

**CASE**

**02 / 18**

**STUDY**



**Jefferson County, AL**



**14 iTracker I&I Sensors**



**4 Months**



**Analyzed 22 miles of piping in 48 hours**



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## OBJECTIVE

### Background

In conjunction with the Hazen & Sawyer Engineering Team, the area selected for the Jefferson County I&I Pilot Project was Turkey Creek "TK2B", which was one of their basins responsible for contributing the greatest amount of I&I.

### What we did

It was decided to place (14) iTracker® sensors within the 22 linear miles comprising the TK2B basin. The project was scheduled for completion in three phases during what was to be a 6-month Pilot Project.

What resulted was a project completed in 3-1/2 months with actual man-hours expended on all three phases (including developing analytical reports) totaling just 48 hours.

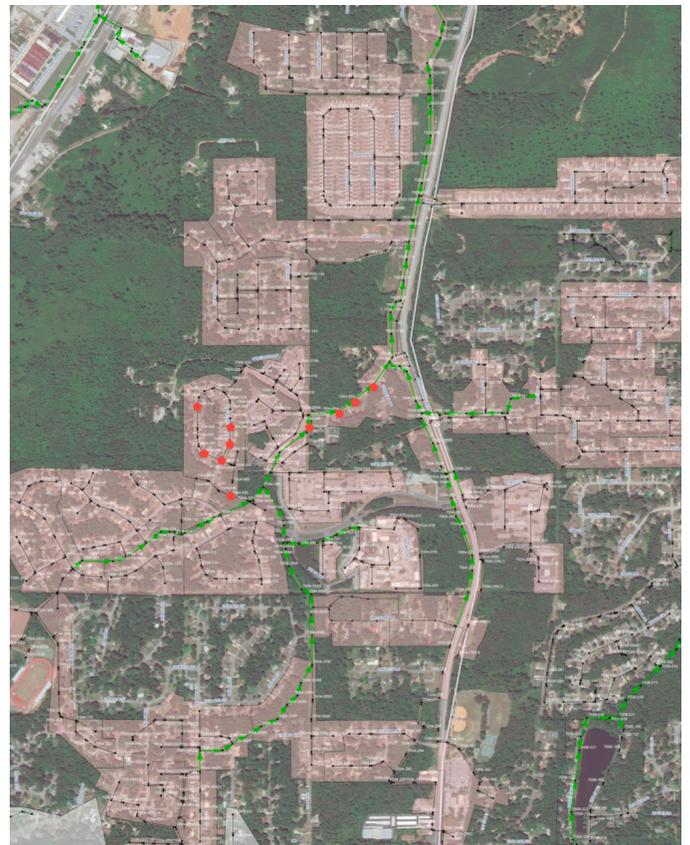


Figure 1: Phase III location of (11) iTracker sensors

## PHASE I

The project began at the beginning of February by installing all (14) iTracker sensors at strategic locations along the 22-mile TK2B basin. On average, it took 20-30 minutes to locate each manhole and 15 minutes to install each sensor. The entire installation process was completed in less than 10 hours.



*Figure 2: iTracker sensors, weighing just under 2 lbs. are installed without the requirement for confined-space entry*

# PHASE II

Phase II comprised the data collection and initial review of the strategically placed iTrackers. On March 16, about five weeks post-installation and after a few rain events, data was simply and safely collected from each monitored site via smartphone Wi-Fi connectivity (Figure 3).

The collected data was imported into the iTracking® analytical software program to determine the basins responsible for contributing the greatest amounts of I&I.

With the click of a button, a bar graph (Figure 4) was automatically developed detailing **RDII, Groundwater, Base, and Total I&I** for each monitored site.

It was quickly determined that Mini-Basin 7004-002 was responsible for the highest volumes of Rain-Derived I&I (RDII).

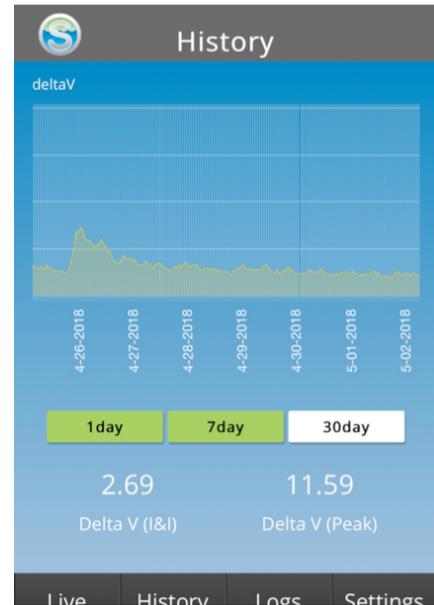


Figure 3: Data via smartphone app from iTracker for manhole location 7004-002

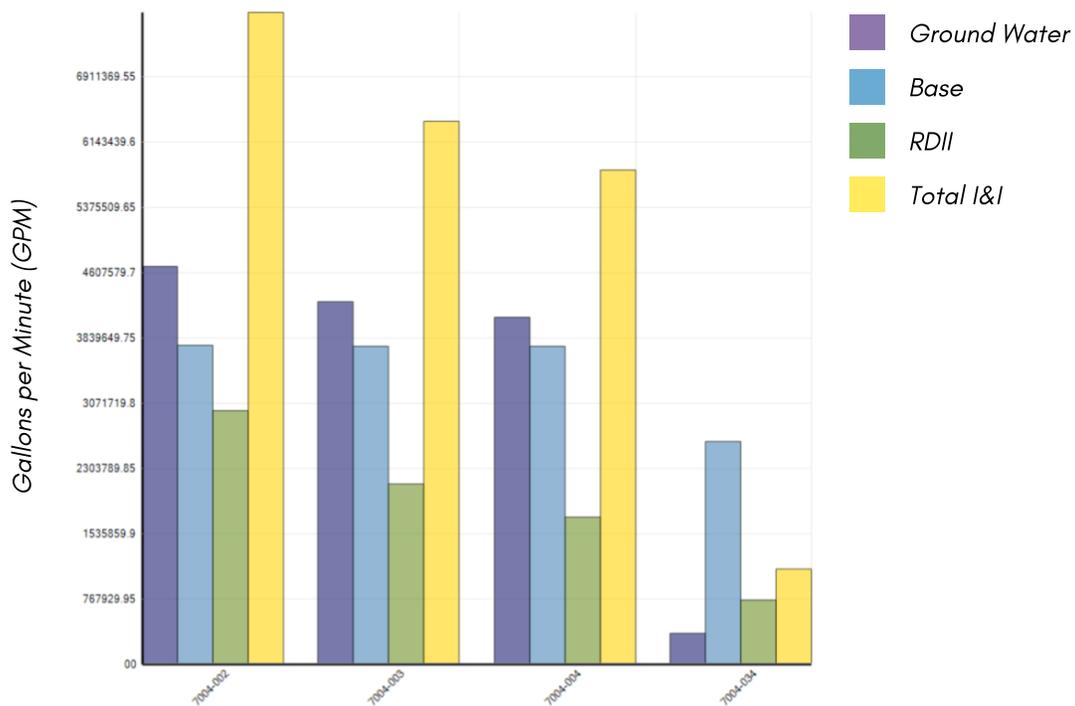
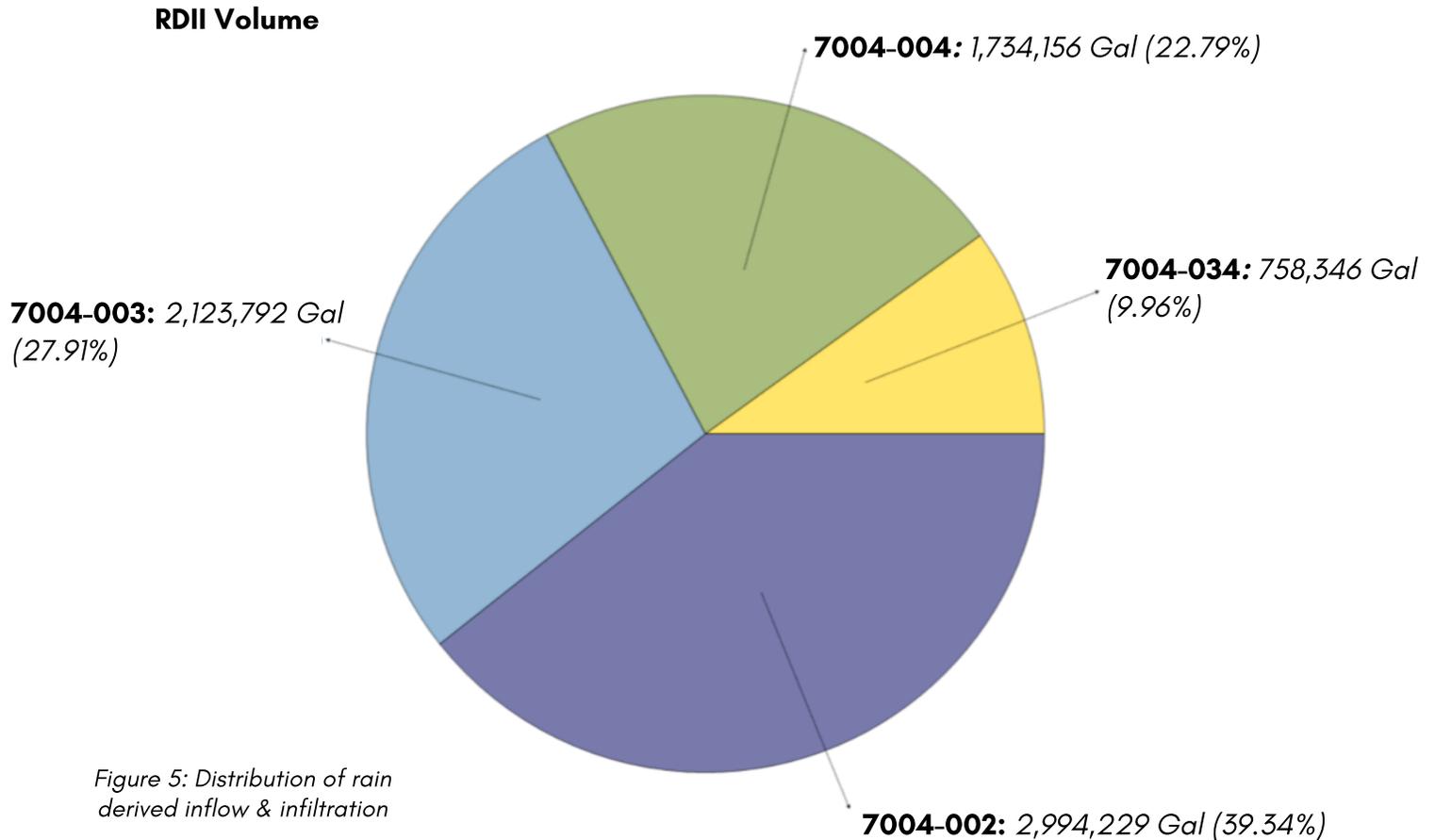


Figure 4: Volumetric data processed from manhole locations 7004-002, 7004-003, 7004-004, & 7004-004

# PHASE III

In order to further isolate the source of I&I entering the system, (11) iTracker sensors were strategically placed upstream of Site 7004-002 (Figure 1).

It was quickly concluded that an area directly upstream of 7004-002 consisting of only four manholes alongside a creek were responsible for contributing the majority of RDII.



Evidence of major infiltration was discovered along the 7004-002 15" ID micro-basin with the majority entering between two adjacent manholes 002 and 003 (Figure 5).

Cameras were immediately dispatched and determined that the large volumes of I&I were due to faulty laterals entering the 7004-002 micro-basin between manholes 002 and 003.

## RESULTS

After just 48 hours of field and analytical time expended we, in conjunction with Hazen & Sawyer, were able to quickly and cost-effectively evaluate 22 miles of collection system piping all the way down to (14) mini and micro-basins in just a 3-1/2 month period.

**48  
HRS**

of actual field and  
analytical time to  
diagnose 22 miles of  
collection system piping



# GLOSSARY

**Base Flow** - Wastewater directly discharged by the population upstream of the iTracker® I&I Micro Detection Monitor

**GW** - Abbreviation for 'Groundwater infiltration.' Water entering the collection network from saturated soil.

**I&I** - Inflow and infiltration

**Infiltration** - Surface water that enters the wastewater collection system after seeping through the soil.

**Inflow** - Water running directly into the sewer through open manholes, downspouts, and other openings or gaps not covered by soil

**Peak** - Level/Flow Values based upon maximum one-hour averages.

**Population** - Refers to the number of residences contributing to the sewer shed upstream of the monitored site. iTracking® technology utilizes the population to estimate the average amount of flow expected on a typical dry day to establish dry day Base Flows.

**RDII** - Abbreviation for "Rain-Derived Inflow and Infiltration." RDII is rainwater that enters the collection system.

**Peak Delta Q** - Increase in wastewater volume from the typical dry day average volume to the peak volume during a rain event expressed as a multiplying factor relating to volume. (EXAMPLE: Normal Dry Day Average Volume designated as 1. If Peak Volume shows an increase of 5x over Normal Dry Day Volume, **PEAK DELTA Q** is 5.)