

Protecting our Infrastructure in Streams

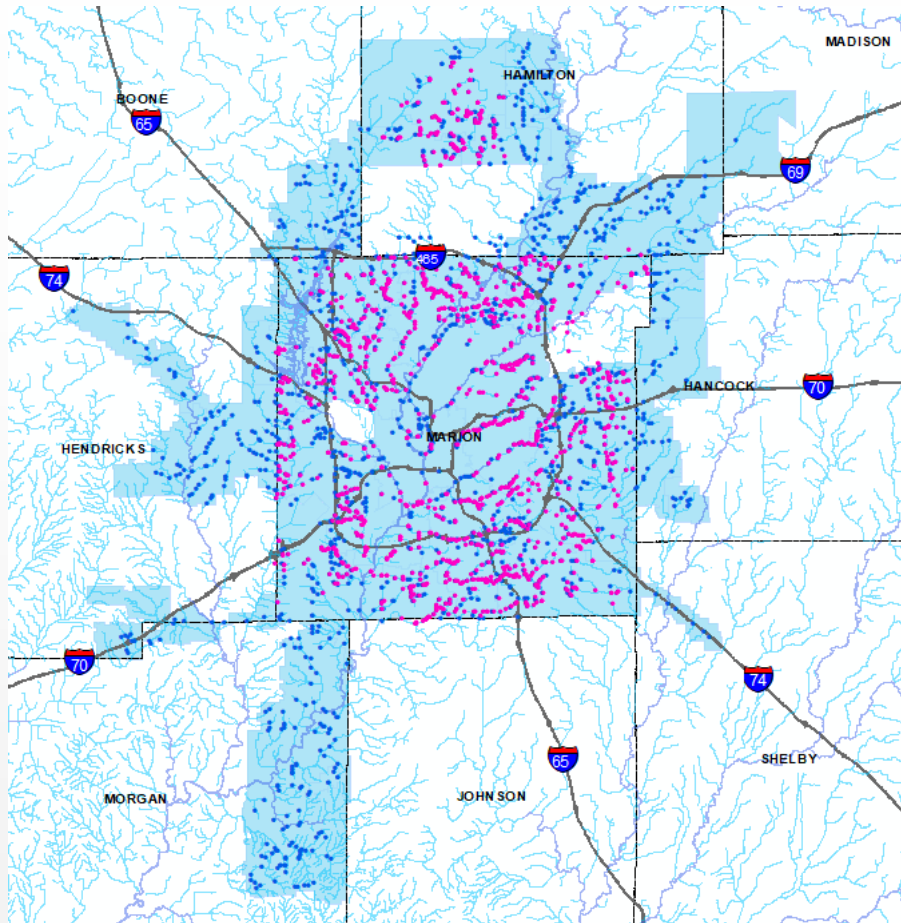
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2023

A stylized white skyline logo featuring various building shapes, including a prominent tower with a dome, set against a dark background.

INDIANAPOLIS
FIVE CITIES PLUS

Citizens Infrastructure



Water

- 4,800 miles of Water Main
- 1,700 Water Stream Crossings
 - 15 exposed

Wastewater

- 3,400 miles of Sewer
- 1,500 Sewer Stream Crossings
 - 40 exposed

Importance of Stream Crossing Inspections



- Causes:
 - Erosion
 - Change in stream shape
- Potential Concerns:
 - Higher risk of failure
 - Infiltration/Exfiltration
 - Environmental impact
- Identifies exposed pipes

Our Stream Crossing Program

1. Annual Stream Crossing Inspections
 - 3-year cycle
 - Exposed - inspected annually
2. Exposed Crossing Inspections
 - Determines level of severity
 - Alternatives to remedy exposure
3. Planning Project
 - Prioritizing
 - Scheduling

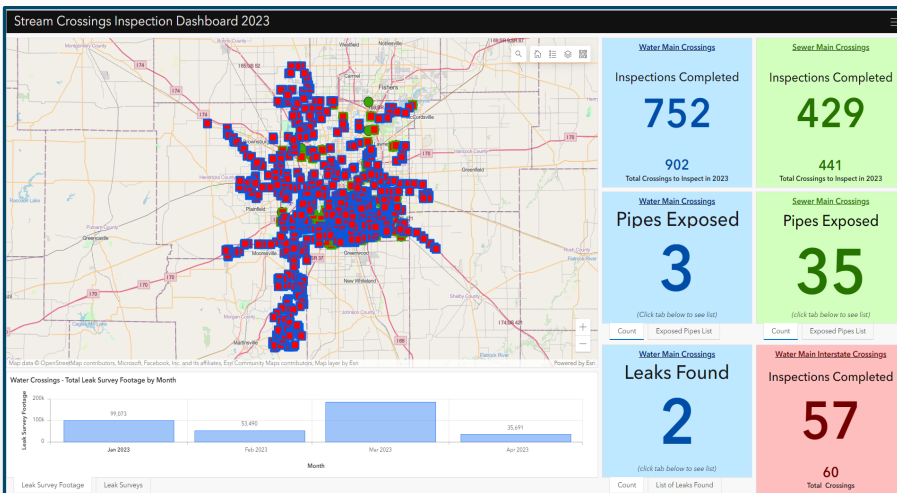


Step 1 - Annual Inspections

Exposures = automatic email response



Field	Data
Sewer Crossing ID	180039
Stream Name	Williams Creek
Pipe Material	RCP
Pipe Diameter	27
Year Installed	-56271800000
Is this a True Stream Crossing? We would like to verify crossings are on true streams and remove any on ditches, swales , etc.	Yes
Stream Crossing Comments	
Pipe Located?	Yes
Pipe Location Comments	
Pipe Exposed?	Yes
Pipe Diameter Exposed (%)	0-25
Pipe Diameter Exposed Comments	
Pipe Length Exposed (ft)	0-25
Pipe Length Exposed Comments	
Bell Exposed	No
Bell Exposed Comments	
Leak Found?	No
Leak Found Comments	
Estimated Depth of Pipe (ft)	0'
Odor?	1,5
Is Marker Post Present?	Yes
Was a Marker Post Installed	
Marker Post Installed Comments	

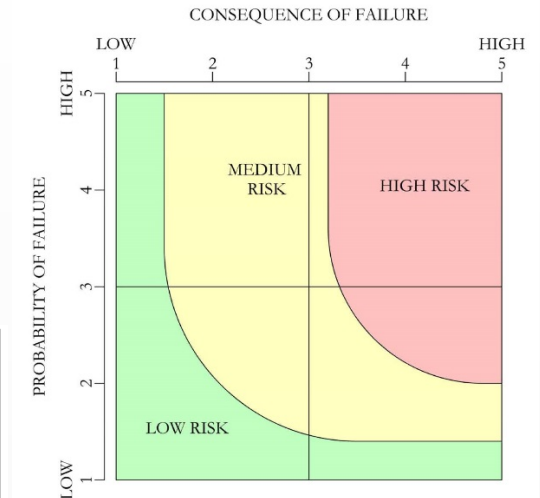


Step 2 - Detailed Inspection

- Asset Risk Rating
 - Probability of Failure
 - Consequence of Failure

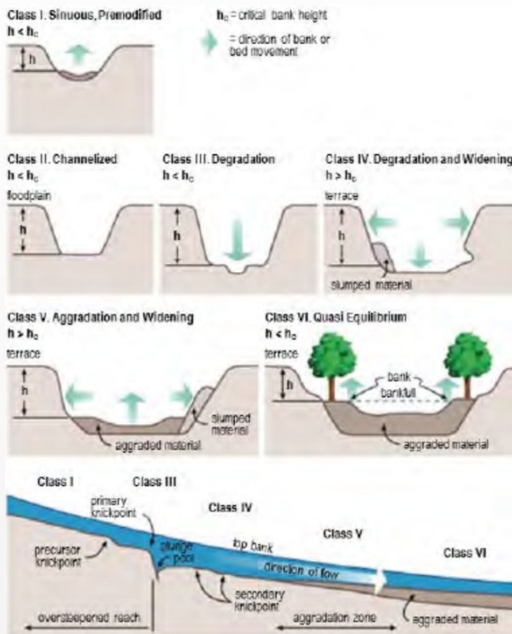
PROBABILITY OF FAILURE RATING								
Element	1	2	3	4	5	Rating	Weight	Score
Technical Performance	Capacity exceeds current requirements	Exceeds current requirements	Meets current requirements but with room for improvement	Inefficient; becoming ineffective, obsolete	Failing, not capable of sustaining required performance		5%	0
Repair History	No Issues	1 repair	Multiple Repairs	Leaks currently detected	Leaks currently detected and multiple repairs		10%	0
Pipe Diameter Exposed (% of pipe dia)	0-25%	26-50%	51-75%	76-99%	100% *Water passing below pipe		30%	0
Pipe Exposed Length (% of Channel Width)	0-25%	26-50%	51-75%	76-99%	100% and/or exposed bell		25%	0
Pipe Age	1980-Present	1975-1979	1920-1944	0-1919	1945-1974		30%	0
TOTAL SCORE							100%	0

CONSEQUENCE OF FAILURE RATING								
Element	1	2	3	4	5	Rating	Weight	Score
Critical Customers	No	N/A	N/A	N/A	Hospitals, Health Clinics, Schools, etc.	0	40%	0
Potential Customers Without Utility	0-10	11-25	26-50	51-100	>101	0	30%	0
Redundancy	Yes	N/A	N/A	N/A	No	0	30%	0
TOTAL SCORE							100%	0

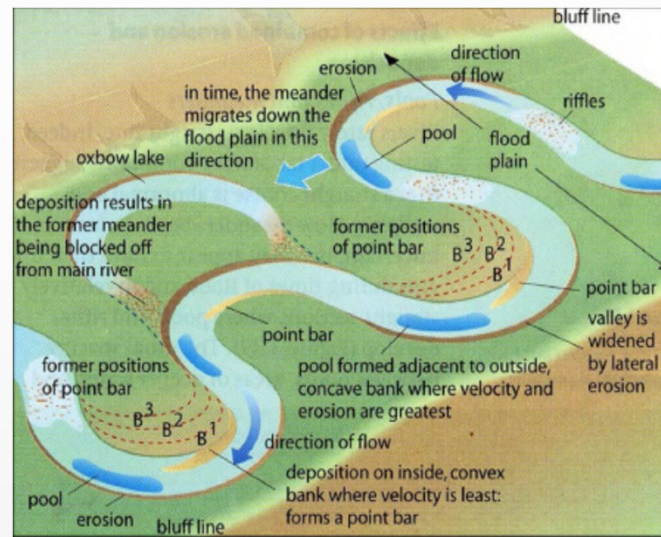


Step 2 Cont. - Stream Modification Rating

Vertical Stability



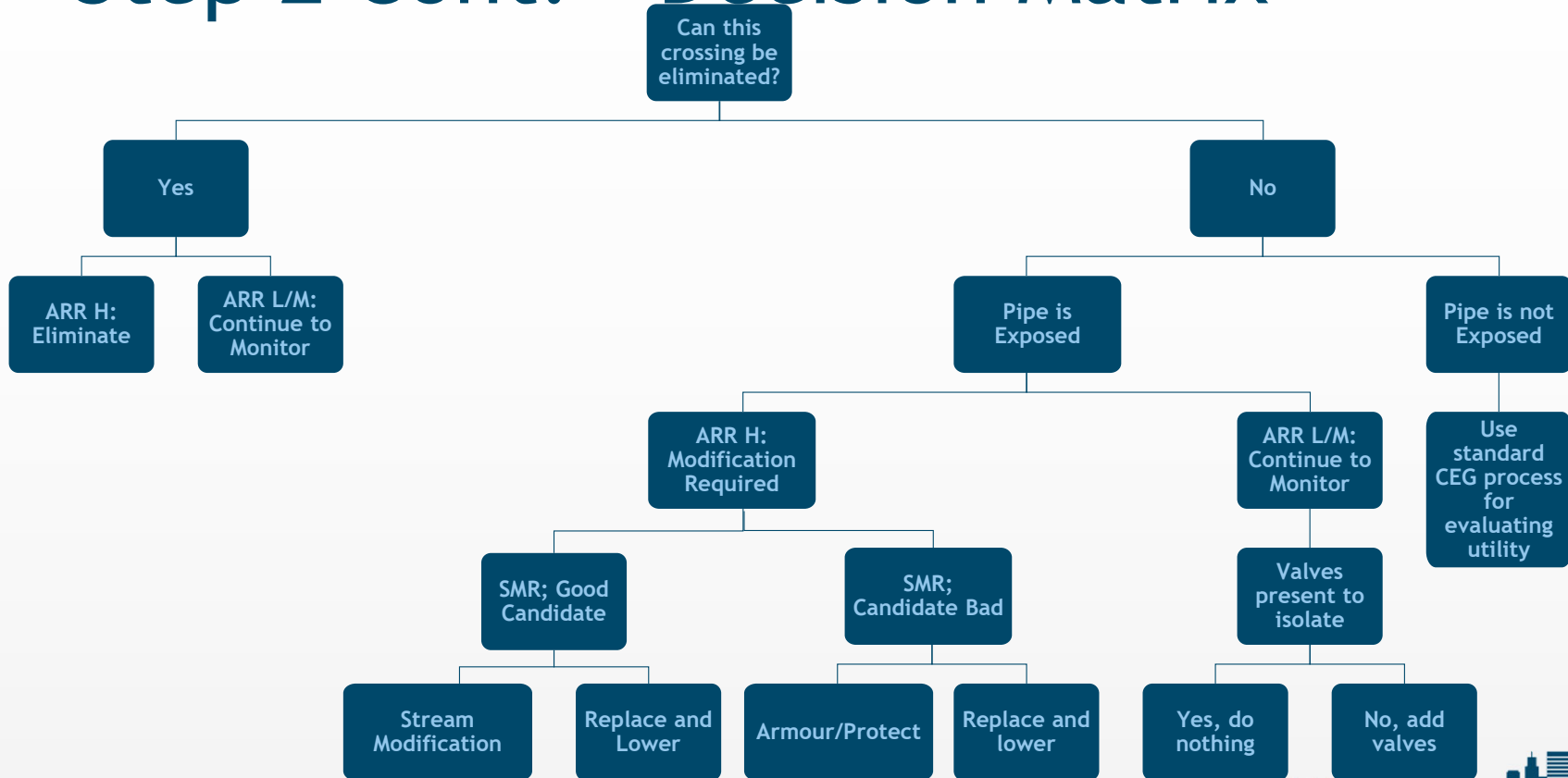
Lateral Stability



Permitting

- IDNR
- IDEM
- USACE

Step 2 Cont. - Decision Matrix



Step 3 - Project Planning

- Prioritize projects using detailed inspection
- Schedule Project
 - Water: Goal of 1 SX project a year
 - Sewer: Dependent on severity compared to other sewer rehab projects
 - High risk = 1-2 years, Medium = 3-5 years, Low = annual inspections
- Class 4 Cost Estimate
- Project Planning Memo



Case Study - Instream Exposure

Existing Condition

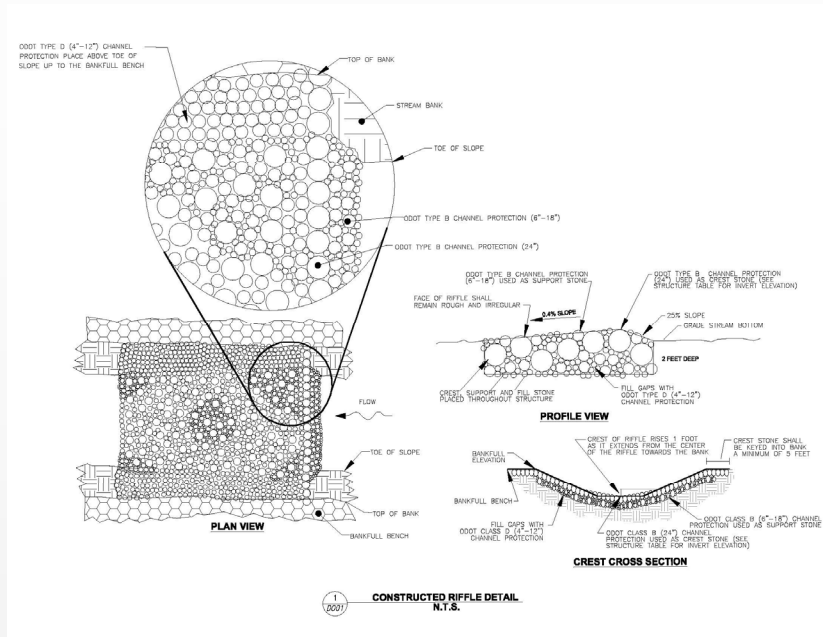
- 36” Watermain
 - Main transmission line. Can not be taken out of service
 - Levee on south bank
 - 30’ elevation change on both banks
 - Floodway (IDNR Permit Required)

Proposed Alternatives

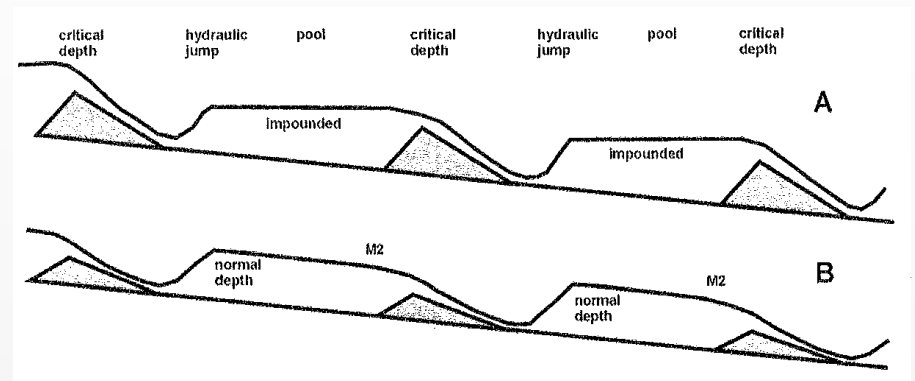
- Jack and Bore
 - Cost: 1.25M
- Horizontal Directional Drilling
 - Cost: 1.08M
- Instream Improvements
 - Cost: 300K
- Re-route
 - Not feasible

Solution: Newbury Riffle

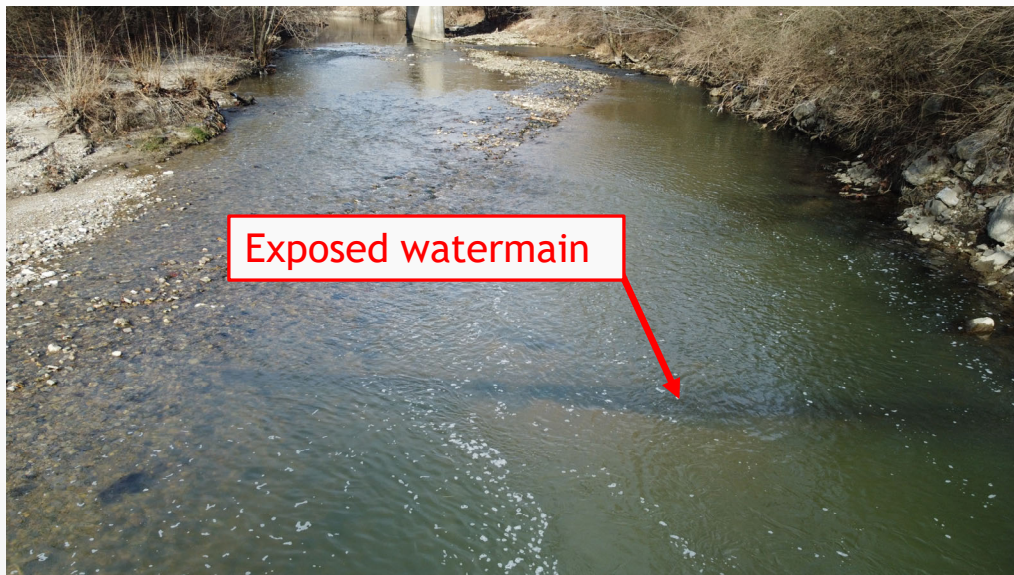
Typical Detail



Vertical stability



Existing Condition



Construction Photos



Construction Photos

Before



After



Case Study - Ravine Erosion

Existing Condition

- 24” Aerial Sanitary Sewer
- Abandoned wooded bridge
- Exposed pier
- 40’ banks with sever erosion
- Limited access
 - White River
 - Apartment buildings

Proposed Alternatives

- Re-route
 - Not feasible
 - Multiple lift stations
- Instream improvements
 - SMR: Bad
- Reinforced infrastructure
 - Cost: 1.0M

Existing Condition



During construction

Looking South



Looking North



Final Condition

Looking South



Looking North



Case Study - Multiple Utilities

Existing Condition

- Exposed sanitary sewer
- Exposed watermain
- Failed low-head dam
- Existing CSX bridge
- Mapped Floodway
- 5' of elevation fall within the channel

Proposed Improvements

- Relocation
 - Possible but very high costs
- Instream structures
 - Riffle at each utility
 - Boulder cluster
 - Rock cross vane

Existing Condition

Debris from dam



Exposed sanitary



Construction Photos

Reuse concrete slabs



Keyway complete



Final Condition



Comparison Photos



Questions?

