# iTRACKER®

## The First Inflow & Infiltration Detection Monitor

eastech

# iTRACKER®

## I&I DETECTION MONITORS

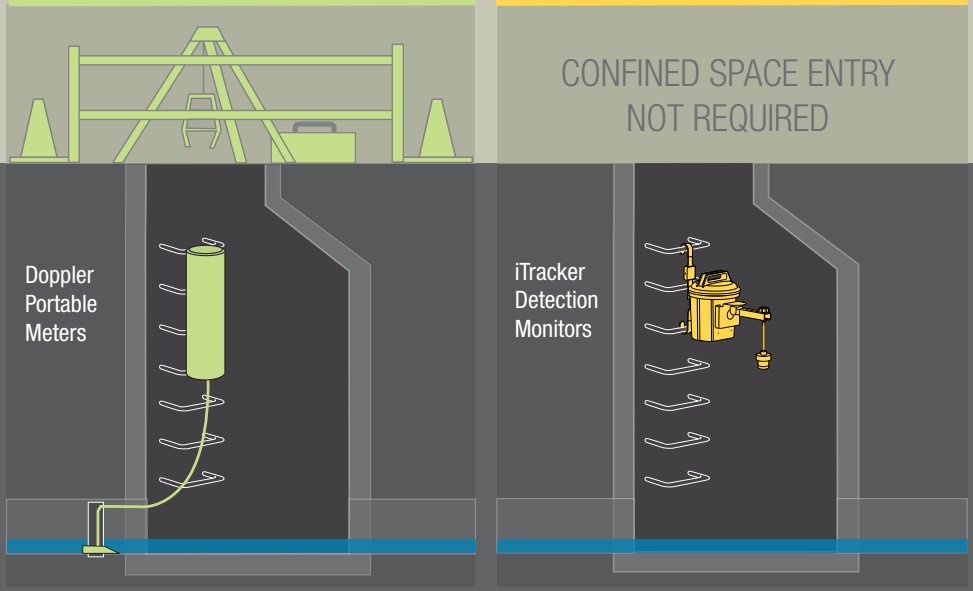
*iTracker's unique ability for cost-effectively locating Inflow and Infiltration finally creates the opportunity for municipalities throughout the United States to reduce their wastewater treatment costs by hundreds of thousands of dollars.*

# A Major Economic Breakthrough in Detecting and Locating Inflow & Infiltration

iTracker, the first I&I Detection Monitor, now makes it possible to cost-efficiently pinpoint sources of I&I at a fraction of the expense of conventional methods by eliminating labor-intensive installation, confined space entry, periodic maintenance and time-consuming data retrieval.

## COMPARATIVE COST ANALYSIS

| CONVENTIONAL FLOW STUDY (Doppler Portable Meters) | | iTRACKER | |
|---|---|---|---|
| Five Portable Flow Meters w/Flow Analysis Software | $22,500 | Five I&I Detection Monitors w/ I&I Analysis Program | $14,375 |
| Installation (5 units) Requiring Confined Space Entry | $5,000 | Installation (5 units) Confined Space Entry Not Required | $750 |
| Yearly Maintenance ($800/Unit/Month) | $48,000 | Yearly Maintenance Contract (5 units) | $0 |
| TOTAL COST | $75,500 | TOTAL COST | $15,125 |




| | |
|---|---|
| **TOTAL FIRST YEAR SAVINGS (80%)** | $60,375 |

# iTRACKER

# A Better Idea

## The First I&I Detection Monitor

Eastech is proud to introduce a major economic breakthrough in detecting and locating I&I that for the first time ever, makes it possible to cost-effectively pinpoint unwanted sources of I&I at a fraction of the expense of conventional methods. A revolutionary new technology, designated as DELTA Q, provides calculated volumetric deviations in wastewater flows between periods of dry and wet weather, except without the necessity for labor-intensive installations, confined space entries, periodic maintenance schedules and time-consuming retrievals of data.

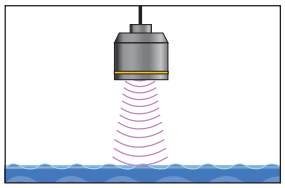
### Minimal Purchase Cost

When comparing historical purchase costs of conventional portable flow meters complete with flow analysis software programs to iTracker Detection Monitors, upfront savings of approximately 40% may be immediately realized.

UNIT COST: $2,875
iTracker + Software
2 Yr. Lease/Purchase: $135/mo.

### Non-Confined Space Installation

The true cost of an I&I study does not lie in the initial purchase price of the equipment, but rather in the confined space entry, data retrieval and ongoing maintenance charges. iTracker installation is efficiently accomplished in 15 minutes from the street level. No tools or hardware are required. The iTracker quickly locks onto the top rung of any manhole ladder with sensor adjustment being accomplished through the simple positioning of a stainless steel arm having 180° adjustability.



### Zero Maintenance

Periodic confined space maintenance is a fact of life when attempting to ascertain differentials in volumetric flow through the utilization of bottom-sitting Doppler/Pressure Cell sensors. Because the "above-the flow" ultrasonic sensor of the iTracker never comes into direct contact with the flow media, maintenance is no longer an issue nor is loss of critical data an ongoing concern.

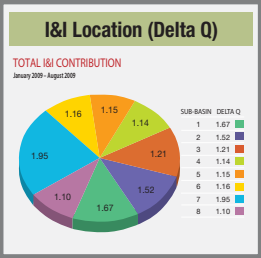
### Instant Data Retrieval

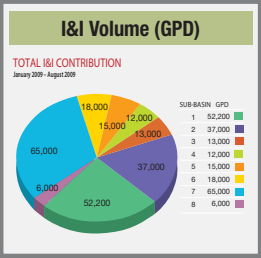
Conventional flow meters require retrieval of field data through physical downloading to a laptop, which at times, must be accomplished under non-accommodating weather and field conditions. With the iTracker, data retrieval is as easy as removing the USB flash drive located within the IP67 rated electronic enclosure and then reinserting it into the USB port of any computer.

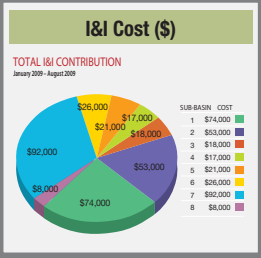
## DELTA Q Technology

The discovery by Eastech's engineering group of a unique algorithm designated as DELTA Q (pat. pend.), having the ability to compute volumetric differences in wastewater flows between periods of dry and wet weather (except without the requirement for confined space entry), provided the cornerstone for the establishment of an entirely new methodology for detecting, locating and cost analyzing the effects of I&I.

# An Advanced Concept




## I&I Location, Volume and Cost Analysis Reports

The process is simple. iTracker I&I Detection Monitors are strategically placed within designated manholes of each major basin comprising the overall wastewater collection system. An onboard data logger records wastewater levels for specified periods of time incorporating both dry and wet days. An internal USB flash drive housed within each iTracker stores the pertinent data for easy transfer to a PC running DELTA Q analysis programs. Once the recorded changes in levels between dry days and dry + wet days are imported into a PC running iTracker analysis software, DELTA Q algorithms calculate a mathematical factor, expressed in ratio form, showing the exact volumetric increases in flows between dry days and wet weather events for each major basin within the collection system.

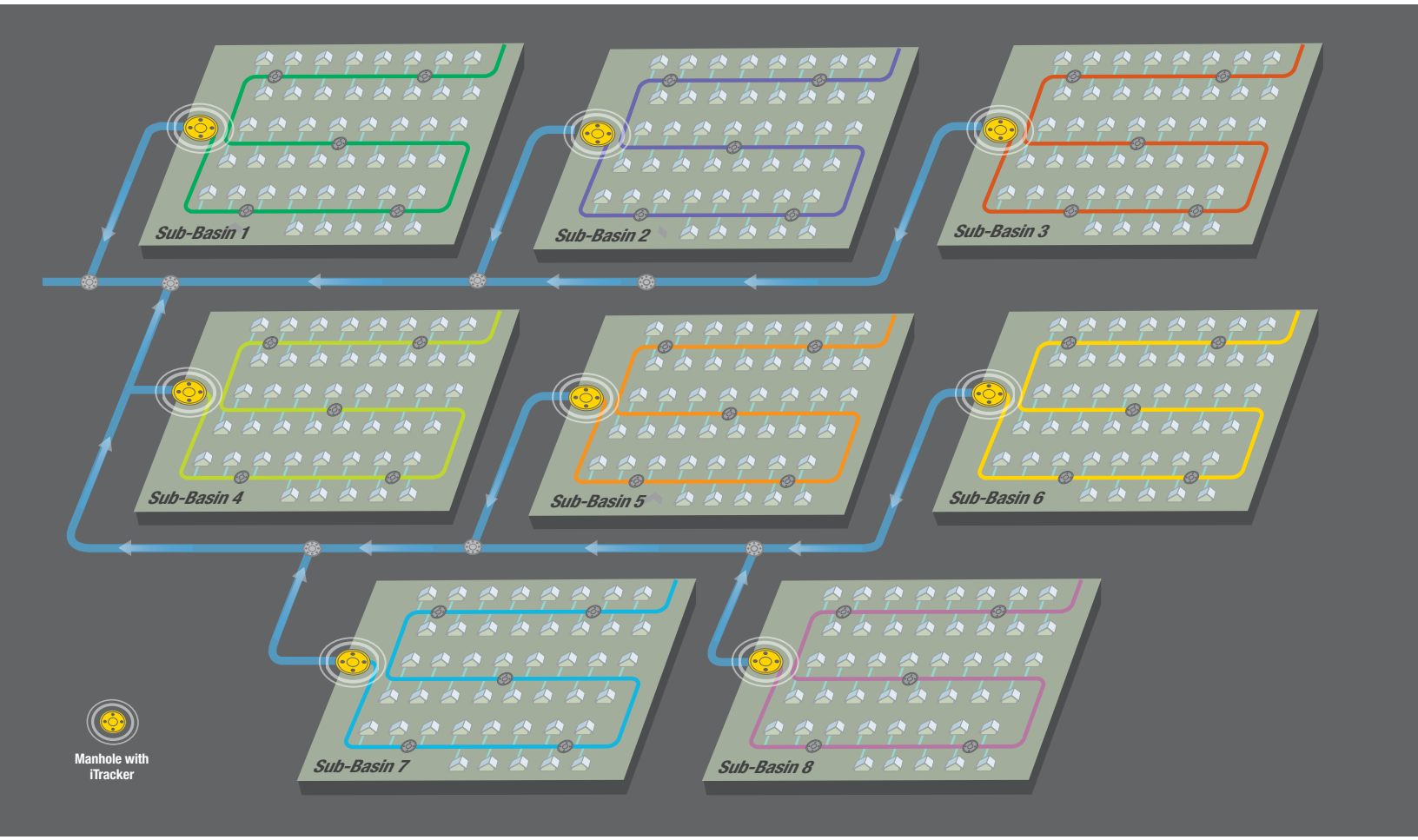
DELTA Q analysis programs initiate both volumetric and cost reports of the effects of any extraneous flows that have entered each major basin during the designated monitoring period. Once the major basins contributing the highest rates of I&I are revealed, the iTrackers are removed and repositioned in order to further pinpoint the exact location of those segments within each major basin contributing the greatest volumes of extraneous ground and storm water. Again, analysis reports in simple pie chart form detail the location, volume and cost of those manhole segments within the collection system generating the highest rates of inflow and infiltration.

# I&I Mapping the Wastewater Collection Grid

Both the EPA and the American Public Works Association suggest a "Systems Approach" for locating major sources of inflow and infiltration (I&I). The Engineering Group within Eastech decided to follow this identical approach. Wastewater collection systems selected for investigation are initially divided into separate Sub-Basins (major basins) and then again into Mini-Basins (segments of a Sub-Basin) in order to cost-effectively ascertain the most prevalent areas of unwanted ingress.

Extensive international studies of inflow and infiltration have proven in case after case that the 80/20 Principle usually applies (approximately 20% of the wastewater infrastructure network contributes 80% of the I&I). These extensive studies only confirm the economic value of implementing a structured I&I mapping approach.

**1 Initially, battery powered iTracker Detection Monitors are strategically placed within the last manhole of each Sub-Basin comprising the collection grid.**




iTracker monitoring is conducted for a minimum period of three consecutive months in order to establish a volumetric mathematical factor (DELTA Q) comparing "dry weather" diurnal flows to "dry + wet weather" diurnal flows. "Dry weather" data will ascertain flows absent of inflow and infiltration. "Dry + wet weather" data will include the effects of inflow and infiltration. Once the information is gathered and transferred through Flash Technology to the iTracker Analysis Program, DELTA Q volumetric ratios (dry day versus dry + wet day flows) are calculated for each Sub-Basin and reports are generated in order to establish those Sub-Basins contributing the highest percentage of additional volume due to the effects of Inflow & Infiltration.

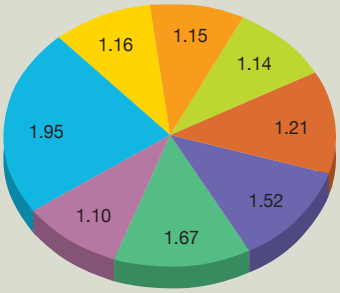
## I&I DETECTION REPORT

It is quickly recognizable from the Delta Q Report shown below that Sub-Basins 1 and 7, due to their high DELTA Q Factor, are the two major contributors of I&I to the overall wastewater collection system. Treatment costs within Sub-Basin 1 have increased by 67% due to the effects of I&I. Although the average level within the 12" sewer pipe has only increased by 1 inch, the volume has increased by 67% and consequently, so has the cost.

### I&I CONTRIBUTION ANALYSIS

**DELTA Q CALCULATION** SUB-BASINS 1 - 8 (APRIL 1 - JUNE 30 2009)

| Sub-Basin | Pipe Diam. (In.) | Avg. Dry Day Level (% Full Pipe) | Avg. Dry + Wet Day Level (% Full Pipe) | DELTA Q Avg. Change in Volume Due to I & I |
|---|---|---|---|---|
| 1 | 12 | 25% | 33% | 1.67 |
| 2 | 10 | 25% | 31% | 1.52 |
| 3 | 8 | 25% | 27% | 1.21 |
| 4 | 12 | 25% | 27% | 1.14 |
| 5 | 15 | 27% | 29% | 1.15 |
| 6 | 18 | 28% | 30% | 1.16 |
| 7 | 10 | 30% | 43% | 1.95 |
| 8 | 8 | 25% | 26% | 1.10 |




| SUB-BASIN | DELTA Q |
|---|---|
| 1 | 1.67 |
| 2 | 1.52 |
| 3 | 1.21 |
| 4 | 1.14 |
| 5 | 1.15 |
| 6 | 1.16 |
| 7 | 1.95 |
| 8 | 1.10 |

## I&I VOLUME REPORT

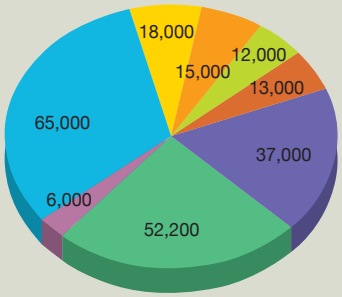
By obtaining survey data from local community records, one can quickly ascertain the number of homes and the average residents per home being serviced by each individual Sub-Basin. Additionally, the EPA, USGS and AWWA have all confirmed that average daily water usage by an individual in the United States is 70 Gal/Day.

By multiplying the number of residents served in each Sub-Basin by 70 Gallons, one arrives at the typical average volume for a "Dry Day". As demonstrated in the Report below, multiplying the "Dry Day" volume by Delta Q provides the increase in average volume ("Dry + Wet Day Volume") due to the effects of Inflow & Infiltration.

### I&I CONTRIBUTION ANALYSIS

**VOLUME CALCULATIONS** SUB-BASINS 1 - 8 (APRIL 1 - JUNE 30 2009)

| Sub-Basin | Residents Served | Avg. Dry Day Volume (Gallons/Day) | DELTA Q | Avg. Dry + Wet Day Volume (Gallons/Day) | INCREASE Due to I&I (Gallons/Day) |
|---|---|---|---|---|---|
| 1 | 1126 x 70gal. | 78,000 | 1.67 | 131,000 | 52,200 |
| 2 | 1050 x 70gal. | 73,000 | 1.52 | 110,000 | 37,000 |
| 3 | 910 x 70gal. | 64,000 | 1.21 | 77,000 | 13,000 |
| 4 | 1121 x 70gal. | 83,000 | 1.14 | 95,000 | 12,000 |
| 5 | 1400 x 70gal. | 98,000 | 1.15 | 113,000 | 15,000 |
| 6 | 1680 x 70gal. | 118,000 | 1.16 | 136,000 | 18,000 |
| 7 | 980 x 70gal. | 68,000 | 1.09 | 133,000 | 65,000 |
| 8 | 840 x 70gal. | 59,000 | 1.10 | 65,000 | 6,000 |




| SUB-BASIN | GPD |
|---|---|
| 1 | 52,200 |
| 2 | 37,000 |
| 3 | 13,000 |
| 4 | 12,000 |
| 5 | 15,000 |
| 6 | 18,000 |
| 7 | 65,000 |
| 8 | 6,000 |

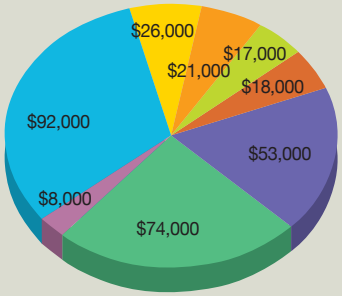
## I&I COST REPORT

Now that one has established both the average "Dry Day" and "Dry + Wet Day" volumes, the added costs generated by increases in volume due to I&I may simply be calculated by subtracting the average "Dry Day" volume from the average "Dry + Wet Day" volume and multiplying the result by a municipality's wastewater treatment rate. In the Report shown below, we chose $3.88/1000 Gallons since this is the Average U.S. Wastewater Treatment Rate determined through a national study conducted by the NUS Consulting Group.

### I&I CONTRIBUTION ANALYSIS

**COST CALCULATIONS** SUB-BASINS 1 - 8 (APRIL 1 - JUNE 30 2009)

| Sub-Basin | INCREASE Due to I&I (Gallons/Day) | INCREASE Due to I&I ($/Day) | INCREASE Due to I&I ($/Year) |
|---|---|---|---|
| 1 | 52,200 | $202 | $74,000 |
| 2 | 37,000 | $144 | $53,000 |
| 3 | 13,000 | $ 50 | $18,000 |
| 4 | 12,000 | $ 46 | $17,000 |
| 5 | 15,000 | $ 58 | $21,000 |
| 6 | 18,000 | $ 70 | $26,000 |
| 7 | 65,000 | $252 | $92,000 |
| 8 | 6,000 | $ 23 | $ 8,000 |

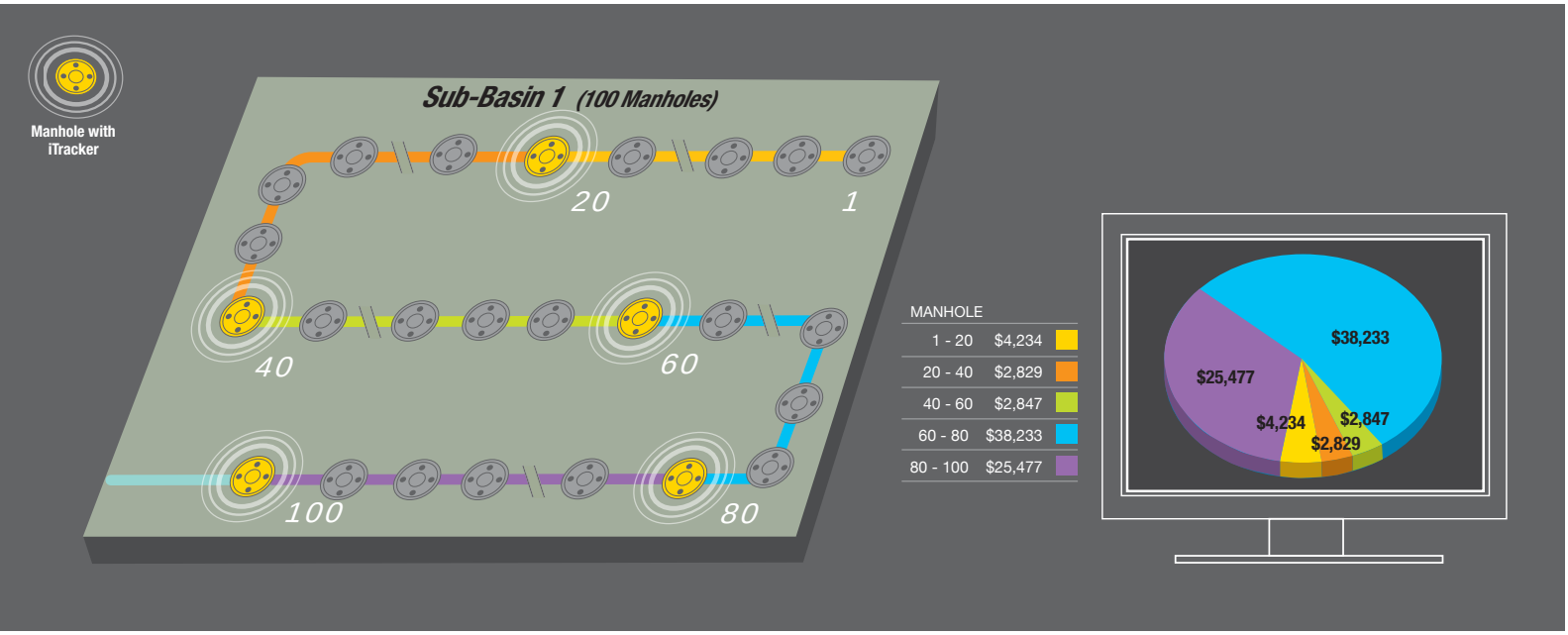



| SUB-BASIN | COST |
|---|---|
| 1 | $74,000 |
| 2 | $53,000 |
| 3 | $18,000 |
| 4 | $17,000 |
| 5 | $21,000 |
| 6 | $26,000 |
| 7 | $92,000 |
| 8 | $8,000 |

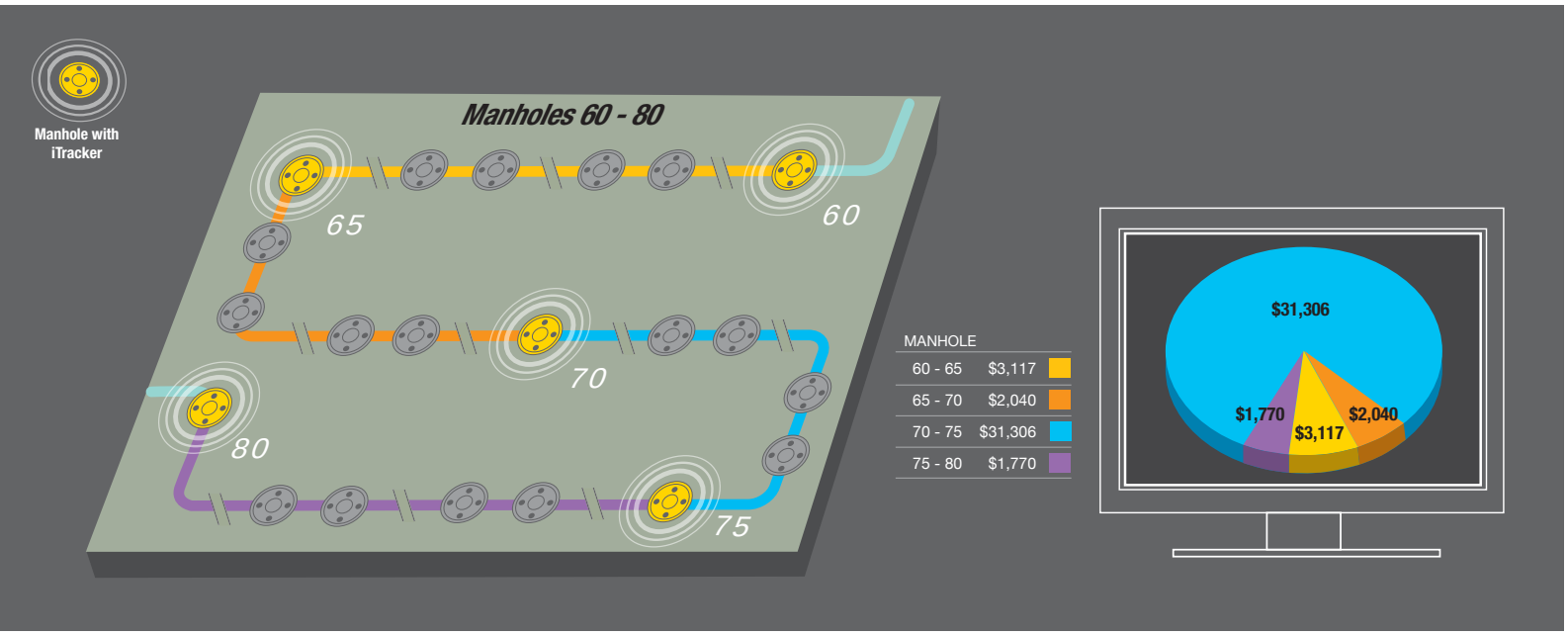
***If just 50% of the I&I in Sub-Basins 1 and 7 is eliminated, a municipality will realize annual savings of $83,000 or $830,000 over a ten year period.***

# I&I Mapping the Wastewater Collection Grid

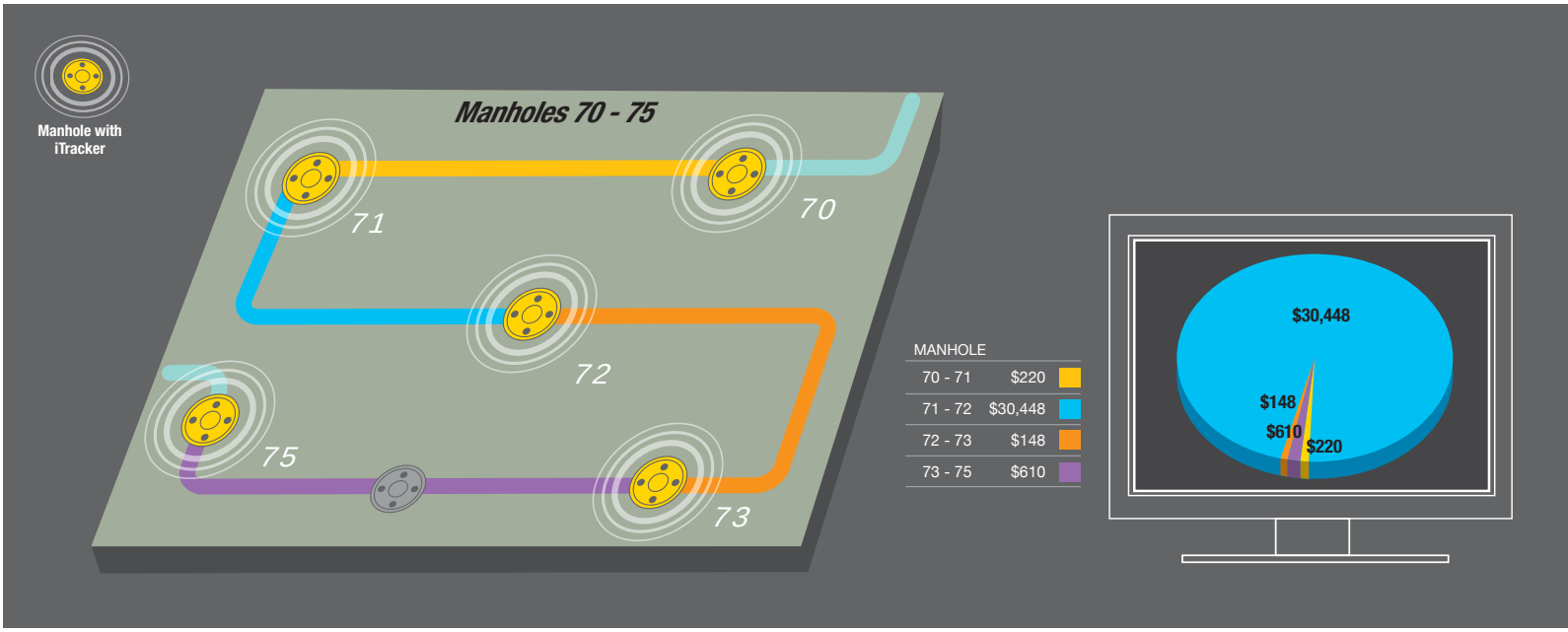
**2** iTracker Detection Monitors are now repositioned at 20 manhole intervals in Sub-Basin 1 in order to furthur isolate the largest volume of I&I.




**3** Since the major area of I&I is discovered to reside between manholes 60 & 80, iTrackers are again repositioned within this new segment.



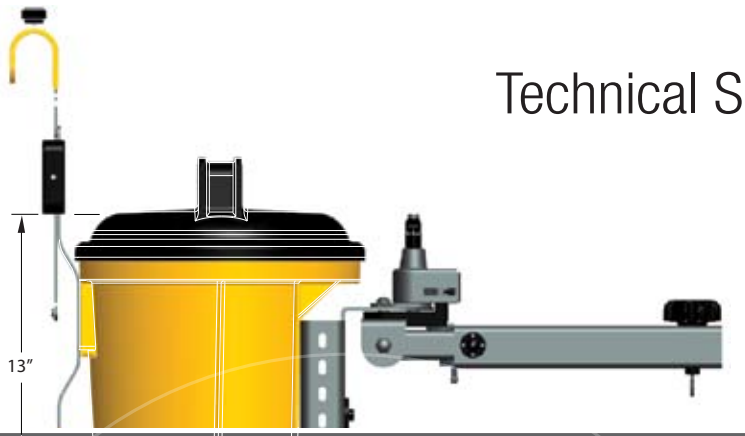
**4** By isolating the major cause of I&I to between manholes 70 and 75, it is now possible to pinpoint the exact location to within 2 manholes.

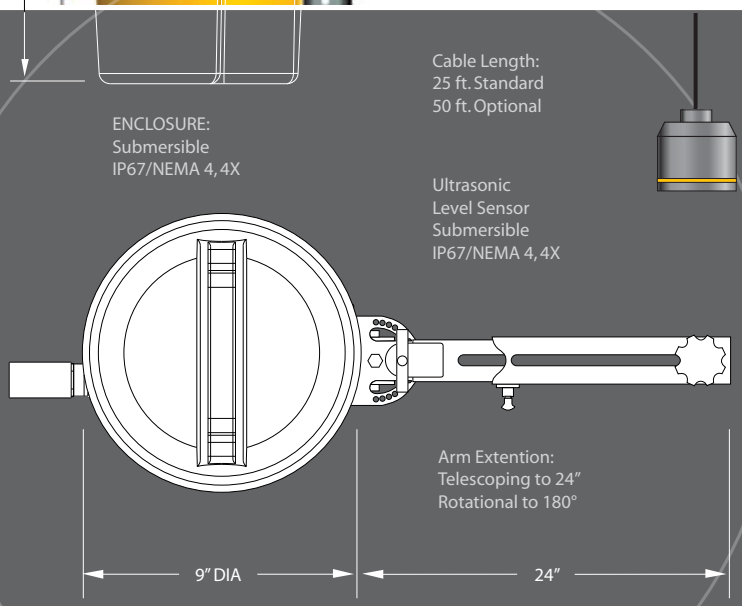



**5** According to the final analysis, the major area of inflow and infiltration within Sub-Basin 1 is located between manholes 71 and 72 ($30,488/Year).

**6** Robotic surveillance cameras should now be contracted in order to pinpoint the exact location and cause for these high volumes of ground and storm water entering the collection system between manholes 71 and 72.

# Technical Specifications




| ENCLOSURE | |
|---|---|
| Description: | Submersible IP67/NEMA 4, 4X |
| Material of Construction: | PolyProp/Stainless Steel |
| Weight: | 18lb. |
| Temperature: | -4 to 158F (-20 to 70C) |
| Data Transfer: | USB Flash Drive |

| BATTERY | |
|---|---|
| Description: | 6 Volt Alkaline Lantern Battery (Energizer EVR-521) |
| Capacity: | 52,000 mAh |
| Battery Life: | 5 Minute Logging Interval: 60 Days<br>10 Minute Logging Interval: 120 Days<br>15 Minute Logging Interval: 180 Days |
| Low Battery Alert: | Standard |

| SENSOR | |
|---|---|
| Description: | Ultrasonic Level (Temp. Comp.)<br>Submersible IP67/NEMA 4, 4X |
| Cable Length: | 25 ft. Standard; 50 ft. Optional |

| I&I ANALYSIS SOFTWARE |
|---|
| Standard |

**SUGGESTED SPECIFICATION:** A microprocessor-based I&I Detection Monitor shall be installed at the location on the plans in accordance with the manufacturers recommendation. A field-ready corrosion resistant housing meeting IP67/NEMA 4,4X standards shall be provided with 180* adjustable stainless steel sensor mounting arm. Unit must be designed for maintenance-free operation and non-confined space entry. Unit will be provided with a field replaceable 6-Volt Alkaline Lantern Battery and have the capability of logging and storing wastewater levels through the use of USB flash drive technology. Unit shall have low battery alert and be provided with DELTA Q I&I analysis software. Unit shall be iTracker Model 9000 as manufactured by Eastech Flow Controls, Upper Saddle River, NJ or equal.

ITracker - I&I Analysis Software

## ORDERING GUIDE

| iTracker | SENSOR CABLE | SOFTWARE |
|---|---|---|
| 9000 | 25 ft.<br>(Standard)<br><br>50 ft.<br>**X** | I&I Analysis<br>(Standard) |

The Future of I&I Detection

**CORPORATE SALES**
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