

APGA Security and Integrity Foundation
making systems safer

Distribution Integrity Management Programs (DIMP) & SHRIMP

IAMU

October 9, 2009



Distribution Integrity Management Programs (DIMP) History & Future

- 2001 – Liquid Integrity Management Rule
- 2003 – Transmission IMP Rule
- 2004 – DOT Inspector General Testifies
- 2005 – PHMSA Issues Phase 1 Report
- 2006 – Gas Piping Technology Committee (GPTC) Prepares Guidance
- 2008 – Notice of Proposed Rule (June 25, 2008)
- 2009 – Expected final Rule (October?)
- 2011 – 18 months after final rule – must have written DIMP Plan in place

Phase 1: 7 Elements of a DIMP Plan

1. Develop a written integrity management plan
2. Know your infrastructure
3. Identify threats (existing and potential)
4. Assess and prioritize risk
5. Identify and implement measures to reduce risks
6. Measure and monitor performance, and
7. Report results

2. Know Your Infrastructure

- Material(s) of construction
- Leak history
- Repair history
- Inspection records, such as :
 - Cathodic protection
 - Leakage surveys
 - Exposed pipe inspections

4. Assess and Prioritize Risk

- Rank those 8 threats to entire pipeline or pipeline segments that are most serious
- There are mathematical methods, or
- Just use the best judgment of your most knowledgeable operator – the folks who inspect and maintain your system

5. Implement Actions to Reduce Risks

- **DIMP does not presume that additional actions will always be required.**
- GPTC offers suggestions for each threat
- Operators may elect to continue existing inspection/repair/replacement programs, choose actions from the GPTC list or develop their own actions to address threats

Specific Requirements

- Excess Flow Valves required on new and replaced single residential services > 10 psig
- Leak classification system
 - Locate the leak
 - Evaluate its severity
 - Act appropriately to mitigate the leak
 - Keep records
 - Self assess
- Or alternatively, if you fix all leaks, no need to evaluate severity – Locate and Fix

EFV Requirements

- Congress instructed DOT to include a June 1, 2008 EFV deadline in DIMP rule
- DIMP rule will not be final by June 1
- PHMSA has written to states urging them to encourage operators to install EFVs June 1
- Not a legal requirement, but APGA and PHMSA urge operators to begin installing EFVs by the June 1 deadline

6. Measure and Monitor Results

- How will you measure whether your program is successful at reducing risks?
- Internal and external performance measures
 - Internal – Used by the utility
 - External – Submitted to the State/Federal regulators
- Possible performance measures for each threat are included in GPTC material

7. Report Results

External Performance Measures

- To allow states and PHMSA to determine if DIMP is working
 - Number of hazardous leaks either eliminated or repaired, per Sec. 192.703(c), categorized by cause;
 - Number of **excavation damages**;
 - Number of excavation tickets (receipt of information by the underground facility operator from the notification center);
 - Number of EFVs installed;
- Reporting via Annual Reports

Internal Performance Measures

- To allow the operator to determine if DIMP is working
 - Total number of leaks either eliminated or repaired, categorized by cause;
 - Number of hazardous leaks either eliminated or repaired per Sec. 192.703(c), categorized by material; and
 - Any additional measures to evaluate the effectiveness of the operator's program in controlling each identified threat.
- No reporting, but available for audit during state inspections

Continuing Improvement

- Operators will be required to periodically assess the effectiveness of their DIM Plan
- If performance measures show improvement, no further action required, however,
- If performance measures show no progress or threats are getting worse, operators must modify DIM Plans

Required Elements

Element	Utilities	Master Meter / LPG
Written Program	Required	Simple (checklist)
Know system	Relevant factors	Location/material
Identify threats	Thorough analysis	Checklist approach
Analyze risk	Required	Not required
Mitigate risk	Required	Required
Performance Measures	7 plus threat-specific	Leaks by cause
Review/revised	Required	Required
Report Perf Measures	4 measures	Not required

Additional Provisions in Proposed Rule

- Allowing alternate time intervals for certain requirements currently in Part 192 (1017)
- Consideration of compression coupling failures in the threat analysis (1007(b); 1009)
- Plastic Pipe failure reporting (1009)
- DIMP programs to include a Prevention Through People (PTP) component (1007(d))

TPSSC Recommendations

- Documentation and Recordkeeping (Keep only important documents & for 10 yrs)
- Reporting Plastic Pipe Failures (Report only Mech. Couplings failures)
- PTP (Remove)
- Low Stress transmission lines (<30%) (Future Consideration)
- Definition of “Damage” (Revise per DIRT)
- Time to Implement DIMP (18 months okay)
- Alternative Intervals for current inspection periods (Keep)
- Limited Requirements for MM and LPG operators (Risk Ranking required)
- EFVs (Require for MM and LPG if they qualify)

For small operators ...

- First there was LIMP (Liquid Integrity Management Program)
- Then there was TIMP (Transmission Integrity Management Program)
- Next came DIMP (Distribution Integrity Management Program)
- Finally for small systems, comes

Introducing SHRIMP!

- Simple, Handy, Risk-based Integrity Management Plan



SHRIMP

- Software product similar to tax preparation software (TurboTax)
- SHRIMP asks the user a series of questions about the system and its inspection and maintenance history
- Questions change based on answers
- Output will be a complete DIM Plan

SHRIMP Timing

- Due 6 months after final rule
- GOAL: Have SHRIMP trial version available when final rule is issued.
- That way utilities can decide whether to use SHRIMP or other means to develop DIMP
- <http://shrimp.gas-distribution.com>

SHRIMP Development

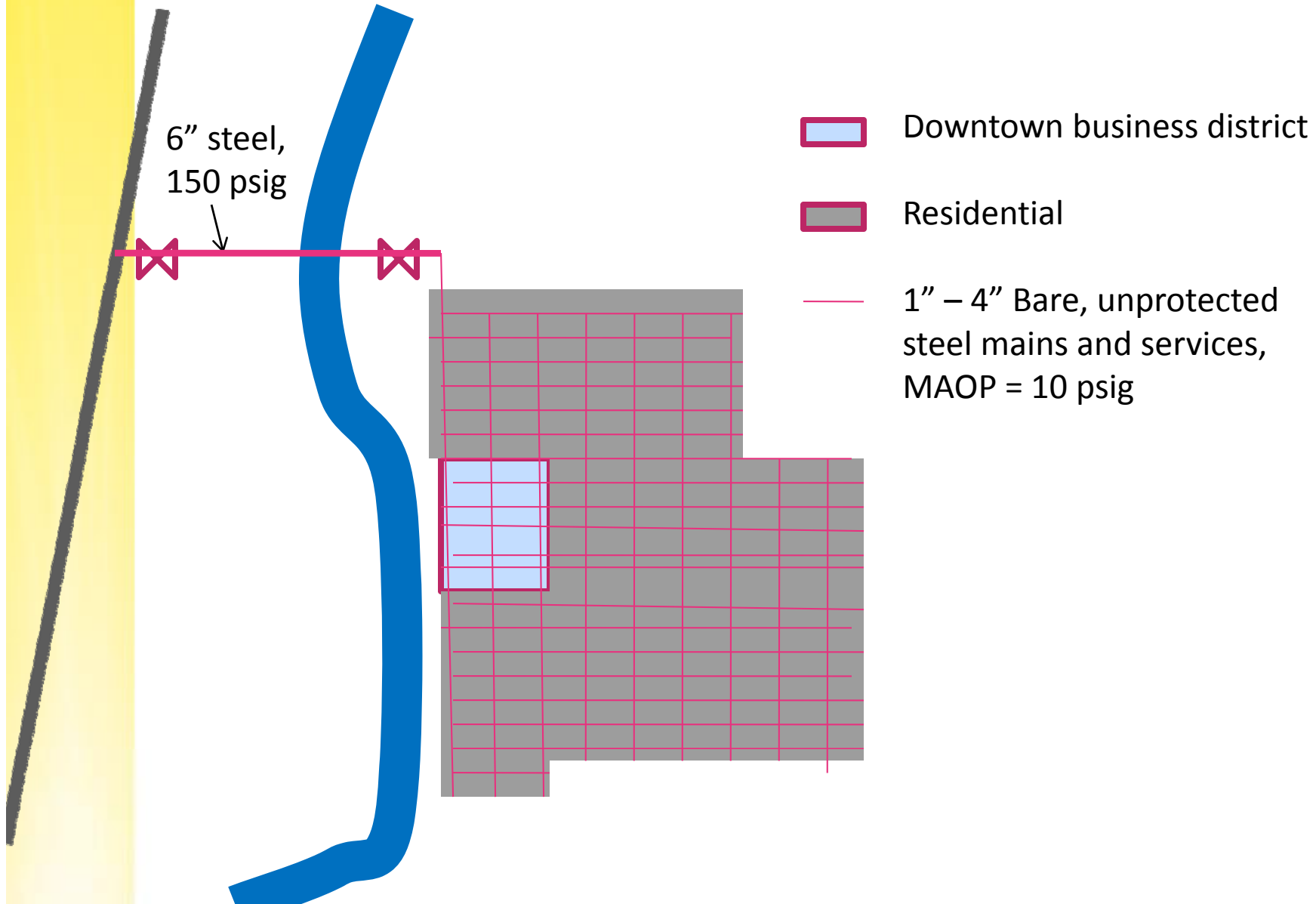
- Advisory Group made up of state regulators, federal regulators and industry
- Technical Toolboxes is software developer
- Heath and Associates, Technical Consultant
- Viadata, Technical Consultant

Hypothetical Case Study

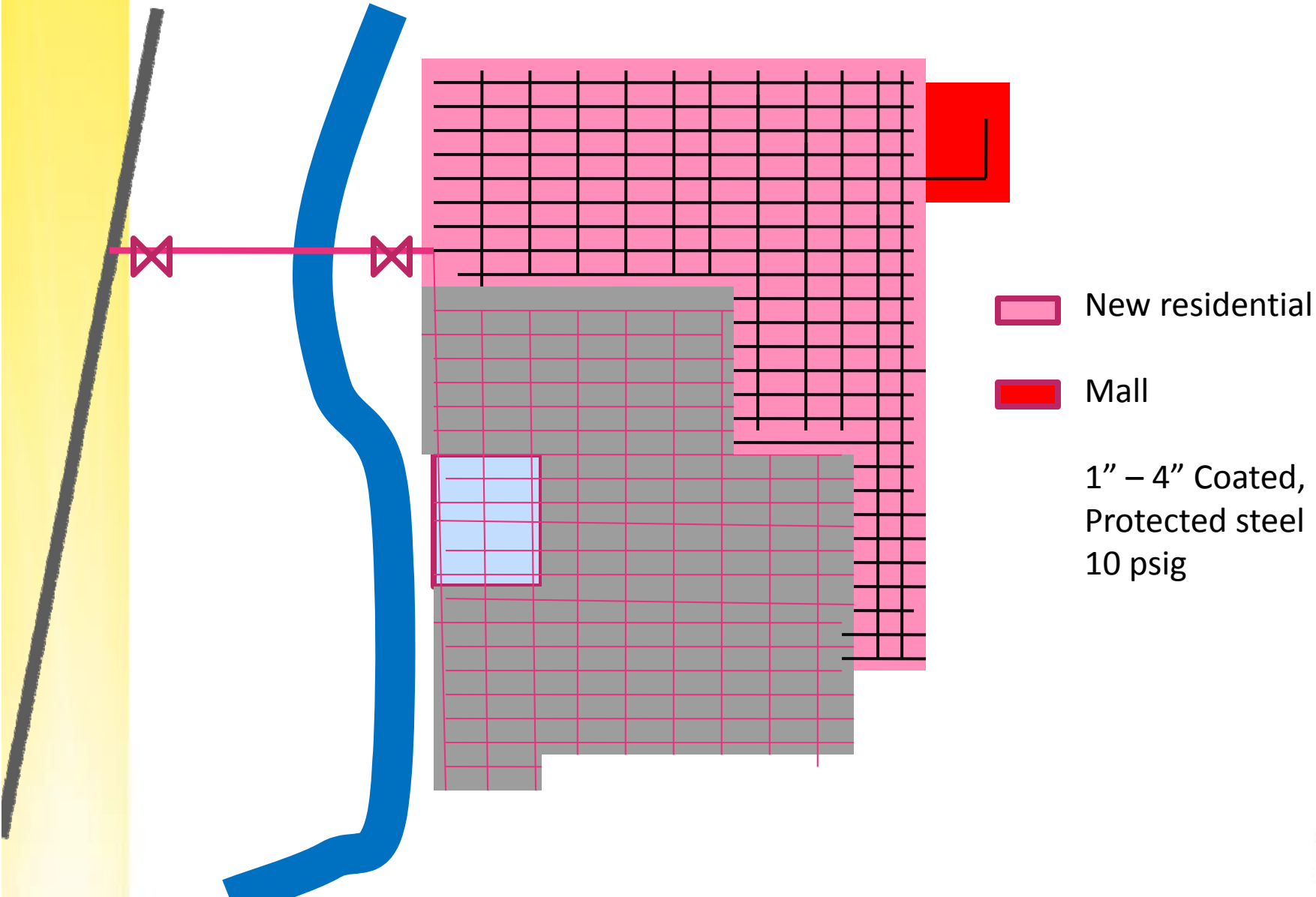
- A one-hour Web Conference conducted March 23rd, recorded and viewable at APGA and PHMSA website
- Walks through the process of developing a plan for—

Kastanasburg

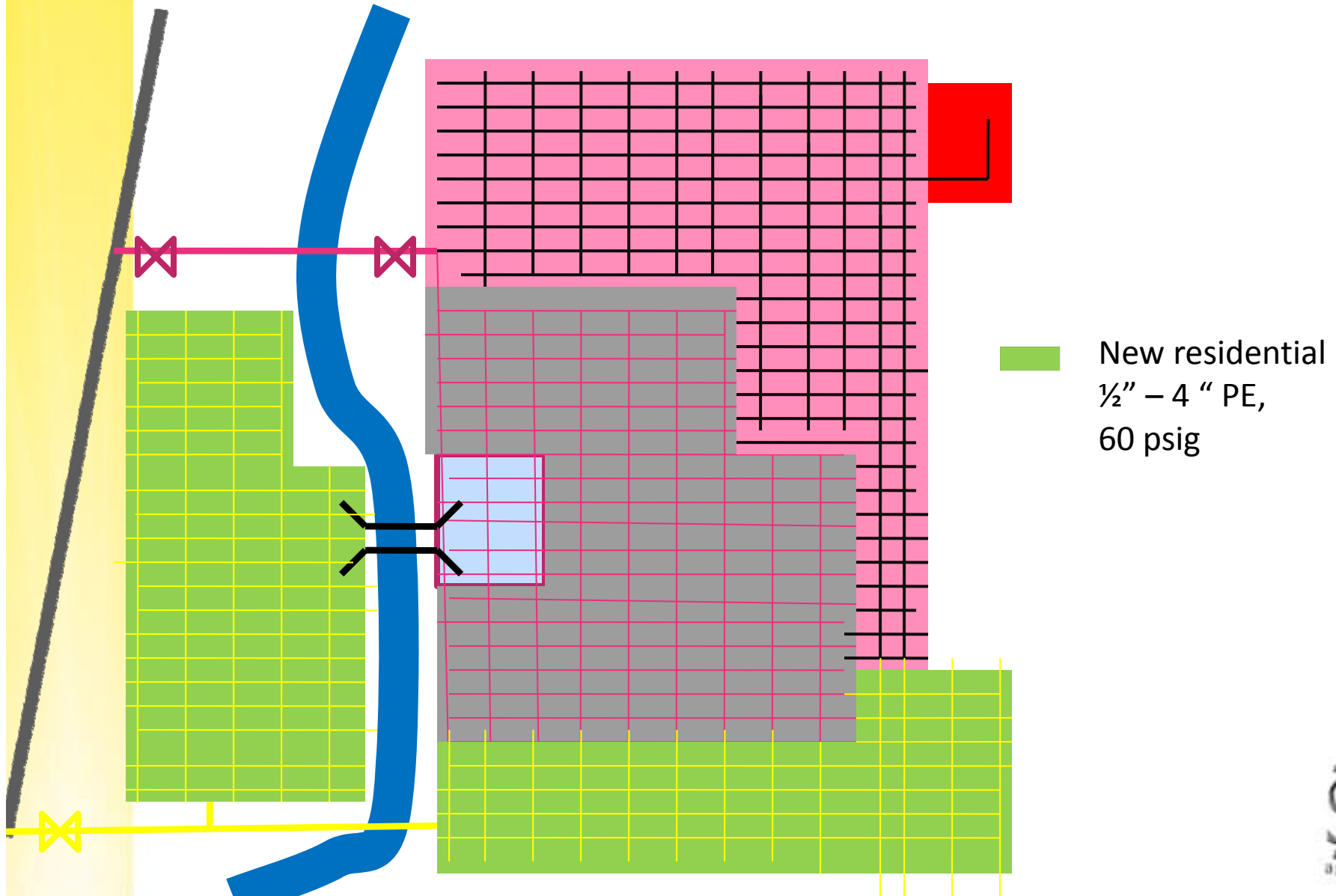
Welcome to Kastanasburg, 1950



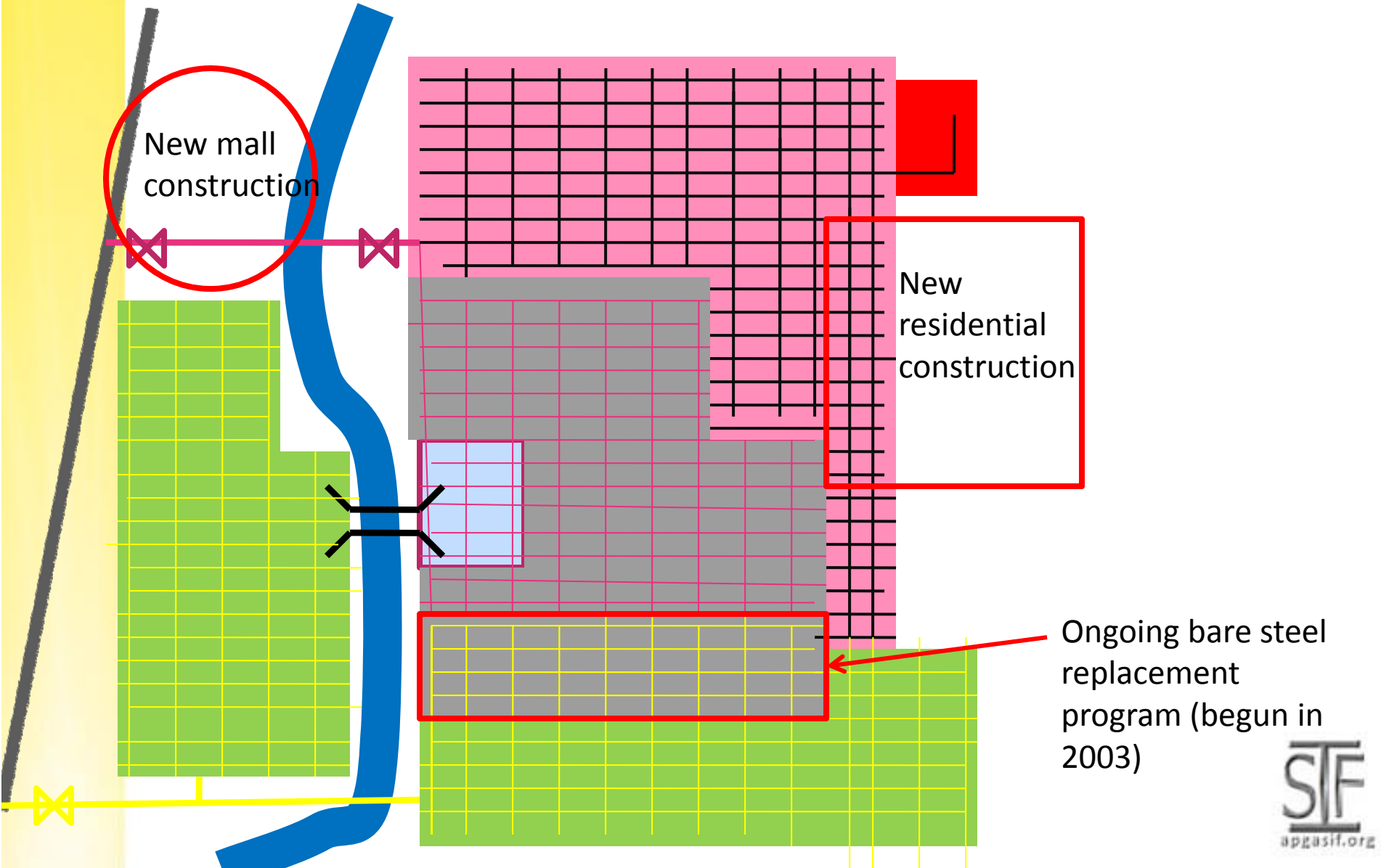
Kastanasburg Expands, 1975



Kastanasburg Expands Further, 2000



Kastanasburg – Today



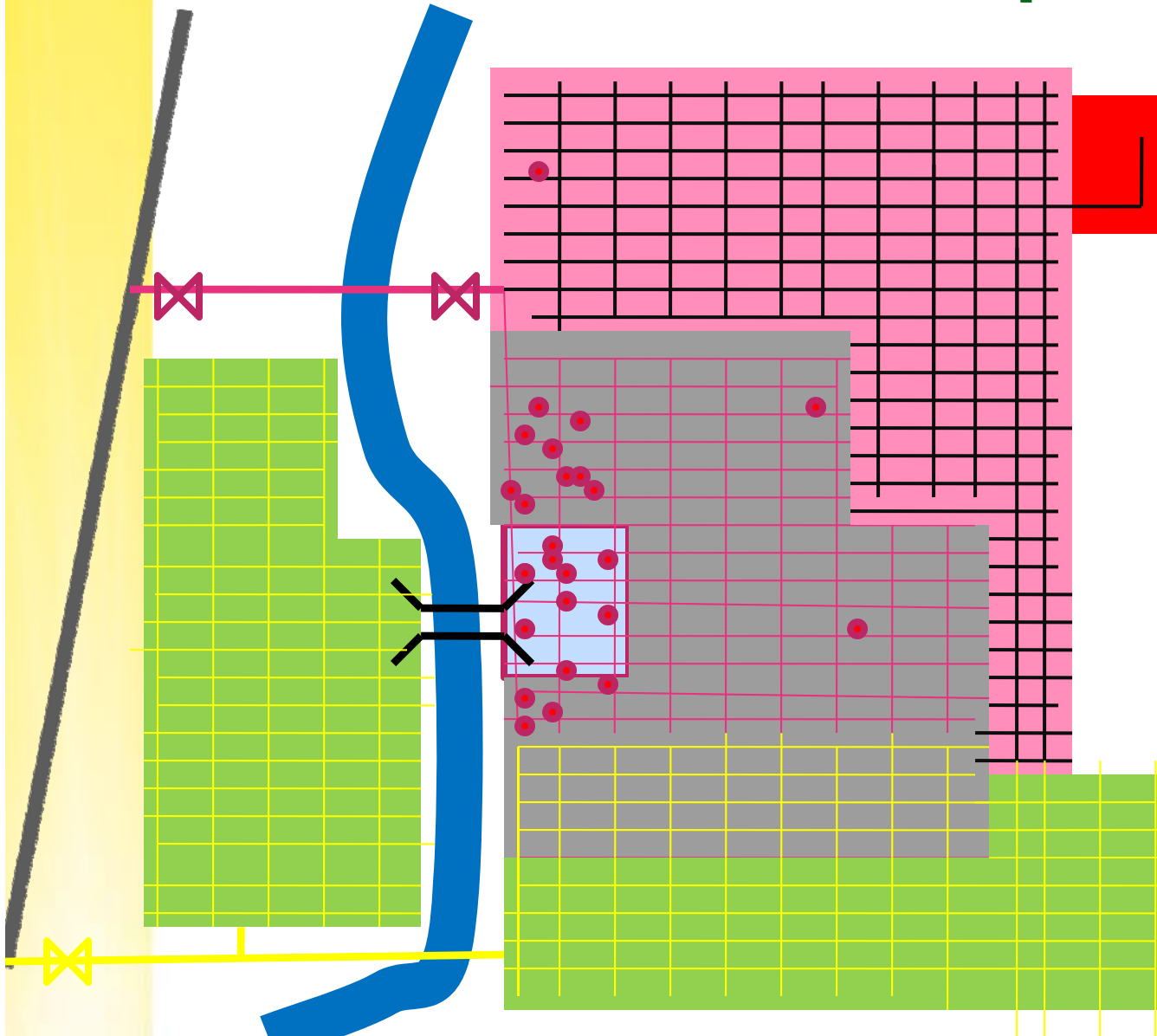
New mall construction

New residential construction

Ongoing bare steel replacement program (begun in 2003)

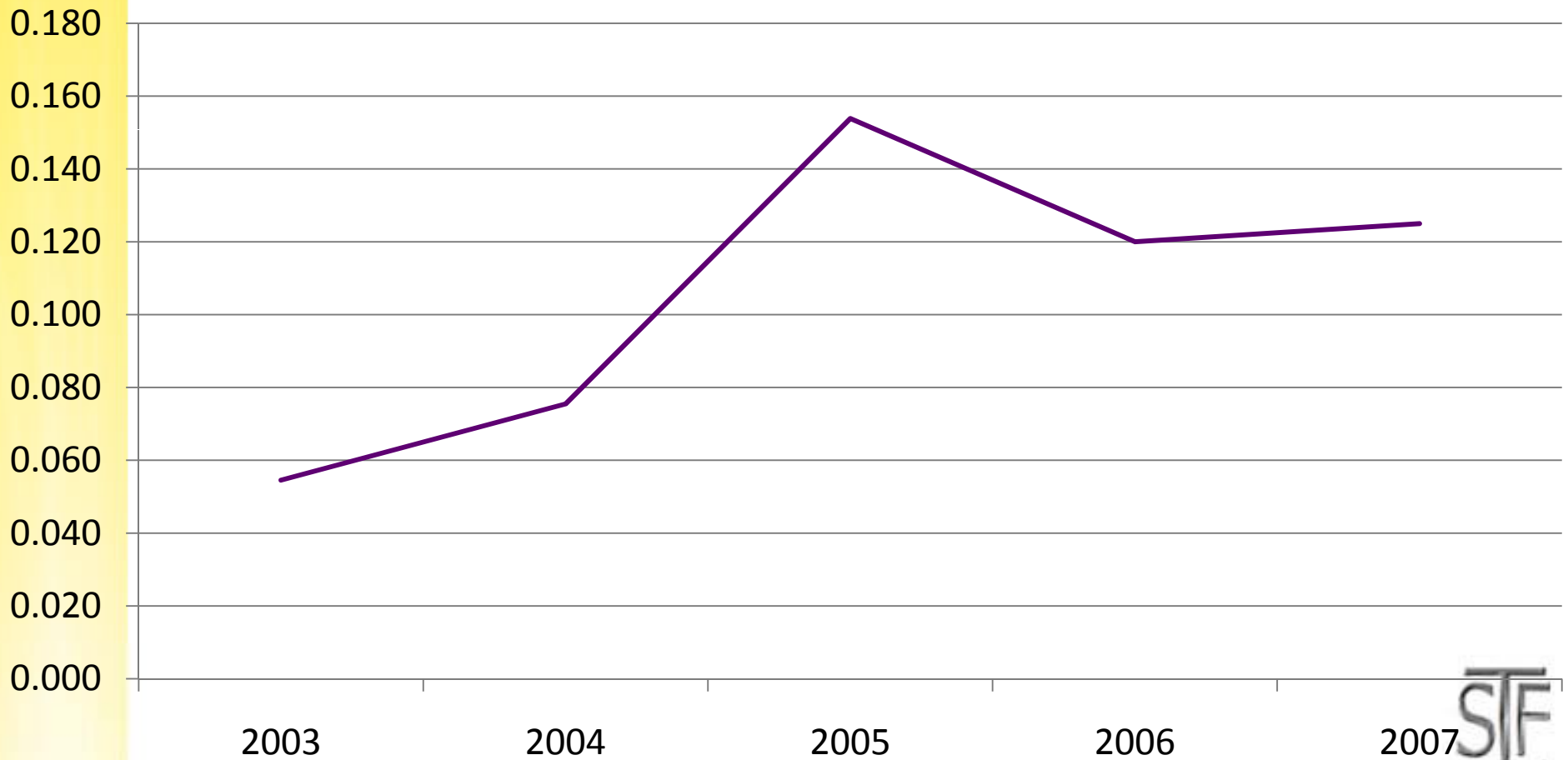


Corrosion Leaks Repaired 2003-2007

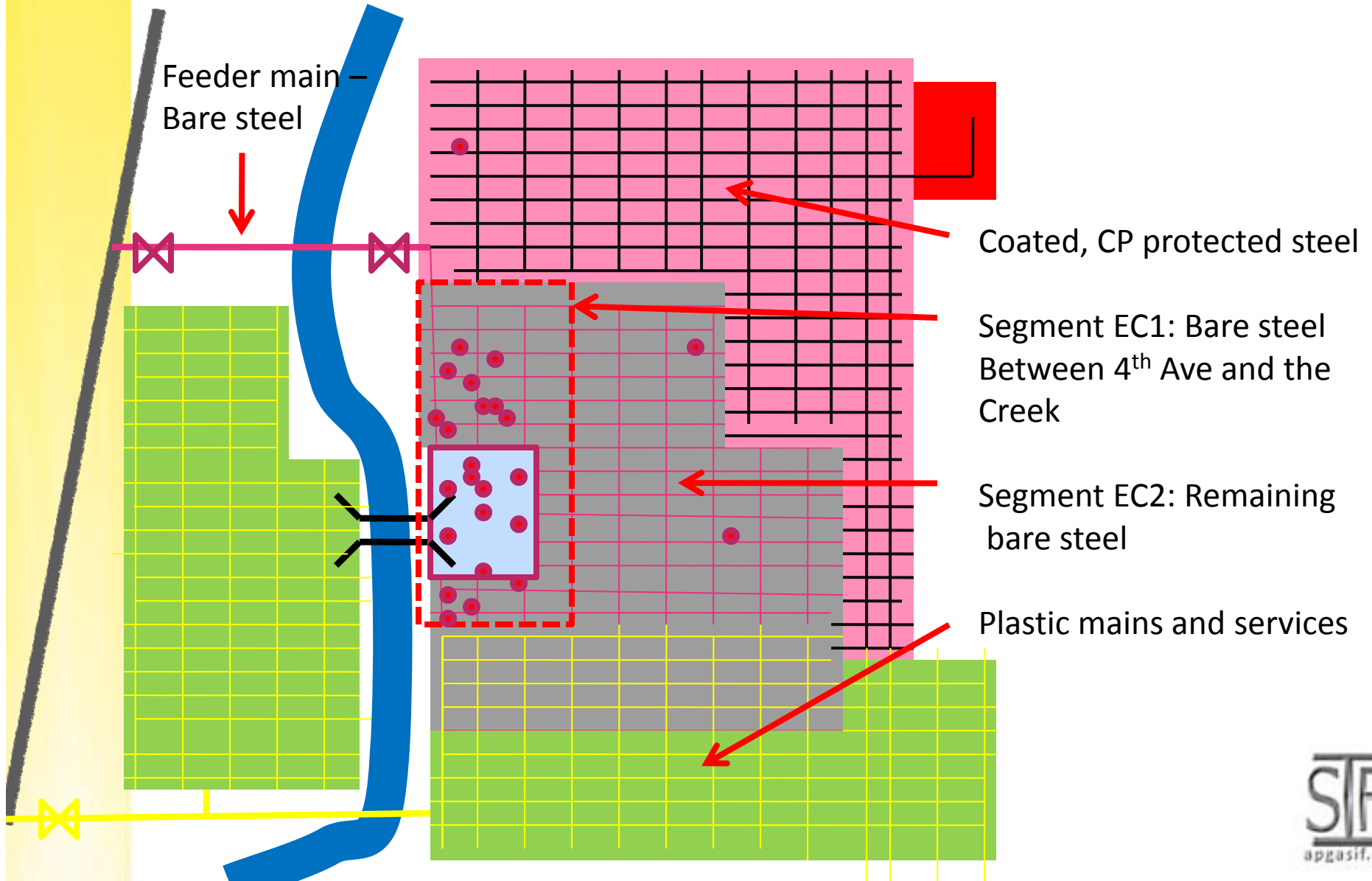


Trend in Corrosion Leaks Repaired

Corrosion Leaks Repaired/mile of metal main



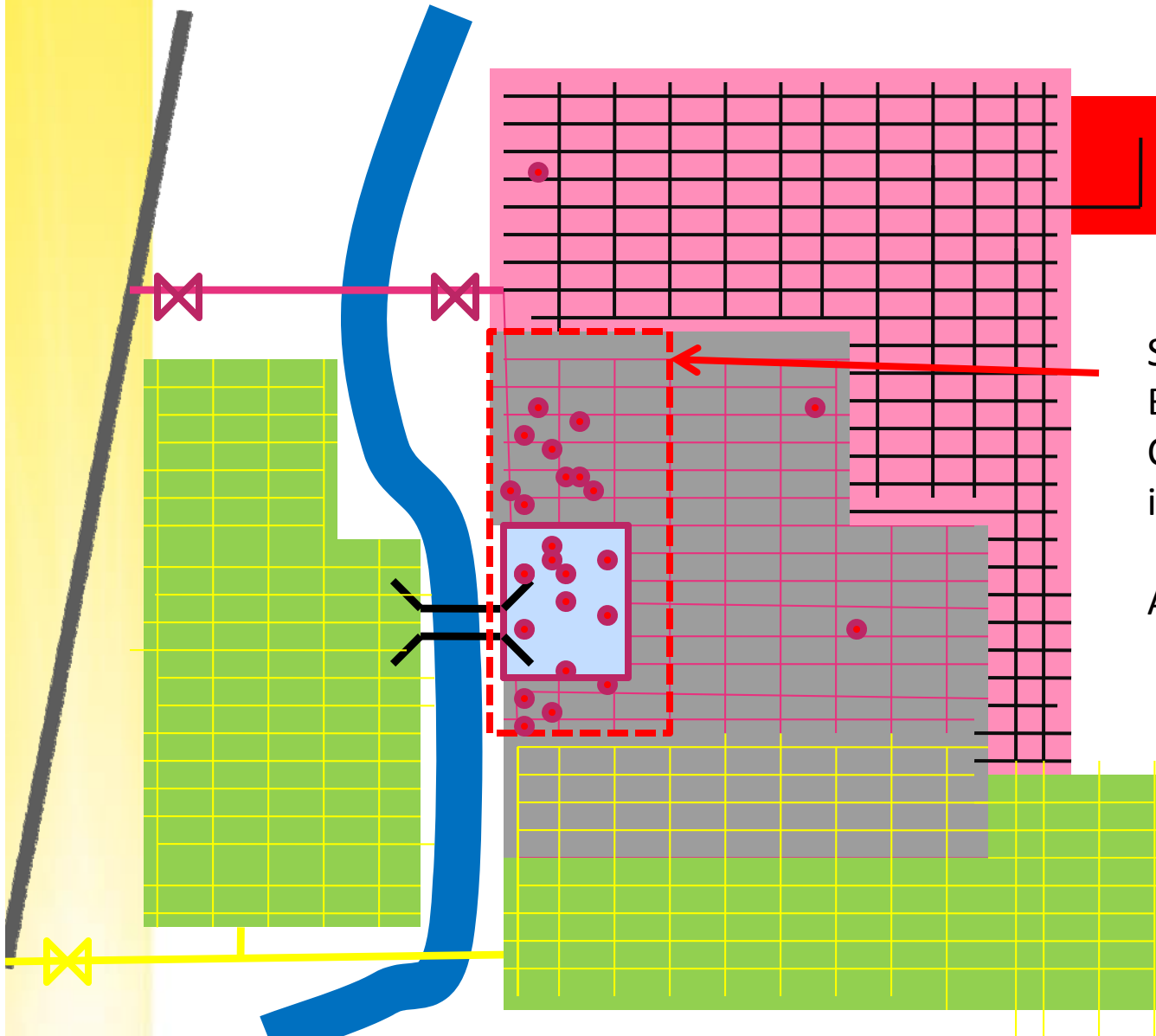
4 Corrosion Threat Segments



Consequence Factors

- User is asked for each segment would a failure here have greater consequences than average because of:
 - Larger diameter/higher pressure than most
 - In the business district under wall-to-wall pavement
 - The significance of the facility, and/or
 - The response time to get crews to it should it fail
- Results in multiplier of 1 to 1.5

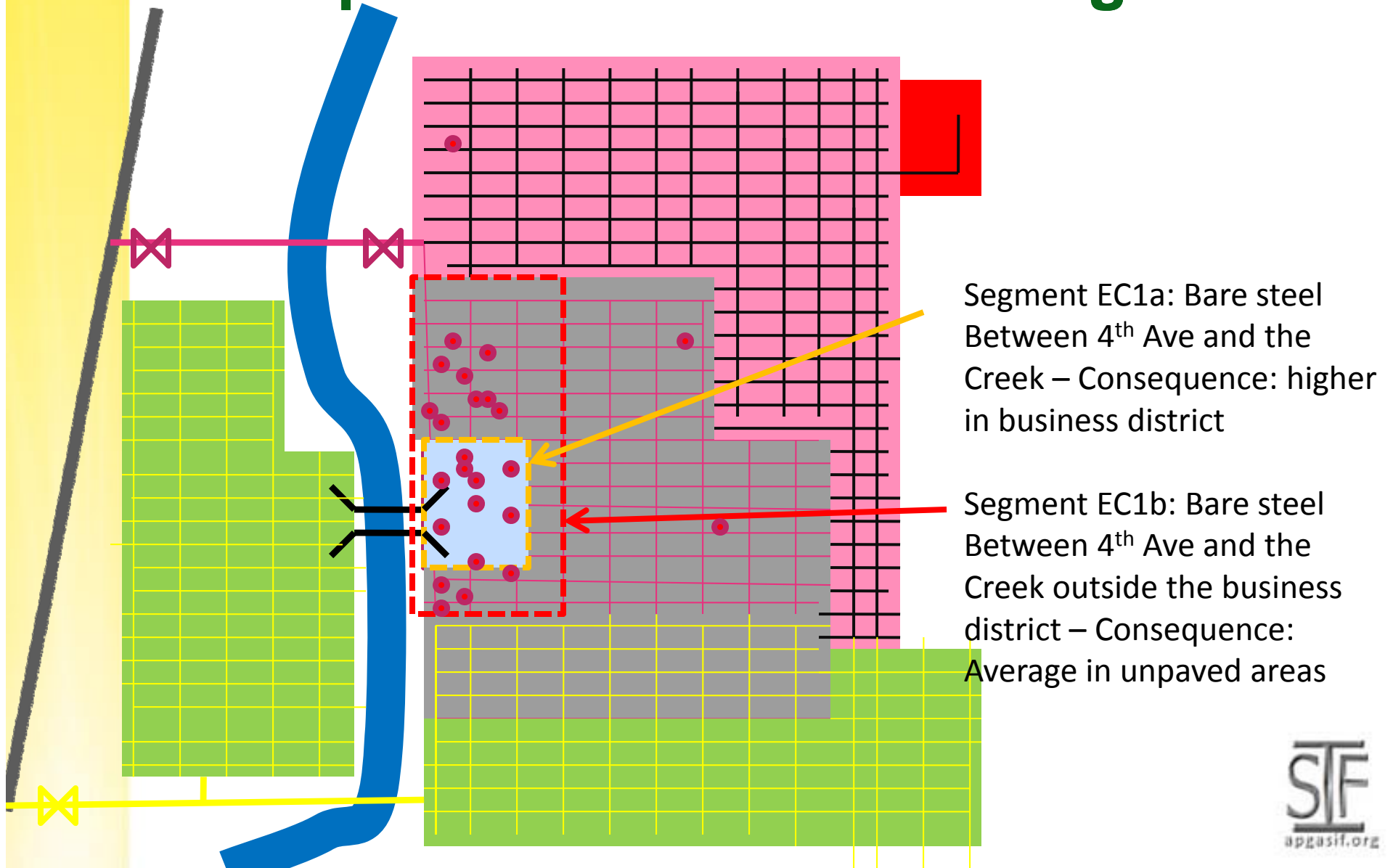
Corrosion Threat Segments



Segment EC1: Bare steel
Between 4th Ave and the
Creek – Consequence: higher
in business district

Average in unpaved areas

Split Corrosion Threat Segments



Risk Ranking

- Risk = Probability times Consequence
- GPTC and SHRIMP questions address only probability of a failure for each threat
- SHRIMP adds consequence questions
- Challenge: How to compare risks across threats?

Probability of Failures Causing Incidents

Reported Cause of Incidents and Failures 2005-2007	# OF INCIDENTS	# OF FAILURES	INCIDENTS/1000 FAILURES	Normalized to corrosion
CORROSION	6	293933	0.02	1
EXCAVATION DAMAGE	73	338666	0.22	11
INCORRECT OPERATIONS	8	30145	0.27	13
MATERIAL FAILURE	8	147384	0.05	3
EQUIPMENT FAILURE	6	140442	0.04	2
NATURAL FORCE DAMAGE	22	77229	0.28	14
OTHER OUTSIDE FORCE DAMAGE*	39	37426	1.04	51
ALL OTHER CAUSES	NA	NA	NA	

- Corrosion is a leading cause of leaks, but least likely to result in reportable incidents
- Other outside force mainly vehicles hitting meters

Risk Ranking

- Threat segments are ranked from highest lowest by SHRIMP
 1. Corrosion on bare steel in the business district
 2. Excavation near the feeder main
 3. Excavation on the Northeast side
 4. Corrosion on bare steel near the creek outside the business district
 5. Natural forces on 1950 creek crossing
- User can change the order but must enter an explanation why

Additional/Accelerated Actions

Corrosion on bare steel in
business district

Replace 5% per year

Excavation near the feeder
main

Inspect at least once per day

Excavation on the Northeast
side

Increased public awareness

Corrosion on bare steel outside
the business district

Increase leak surveys to once per year

Natural forces on two creek
crossings

Inspect after heavy rains

Performance Measures

Corrosion on bare steel in business district

Replace 5% per year

Corrosion leaks repaired/mile and /service

Excavation near the feeder main

Inspect at least once per day

of excavation damages

Excavation on the Northeast side

Increased public awareness

of excavation damages

Corrosion on bare steel outside the business district

Increase leak surveys to once per year

Corrosion leaks repaired/mile and /service

Natural forces on two creek crossings

Inspect after heavy rains

of natural force damage leaks repaired

SHRIMP Creates a Written DIM Plan

- Documents significant decisions made in previous steps
- Addresses all seven required elements
- Will include required provisions on LEAKS, EFVs and possibly (likely) mechanical coupling failure reporting

Pricing (Tentative)

System size (# of services)	
1-1000	Free
1001-5000	\$ 100
5001-20K	\$ 250
20K-35K	\$ 500
35K-50K	\$ 750
50K - 75K	\$ 1,500
> 75K	\$ 5,000

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QUESTIONS?

