

OptimizerPSTM

VIRTUAL PUMP STATION



INTRODUCTION TO COLLECTION SYSTEMS INNOVATION
AND THE FUTURE OF PUMP STATION ASSESSMENT

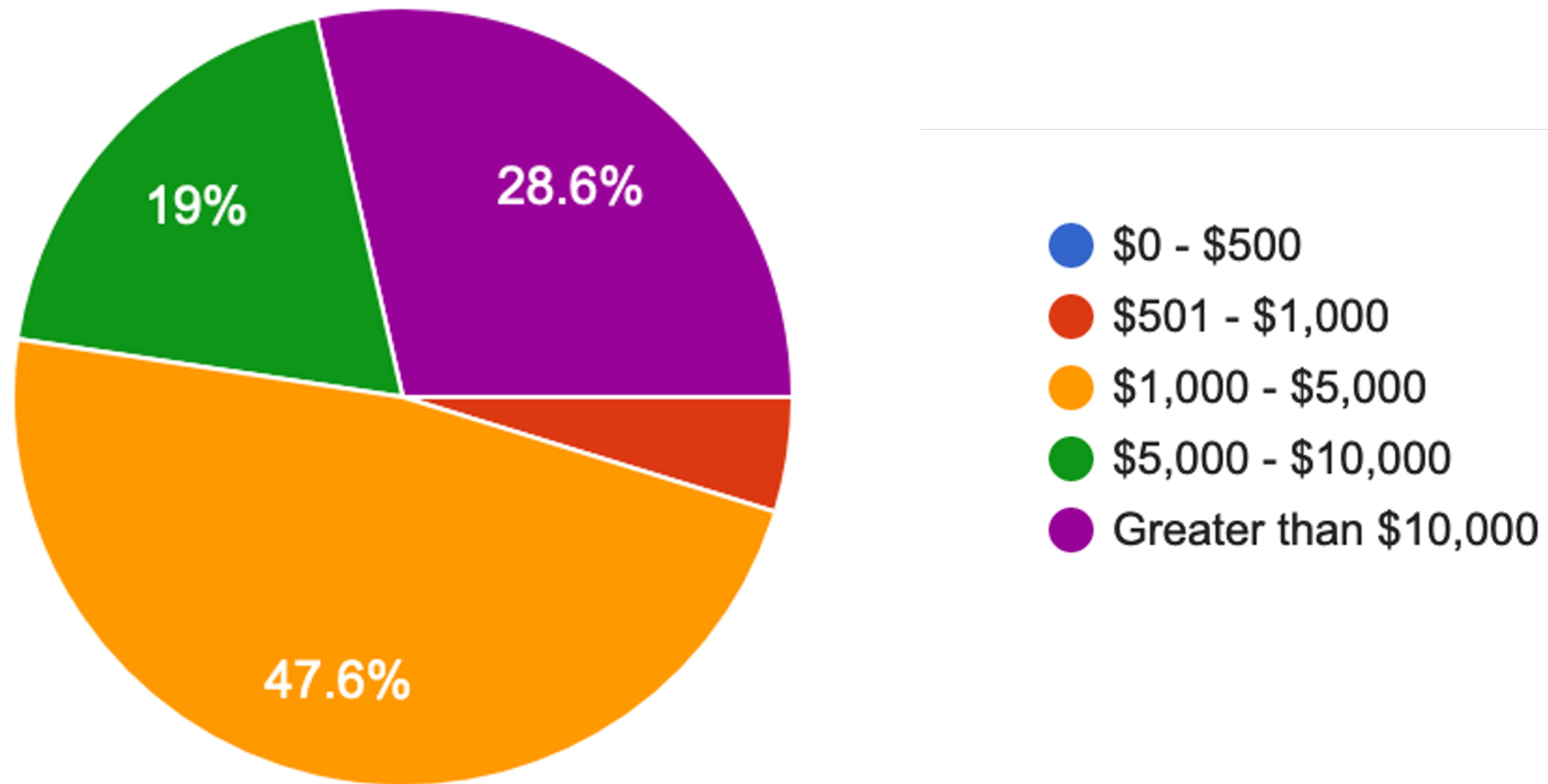
QUESTION:

How much do you spend annually
on pump station maintenance?

A grayscale background image showing a person's hands and arms working on a large blueprint or set of plans. The person is wearing a dark shirt and light-colored pants. A white hard hat is visible on the left side of the frame. The hands are positioned over the blueprint, with one hand holding a pen or pencil. The overall scene suggests a professional engineering or construction environment.

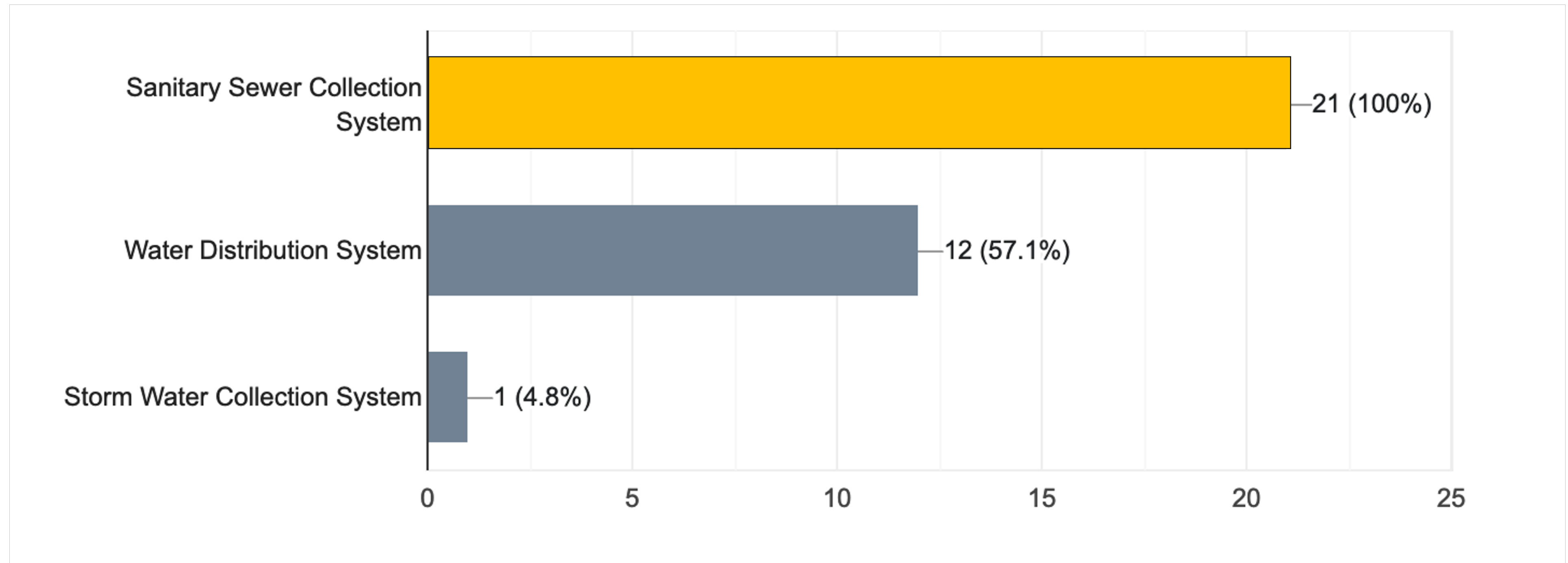
28.6 PERCENT
More than \$10,000.

SOURCE: Jones & Henry Survey of Ohio Sanitary Engineers, 2021.



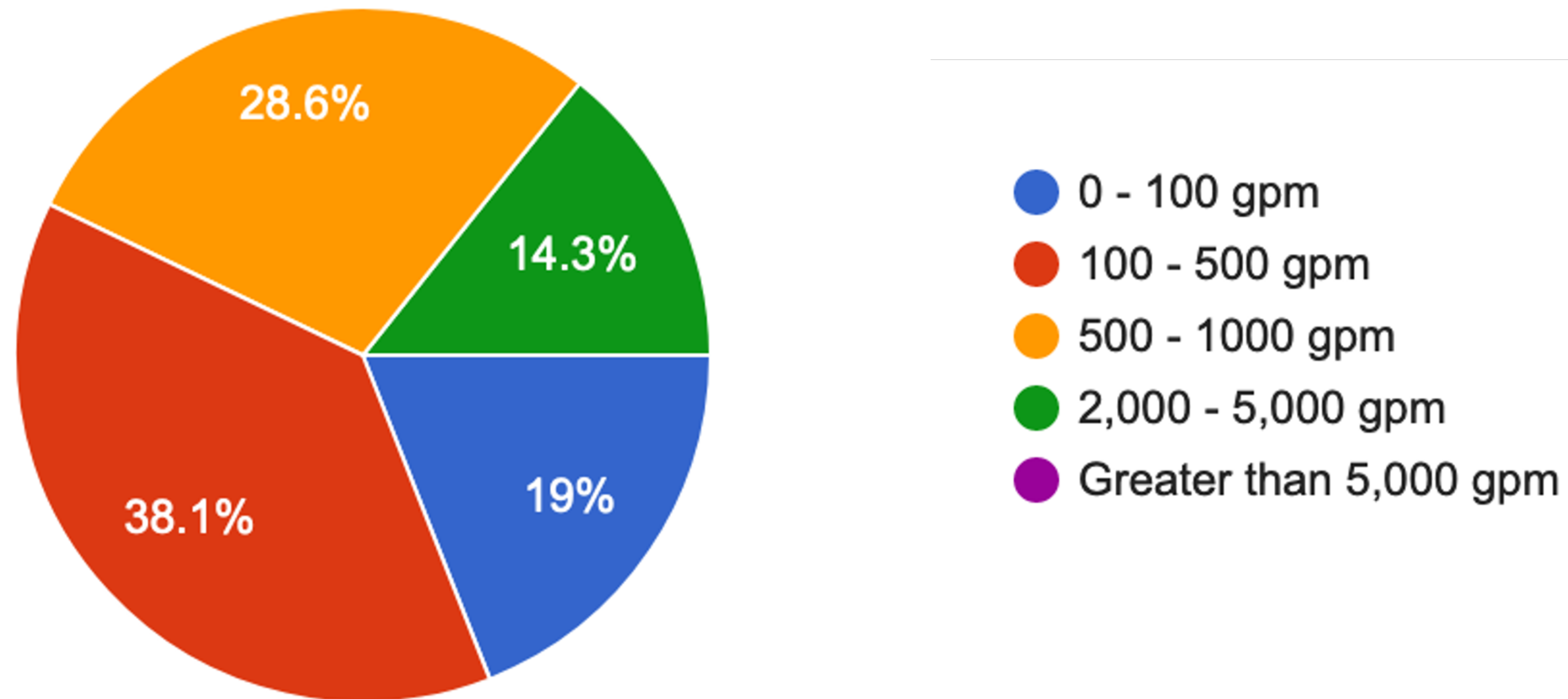
SOURCE: Jones & Henry Survey of Ohio Sanitary Engineers, 2021.

Type of Pumping



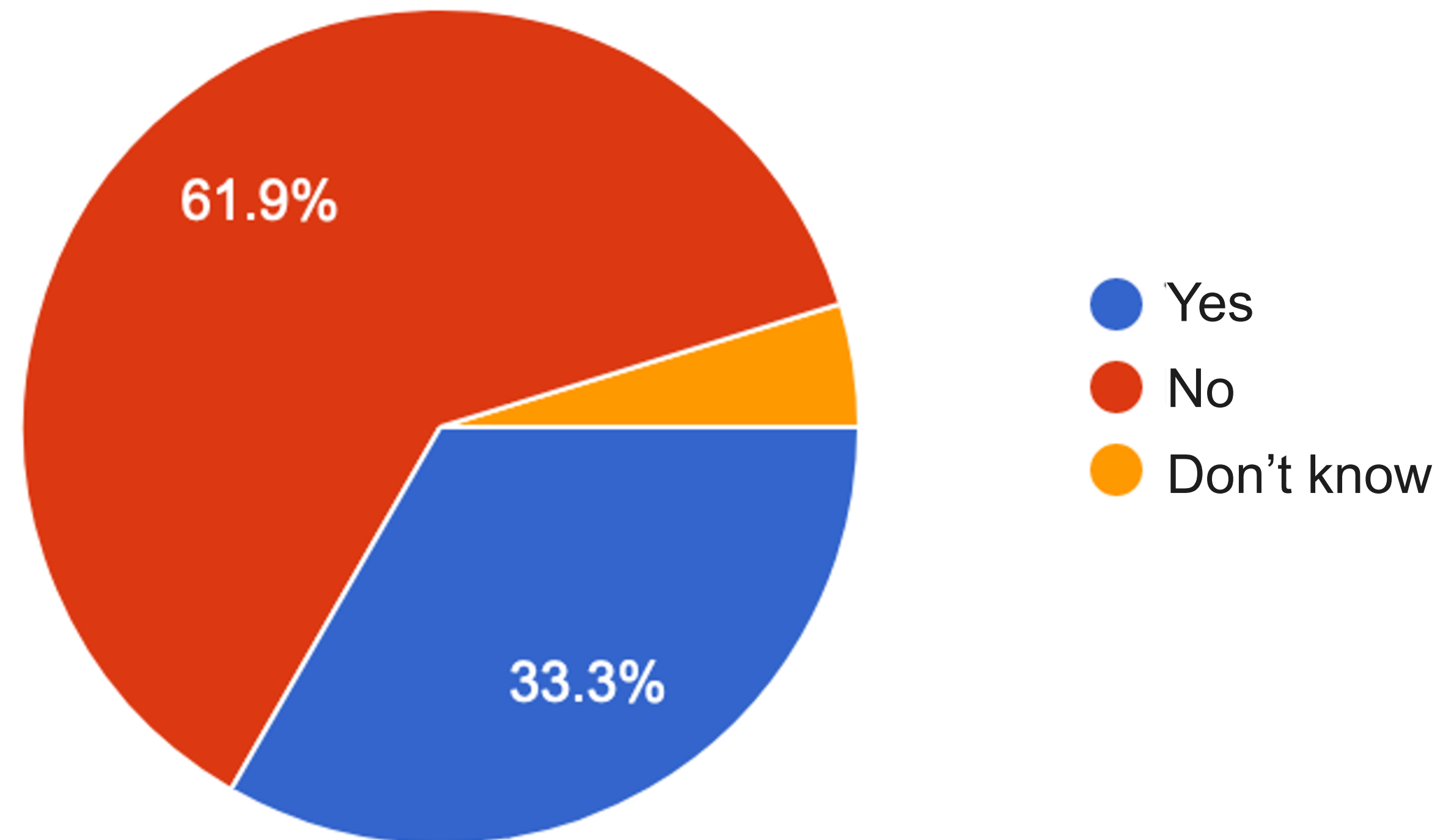
SOURCE: Jones & Henry Survey of Ohio Sanitary Engineers, 2021.

Pump Station Capacity



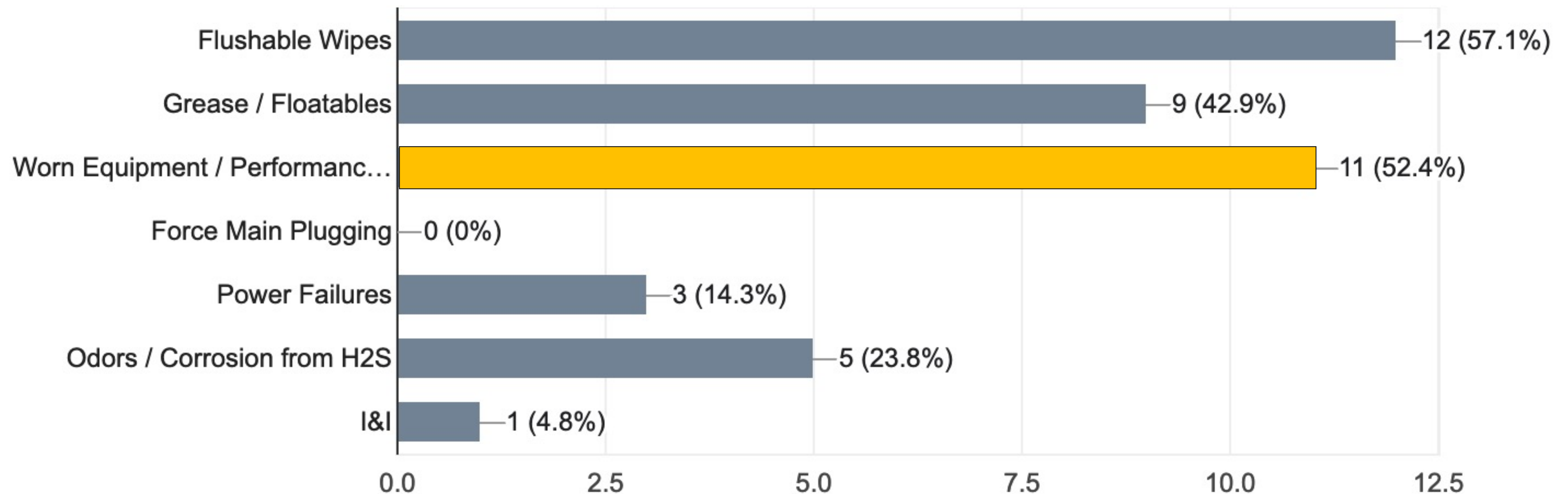
SOURCE: Jones & Henry Survey of Ohio Sanitary Engineers, 2021.

Do you jet clean force mains?



SOURCE: Jones & Henry Survey of Ohio Sanitary Engineers, 2021.

Most Common Maintenance Problems



SOURCE: Jones & Henry Survey of Ohio Sanitary Engineers, 2021.



IMAGINE

A low-cost way to
predict and investigate
these problems.

What if you could...

- Plan the replacement of equipment proactively?
- Check force mains for performance?
- Avoid costly emergencies?
- Optimize pump operation?

145
92



WILLIAM, heart attack survivor.

THIS IS WHAT
HIGH BLOOD PRESSURE
LOOKS LIKE.

Go to
LowerYourHBP.org
before it's too late.



TECHNOLOGY

Like it or not, digital and automation innovations are leveling the barriers to entry for all industries.



As a critical component of a wastewater collection system, the pump station is potentially **a single point of failure.**

Hey, it's
pumping
water, so it
must be fine.



The running-your-
infrastructure-into-the-
ground approach is no
longer sustainable.



A PUMP

MOVES WASTEWATER FROM

a lower to a higher elevation

– by adding –

ENERGY

2 PERCENT

US electric consumption used to
move and treat water and wastewater.

SOURCE: Hydraulic Institute

Opportunities Await

- ✓ Save energy
- ✓ Boost reliability and up-time
- ✓ Reduce wear
- ✓ Lower maintenance costs
- ✓ Minimize environmental impacts
- ✓ Improve MTBF and MTTR metrics





“When you’re on the forefront, you can see what the next innovation needs to be. When you’re behind, you have to spend your energy catching up.”

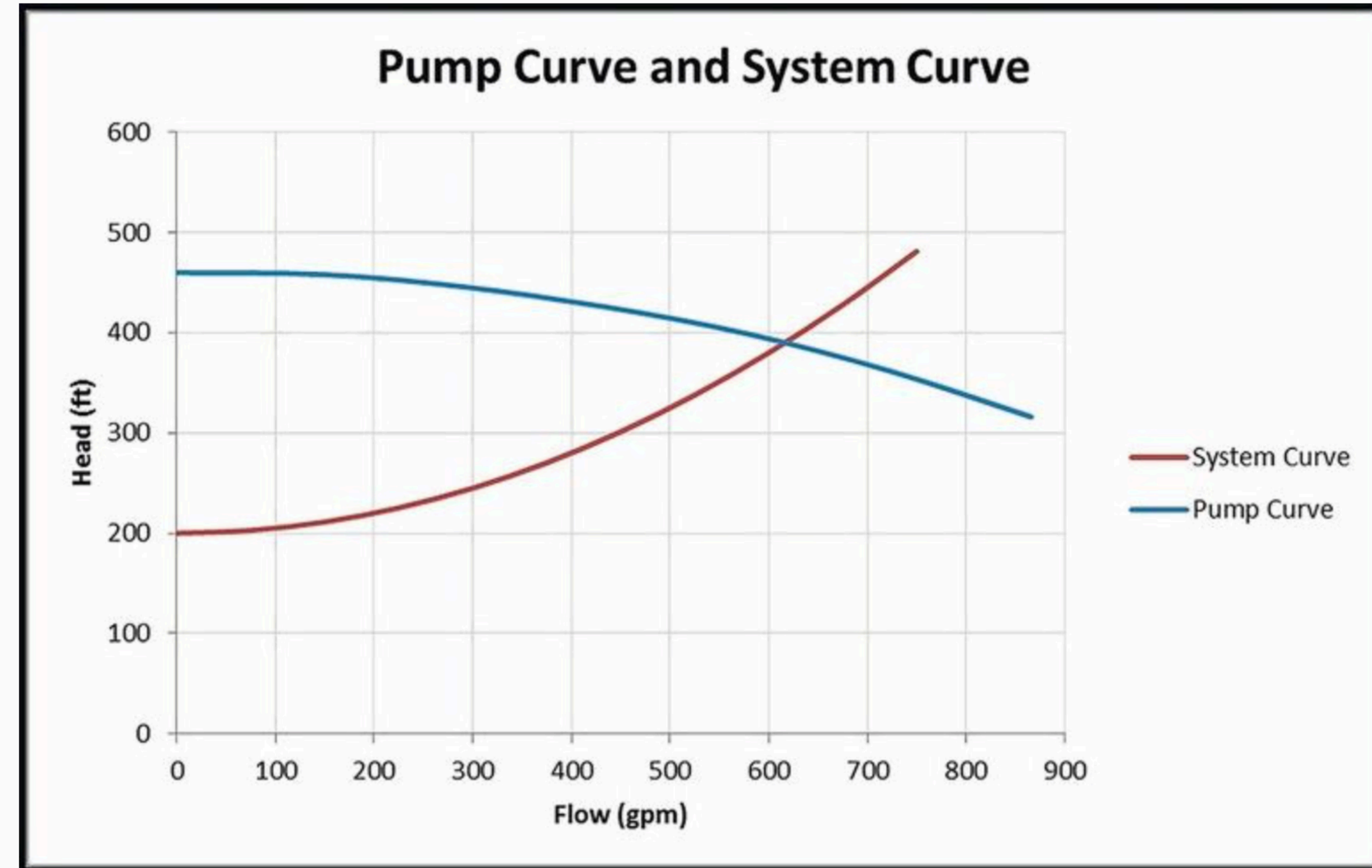
—Robert Noyce, Intel Co-founder



PUMP STATION ASSESSMENT



A good assessment will consider the entire station, including its components and their performance.



PUMP STATION ASSESSMENT

**Pump
Performance**

**Valve
Operation**

**Force Main
Characteristics**

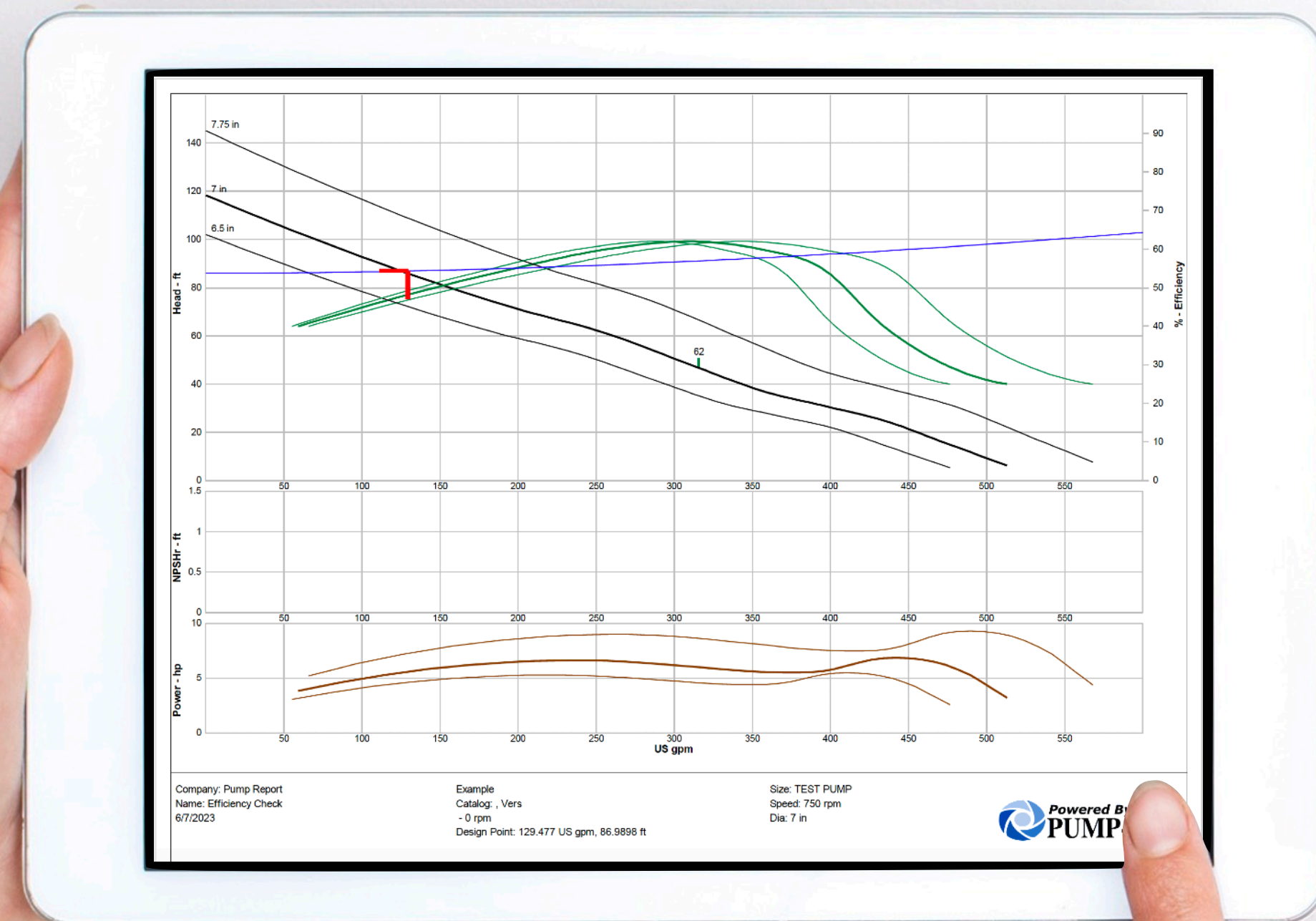
**Level
Systems**

**Flow
Meters**

Wet Well

Dry Well

**Operational
Concerns**



A pump system assessment aims to identify **energy** or **capital savings** with prioritized operational, equipment, or project-level improvements.



INTRODUCING

OptimizerPSTM

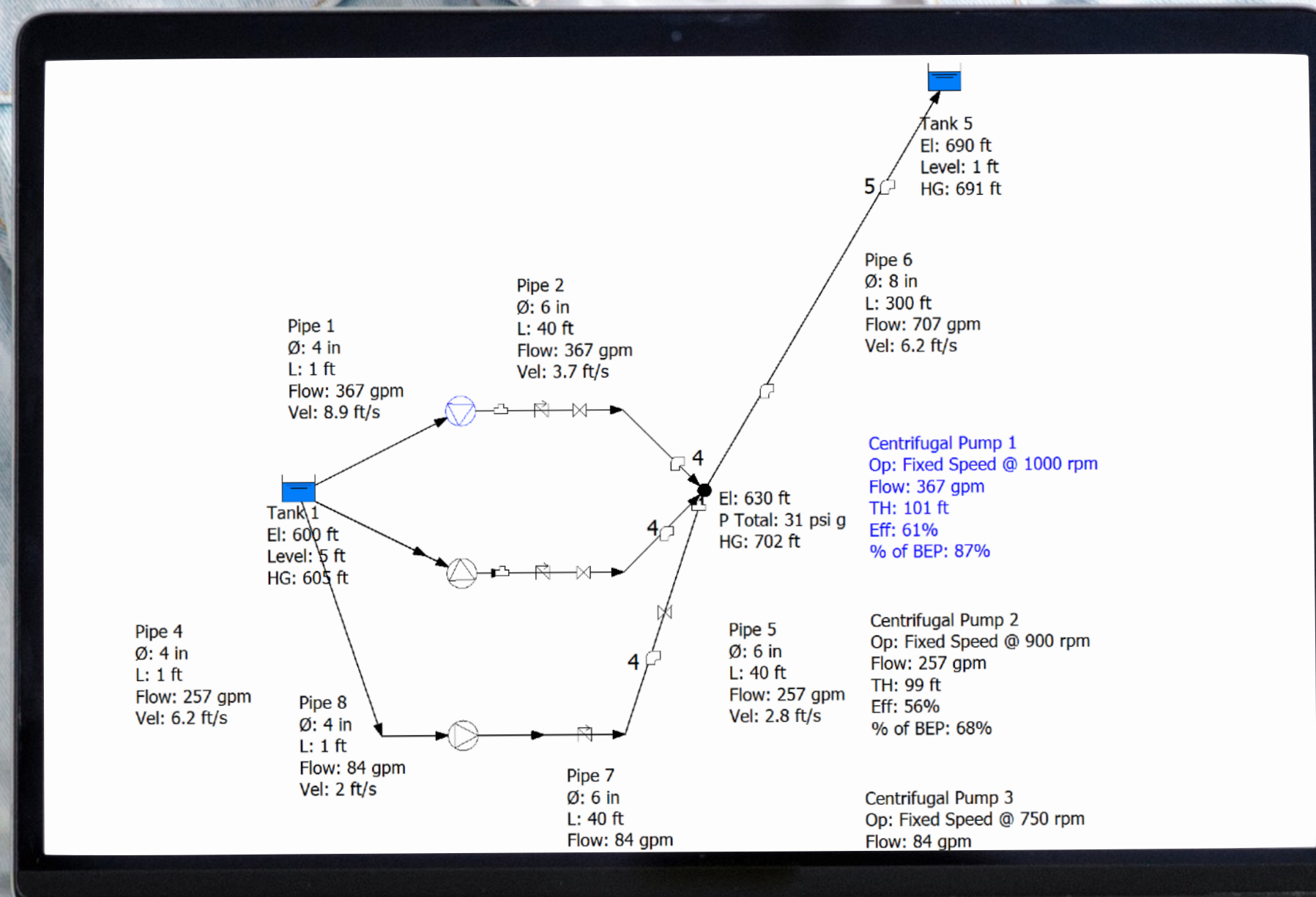
VIRTUAL PUMP STATION

A Virtual Pump Station is a **data-driven** model representing the pumping system—tuned to operate like the actual pump station.

RATHER THAN SIMPLY DOCUMENTING PERFORMANCE
AND CATALOGING THE OBSERVATIONS, OPTIMIZER**PS**
TAKES PUMP STATION ASSESSMENT TOOLS TO THE

NEXTLEVEL

Using robust modeling software, **OptimizerPS** possesses more horsepower and functionality than most spreadsheet-style digital twins.



A close-up photograph of a person's hand holding a vintage-style camera. The camera is black with a large lens and a leather strap. The person is wearing a brown leather bag and dark jeans. The background is blurred, showing a street scene. An orange rectangular box is overlaid on the right side of the image, containing the text "a current snapshot" in white.

a current
snapshot



**CHECK AGAINST
ORIGINAL DESIGN**

“Procurement and selection of the most suitable pumping equipment...is made even more difficult by high pressure [sales tactics] from an overdeveloped industry.”

— **Roger Walker**

Pump Selection: A Consulting Engineer's Manual

Virtually

**TRY BEFORE
YOU BUY**

MOST IMPORTANTLY

Recapture
operating funds
lost to poor
efficiency.



MOST PUMP SYSTEMS OPERATE AT

40%

EFFICIENCY

SOURCE: Hydraulic Institute



Operating left of the curve will cause:

- High temperature rise
- Low flow cavitation
- Low bearing and seal life
- Reduced impeller life
- Suction recirculation
- Discharge recirculation

**Best
Efficiency
Point**

Operating right of the curve will cause:

- High flow cavitation
- Low bearing and seal life

UP TO
60%
LESS ENERGY



Energy Efficiency

Energy savings of 20-60 percent are routinely possible in the centrifugal pump systems found in most water and wastewater applications.

The background of the slide is a composite image. The top half shows a row of red-handled valves or pumps in a blurred industrial setting. The bottom half shows a close-up of a metal pipe with a blue valve handle and a threaded fitting. A semi-transparent blue horizontal band runs across the middle of the image, containing the title text.

SAMPLE CASE STUDY

OptimizerPS™
VIRTUAL PUMP STATION

Objectives

- Pump Station Assessment
- Snapshot of Current Conditions
- Proactive Evaluation

A detailed topographic map of a city area, showing a grid of streets, contour lines with elevation markers (e.g., 120, 125, 130, 135, 140, 145, 150, 155), and various landmarks. The map is rendered in a light gray tone, serving as a background for the left half of the slide.

Facility Scope

- Municipal Agency
- 20,000 customers
- Key Pump Stations
 - 2 Submersible
 - 1 Flooded Suction
 - 2 Self-Priming



Pump Station #1: Submersible

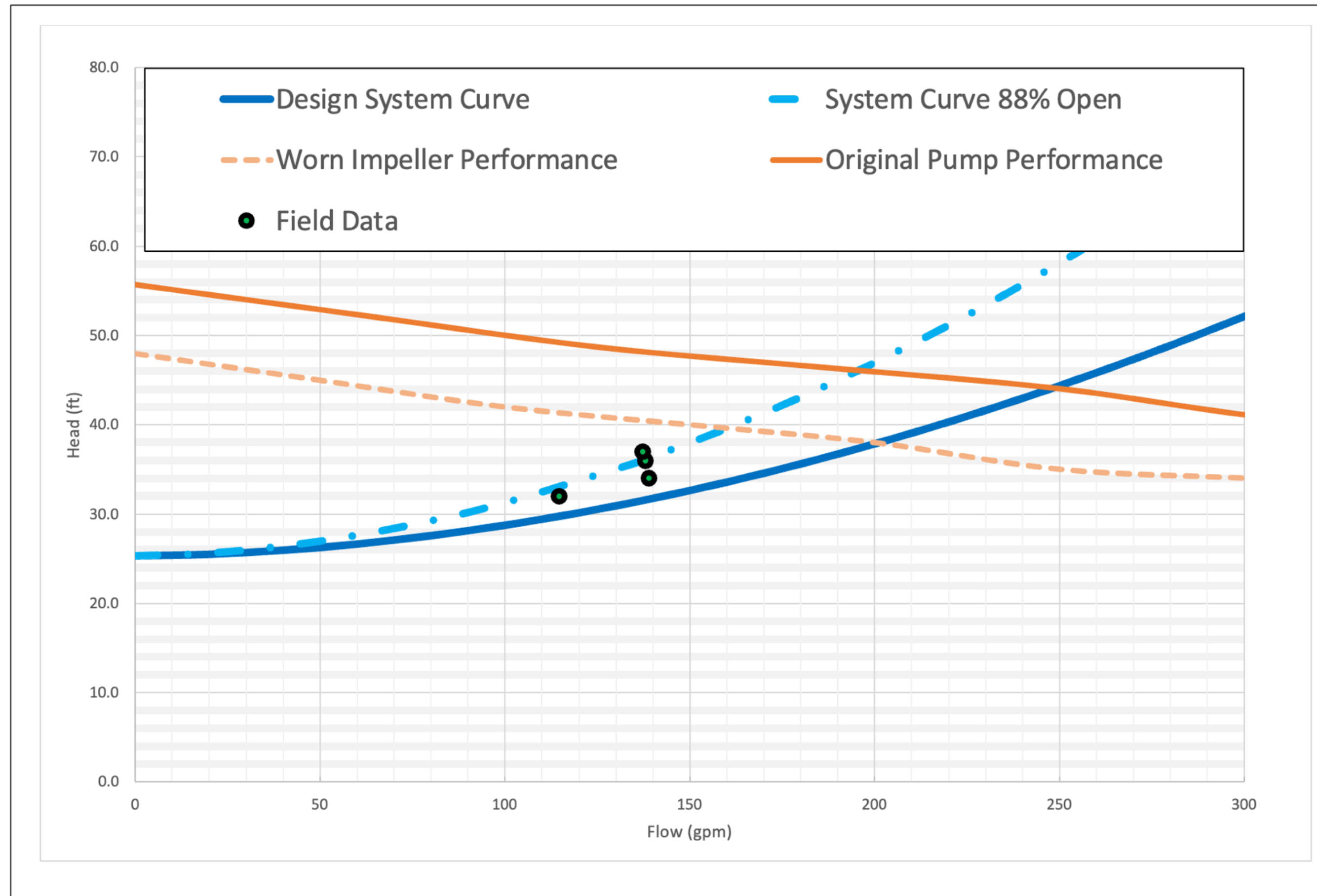
(Constructed in 2006)

✓ No Issues Discovered



Pump Station #2: Self-Priming

A Known Long-Running-Time Issue



Pump Station #2

- Force Main Clogged 12 percent
- Impeller Wear



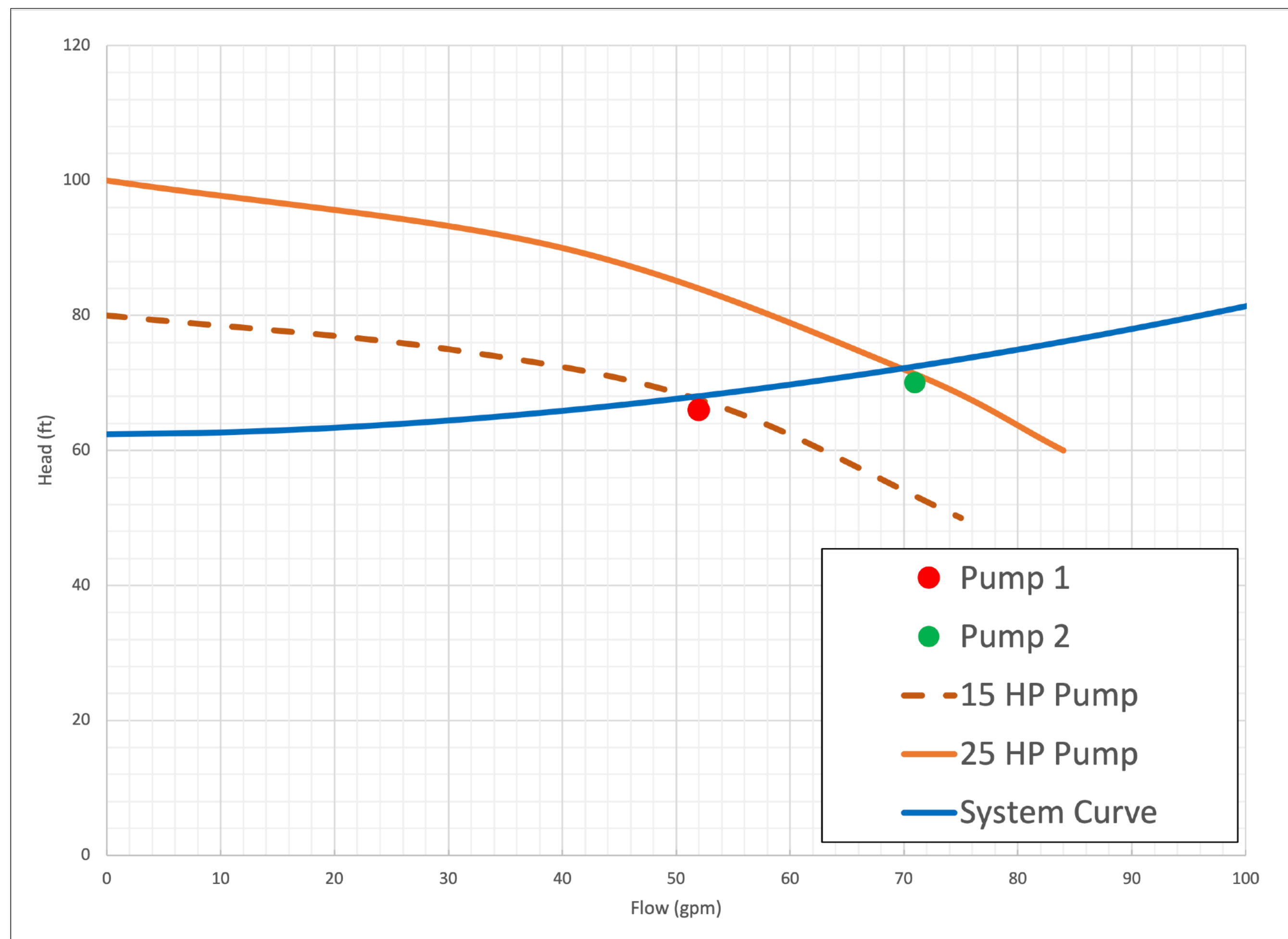
Pump Station #3: Self-Priming

✓ No Issues Discovered



Pump Station #4: Submersible

✓ No Known Issues



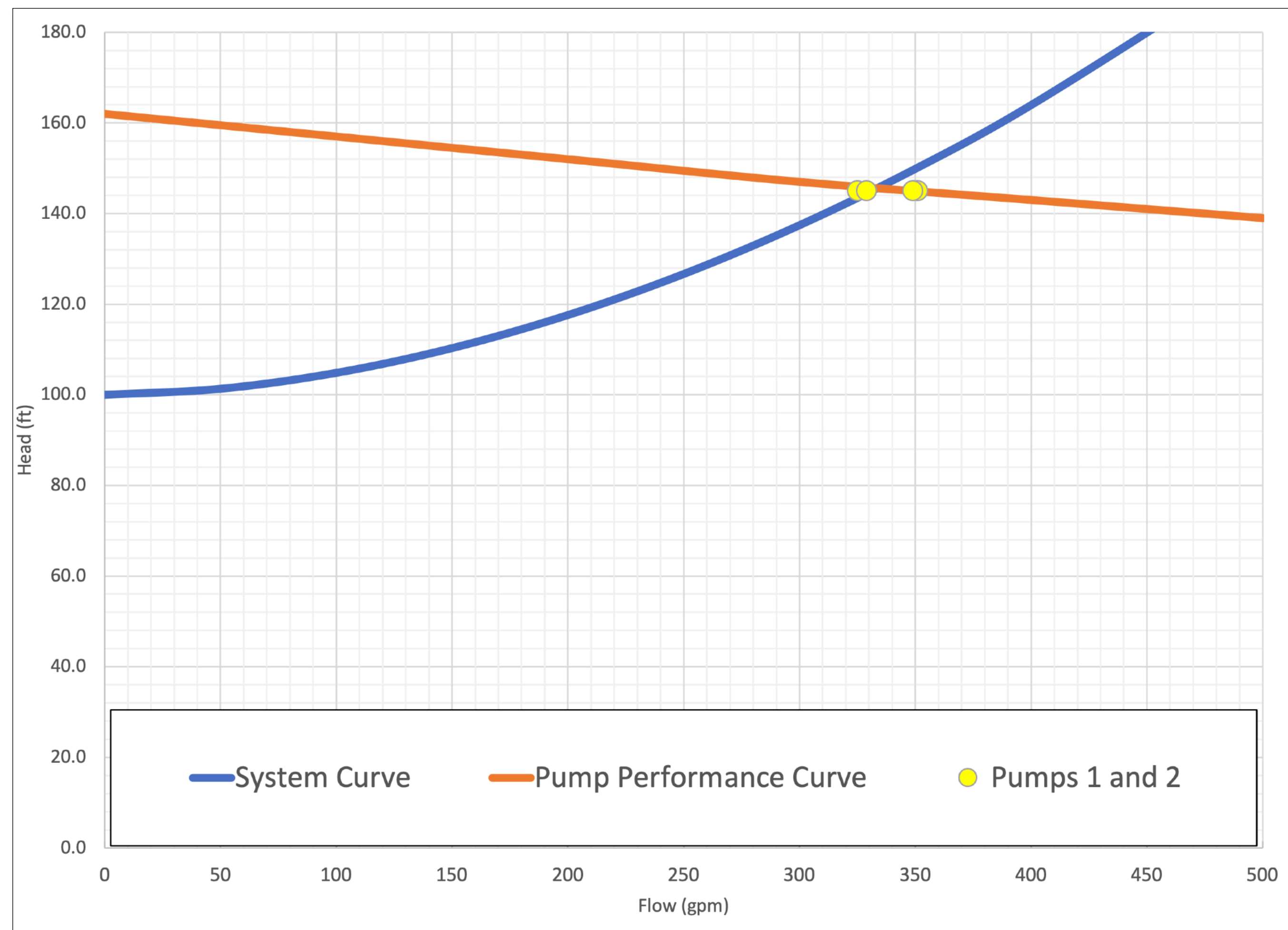
Pump Station #4

► Different Pump Units



Pump Station #5: Flooded Suction

✓ Wet Weather SSOs



Pump Station #5

- ▶ Pump Capacity Confirmed
- ▶ SSES Recommended

A pair of black-rimmed glasses and a black pen are resting on a financial chart. The chart features a grid with a line graph and bar charts. The x-axis is labeled with months: Apr., May., Jun., Jul., Aug., and Oct. The entire image is overlaid with a semi-transparent blue filter. The text "Better capital improvement planning begins with data." is written in white, sans-serif font on the left side of the image.

Better capital
improvement planning
begins with data.



Perspective Shift:

Many agencies assume that all pumps for a given price are equal or comparable along a sliding scale where cost and performance are linear.

WHAT IF

OptimizerPS allows us to try out various real-time solutions—including those that are highly complex without software.

With the OptimizerPS virtual pump station, you can compare various options and pick a unit with the best performance and lifecycle cost.



welcome to the Internet of Things (IoT)

Optimizer**PS**[™]
VIRTUAL PUMP STATION

Predictive Maintenance and Industry Comparisons

With more data about how pumps are performing, look for SCADA and monitoring to improve.





Learn more about OptimizerPS™ and

DOWNLOAD THESE SLIDES



OptimizerPS.com

OptimizerPSTM

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