A Sewer Asset Management Case Study

City of Walla Walla

J-U-B ENGINEERS, INC.

Agenda

Today's talk:

NOT about "what is asset management"

NOT why you should do asset management

IS how Walla Walla approached asset management of the sewer collection system

Five Step Approach

Data Inventory

Performance Assessment

Condition Assessment

Risk Assessment

Prioritize

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The Problem

150 miles of pipe from 6" to 36" diameter.

Estimated $200M asset.

Significant I/I problems, overflows

City wanted to target 150 pipes for renewal/replacement over 10 years.

No major hydraulic bottlenecks

Condition ratings showed large portion of system in very poor condition – need better way to prioritize

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Objectives

- **Evaluate** existing collection system
  - Create hydraulic model – ID existing bottlenecks & future
  - Develop master plan for extension to serve entire UGA
  - Develop pipe scoring criteria to prioritize replacement
    - Risk of Failure – incorporating City's pipe condition ratings
    - Consequence of Failure – additional criteria to further prioritize
    - Ability to update in-house utilizing GIS

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Objectives – Cont.

- **Develop** 10-year CIP
  - Determine collection system replacement costs
  - Coordinate with IRRP
  - Focus on addressing overflows within next 5 years
  - Incorporate existing improvement plan for WWTP
- **Document** financial condition and ability to fund CIP
- **Satisfy** WDOE requirements for a General Sewer Plan

Step 1 – Data Inventory

Compile the data you already have

- Location Mapping
- Condition assessments (CCTV inspection) Granite
- Maintenance history (cleaning frequency and causes)
- Collapses and emergency repairs
- Customer complaints
- Basement backups
- Previous evaluations (master plans, flow studies)
- Institutional knowledge

Walla Walla – GIS

- City began developing GIS system in 2000.
- City has dedicated GIS department
- GIS data for each pipe includes: material, date of install, invert elevations.
- GIS track locations of backup claims.
- Track "hot list" of spots visited monthly and quarterly for preventative maintenance.

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Data Inventory - CCTV

City began CCTV of sewer system in 1990.

CCTV 20% of system each year.

City has reviewed tapes and determined condition scores for all pipes in the system – using Granite XP software

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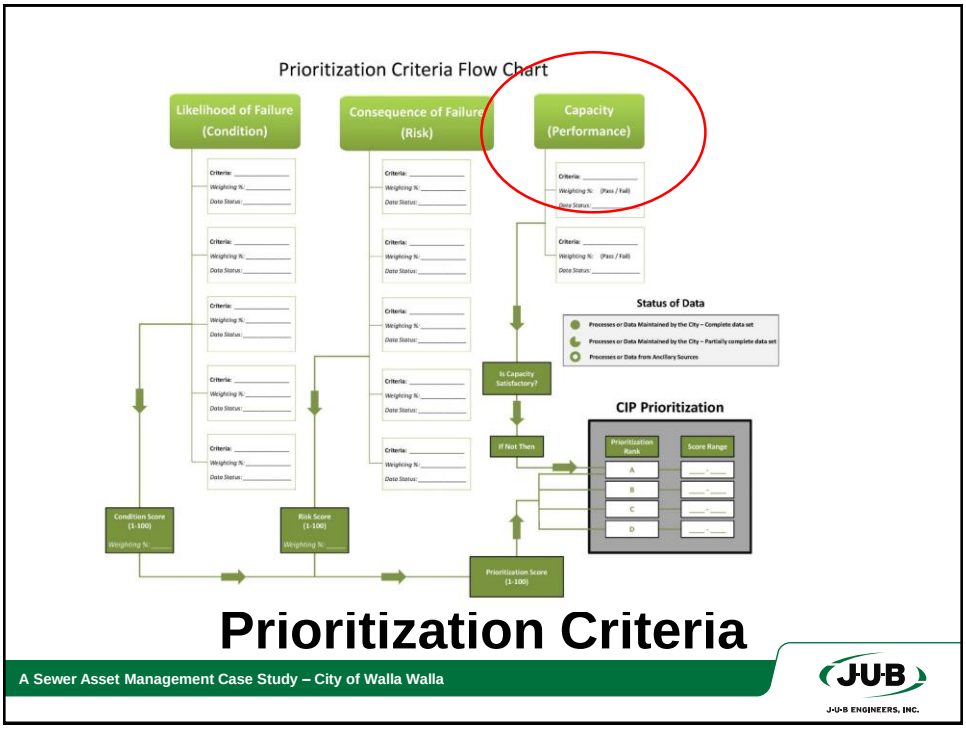

Step 2 – Performance Assessment

HYDRAULIC CAPACITY (EXISTING AND FUTURE)

FLOW DATA UTILIZED WINTER WATER SERVICE METER DATA

HYDRAULIC MODEL - CALIBRATED WITH FIELD DATA

ASSESSMENT SHOWED A FEW BOTTLENECKS – BUT NOTHING SIGNIFICANT.

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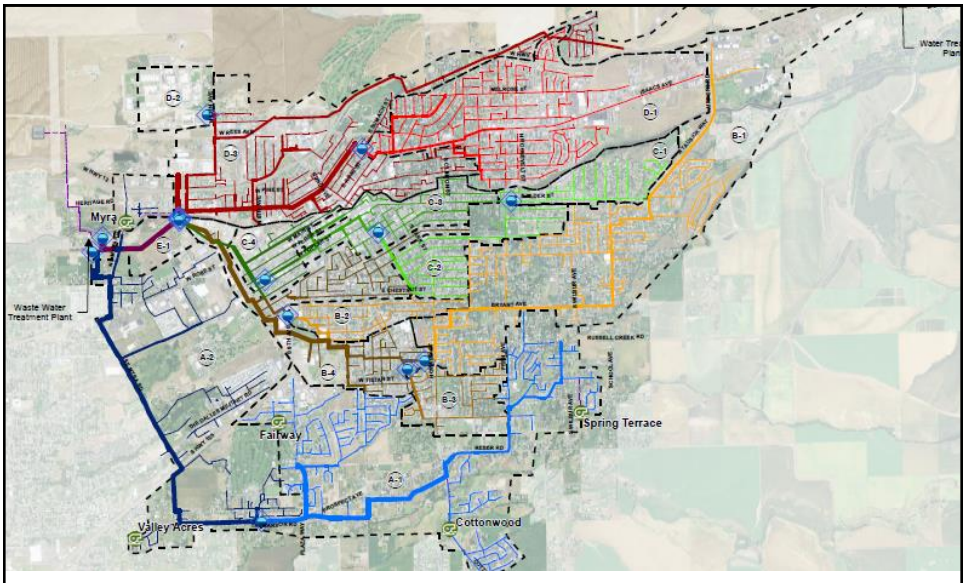

Sewer Basins

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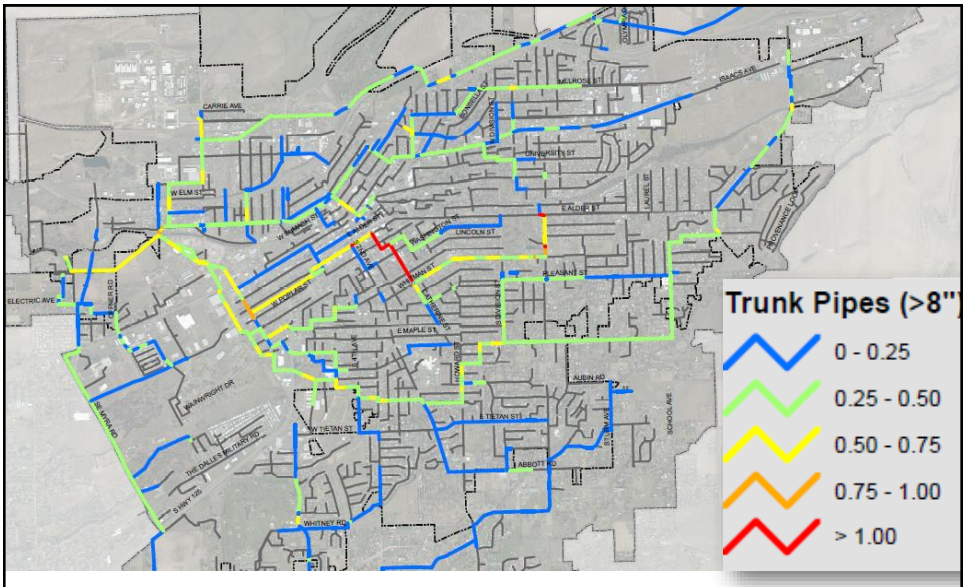

Hydraulics

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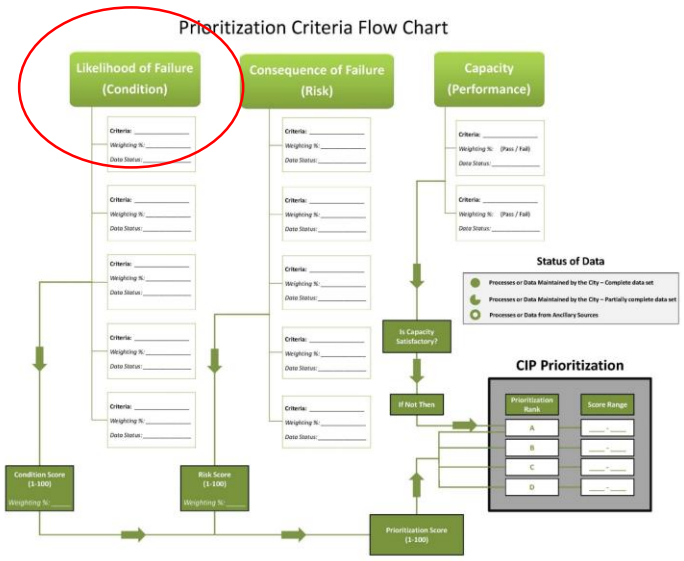

Prioritization Criteria

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Step 3 – Condition Assessment

- "Likelihood of Failure" - LOF
- Pipe and manhole inspection
- Condition assessment methods:
  - Subjective grading – visual inspection
  - Distress-based evaluation – defect coding
  - Non-Destructive Testing Methods

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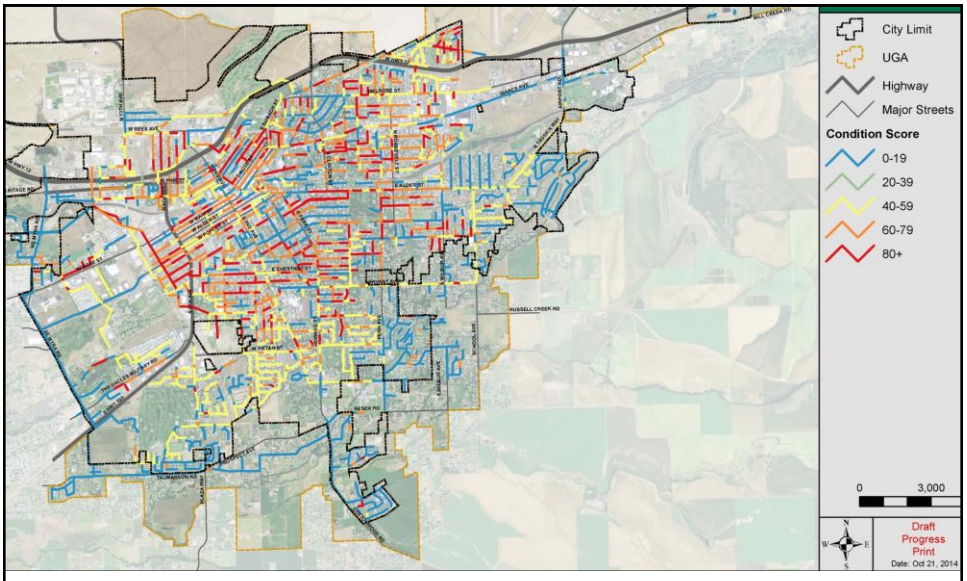

Granite XP Scores

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Walla Walla LOF Score

- 50% - Granite Pipe Score
- 10% - Pipe Material (Conc 100, Clay 90, DI 80, PVC 0)
- 10% - Time since last CCTV inspection
- 30% - O & M Frequency (Monthly 100, Qtr 50, Routine 0)
- +20 – Overflow/claim
- +40 – 2x Overflow/claim
- +10 – 6-inch diameter pipes

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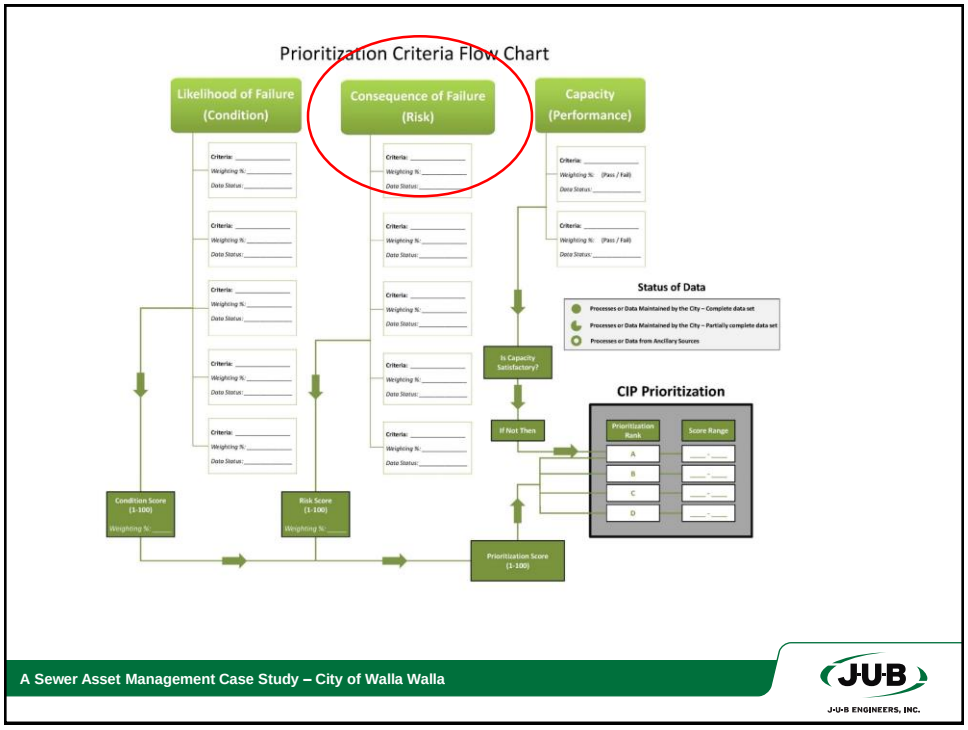
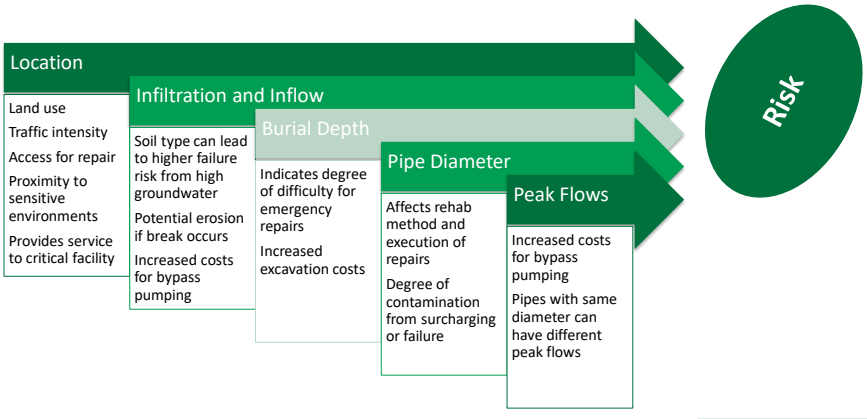


Step 4 – Risk Assessment

"Consequence of Failure" – COF



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Walla Walla COF Score

- 20% - Pipe Diameter (36”-100, 18”-50, 8”-10)
- 20% - Peak Flow (scaled by highest peak flow in system)
- 20% - Pipe Depth (30’-100, 15’-40, 10’-20)
- 20% - Location (Distance from major waterway, road classifications, Railroad, and local important locations such as Historic Downtown, State Penitentiary, VA Hospital, Schools)
- 20% - I & I Volume (scaled by highest I/I in system)

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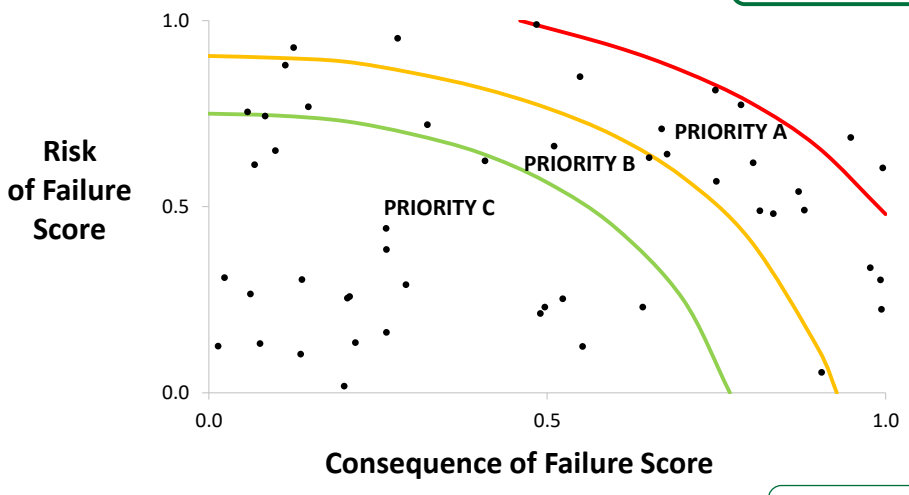
Step 5 – Prioritize



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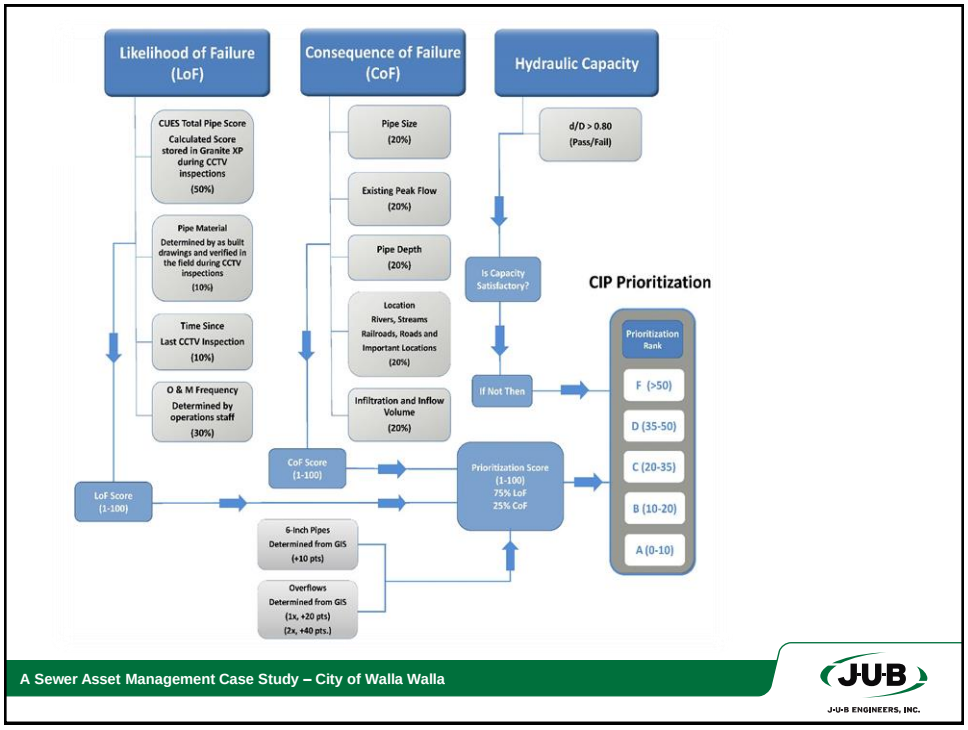

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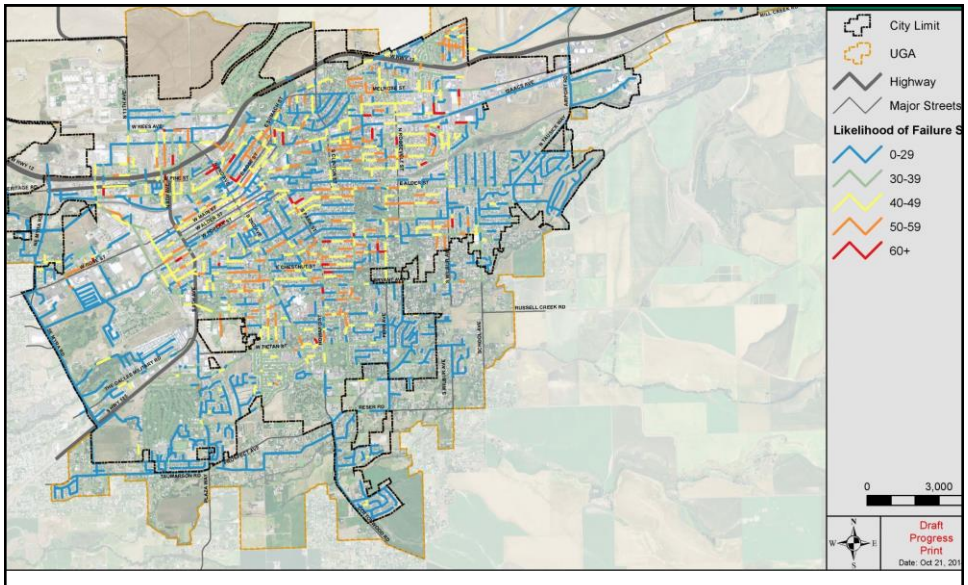

LOF Scores

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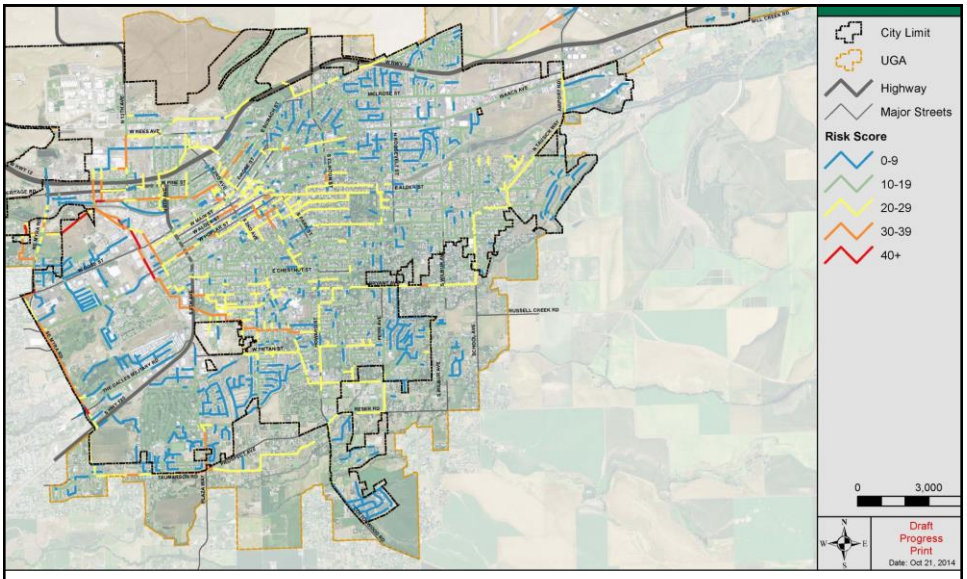

COF Scores

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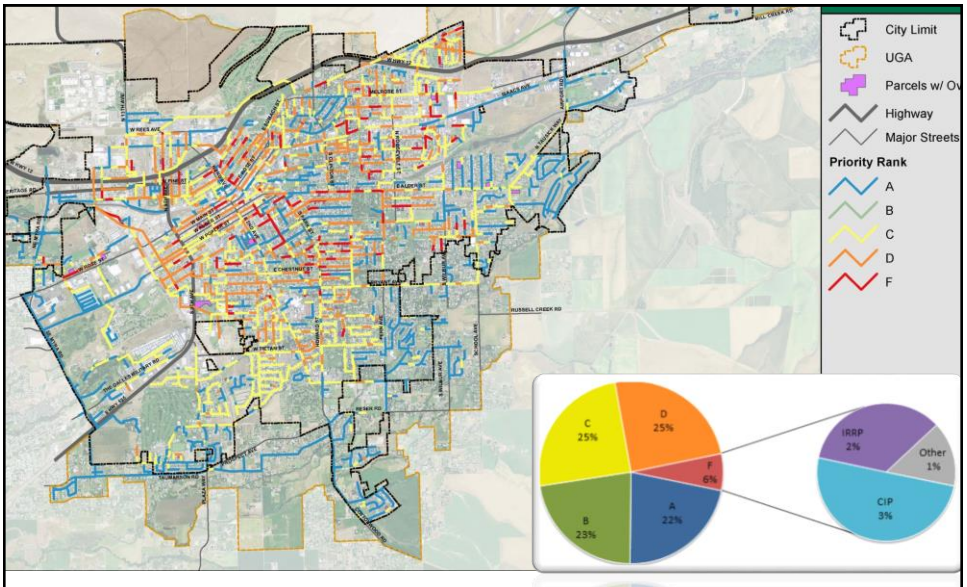

Priority Scores

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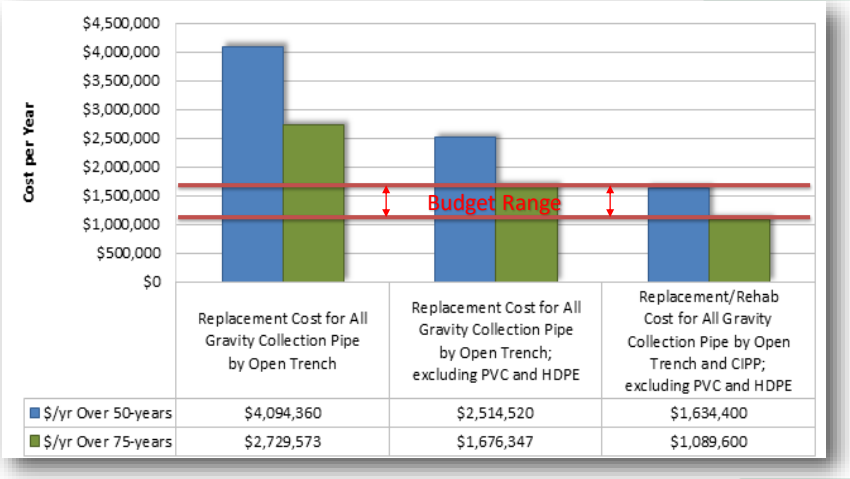
Capital Improvement Plan

- "F" assigned to pipes with score > 50
- 129 pipes – 6% of system
  - 43% already planned for replacement – IRRP
  - Remaining 73 pipes mapped, developed CIP
  - Expanded projects to include adjacent "D" rated pipes where it made sense to
  - Resulted in 200 pipe segments in CIP
  - Approximately $15M over next 10 years

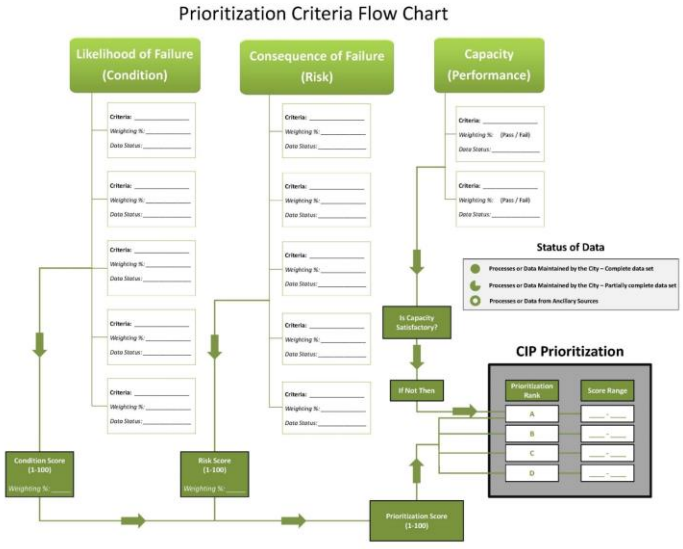
Estimated Yearly Replacement



	Replacement Cost for All Gravity Collection Pipe by Open Trench	Replacement Cost for All Gravity Collection Pipe by Open Trench; excluding PVC and HDPE	Replacement/Rehab Cost for All Gravity Collection Pipe by Open Trench and CIPP; excluding PVC and HDPE
$/yr Over 50-years	$4,094,360	$2,514,520	$1,634,400
$/yr Over 75-years	$2,729,573	$1,676,347	$1,089,600

Summary

- Not rocket science – you can do it
- START GATHERING DATA! *(GIS)*
  - Pipe Material
  - Condition ratings
  - Time since last CCTV inspection
  - O & M Frequency
  - Sewer back-up/claim



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Questions?

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