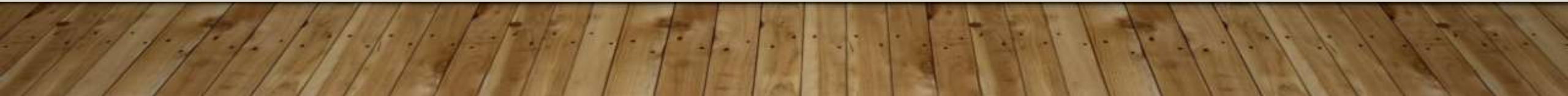


CASE STUDIES

BY: DYLAN TISSUE AND PATRICK STRONG,



CASE STUDY I- DYE TESTING

- Observed flowing outfall.
- Parameters in range except one.
- Chlorine read >1.5 ppm.



DISCOVERY

- No leaks were visible above surface.
- Storm drain was televised.
- Infiltration from a sub surface break was found.

AERIAL



CASE STUDY 2

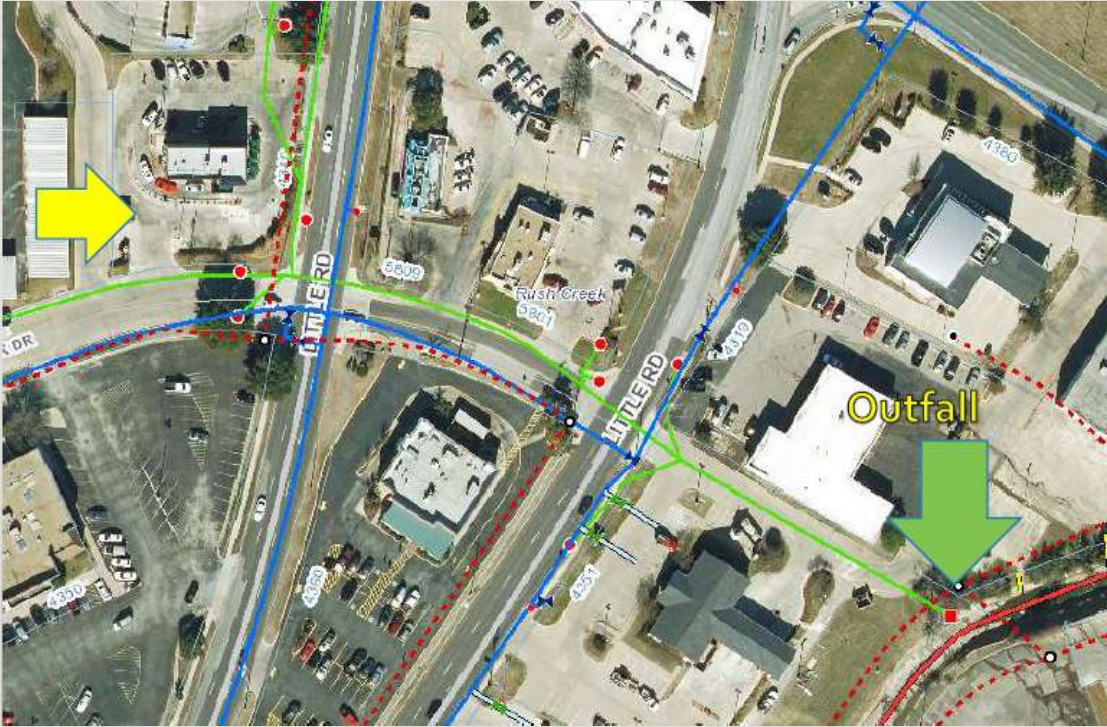
- Observed flowing outfall.
- Sewage odor and scum observed.
- Ammonia read <8.0 mg/L.



DISCOVERY

- Sewer main dye tested and televised
 - No results
- Televised storm drain system
 - Could not traverse some lines.
- Dye tested businesses.

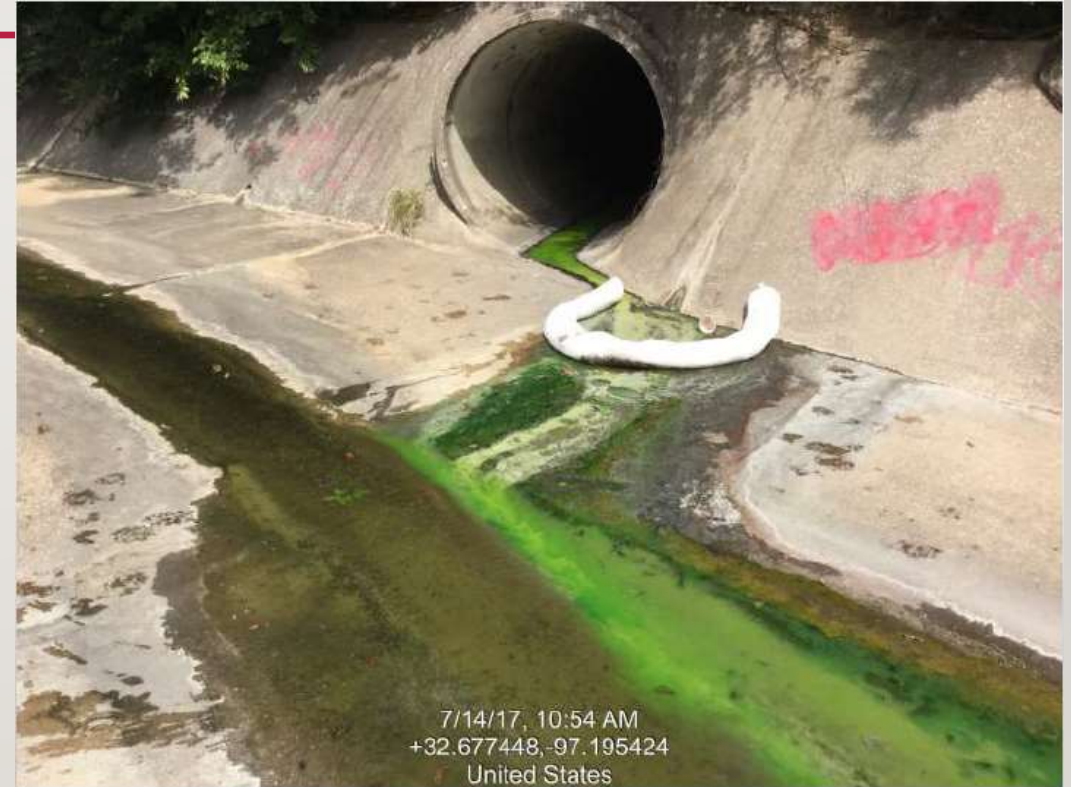
AERIAL



ILLICIT CONNECTION INVESTIGATION

- Outfall observation
 - Discharging
 - Sewage Odor
 - Scum observed
- Residents/business owners complaining of sewage odor
- Ammonia reading OVERANGE >8.0 mg/L

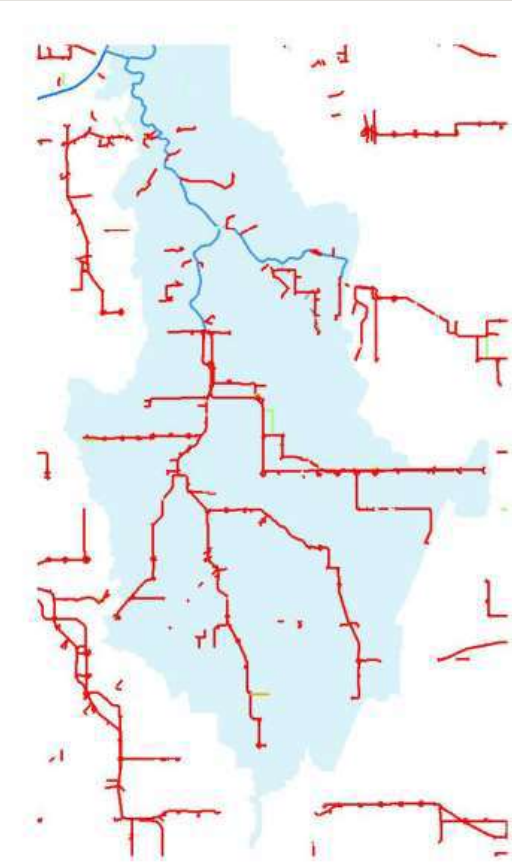
DYE TEST RESULTS



REMEDIATION



CASE STUDY 2- CITY OF FORT WORTH (ZOO CREEK)



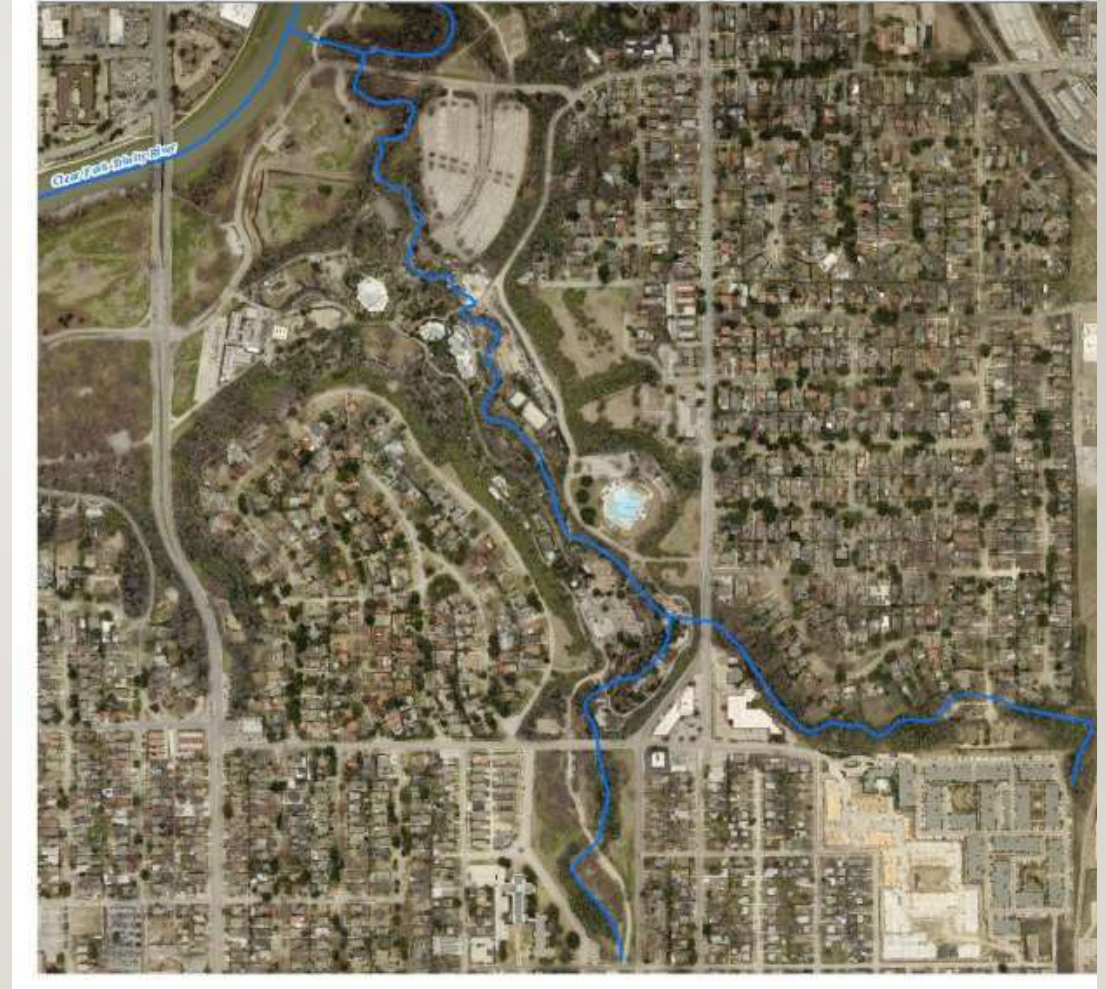
- Approximately 1,247 acres
 - 65 of those are Zoo
- 50 Outfalls
- 397 Inlets

CASE STUDY 2- BACTERIA

- Clear Fork downstream from Zoo Creek is sampled monthly for bacteria
 - Occasional uptick in bacteria
- Outfalls typically have flow through the area
- Elevated bacteria results observed during monthly monitoring

OBSERVATION FACTS:

- Series of outfalls with ambiguous sampling results
 - Ammonia-nitrogen was elevated
 - *E.coli* was less than 2,400 MPN/100ML
 - Not necessarily an SSO, could be wildlife
- Old infrastructure from 1920s
- Area surrounds University



WHERE IS THE BACTERIA COMING FROM?

- Aging infrastructure?
 - Some sanitary sewer pipes are from the 1920s
- Cross Connections?
- Wildlife and Pets?
- University or Schools?
- Zoo?

PROBLEM

- Cost
 - CCTVing is EXPENSIVE
 - Bacteria source tracking is (slightly) expensive
 - Only a few outfalls would be able to be source tracked
- Time
 - A luxury we don't have



SOLUTION

- Test for optical brighteners
 - Optical brighteners are found in laundry detergent
 - Used to make your whites whiter and your brights, brighter
 - When optical brighteners are present, they will show fluorescent under UV light

SOLUTION

- Fluorometers
 - Slightly expensive (\$1K) and our budget was stretched thin
 - Not to mention we needed answers quickly
- Tampons to the rescue!!!
 - Super cheap and readily available
 - WE had UV light and chamber for bacteria analysis

Install



RESULTS

- Break in sanitary line just past lateral connection
- Water Department repaired break
- Outfalls are optical brightener free

Results

