

A NEW APPROACH TO AN OLD PROBLEM:

DESIGN BUILD MEETS COLLECTION SYSTEM REHABILITATION

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WHY REHABILITATE?

- *Extend the useful life on the infrastructure investment*



- *Recapture capacity*



- *Eliminate health hazards*



WHY REHABILITATE?

- *Eliminate “paralysis by analysis”*
- *Expedite compliance*
- *Leverage previous investments*
- *Demonstrate accountability to the “customer”*



"TRADITIONAL" APPROACH

- *Define problem*
 - *Excessive I/I, overflows, blockages, regulatory actions*
- *Study, study, and study problem*
- *Engineering design*
- *Bid and award*
- *Construction and inspection*
- *Evaluate results*



CHANGING THE WAY WE THINK



INDIANA CODE: IC 5-30



ALTERNATIVES TO THE "TRADITIONAL" APPROACH



- *Find and Fix It Approach*
 - *Design build applied to sewer investigation and repair*
- *Performance-Based Contracting Element*
 - *Contractor guarantees some performance standard such as*
 - *Reduction of CSOs*
 - *Percentage Reduction of Infiltration and Inflow (I/I)*
 - *Penalty for failing to meet goals*
 - *Bonus for exceeding guarantees*

"FIND & FIX" CONTRACT

- *Design-build concept applied to sewer repair and rehabilitation*
- *Blend of engineering and construction*
 - *not another study*
- *Integrates inspection, problem determination, design, and construction*
- *Allows decisions to be made in field not office*
- *Contractor element allows for most cost-effective solution to each problem*
- *Allows for quick and economical fixes to problems*

GOALS OF A FIND AND FIX

- *Quick and economical approach to fixing problems*
- *Reduce I/I*
- *Recapture capacity*
- *Extend useful life on infrastructure investment*
- *Expedite compliance*
- *Leverage previous investments*
- *Demonstrate accountability to “customers”*

CRITICAL SUCCESS FACTORS

- *Leverage available data, knowledge and experience*
- *Establish preconstruction baseline flow*
- *Target most effective and efficient repairs*
- *Integrate construction and continued field investigations*
- *Access to the ENTIRE system*
- *Measure effectiveness*



POTENTIAL PITFALLS

- *A half empty “tool box”*
 - *Biased decisions*
- *Poorly and/or ill defined scope, baseline conditions, pay items, reward*
- *Unrealistic expectations*
- *Politically made marriages*
- *Decision paralysis*
- *Ill defined approval process*



"FIND & FIX" APPROACH

- *Establish baseline: preconstruction condition*
- *Use owner's data, knowledge, and experience*
- *Integrate construction and additional field investigations*
- *Complete system rehabilitation*
 - *Sewers (full and partial rehab)*
 - *Manholes*
 - *Service laterals*
- *Measure effectiveness*







BENEFITS OF "FIND & FIX"

- *TEAM SYNERGY: Expertise from the technical and practical side together with the same goal*
- *Speeds results - construction is immediate after investigation*
- *Quicker system benefits*
- *Allows for efficiency in rehabilitation and scheduling thus reduced costs*
- *Streamlines time and effort*
- *Reduces I/I*
- *Recaptures capacity*
- *Extends useful life on infrastructure investment*
- *Expedites regulatory compliance*
- *Leverages previous investments*
- *Demonstrates accountability to "customers"*



WHAT IS A PERFORMANCE BASED ELEMENT?

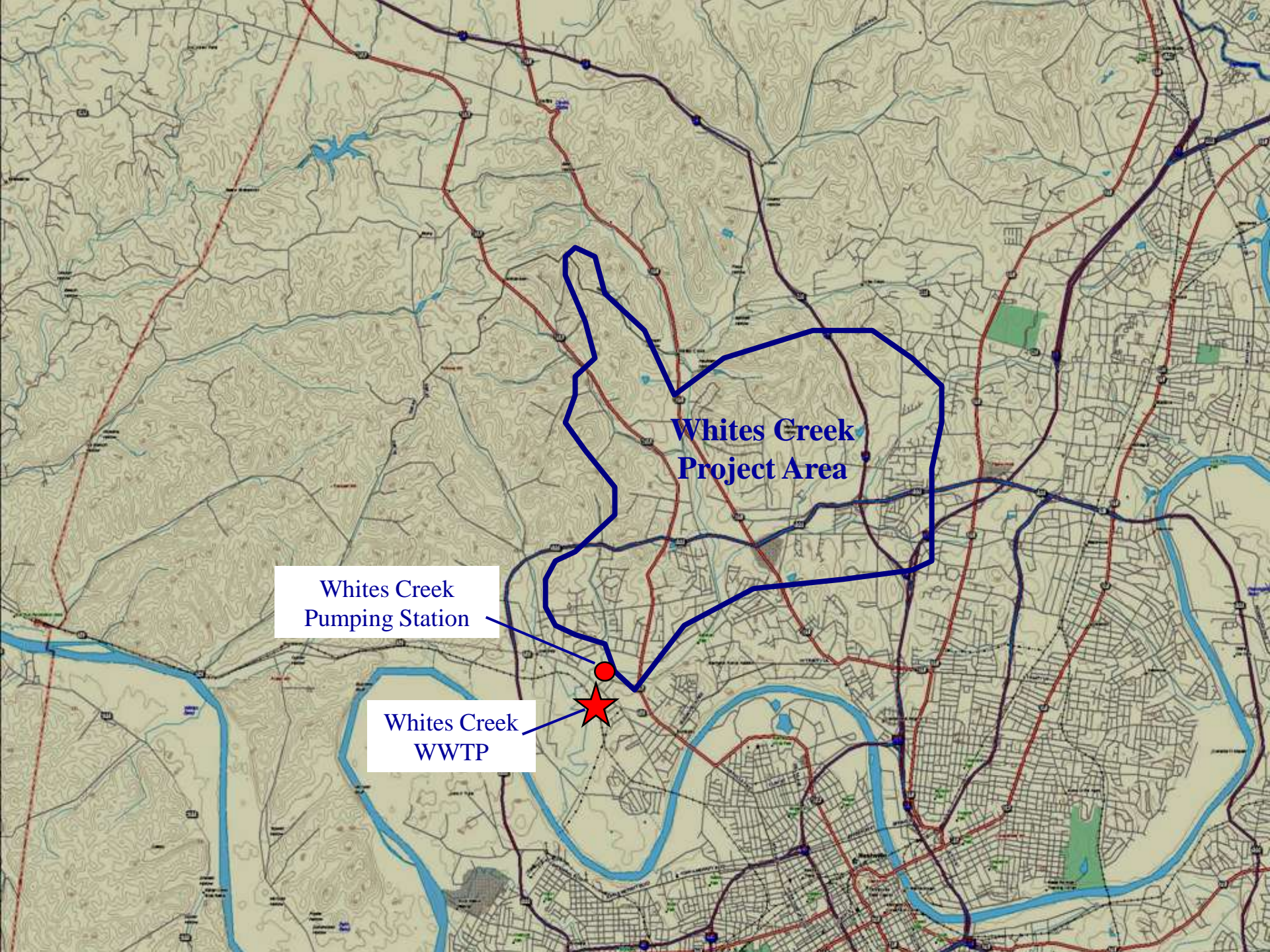
- *Contractor/engineer team is held to a predefined performance standard*
 - *Guaranteed reduction in I/I (reasonable)*
 - *Elimination or reduction of CSOs*
- *Team is provided with a bonus when goals are met or assessed a penalty if goals are not achieved – typically monetary*
- *Provides accountability*
- ***MUST HAVE SOMETHING ON WHICH TO EFFECTIVELY AND ACCURATELY MEASURE RESULTS***

CASE STUDY #1: WHITE'S CREEK: NASHVILLE, TN

- *5-year, \$7.5 million contract with the Metro Water Services of Nashville and Davidson County*
- *Began August 2000*
- *Performance guarantee:*
 - *Reduce total system I/I by 20 percent*
- *\$500,000 penalty for failure to meet goal*
- *\$500,000 bonus for 30 percent I/I reduction*
- *Contract Structure and Pricing*
 - *Schedule A: I:I Related Items*
 - *Schedule B: Structural Repairs*

WHITES CREEK BASIN

- *Approximately 160 miles of 8 to 60 inch sewers*
- *20,000 acres*
- *Whites Creek Pumping Station: 11.5 MGD capacity*
- *Chronic system problems*
- *Overflows*
- *Very limited rehabilitation completed in system*



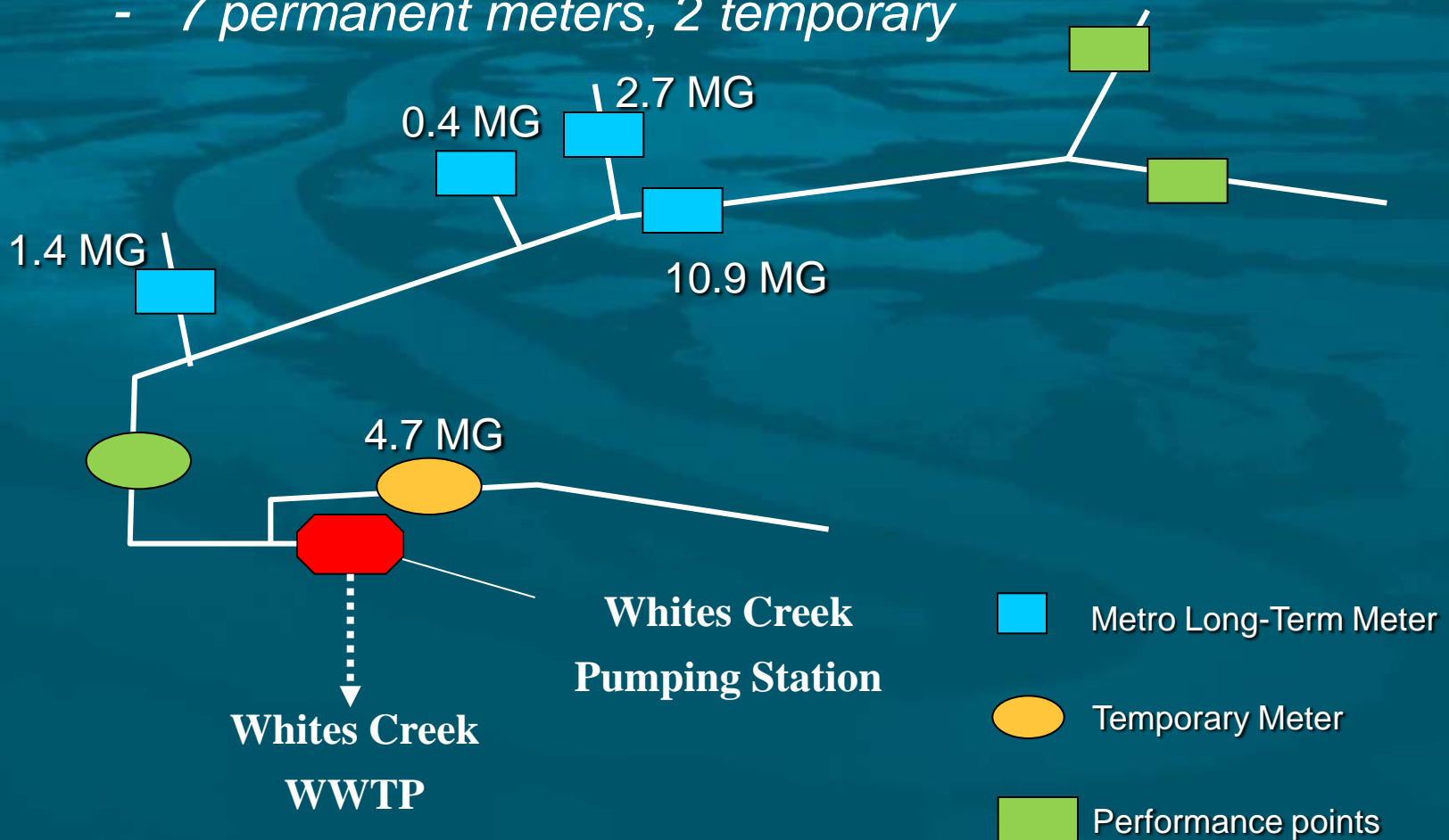
**Whites Creek
Project Area**

Whites Creek
Pumping Station

Whites Creek
WWTP

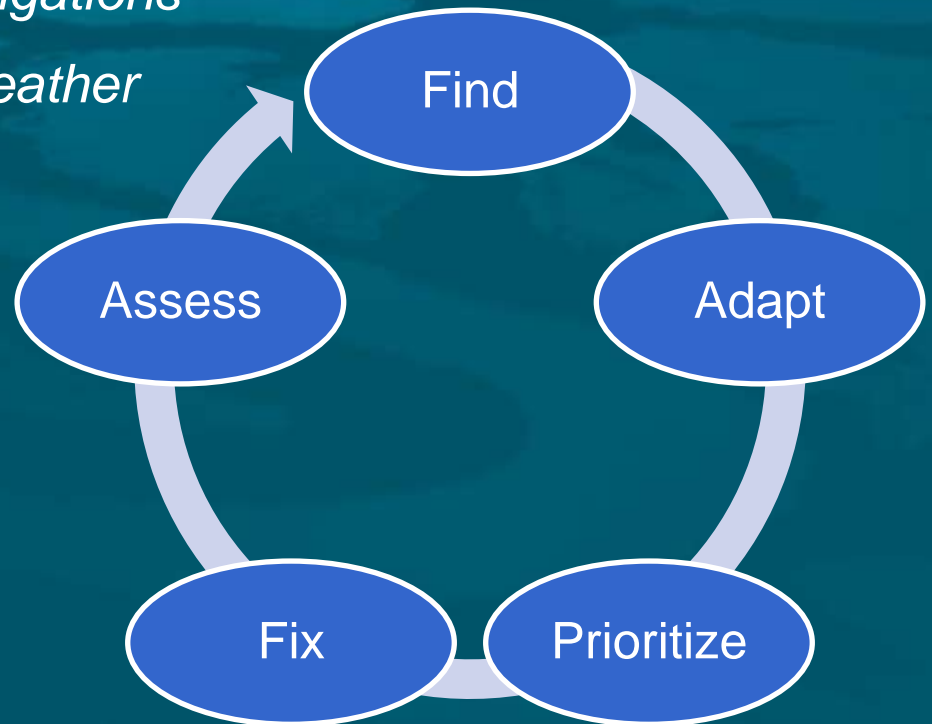
WHITES CREEK APPROACH

- Establish flow baseline
 - 7 permanent meters, 2 temporary



WHITES CREEK APPROACH

- *Leverage existing knowledge*
- *Target known problems and begin immediate repairs*
- *Continual investigation while completing repairs*
 - *Wet weather field investigations*
 - *Televising during wet weather*
 - *Manhole inspections*
- *Continual cycle*



WHITES CREEK RESULTS

- *Rehabilitation Summary*
 - *125,000 feet of 8-24 inch CIPP*
 - *470,000 feet of televising*
 - *433 manholes rehabilitated*
 - *922 laterals rehabilitated (735 with CIPP)*
 - *1720 feet of pipe bursting*
- *41% reduction in I/I (29.05 MGD to 17.03 MGD)*

CASE STUDY #2: GWINNETT COUNTY, GA FIND AND FIX

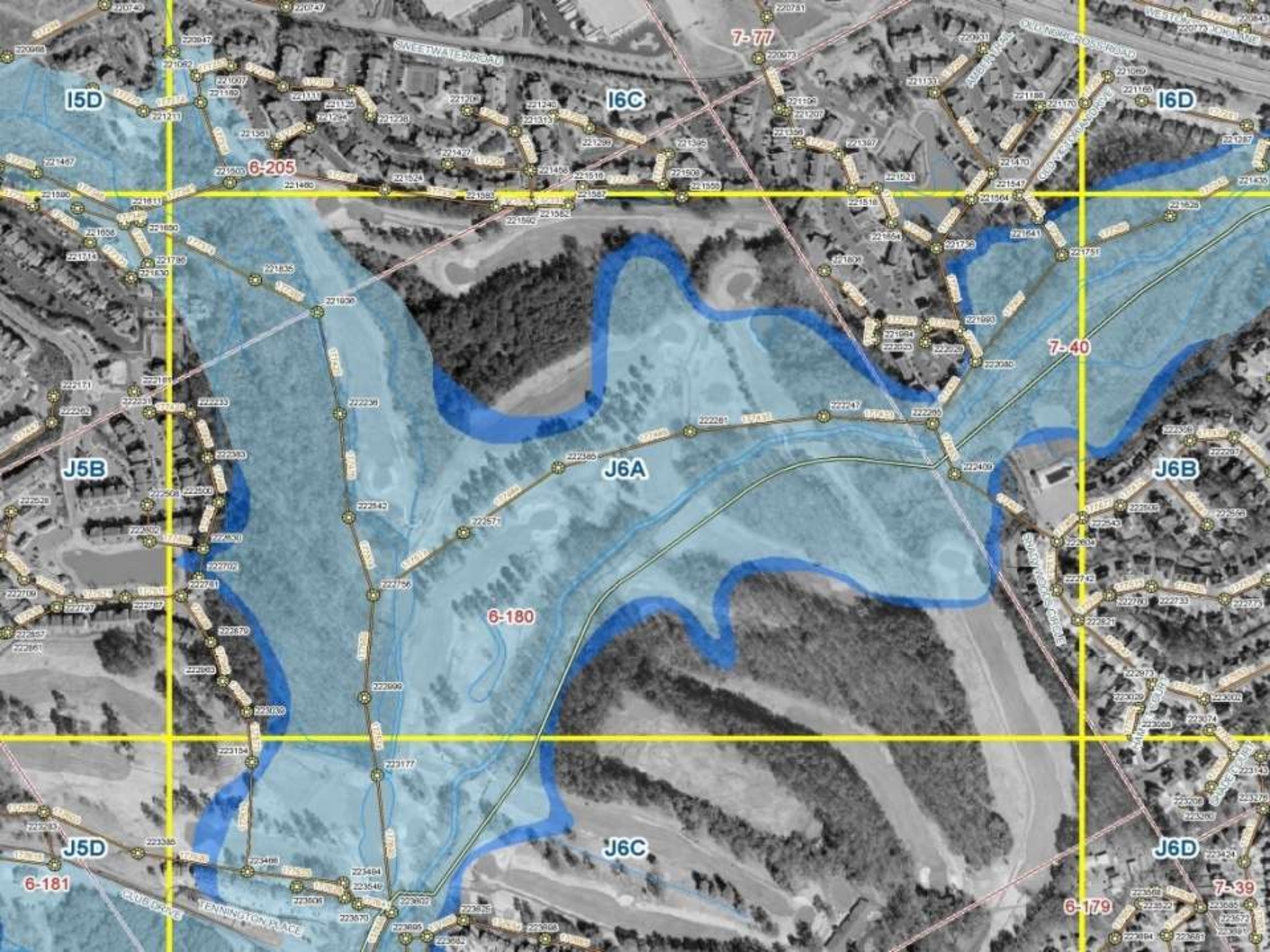
- *Drivers*
 - *Capacity limitations from growth*
 - *Eliminate “analysis by paralysis”, no more studies!*
 - *Show results now*
 - *Believe problems are limited to floodplain*
- *Previous studies, limited rehabilitation*
- *Limited baseline flow data*

GWINNETT COUNTY FIND AND FIX

- *Gwinnett County sewer system*
 - *Beaver Run, Jackson Creek, Sweetwater Creek, Upper Yellow River*
 - *5,000,000 LF sewers*
 - *24,000 manholes*
 - *79,000 acres*
- *Project area = 100-year floodplain within selected basins*
 - *950,000 LF sewers*
 - *3,000 manholes*
 - *7,000 acres*

GWINNETT COUNTY FIND AND FIX

- *Began summer 2002 as 1 year contract \$2.5 million with 2 one-year renewals*
- *Established unit prices for numerous work items*
- *Work order approval by owner*
- *Prepare system maps*
 - *Utilize available data from several sources*
- *Integrate field investigations and “Fix” selection*
- *Search, select, purchase, populate, and maintain computerized maintenance management system (CMMS) software*



Sewer Television Inspection



US Manhole: 5847-219 | 130 BLECKLEY DR
 DS Manhole: 5847-218 | 301 BLECKLEY ST
 Flow Basin: E04D | Date Televised: 04/04/1994 | TV Direction: 2 | Down->Up

Set-up | Pipes | TV Observation | Summary | User Defined

Distance (ft)	VCR Counter	Location	Description	Rating	Image	Movie	Observed (gpm)	Estimal ▲
184.00	00:05:23	Joint	Collapsed Pipe	4	No	No		
184.00		Camera Blocked	N/A	0	Yes	No		
183.00		Upper Right	Crack-Horizontal	1	No	No		
180.00		Upper Left	Crack-Horizontal	3	No	No		
177.00		Upper Right	Crack-Horizontal	3	No	No		
173.00		Upper Left	Crack-Horizontal	3	No	No		
170.00	00:06:45	Upper Left	Crack-Horizontal	3	No	No		
167.00		Upper Left	Crack-Radial	2	No	No	0.000	
164.00		Upper Right	Crack-Horizontal	3	No	No		
161.00		Joint	Roots	2	Yes	No	0.000	
158.00		Upper Right	Crack-Horizontal	3	No	No		
155.00		Upper Left	Crack-Horizontal	3	No	No		
152.00		Upper Right	Crack-Horizontal	3	No	No		

GWINNETT FIND AND FIX RESULTS

- *\$11 million spent in 3 year period*
- *Investigation*
 - *Televised 875,800 feet of sewer*
 - *Inspected 3,380 manholes*
- *Rehabilitation – 3,100 Approved Work Orders*
 - *28,350 LF CIPP (8” – 24”)*
 - *225 point repairs (8” – 24”)*
 - *146 Joint Seals (36” – 60”)*
 - *\$5.4 million in MH Rehabilitation*
- *Identified an estimated 16.7 MGD of I/I*
- *Removed an estimated 9.3 MGD of I/I*
- *Cost of I/I removal : \$0.82 per gallon*
- *Estimated annual savings: \$3.5 million in transport and treat costs*

KEYS TO SUCCESS

- *Established synergy between contractor and engineer*
- *Complete tool box of rehabilitation methods*
- *Access to entire sewerage system*
- *Leverage existing knowledge, information and maps*
- *Client with well defined expectations, ability and empowerment to make decisions*
- *Established baseline conditions*
- *Clearly defined work order approval process*
- *Communication!!!*



DESIGN BUILD WAS USED HERE



Ancient Rome

Ancient Greece



AND HERE...



Route 125: San Diego, CA



Palm Island bridge; Dubai, UAE



“Odorless” WWTP; Fulton County, GA

WHY NOT HERE?



***WHERE ARE YOU,
WHERE DO YOU WANT TO GO
AND
HOW DO YOU GET THERE?***

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