Eliminating the Wet Well with Direct In-Line Pumping

INDUSTRIAL FLOW SOLUTIONS™

IMAGINE IF YOU COULD ELIMINATE…

FOG and Wipe Issues

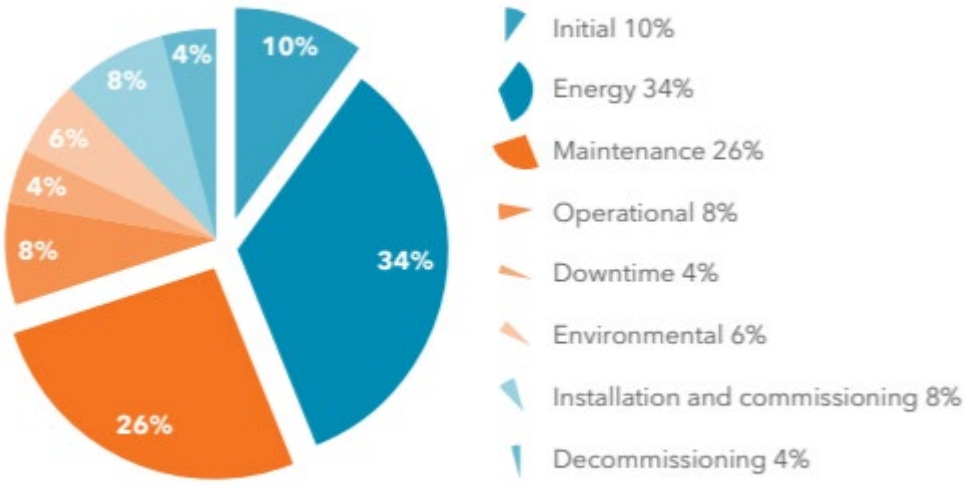
Environmental & Safety Risks

Exposure To Odors & Dangerous Gases

Wet Well Maintenance

IMAGINE A CLEAN, DRY ROOM SAFE FOR PERSONNEL

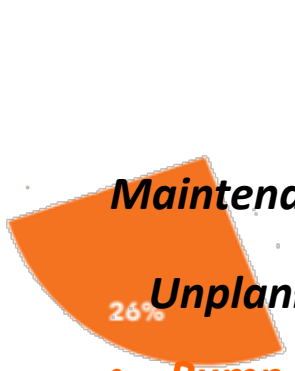
Life cycle cost of a wastewater pumping system…



Life cycle cost distribution of a typical wastewater pumping system.

XYLEM- WHITE PAPER Life Cycle Costs for wastewater pumping systems June 2015

Life cycle cost of a wastewater pumping system…



Maintenance Costs:

Unplanned Downtime:

- *Pump Clogs from Ragging, Wipes, debris*

Planned Downtime:

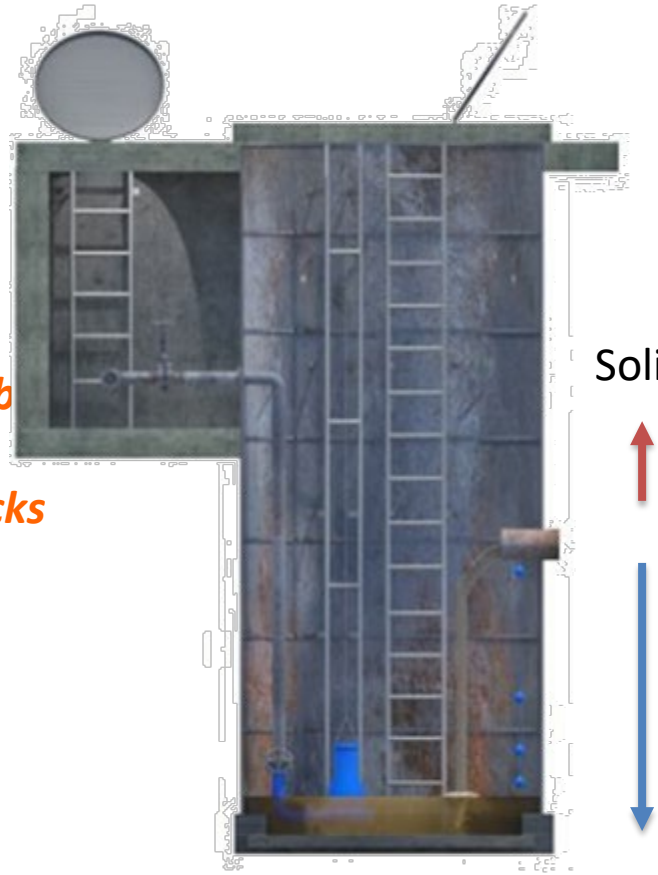
- *Well Cleaning: FOG build up/ Vac Trucks*
- *Odor management*

It's Not the Pump…

Maintenance Costs:

- ***Wipes, Deb***
- ***p/ Vac Trucks***
-

#nowetwell



It's your system.

Eliminate the Wet Well with

The Smart, Direct In-Line Pumping System

- Lifts influent directly from the point of entry
- Simplified maintenance, **eliminates the "root cause" of wet well issue**.
- Constant flow matching and smart machine operation to eliminate blockages/backups

Direct In-Line Pumping Provides…

Lower Maintenance

- No downtime from clogged pumps
- No regular cleaning
- 304L Stainless steel standard construction
- Optional remote monitoring

Direct In-Line Pumping Provides…

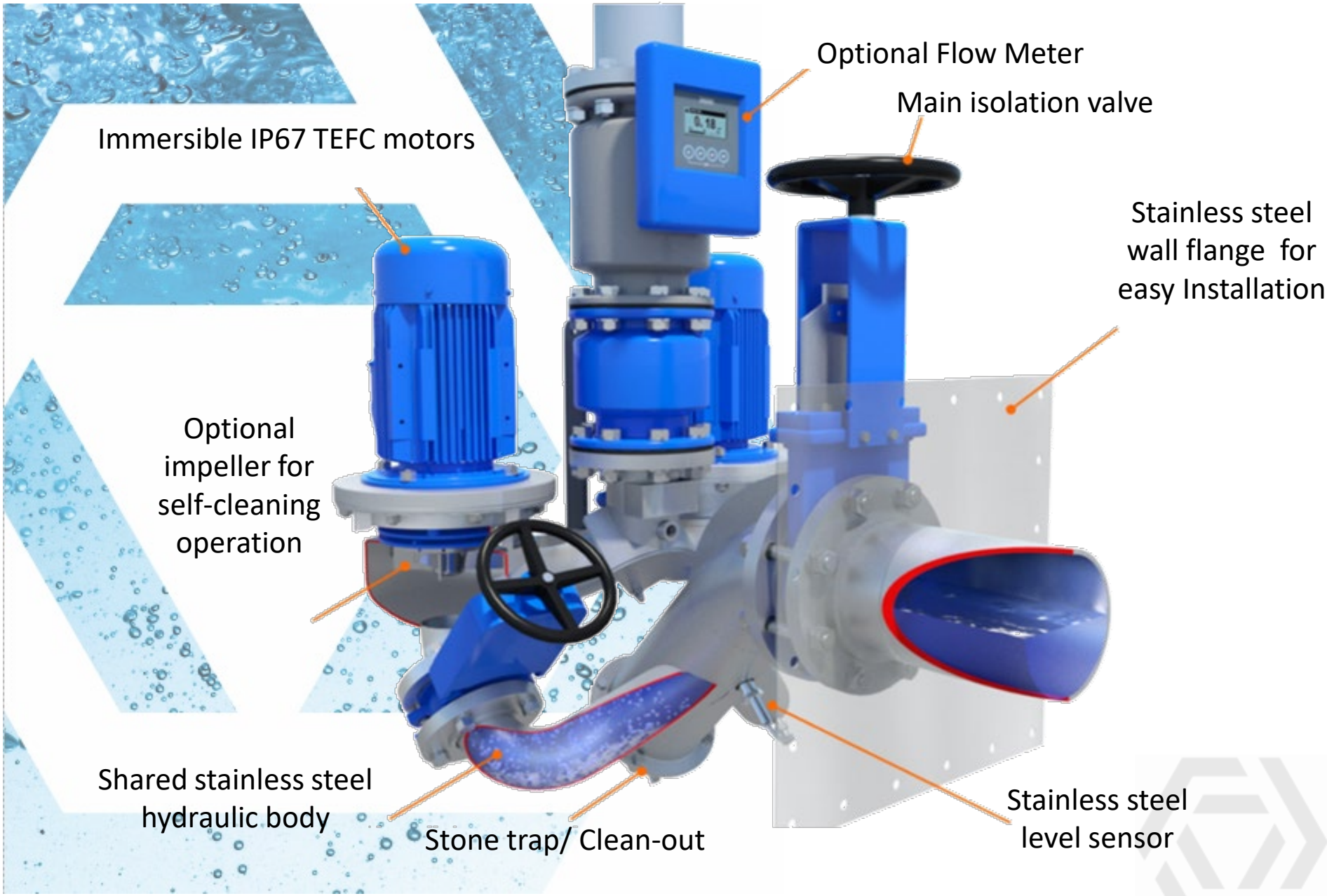
Safer working conditions:

- No build up of odors
- No exposure to Hydrogen Sulfide
- No effluent stored within confined space
- No possible danger of explosion when gases combine with source of ignition

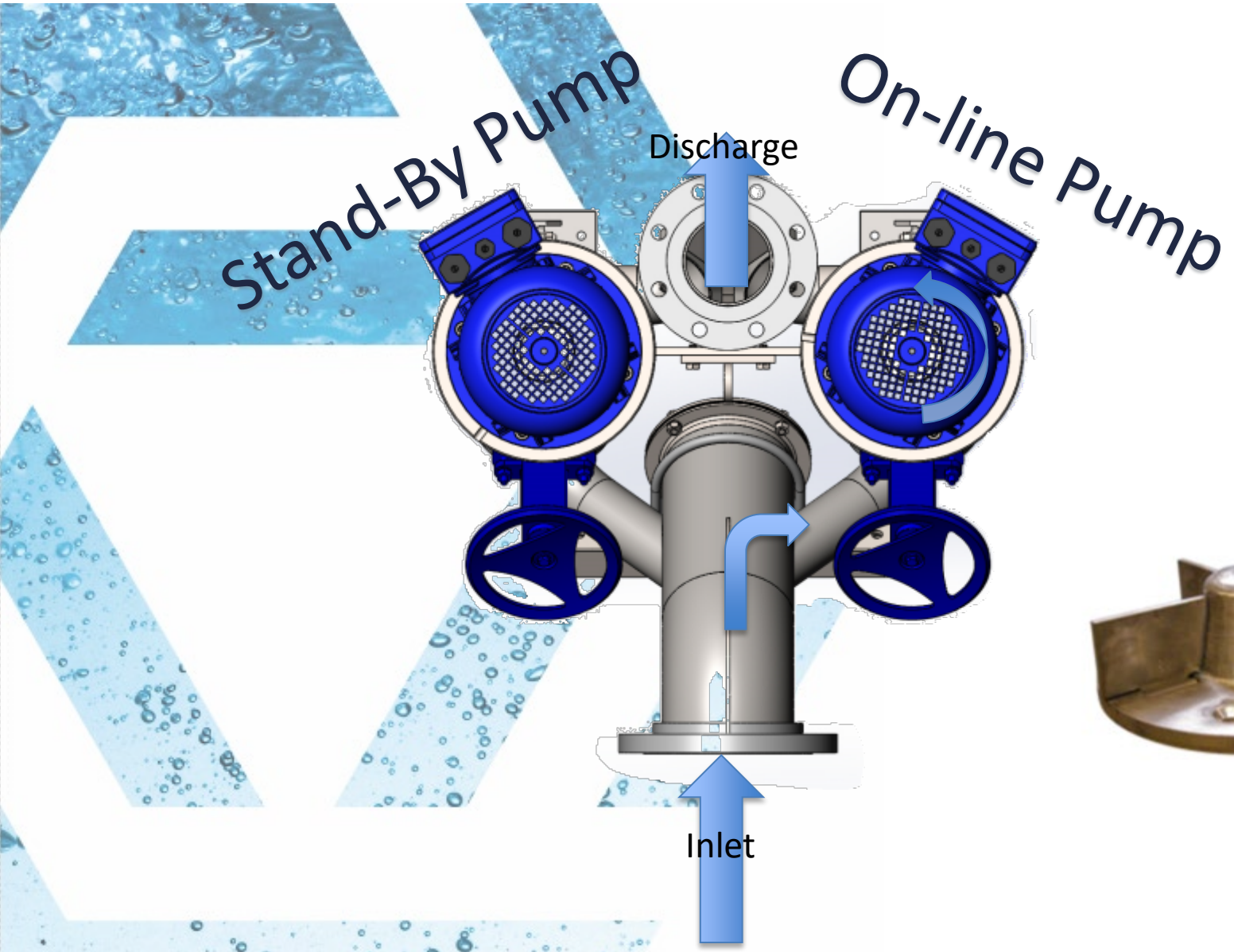
Direct In-Line Pumping Provides…

Environmental Improvements

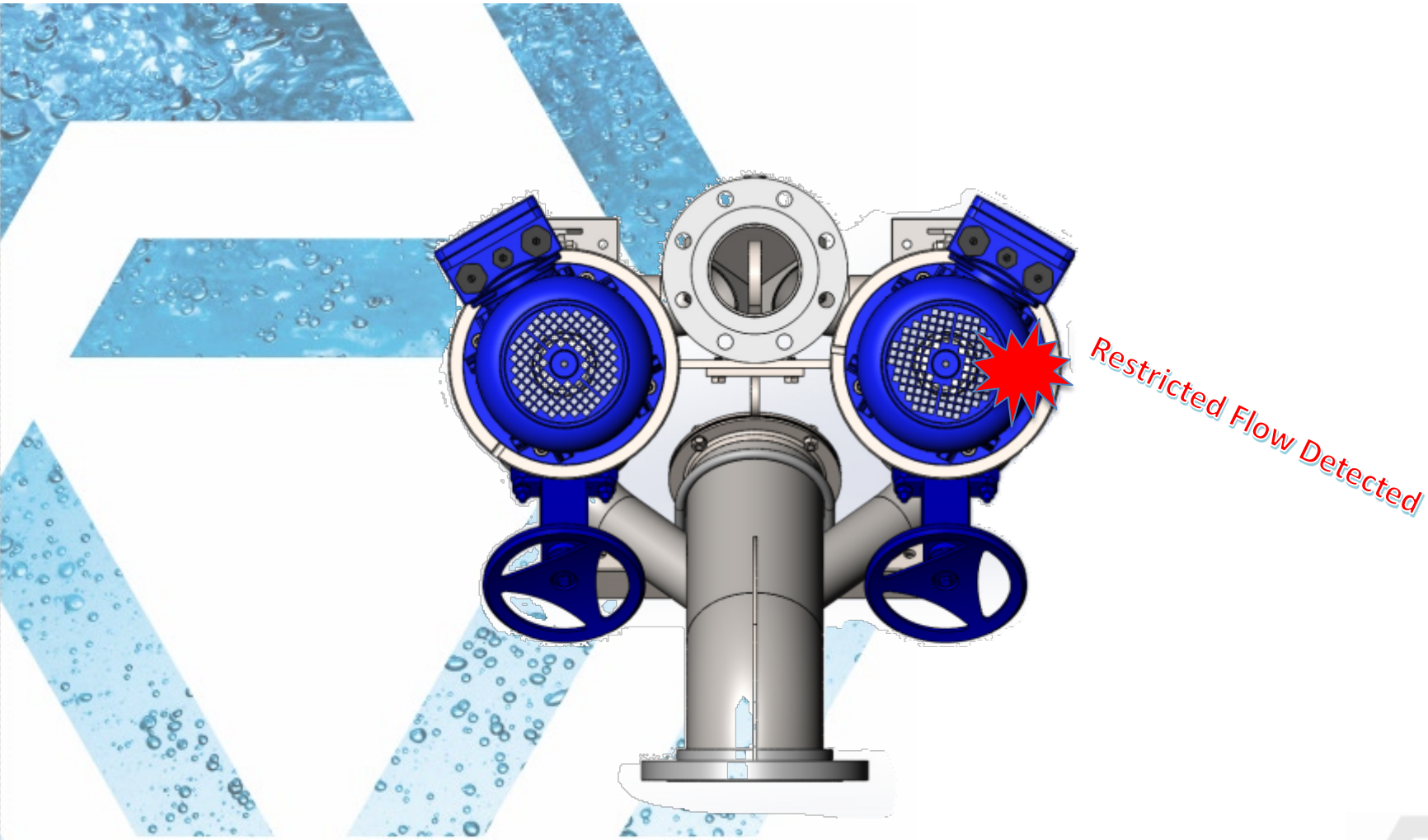
- No Corrosion
- No Odor Pollution
- No Grit/Trash Removal
- Less Detention Time
- Smaller footprint
- No Fat/Sand/Wipes Accumulation


Optional Flow Meter
Main isolation valve
Immersible IP67 TEFC motors
Stainless steel wall flange for easy Installation
Optional impeller for self-cleaning operation
Shared stainless steel hydraulic body
Stone trap/ Clean-out
Stainless steel level sensor

Operating Condition - Normal



Operating Condition – Real Time Pump Protection



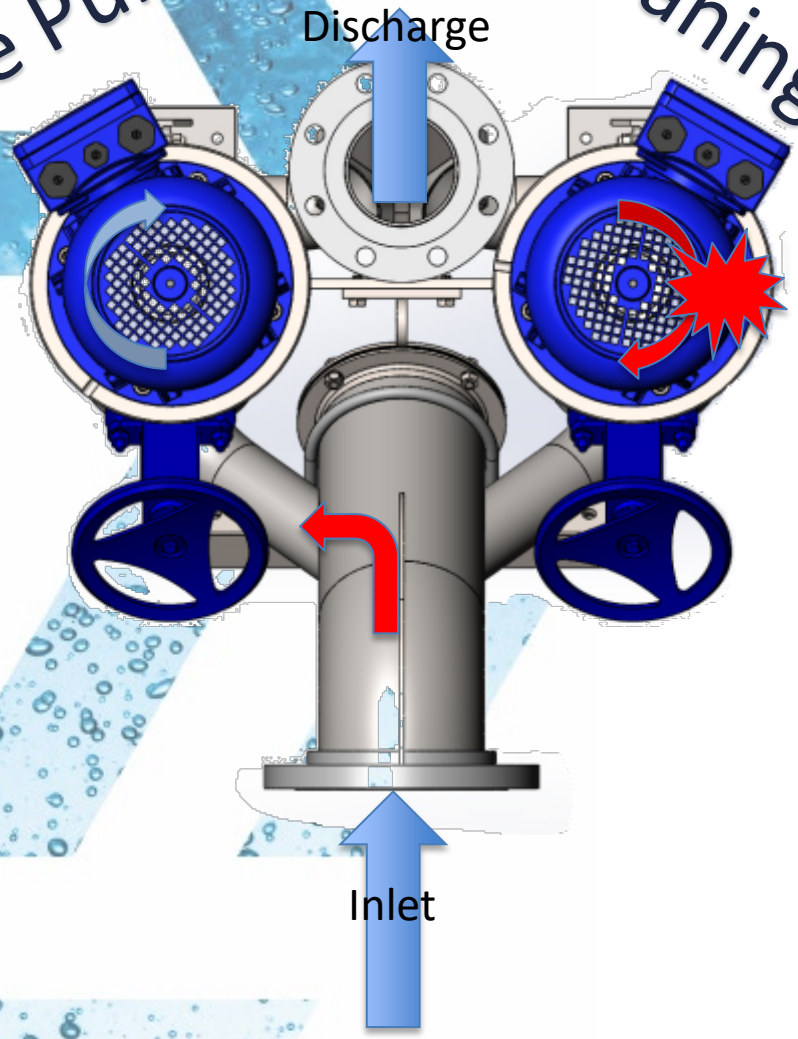
Operating Condition – Restriction Detected

On-line Pump

Cleaning Pump

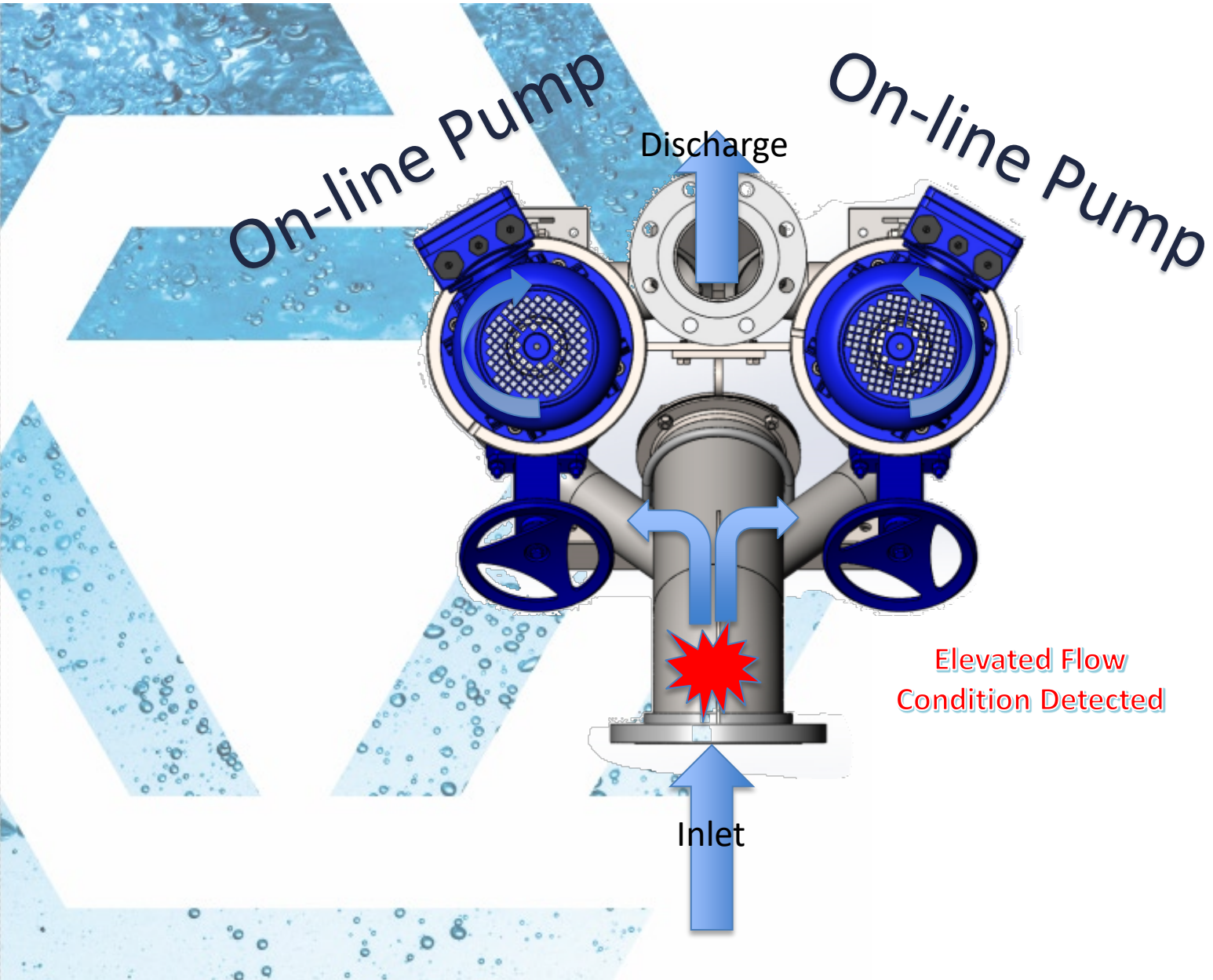
Discharge

Restricted Flow Detected



Inlet

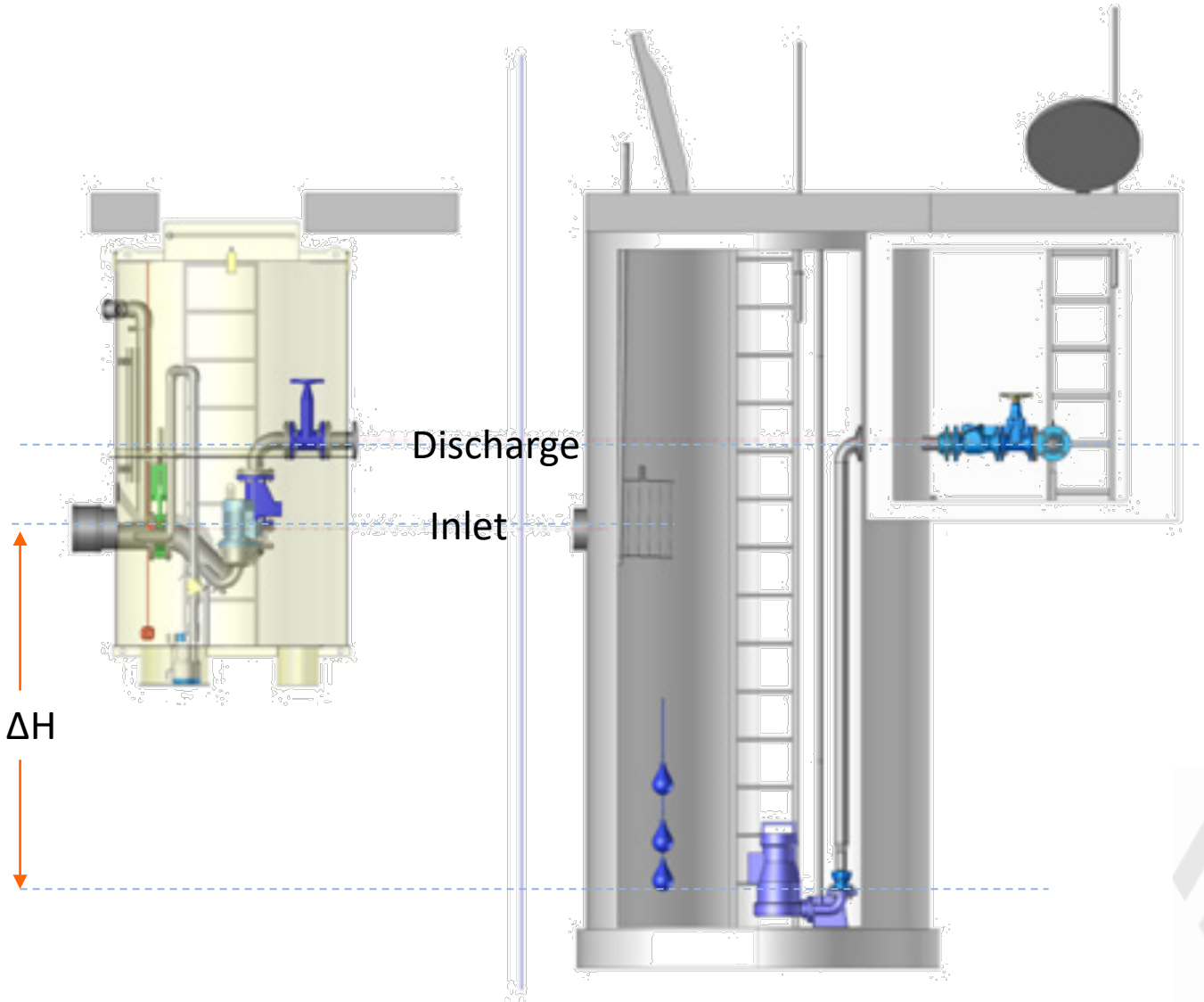
Operating Condition – Peak Flow



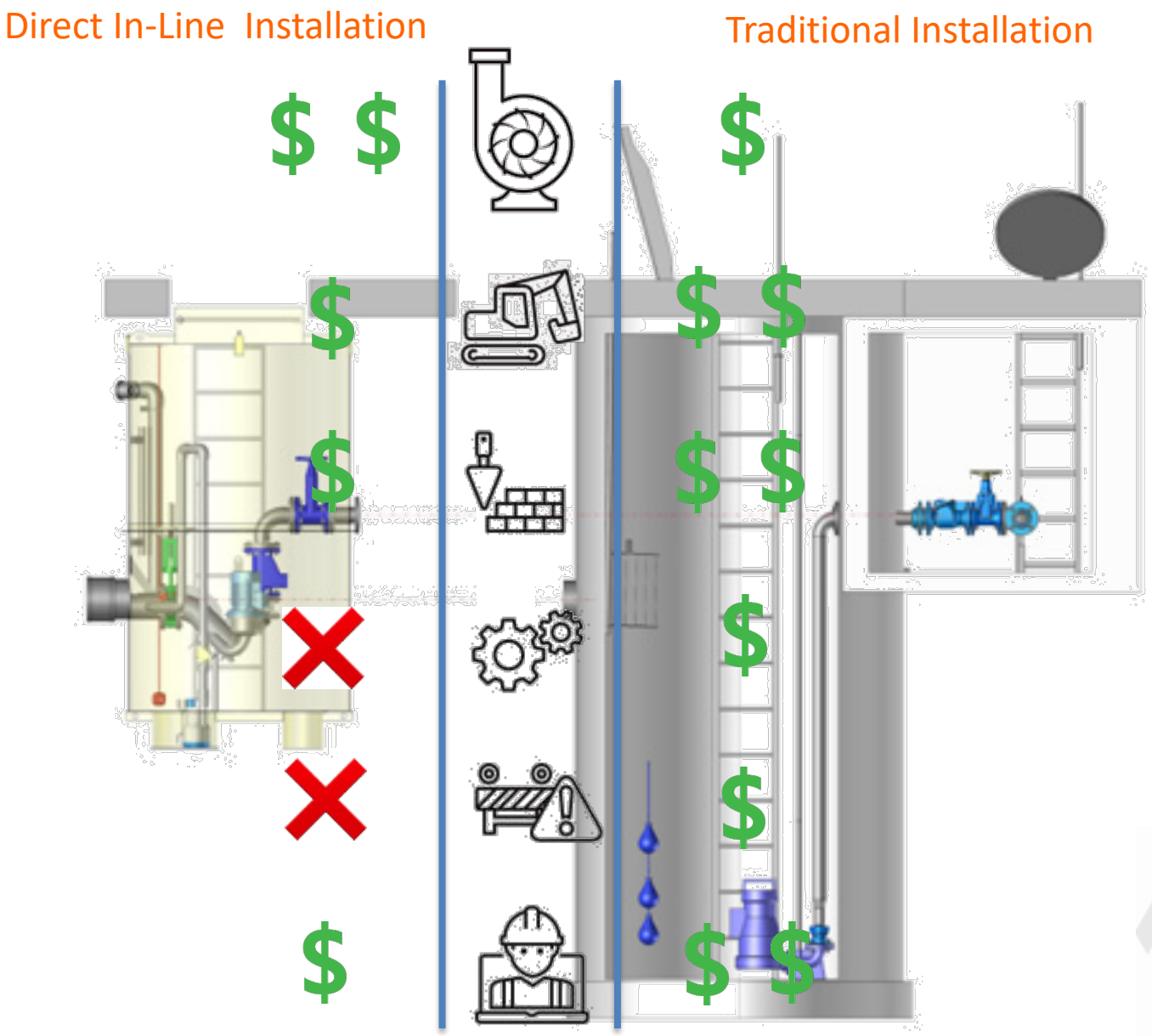
Direct In-Line Pumping Provides Reduced Depth and Footprint

Direct In-Line Installation

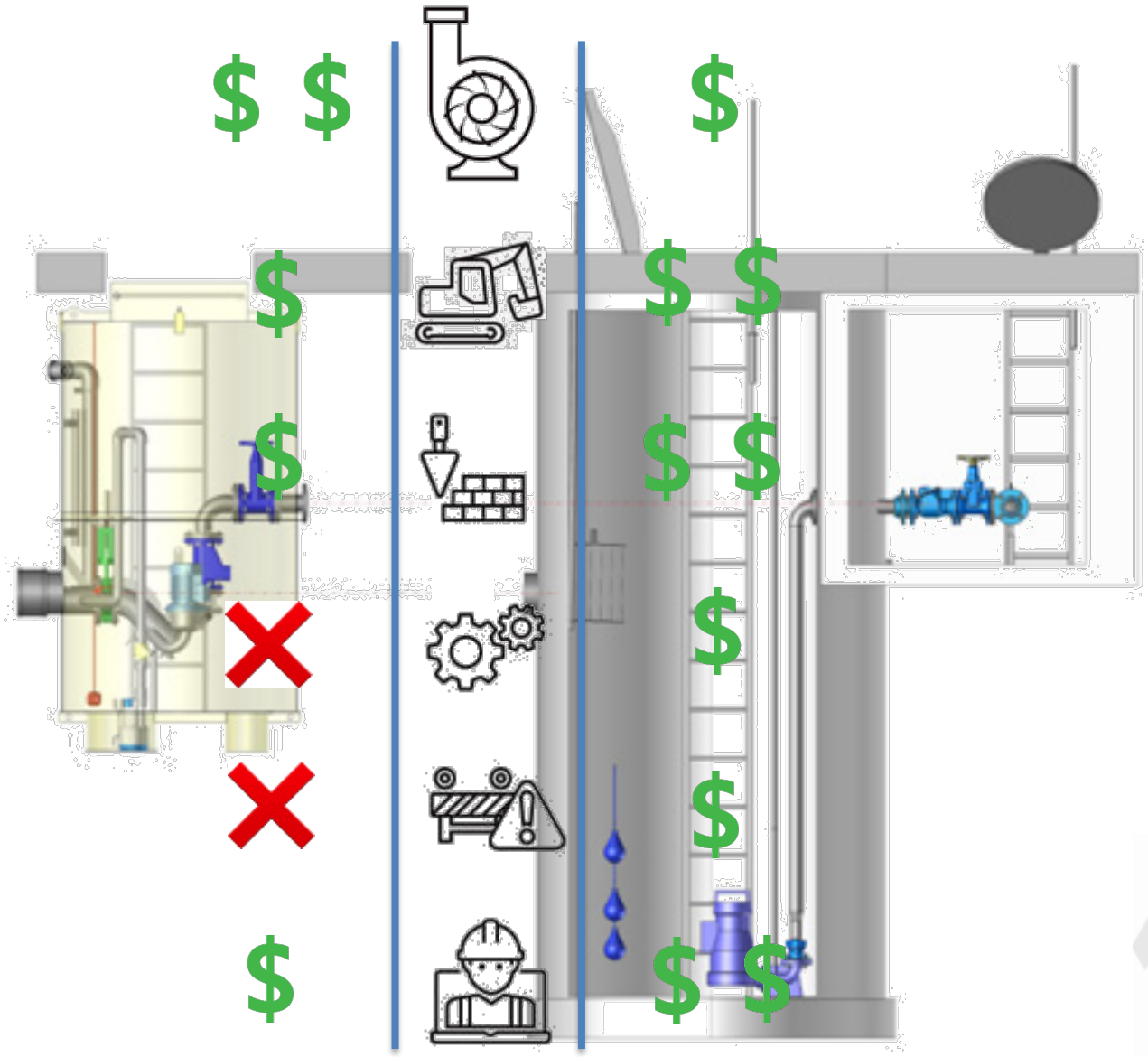
Traditional Installation



Direct In-Line Pumping Provides Reduced Depth and Footprint



Direct In-Line Pumping Provides Reduced Depth and Footprint



The KEYS of Direct In-Line Pumping

1. Eliminates the wet well, removing odors and dangerous gases

2. Reduces water loading through flow matching; eliminating scum layer, ragging, clogging Utilizes vortex impellers; handles “solids” as they arrive

3. Reduction of planned and unplanned downtime; eliminate Vac Trucks

4. Lifts influent directly from the point of entry, reducing excavation depths.

The KEYS of Direct In-Line Pumping

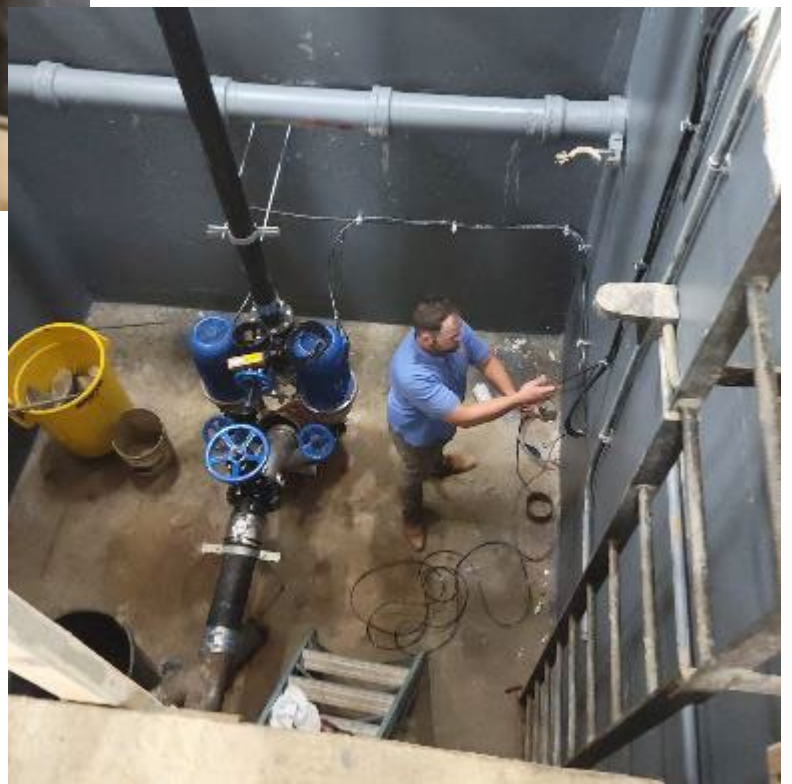
EPA Building, Washington DC.

1. Eliminates the wet well, removing odors and dangerous gases

   Wastewater is always contained within the 304L stainless steel body and never becomes atmospheric, thus eliminating odors, smells, and dangerous gases.

Problem:

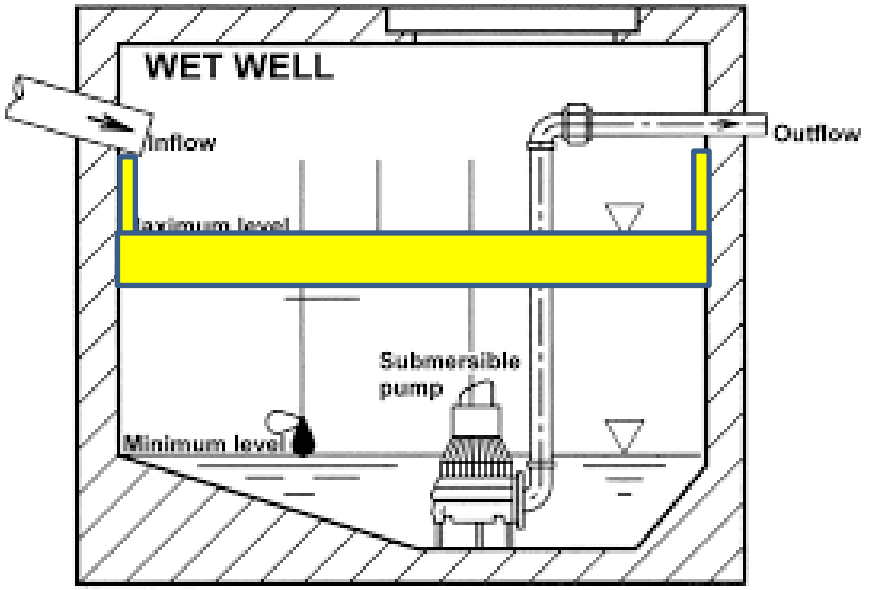
1. Current dry pits for Pneumatic Ejector systems would need to be prepared to hold sewage.
2. Venting of sewer gases through existing building and onto the streets of DC



No Wet Well
No Ventilation
…No Problem

Solution:

The KEYS of Direct In-Line Pumping



2. Reduces water loading through flow matching; eliminating scum layer, ragging, clogging Utilizes vortex impellers; handles "solids" as they arrive

Through flow matching, retained volume is kept moving. Wipes, rags and fibrous material are not allowed to coagulating and solidify with Fats, Oils and Greases (FOG) . As this solidification layer grows, it attaches to floats. Also breaks off into the suction clogging the pump. Rags are handled 1, 2, 3 at a time as they come to the pump.

The KEYS of Direct In-Line Pumping

XYLEM- WHITE PAPER
Life Cycle Costs for wastewater pumping systems
June 2015

Clogging coefficient for different impellers

On/Off control	Clean water			Fine screened sewage			Unscreened raw sewage		
Power (kW)	1.5–7.4	7.5–22	22.1–105	1.5–7.4	7.5–22	22.1–105	1.5–7.4	7.5–22	22.1–105
Open single vane	0			0.5* (Coefficient for unscreened raw sewage)			0.75	0.75	0.5
Closed single vane							0.75	0.75	0.5
Closed two vane							1	1	0.75
Screw							0.75	0.75	0.5
Vortex							0.5	0.5	0.25

Table 16: Clogging coefficient for impellers in different types of media. Closed two vane impeller in unscreened raw sewage is set to one as a reference.

2. Reduces water loading through flow matching; eliminating scum layer, ragging, clogging Utilizes vortex impellers; handles “solids” as they arrive

Pumping

Shredding

The KEYS of Direct In-Line Pumping

The Village of Sherman, NY

By eliminating the wet well, we eliminate the root cause of planned and unplanned maintenance; greatly reduce potential for clogged pumps.

Problem:

1. Depth of Wet well was a safety concern
2. Constant clogging / deragging
3. 26/hrs of maintenance per year.

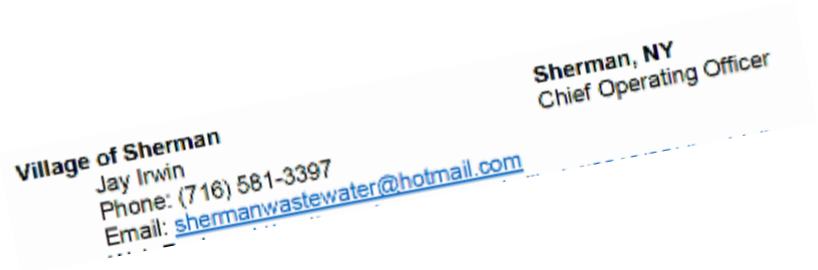
Treatment Plant Operator May 2018

Since Installation in January 2018…

3. Reduction of planned and unplanned downtime; eliminate Vac Trucks

20 Minutes in TOTAL Maintenance.

- Not a single ragging event
- No Vac-trucks
- No planned maintenance
- Depth reduced by 10’



The KEYS of Direct In-Line Pumping

Ritz Carlton- Baltimore, MD

The system installs directly to the lowest invert. This design installs with less depth required, saving on construction costs and increases safety during construction. This also reduces the construction hazards associated with high water tables or subsurface bedrock.

Problem:

Construction costs and water table levels drove designs to an above level basin pump design. This has caused pump clogs and overflows

Solution:

Direct in-line pumping allowed flexibility in design and installation, while eliminating detention, odors and overflows

4. Lifts influent directly from the point of entry, reducing excavation depths.

The Setting:

The SkyHouse Austin's sewage ejector station

- Austin, Texas
- High End Residence building
- 23 Stories
- 320 units
- Restaurant and grocery store in the building

The Problem:

- 6 emergency pump clogs faults in 2 months

  Wipes, diapers, rags
- Restaurant and grocery store on campus causing FOG build up in wet well
- Quarterly visits from Vac-Truck
- Odor on hot Texas summer days
- Valves/ valve vault needed cleaning
- Fault Light on outside of building
- Maintenance crew on 24-hour “walk-a-round” watch.

…The building management team needed to find a better way.

The Rehab:

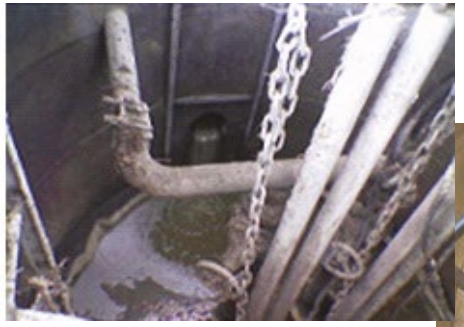
- Installation started at 9am
- Removal of existing pumps, rails and basin cleaned
- OverWatch was placed into the basin by 10:30am
- Suction and Discharge connections were made, Controls connected
- Pump was operational by 6:30pm

The Happy Ending:

- No Downtime from clogged pumps since installation on 9/29/21
- No issues with Odor
- No visits from the Vac-truck
- Communication of performance to maintenance team in real time
- Valve and Valve vaults could be removed for future simplification.

…And more Happy Endings

A cleaner, safer environment free from hazards associated with traditional wet wells and contamination to existing structure.





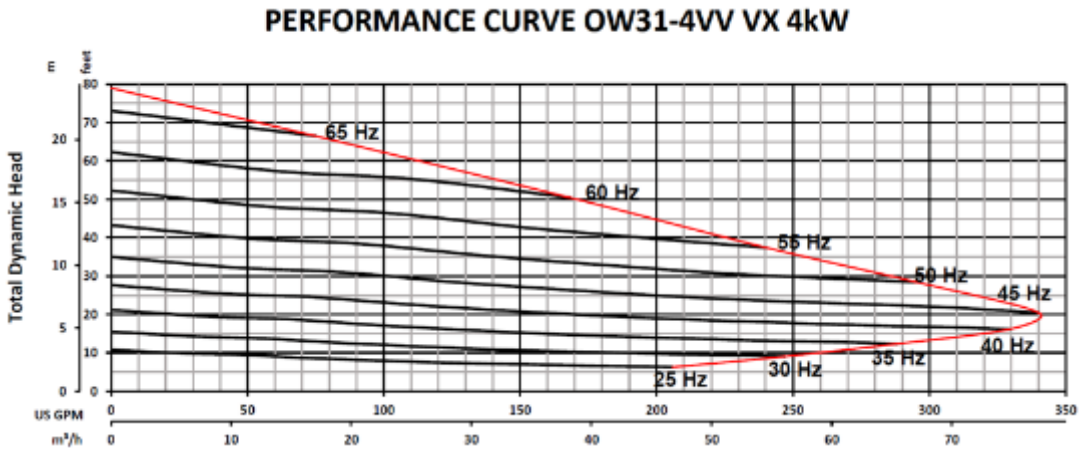




Q&A

Typical objections

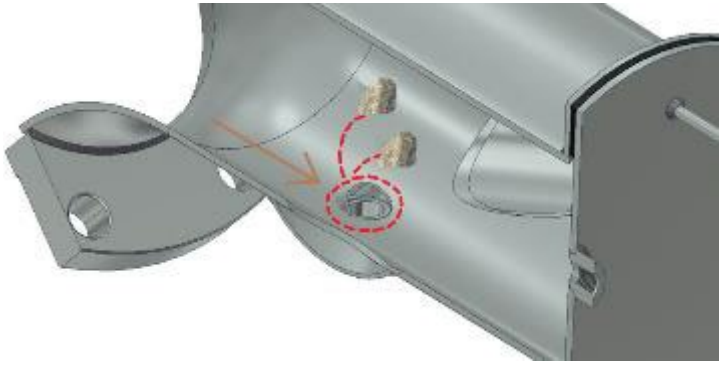
1. A minimum flushing **velocity** of 0.75 m/s (2.5 ft/sec) is needed to **scour** material from inside the **pipe.**
   - Variable frequency controllers allow the pumps to operate at the flow requirement needed to move fluid. As head increases due to restriction, frequency of the motor increase to overcome the backup. To prevent solids build up, the unit has the ability to be fine-tuned to the operating range that matches the flow while eliminating accumulations.



2. How does the system protect against level sensor failure?
   - The controller ensures constant pumping by automatically switching the lead pump to a pre-programmed fixed speed when a level fault is detected. An alarm will be displayed, and a warning can be sent to the host via the communication network.

Typical objections

3. What action occurs if one motor were to fail?
   - If a fault is detected and not resolved by the automatic fault management system, the control system automatically diverts flow to the other pump. Removal of the failed motor can be achieved without any downtime by closing the branch isolation values (c-housing version). Replacing the motor can be achieved in minutes. A cover plate is supplied with each system to seal the motor seat during replacement to allow for a completely safe and clean environment to perform the repairs.
4. What happens to large solids that can come from a gravity network?
   - Larger pieces of material are caught in the stone trap at the rear of the housing. Designed for heavier solids to fall out of stream, they can be manually removed via the service hatch. If the network has a known issue with stone and gravel, it might be useful to fit a trap in the upstream inspection chamber



Typical objections

5. What happens when the system loses power?
   - When the system loses power, the same as with the other system – pumping stops! For critical networks, an automatic start-up generator is recommended.
6. With no water retention, how do you mitigate back-ups?
   - The system has an alarm system for high level, motor or sensor loss, so the host will be notified immediately of an issue. The primary source of back-up is from power loss which is mitigated with a generator. A pump around could also be considered on the suction and discharge to divert water on a short-term temporary basis. If long term retention is required, a retention vessel upstream of the system should be considered