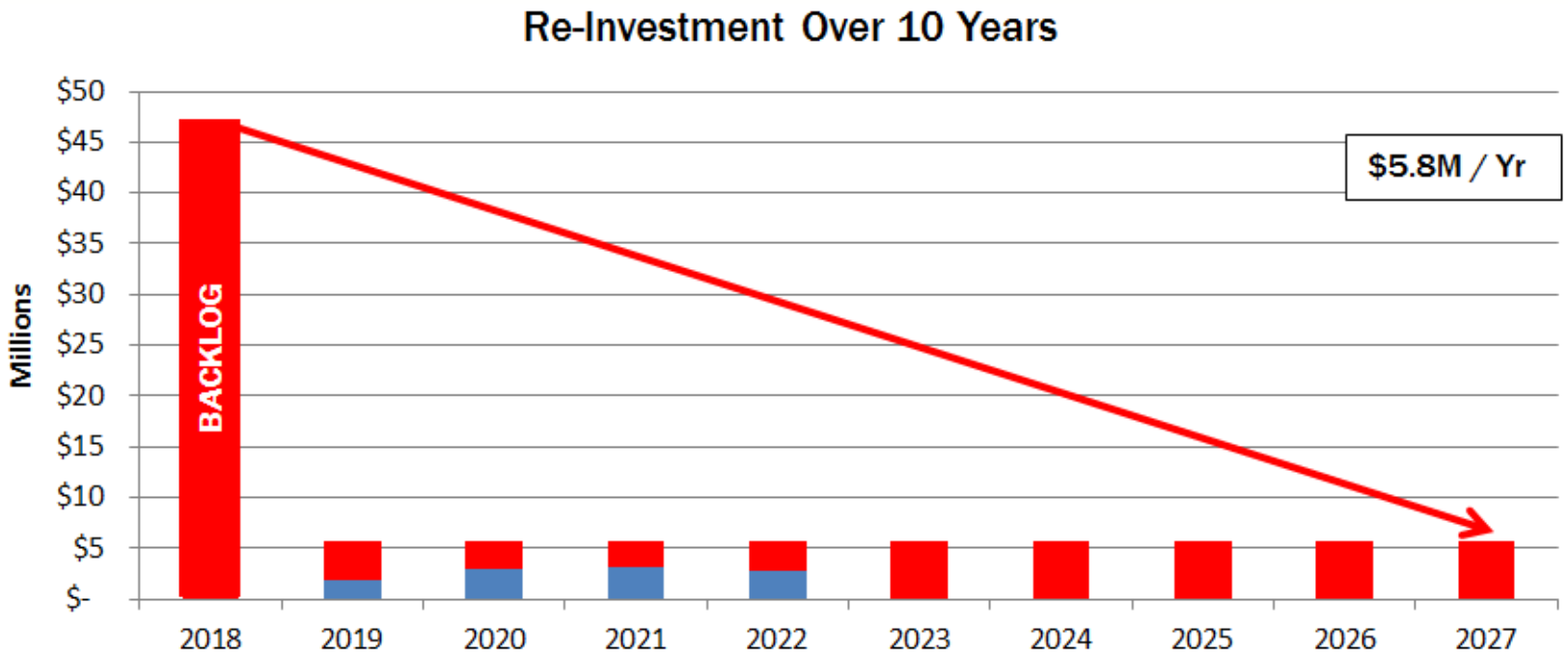
Capital Planning Con't



Capital Planning Con't



Capital Planning Con't



Aligning Capital Work

Using the GIS and eventually Cityworks to align capital projects

- Water and Sewer Master Plans
- Pedestrian Network Study
- Powerplan AMP Road Rehab Recommendations

Benefits of Condition Assessments

- Prioritize work
- Eliminate unnecessary work
- Determine short and long term budgets
- Determine remaining service life
- Risk modeling
- Custom depreciation curves
- Mitigate the risk of surprise asset failures
- Align work

Next Steps

Catastrophic	Immediate action to prevent impact to LOS, Safety, and environment
Extreme	Gearing up for immediate action
High	Monitoring Regime, response plan in place
Moderate	Management responsibility specified
Low	Manage using routine procedures

Risk = PoF x CoF

- Consequence (Impact) of failure

- Levels of Service development and performance metrics

QUESTIONS?

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