Portsmouth Asset Management Program

City of Portsmouth

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Presentation Overview

What are Assets?
What is Asset Management?
Importance of Asset Management
Portsmouth's Asset Management Program
Next Steps

What are Assets?

> **An asset is a resource with economic value and the expectation that it will provide a future benefit.**

Wastewater - Horizontal

- Gravity pipes
- Force mains (pipes)
- Sewer manholes

Wastewater - Vertical

- Pump station equipment
- Wastewater treatment facility equipment

Stormwater - Horizontal

- Gravity pipes
- Drainage manholes
- Catch basins

What is Asset Management?

> **Asset Management is a systematic process of operating, maintaining, upgrading and disposing of assets cost-effectively while maintaining a level of service that is acceptable to the customers.**

What is Asset Management?

Asset Management is a continuous process.

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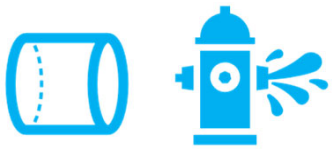
Importance of Asset Management

The City of Portsmouth owns and maintains thousands of assets with varying levels of complexity and replacement costs.

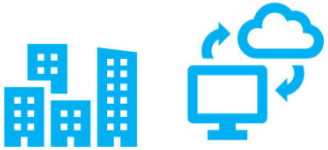


Pipe, manholes, catch basins, hydrants, etc.

Replacement Cost: $100s to $1,000s

Pump Stations

Replacement Cost: $100Ks to $1Ms



Treatment Facilities

Replacement Cost: $1Ms to $100Ms

$100Ms worth of assets

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Importance of Asset Management

Replacement costs can be 2-3x greater when done as reactive, emergency work due to factors like severity of damage, labor availability, shipping/freight, etc.

Asset Management

Maximize the benefits of invested dollars with preventative maintenance and capital improvement plans based on risk.

Level of Service

A Level of Service (LOS) goal defines how the utility owners, managers, and operators want the system to perform over the long term.

- **The City created LOS goals for horizontal wastewater, vertical wastewater, and stormwater utilities.**
- **The LOS objectives were broken into six categories for each utility category:**
  - **Asset Preservation and Condition**
  - **Conservation, Compliance, and Enforcement**
  - **Health, Safety, and Security**
  - **Service Quality and Cost**
  - **Customer Service**
  - **Employee Development**

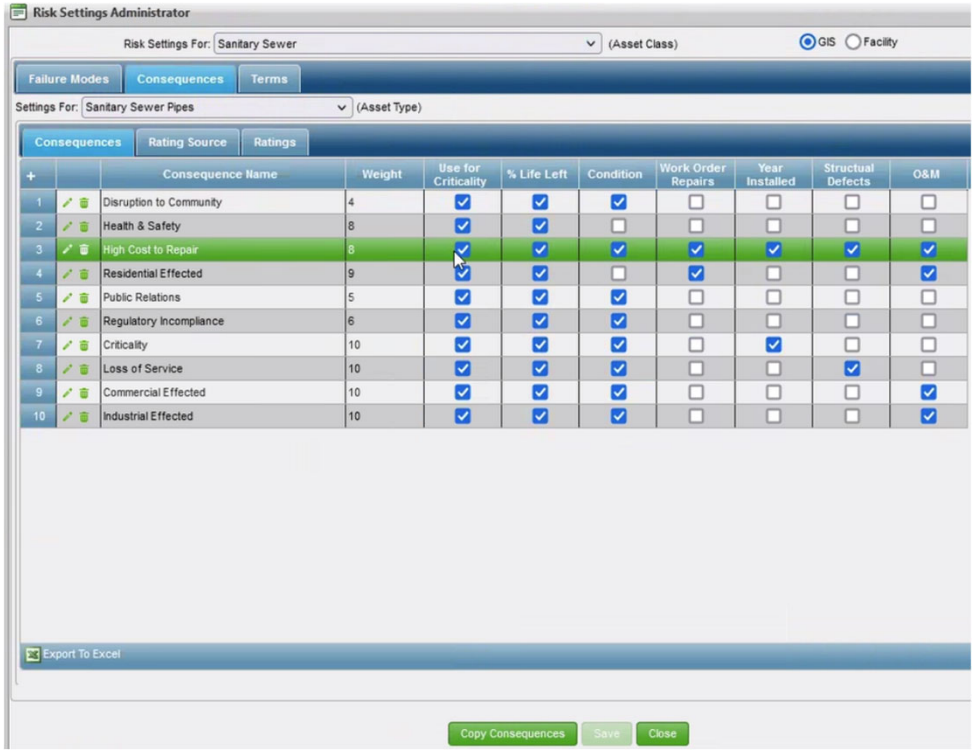
Existing Infrastructure: Summary

The City of Portsmouth owns and maintains both horizonal and vertical wastewater assets, as well as stormwater assets.

Wastewater Asset Type	Quantity
Gravity Pipe	500,000+ LF
Force Main Pipe	50,000+ LF
Manholes	2,636
Pump Station Equipment	285
Treatment Facility Equipment	328

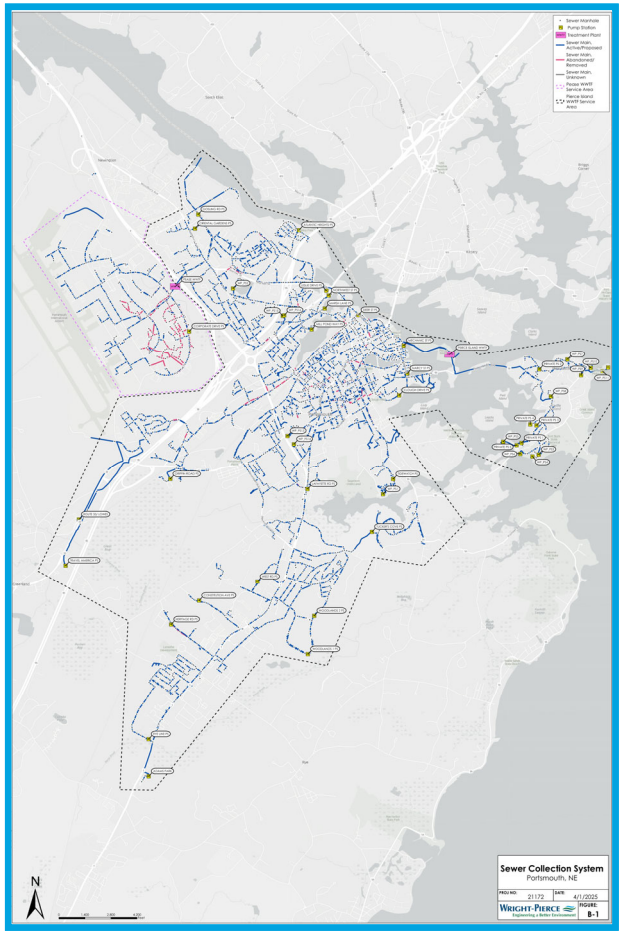
Stormwater Asset Type	Quantity
Drainage Pipe	420,000+ LF
Catch Basins	3,488
Drainage Manholes	1,039
Stormwater Treatment Units	74
Outfalls	205

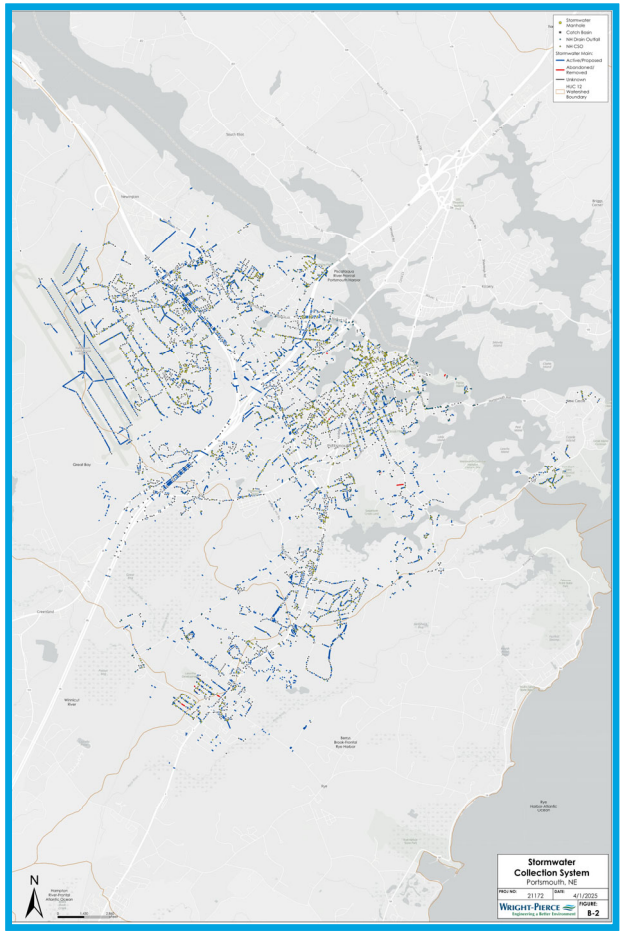
Existing Infrastructure: VUEworks



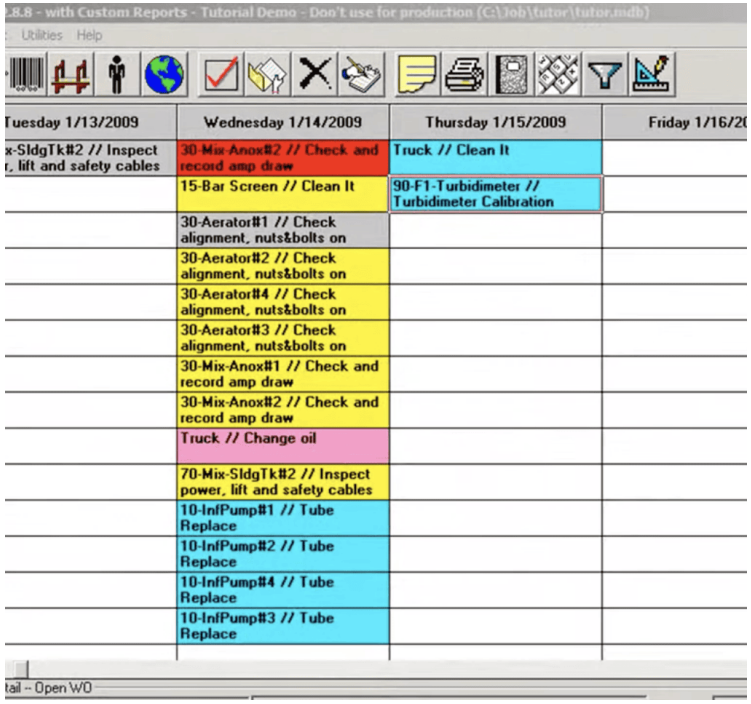
- Provides a common software for all departments to manage horizontal assets
- Centralizes work orders and service requests
- Simple graphical interface for navigating to and updating assets
- Export to Excel and Integration with GIS

Existing Infrastructure: GIS Integration



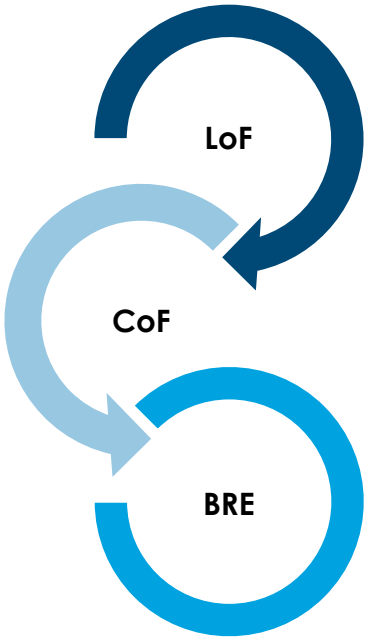


Existing Infrastructure: JobCal



- Provides a common software for all departments to manage vertical assets
- Centralizes work orders and service requests
- Simple graphical interface for navigating to and updating assets
- Export to Excel

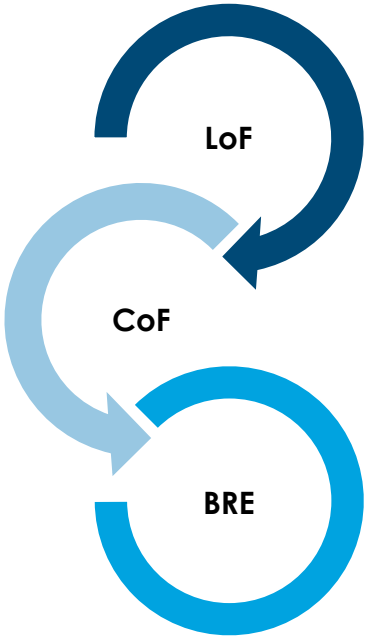
Risk Analysis



- Likelihood of Failure (LoF)
  - 1 to 5
- LoF scores are generally based on:
  - Age
  - Material
  - Failure history

- Consequence of Failure (CoF)
  - 1 to 5
- Consequence of an asset failure can result in various impacts:
  - Social
  - Economic
  - Environmental

Risk Analysis: Business Risk Exposure



- **Business Risk Exposure (BRE)**
  - **Combines the two measures of failure into one number that can be used to sort and rank assets**
  - **BRE = LoF x CoF**

Risk Analysis: Wastewater Horizontal (Gravity Pipe & Manholes)

		Criteria	Criteria Weight
Likelihood of Failure		Asset Life Consumed	25%
		Asset Condition (NASSCO PACP)	50%
		Pipe Material	25%
Consequence of Failure	Social (25%)	Public Health and Welfare	8.33%
		Public Safety (population density per acre)	8.33%
		Environmental Justice Socioeconomic Indicators	8.33%
	Economic (25%)	Pipe Diameter	6.25%
		Depth	6.25%
		Traffic Distribution	6.25%
		Proximity to Railroads	6.25%
	Environmental (50%)	Proximity to Wetlands, Surface Waters, and Tidal Influence	16.66%
		Proximity to Groundwater Classification Areas	16.66%
		Proximity to Critical Plant/Animal Habitat	16.66%

Risk Analysis: Wastewater Horizontal (Force Main)

		Criteria	Criteria Weight
Likelihood of Failure		Asset Life Consumed	50%
		Pipe Material	50%
Consequence of Failure	Social (25%)	Public Health and Welfare	8.33%
		Public Safety (population density per acre)	8.33%
		Environmental Justice Socioeconomic Indicators	8.33%
	Economic (25%)	Pipe Diameter	8.33%
		Traffic Distribution	8.33%
		Proximity to Railroads	8.33%
	Environmental (50%)	Proximity to Wetlands, Surface Waters, and Tidal Influence	16.66%
		Proximity to Groundwater Classification Areas	16.66%
		Proximity to Critical Plant/Animal Habitat	16.66%

Risk Analysis: Wastewater Vertical (WWTFs & PSs)

	Criteria	Criteria Weight
Likelihood of Failure	Asset Life Consumed	20%
	Condition	20%
	Reliability	20%
	Performance	20%
	Maintainability	20%
Consequence of Failure	Redundancy	20%
	Permit Compliance	20%
	Environmental Impact	15%
	Financial Impact	15%
	Loss of Service	10%
	Safety Impact	10%
	Agency's Image	10%

Risk Analysis: Stormwater Horizontal (Gravity Pipe, Catch Basins, & Manholes)

		Criteria	Criteria Weight
Likelihood of Failure		Asset Life Consumed	20%
		Asset Condition (NASSCO PACP)	20%
		Pipe Material	20%
		Flood Zone	20%
		Proximity to Suspected Septic System	10%
		Proximity to Sanitary Sewers	10%
Consequence of Failure	Social (45%)	Public Health and Welfare	15%
		Public Safety (population density per acre)	15%
		Environmental Justice Socioeconomic Indicators	15%
	Economic (45%)	Pipe Diameter	11.25%
		Depth	11.25%
		Traffic Distribution	11.25%
		Proximity to Railroads	11.25%
	Environmental (10%)	Proximity to Wetlands, Surface Waters, and Tidal Influence	10%

Risk Prioritization

Group	Strategy
A	Critical Repair or Replacement
B	Priority Repair or Replacement
C	Priority Monitoring
D	Opportunistic Repair or Replacement
E	Monitor

Likelihood of Failure	Consequence of Failure 1	2	3	4	5
5	D	C	B	A	A
4	D	C	B	B	A
3	D	C	C	B	B
2	E	D	C	C	C
1	E	E	D	D	D

Plotting the likelihood of failure scores against the consequence of failure scores for each asset type provides a visual means of reviewing the BRE scores.

Risk Prioritization Example

Example Asset: Gravity Sewer Pipe (Asset ID: 1660)

Criteria	Weight	Asset Info	Score	LoF
Asset Life Consumed	25%	Installed in 1983, Expected life of 100 years	2	0.50
Asset Condition	50%	Unknown	5	2.50
Pipe Material	25%	PVC	1	0.25

Likelihood of Failure

Asset Life Consumed

= (Current Year – Install Year)/100 * 5

= (2023-1983)/100 * 5 = 2

LoF Score = 0.5 + 2.5 + 0.25 = 3.25

Rounded LoF Score (to nearest whole number) = 3

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Risk Prioritization Example

Example Asset: Gravity Sewer Pipe (Asset ID: 1660)

Criteria	Weight	Asset Info	Score	CoF
Public Health and Welfare (proximity to critical districts/facilities)	8.33%	< 200 ft[1]	4	0.3332
Public Safety (population density per acre)	8.33%	91-120	4	0.3332
Environmental Justice Socioeconomic Indicators	8.33%	60-79th percentile	4	0.3332
Pipe Diameter	6.25%	< 8 inch	1	0.0625
Depth	6.25%	< 10 ft	1	0.0625
Traffic Distribution	6.25%	Local	2	0.125
Proximity to Railroads	6.25%	> 50 ft	1	0.0625
Proximity to Wetlands, Surface Waters, and Tidal Influence	16.66%	< 25 ft	5	0.833
Proximity to Groundwater Classification Areas	16.66%	> 250 ft	1	0.1666
Proximity to Critical Plant/Animal Habitat	16.66%	> 250 ft	1	0.1666

Notes:
1. Within 200 feet of commercial district, mixed-use commercial area, civic district, municipal area, or character district

Consequence of Failure

CoF Score

= 0.3332 + 0.3332 + 0.3332 + 0.0625 + 0.0625 + 0.125 + 0.0625 + 0.833 + 0.1666 + 0.1666 = 2.4783

Rounded CoF Score (to nearest whole number) = 2

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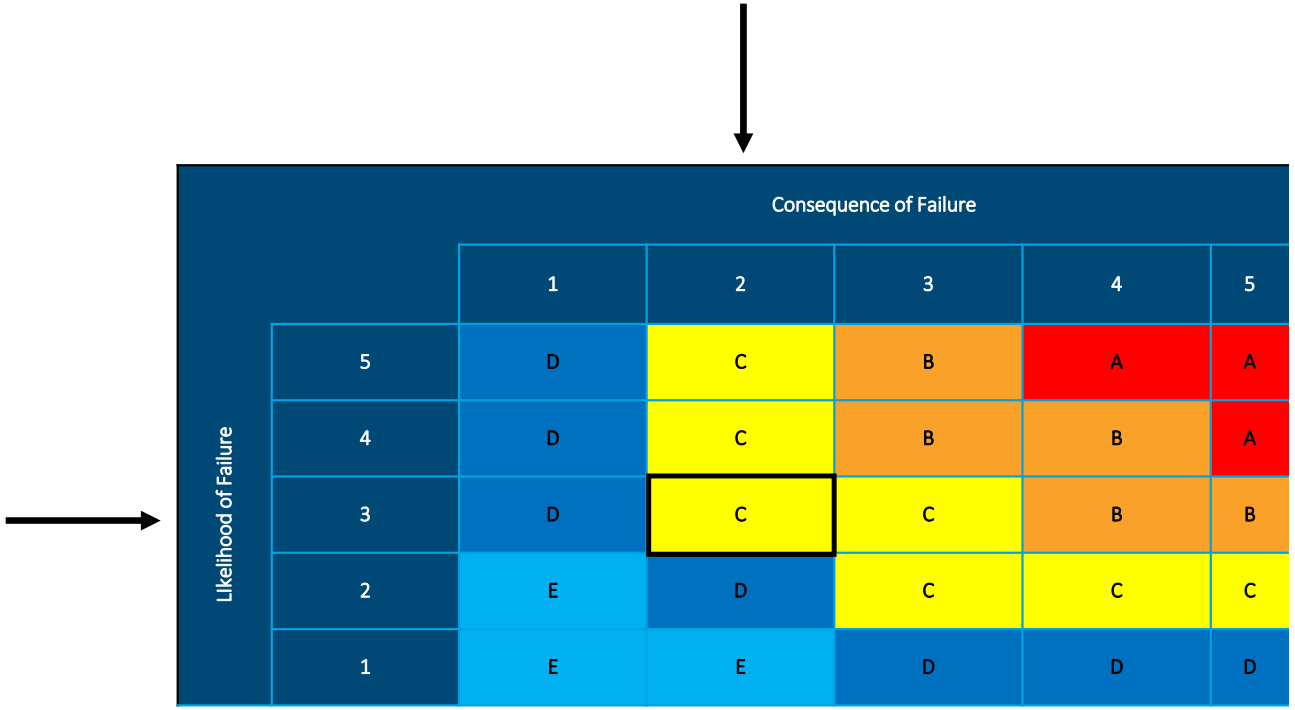
Risk Prioritization Example

Example Asset: Gravity Sewer Pipe (Asset ID: 1660)



Likelihood of Failure	1	2	3	4	5
5	D	C	B	A	A
4	D	C	B	B	A
3	D	C	C	B	B
2	E	D	C	C	C
1	E	E	D	D	D

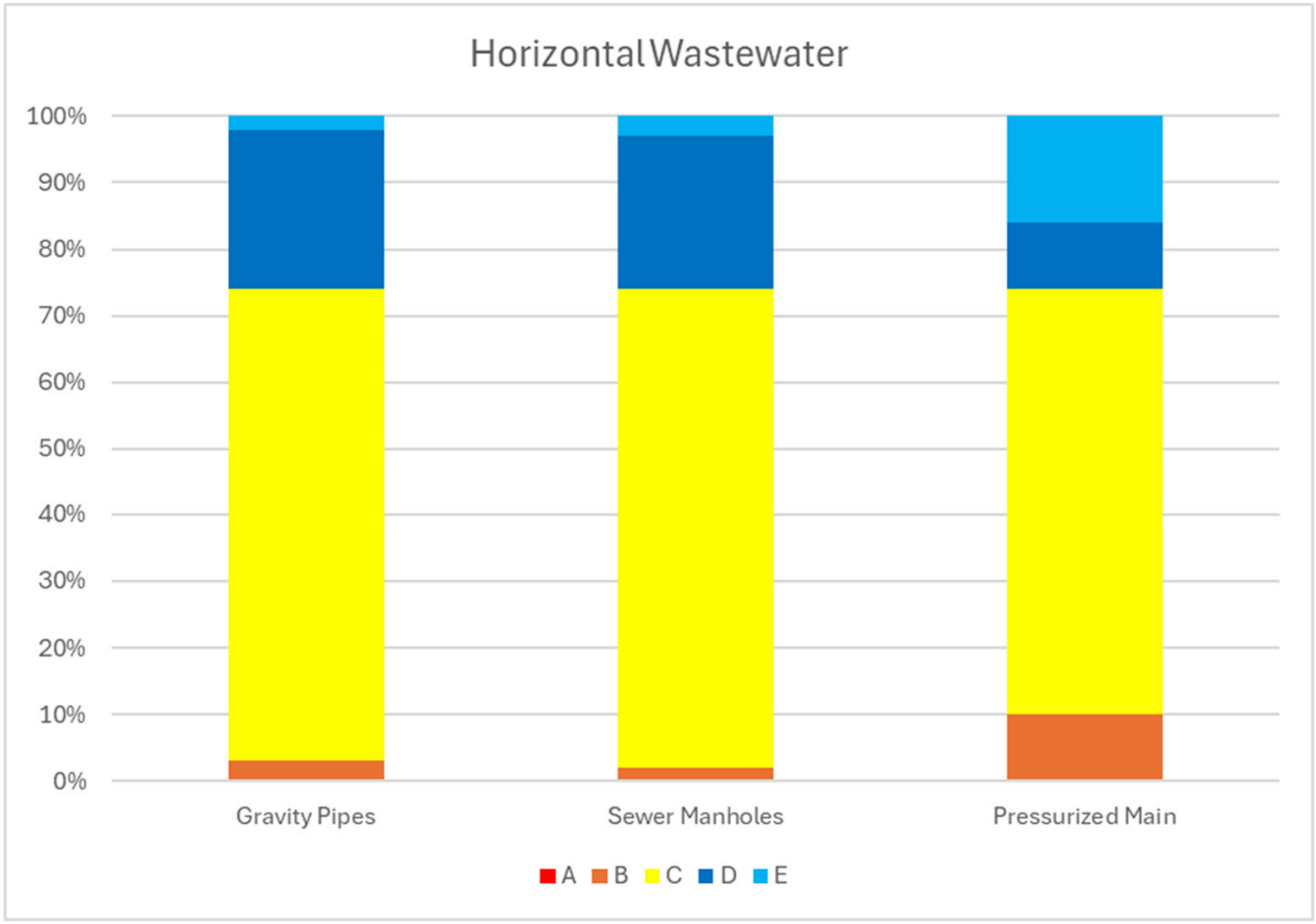
Rounded LoF Score = 3

Rounded CoF Score = 2

BRE Score = 6 = C

Risk Prioritization Results (Horizontal Wastewater)

Group	Strategy
A	Critical Repair or Replacement
B	Priority Repair or Replacement
C	Priority Monitoring
D	Opportunistic Repair or Replacement
E	Monitor



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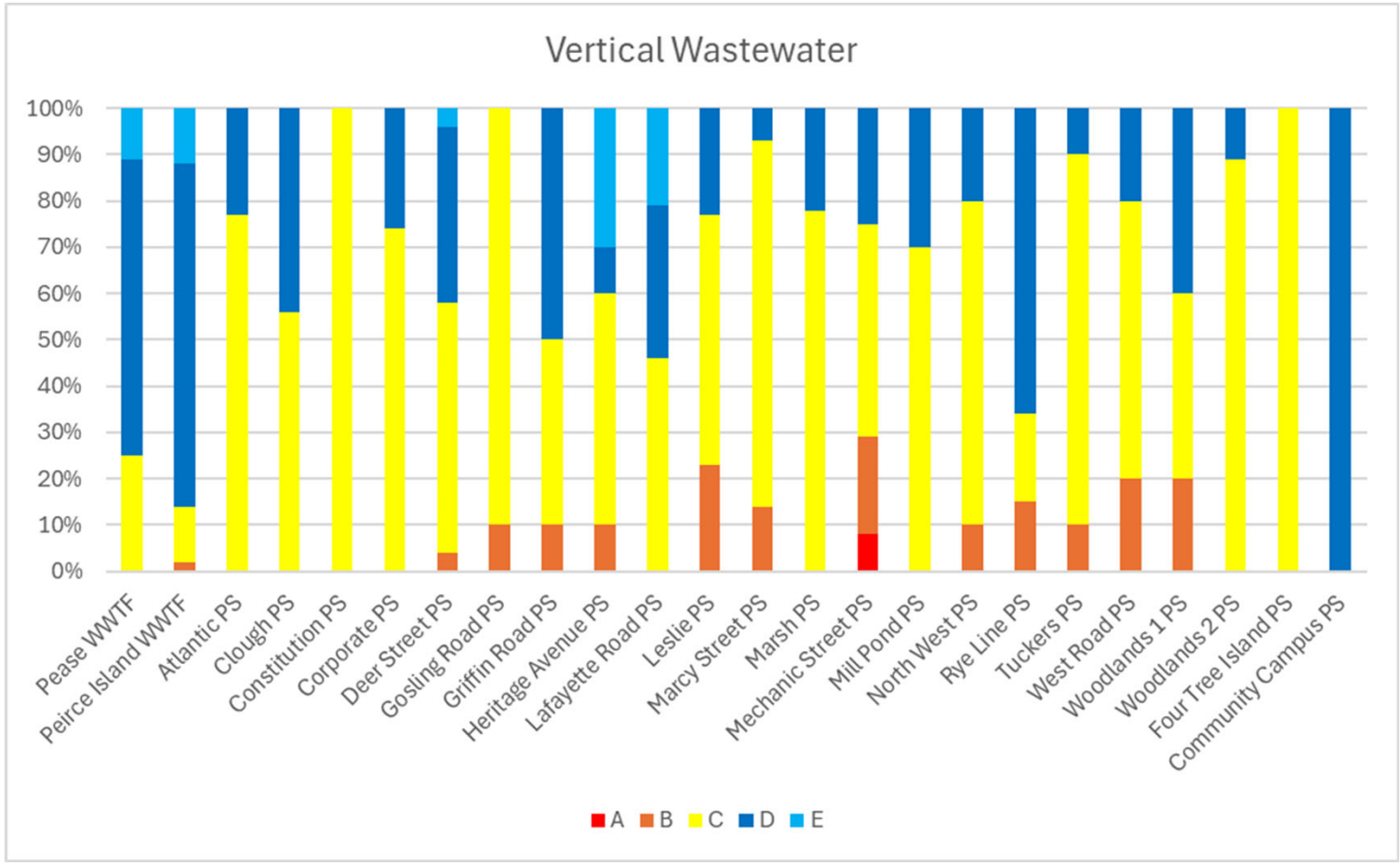
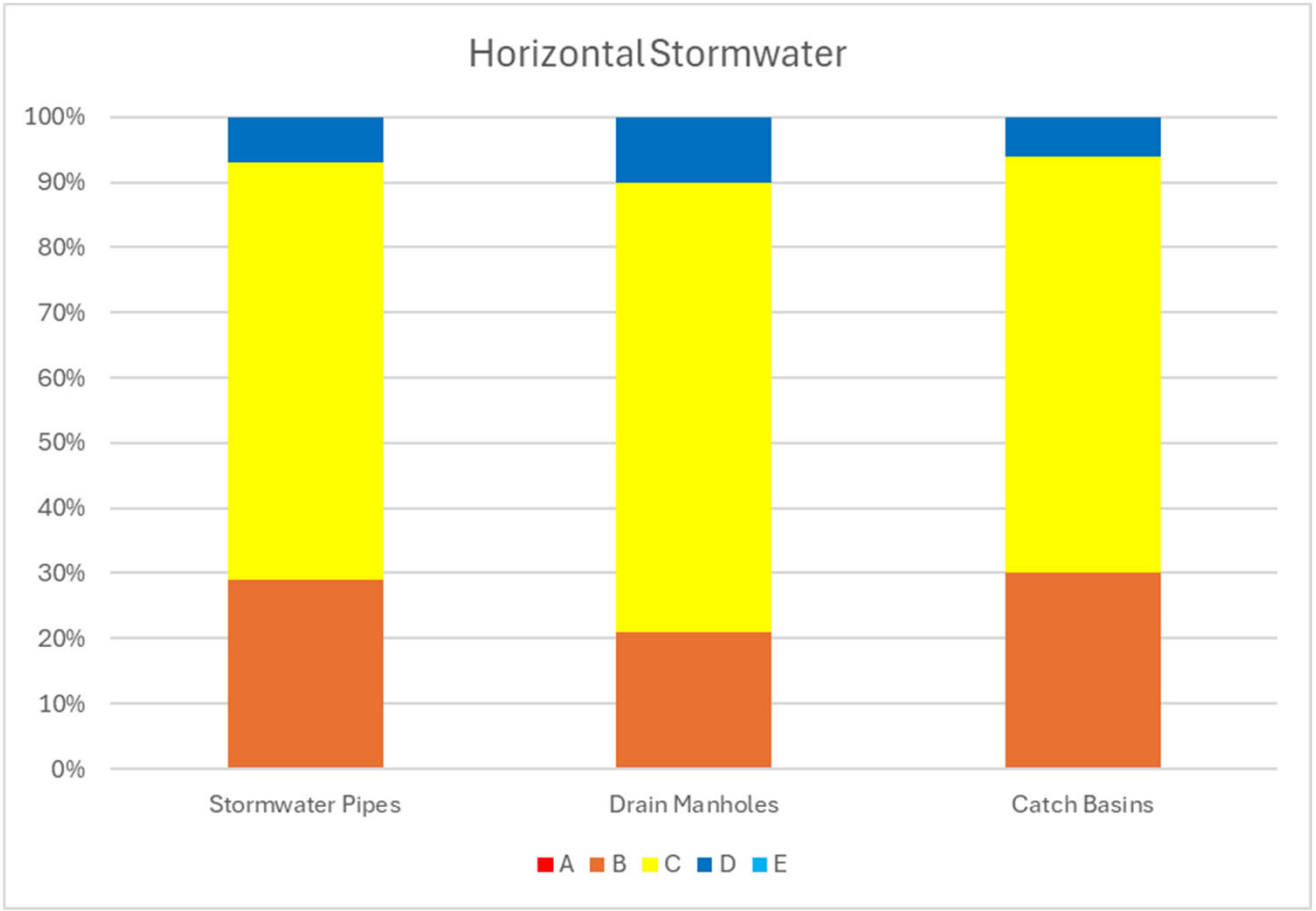
Risk Prioritization Results (Vertical Wastewater)

Group	Strategy
A	Critical Repair or Replacement
B	Priority Repair or Replacement
C	Priority Monitoring
D	Opportunistic Repair or Replacement
E	Monitor



Risk Prioritization Results (Horizontal Stormwater)

Group	Strategy
A	Critical Repair or Replacement
B	Priority Repair or Replacement
C	Priority Monitoring
D	Opportunistic Repair or Replacement
E	Monitor



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Next Steps

Integration into Existing Workflow:

- Continue condition inspections of assets and update asset information as projects are completed.
- Provide recurring training to staff members who will be maintaining data sets and coordinating with Excel, GIS, CCTV, and management softwares.
- Perform bi-annual audits of data sets.

Next Steps

The Asset Management Program will continue to be an important decision-making tool for the City to use indefinitely.

THANK YOU