Without Asset Management...we might be on...

Dilbert

Asok, I need you to go to Elbonia. It's too cold for airplanes to operate there, so you'll need to use the underground route.

Fly into Switzerland and follow the sewer systems from there. Stick to the side of the sewer where it's dryer.

It's a sewerside mission!

You'll need a warm jacket and a rat hammer.
Identifying the Data Pieces You Need to Build Your Business Case

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Have you ever had to ask management for money to support a project?

1. How did it go?
2. Did you use all the data available to you to build your case?
Were you able to:
• Communicate your need clearly?
• Present data that supported your request?
• Get the knowledge out of your head in a way your decision makers could understand?
Knowing what your stakeholders want and communicating with them frequently builds support and transparency!
Key part for a successful business case!
- User rates
- Taxes
- Grants
- Loans
You can’t properly manage or protect your water infrastructure assets if you don’t know:

- What the assets are
- Where the assets are, or
- What condition the assets are in!
Keene – October 2005
The Remains of Tropical Storm Tammy

Total for the month: 17 inches
WWTP flooded on Oct 9 and again on Oct 16
The Keene WWTP flooded twice in October 2005:

#1: Oct 9 flood due to excessive I/I
   11 inches of rain in 2-3 days will do that!
   And oh...the grit...
Cleaning the Clarifier

- 6 hours of grit removal to free the rake arm and get the clarifier back on line.
- Continued primary sludge pumping issues for another week.
- Nat’l Guard and Mutual Aid assistance needed.
The Keene WWTP flooded **twice** in October 2005:

#2: Oct 16 flood due to the river backing up into the effluent channel!
From October 2005 to present, we've spent $30,790 more than our average pump station costs.
Total $ cost:

- Electric: $30,900
- Personnel: $9,800
- Equipment Repair: $30,000
- Grit Removal: ~ $65,000

- Total: $135,700
Total non-$ costs:

- Stress
  - Personnel
  - Equipment
- Permit Violations
- What else?
In July 2021, Keene received 17 inches of rain in a month!

But this time no flooding and no grit issues in the CS or at the WWTP!

How is that possible?
What changed?
How is that possible?

Asset Management!

They used the data from the Oct 2005 flooding events to justify and support changes in O&M as well as design changes!
How is that possible?

**Asset Management!**

What changed?

Increased targeted sewer maintenance to address grit – also helped with SSOs
How is that possible?

Asset Management!

What else changed?

During an upgrade, they changed the hydraulic profile at the WWTP!
How is that possible?

**Asset Management!**

Upgrades are a given

Use data to justify a better upgrade to:

- Improve EE
- Increase resilience/reduce vulnerabilities
- Right-sized equipment/automated controls = better operational control = better water quality = better customer service
- Every $1.00 invested pro-actively saves $7.00 in recovery costs!
How Can You Use Your Data and Knowledge to Adapt to Make Your Facility More Resilient to Changing Conditions?

• Understand and ID Vulnerabilities!
  • Solutions are not always complicated or costly
  • Evaluate the adaptation options
  • Incorporate adaptation measures into planned upgrades

• Sometimes big changes do need to be made
  • Moving the entire facility to higher ground

• Adapting before an event can save $ and avoid potential loss of service

• Every $1.00 invested pro-actively saves $7.00 in recovery costs!
Why Include Energy Use Data in an AMP?
2017* Energy Usage For Municipal Facilities
Hanover, NH

- Hanover High School: 21%
- Drinking Water System: 12%
- Water Reclamation Facility: 26%
- Waste Water Pumping Stations: 5%
- Summer Park: 8%
- Traffic Signals: 1%
- Parking Facility: 4%
- Parking Lots: 0%
- Etna Library: 8%
- Howe Library: 8%
- Police Department: 3%
- Water Pumps: 3%
- Main Fire Station: 3%
- Etna Fire Station: 0%
- Street Lights: 6%
- Town Hall: 1%

Note: * kWh data for WW pumping stations and Hanover HS based on 2016 data and Etna Library and Fire Station based on average data from 2005-2015.

Energy Use Data

Peterborough Municipal Energy Use

- Street/Traffic Lighting: 17%
- WWTP: 23%
- WW Pumping: 4%
- DW Wells: 3%
- DW Pumping and Storage: 3%
- Library: 7%
- Town Hall: 1%
- Fire Station: 1%
- Police Station: 1%
- Community Center: 3%
- Recreation Department: 4%
- Park: 5%
- Recycling Center: 7%
- Schools* (est): 1%

WW+DW: 60%

WW+DW: 43%
Why Include Energy Use Data in an AMP?

• EE will save you money!
• EE will reduce GHG emissions!
• Tracking energy use will provide key data for LCCA equipment replacement decisions.
• Tracking energy use will provide information on equipment O&M issues.
Merrimack Compost Facility Energy Use Over Time
Jan 2012-Dec 2020

Monthly Electric Energy Use, kWh

120,000
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0


Rebuilt biofilter in Fall 2016
Propane and Electric Usage for Sharon's House
What Does Implementation Do For Me?

Note: Woodstove is primary heat source and wood use of approximately 3 cords/year has been consistent over this period reduced to 2-2.5 cords in 2020/2021.
Propane and Electric Expenses for Sharon's House
Pre and Post Energy Audit Performed and Implemented

Note: Woodstove is primary heat source and wood use of approximately 3 cords/year has been consistent over this period. In 2020/2021, wood use decreased to about 2-2.5 cords.
Energy Use Data

Criticality Data

Asset Inventory Data

Climate Change Vulnerability Data

Funding Strategy

Communication

Level of Service
Expect the Unexpected and Make a Plan!

Our plans

Reality
Ready to put the puzzle together?
Business Case Development

- **Step 1:** Identify Problem
- **Step 2:** Identify Solution/Project
- **Step 3:** Gap Analysis/Criticality Assessment
- **Step 4:** Develop Business Case
Identify the Problem

- July 2021
- Starting to recover from over a year of drought conditions,
- It started to rain, and rain, and rain, and rain, and...
- Saturated soils etc.
- No “named” storms – just rain
- Influent flow started to increase dramatically
Problem ID continued

• Extremely High flows at Plant  
  • Too high for plant to operate correctly
• Higher Operating Costs (energy)
• Increased equipment maintenance
• Violated Permit
• Overtime
• Stress/Fatigue
• Additional Expenses (equipment failures)
Problem ID continued

Due to infiltration and inflow the WWTF’s influent flow increased. Operator suspects the bulk of the I&I came from a neighborhood in a low, wet area.
Business Case Development

Step 1: Identify Problem
Energy Demand (kW) for
Pheasant Road (Influent) Pump Station
Why I/I Matters

• Expensive Treatment of Clear Water
  • EPA’s 2014 O&M rate for WW systems is $2 to $5 per thousand gallons

• Reduced Interceptor and WWTP Capacity
  • 35% of water entering a treatment plant is I/I (according to Chalmers University of Technology’s Division of Water Environment Technology)
  • Another 35% is stormwater, and
  • The remaining 30% is sewage

• Water Quality
  • Sanitary Sewer Overflows

• Less Recharge to Aquifers
Short Term Projects

• Vactor Truck Purchase
  • External Costs: $1000 for 1,000 LF of collection system

• Infiltration/Inflow Investigations
  • Smoke Testing
  • Pipe and Manhole Inspections
  • Routine Pipe Cleaning

• Private I/I Sources
  • Sump Pumps/Disconnection Programs
  • Building Inspections
  • Lateral Inspections
Longer Term Project

• Correct/Remove Infiltration/Inflow
Overview

• Demonstrate your problem
  • Photos
  • Energy Data
  • Known Problem Areas
  • Data

• Present Proposed Project
  • I/I Investigations
  • Vactor Truck Purchase

• Provide Gap Analysis Results
  • Inspections
  • I/I Sources

• Provide Cost Estimates
  • Include Savings

• Provide Summary of Benefits