FEAR AND LOATHING

YOUR FORCEMAINS

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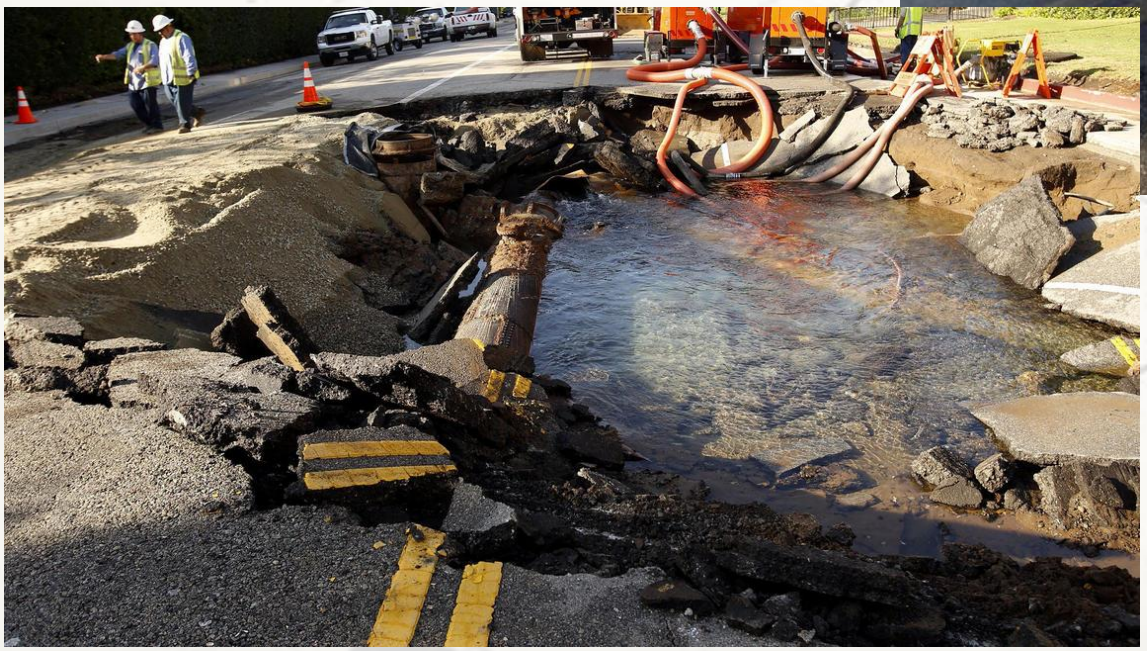
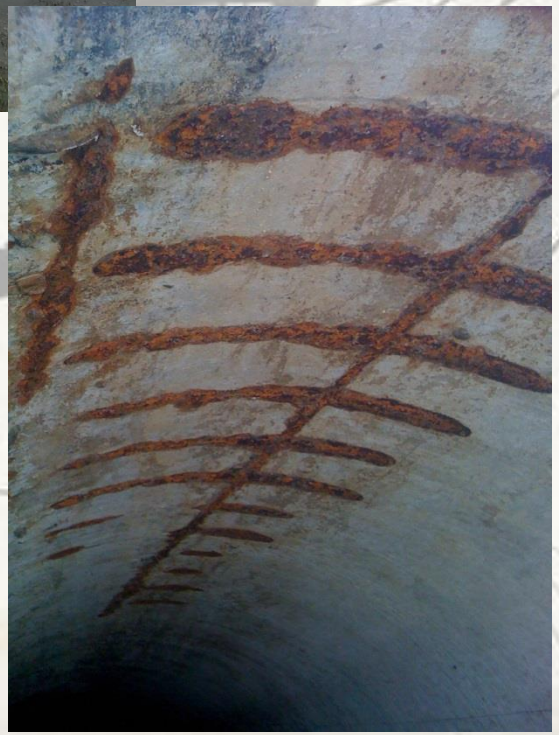
FAIRFIELD-SUISUN
SEWER DISTRICT

The Fear



The Fear Is Real

- 800,000 Gallons Spilled
- Redundant Line
- No External Property Damage
- No Fines
- $540,000 to Repair and Line 1,100 feet



The Loathing

- Underground
- Lack of access
- Material challenges
- Lack of redundancy, little down time
- Cost

Condition Assessment

- Ewers Engineering hired as a consultant
- Worked as a staff extension
- Documented what is known
- Tasks developed to learn more
- Brought in vendors
- Developed framework for C.A.P.

FSSD Major Forcemains

Forcemain	Pump Station	Installed	Material	Length	Priority
36-inch	Suisun & Central	1976	MLCS	16,312-ft	High*
36-inch	Suisun & Central	1976 (2013)	RCPP(lined)	240-ft	Low
48-inch	Central	1989	MLCS	11,495-ft	Med
27-inch	Cordelia	1990	MLCS	17,051-ft	Med
24-inch	Cordelia	1976	RCPP	230-ft	High
18-inch	Cordelia	1976	MLCS	17,132-ft	Med
18-inch	Cordelia	1976	RCPP	500-ft	High

Assessment Costs

Table 5: Conceptual-level cost and timeline for C.A. investigation, 36-in.-diam. CPP force main [a]

Tool	Brand Name	Supplier	Mobilization	Tech. Fee/Inspection	Production Rate	Inspection cost	Site Visit	Reinsertion Fee	Report	Estimated Cost, 1 mile of evaluation	Est. project time, weeks [b]
Level 1											
Pipe-mounted hydrophones	LeakFinder RT	Echologics	$ 4,950	$30,902/mi. [c]	1 mi/day	$ 30,902				**$ 35,852**	NR
Free-swimming hydrophone	Smartball	Pure Technologies	$ 25,000	$14,000/mi.	2 mi/day	$ 14,000		$ 5,000	$ 10,000	**$ 54,000**	14
Tethered hydrophone	Sahara		$ 35,000	$17,000/day	2 insertions/2 mi/day	$ 17,000			$ 10,000	**$ 62,000**	14
Soil envelope investigation	Not yet determined.										
Pigging	Not yet determined.										
Inline mutiple-sensor robotic evaluation	Robotics	Pure Technologies	$ 60,000	$60,000/mi		$ 60,000			$ 10,000	**$ 70,000**	NR
	MSI Responder	Redzone Robotics		$31,680/mi		$ 31,680				**$ 31,680**	10
Level 2											
Inline mutiple-sensor robotic evaluation	See above in Level 1										
Ultrasonic thickness (UT) testing	Many	Many	0	$5,250	per site	$26,250			$ 2,000	**$ 28,250**	2-4
Broadband Electromagnetic (BEM) testing	BEM	Rock Solid Group	0	$15,500	per site	$77,500				**$ 77,500**	NR
Inline relative remaining metal evaluation	Pipe Diver	Pure Technologies	$ 70,000	$70,000/mi		$ 70,000			$ 10,000	**$ 150,000**	NR
Magnetic Flux Leakage (MFL) pig	MFL Pig	Pure Technologies	Much greater than any other technology. Specific costs not available.								

[a] Costs for 1 mile of 36-inch-diameter CPP pipeline evaluation as a pilot project.

Assumptions: Site-specific testing requires 5 sites/mile.

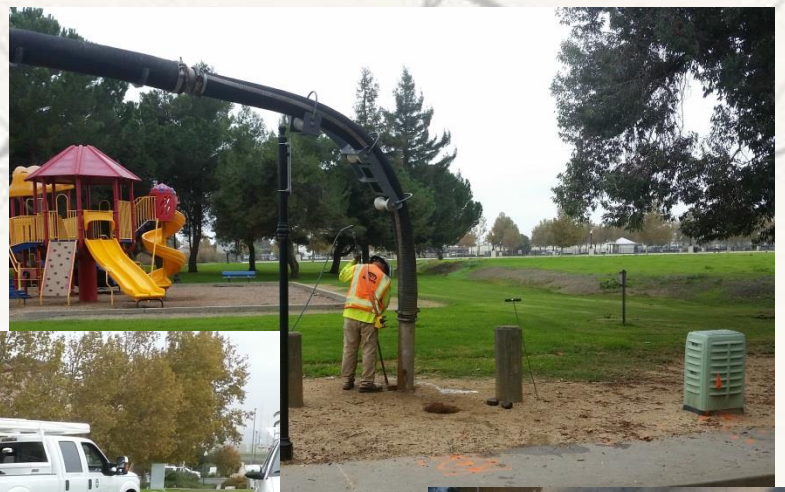
[b] "NR" = No response.

[c] Cost for more than 1 mile of pipe evaluation is $3.58/lf, or $18,902/mi.

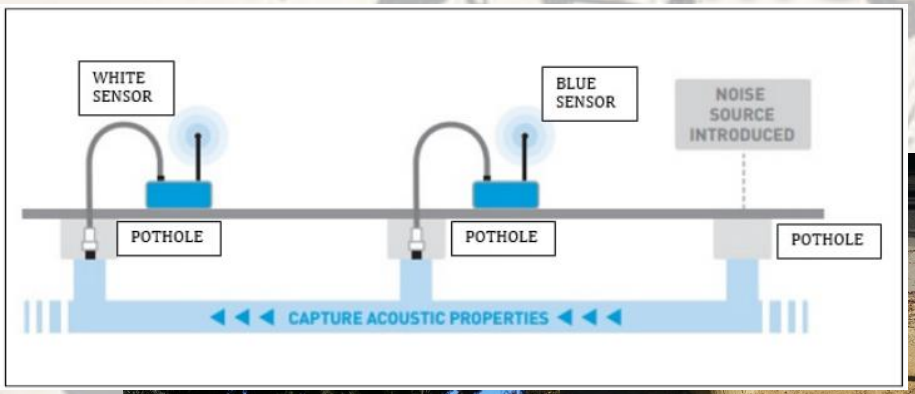
Let's Get to Work

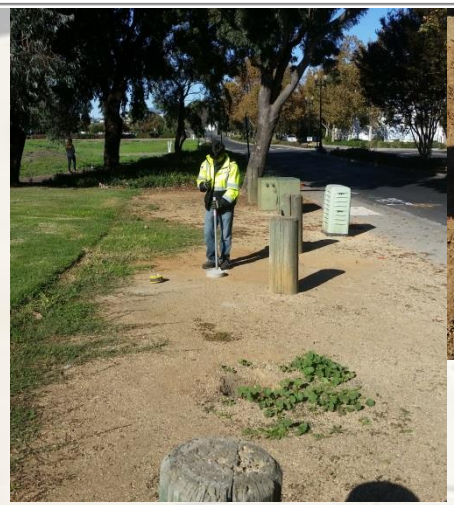
- 10 Inspection Wells Planned
- 2 Existing Valves to be utilized

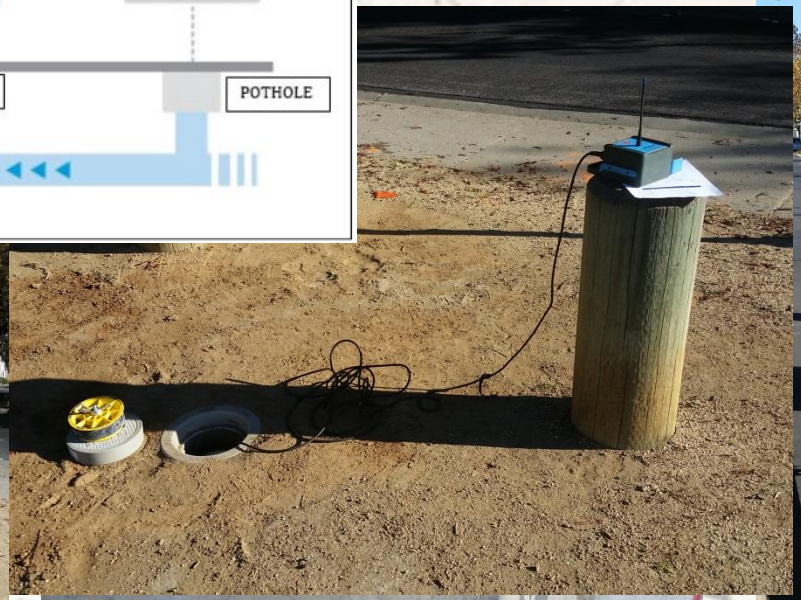
Well Installation

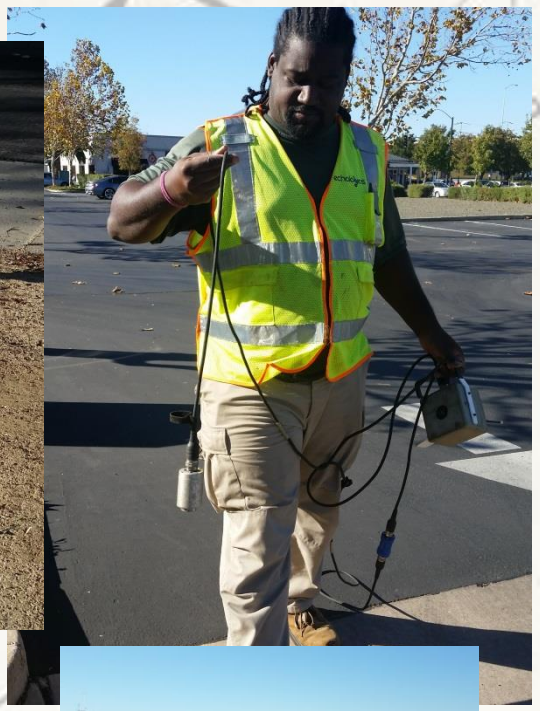


Time to Test

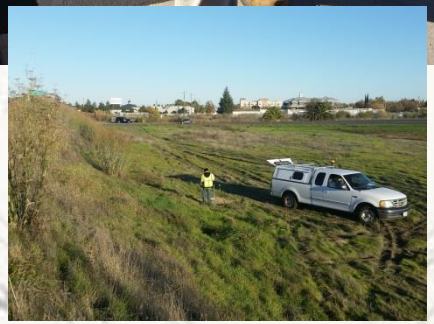

WHITE SENSOR
BLUE SENSOR
NOISE SOURCE INTRODUCED
POTHOLE
POTHOLE
POTHOLE
CAPTURE ACOUSTIC PROPERTIES








SUISUN FM



Results

- Well Installation: $46,000
- Consultant: $37,000
- Zero Leaks
- One possible gas pocket at or near an existing ARV.

Questions?

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