

# PHYN: Detecting Irrigation Leaks



SAN DIEGO STATE  
UNIVERSITY

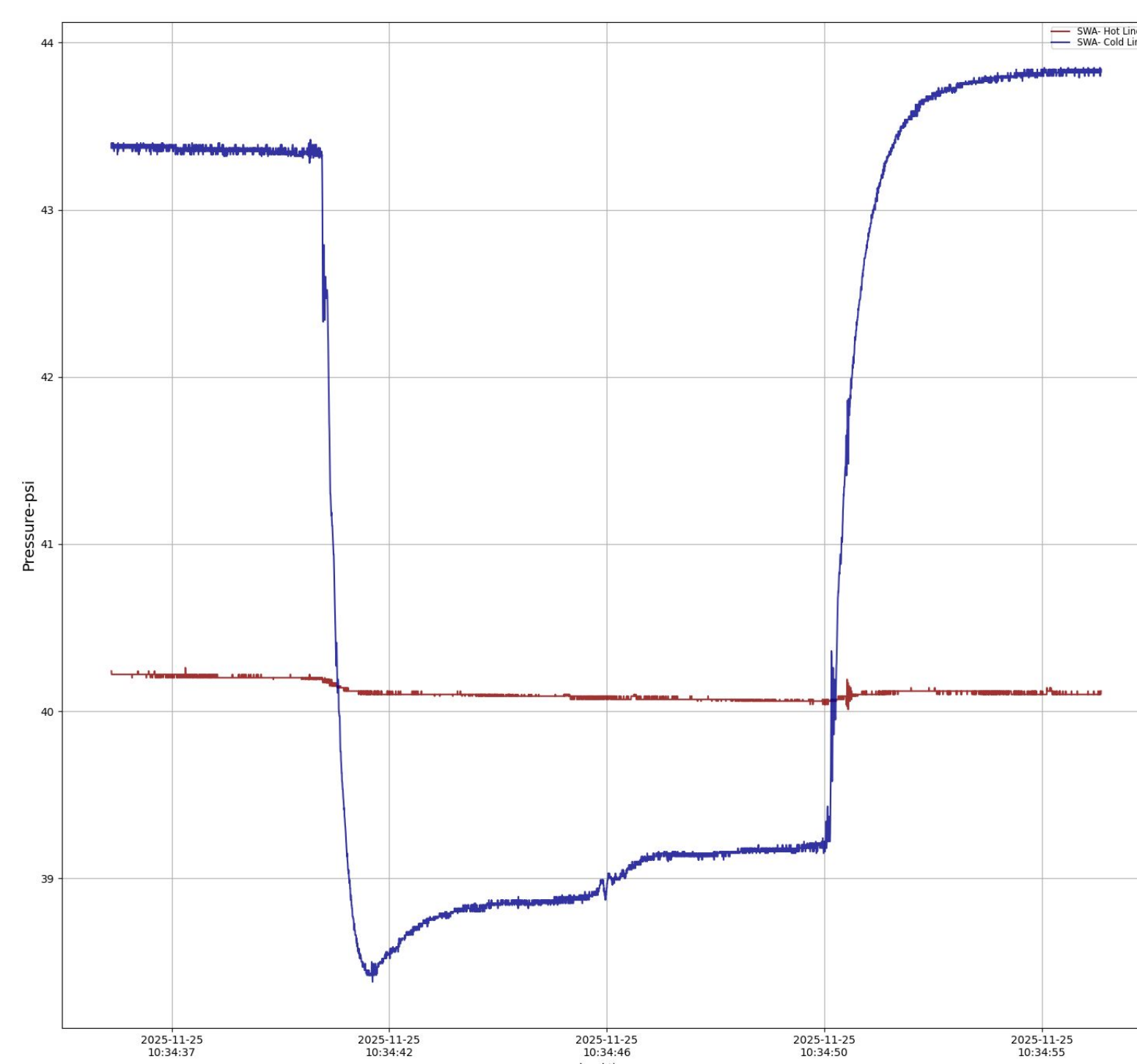
## Background

Phyn develops devices that measure temperature, pressure, and flow rate in a homes pipes. Using pressure measurements, these devices can detect leaks. Currently, these devices can only detect leaks from inside the home, not leaks from the irrigation system. This is because the Pressure Reducing Valve (PRV) blocks sound waves, created by changes in water pressure, from reaching the Phyn device.

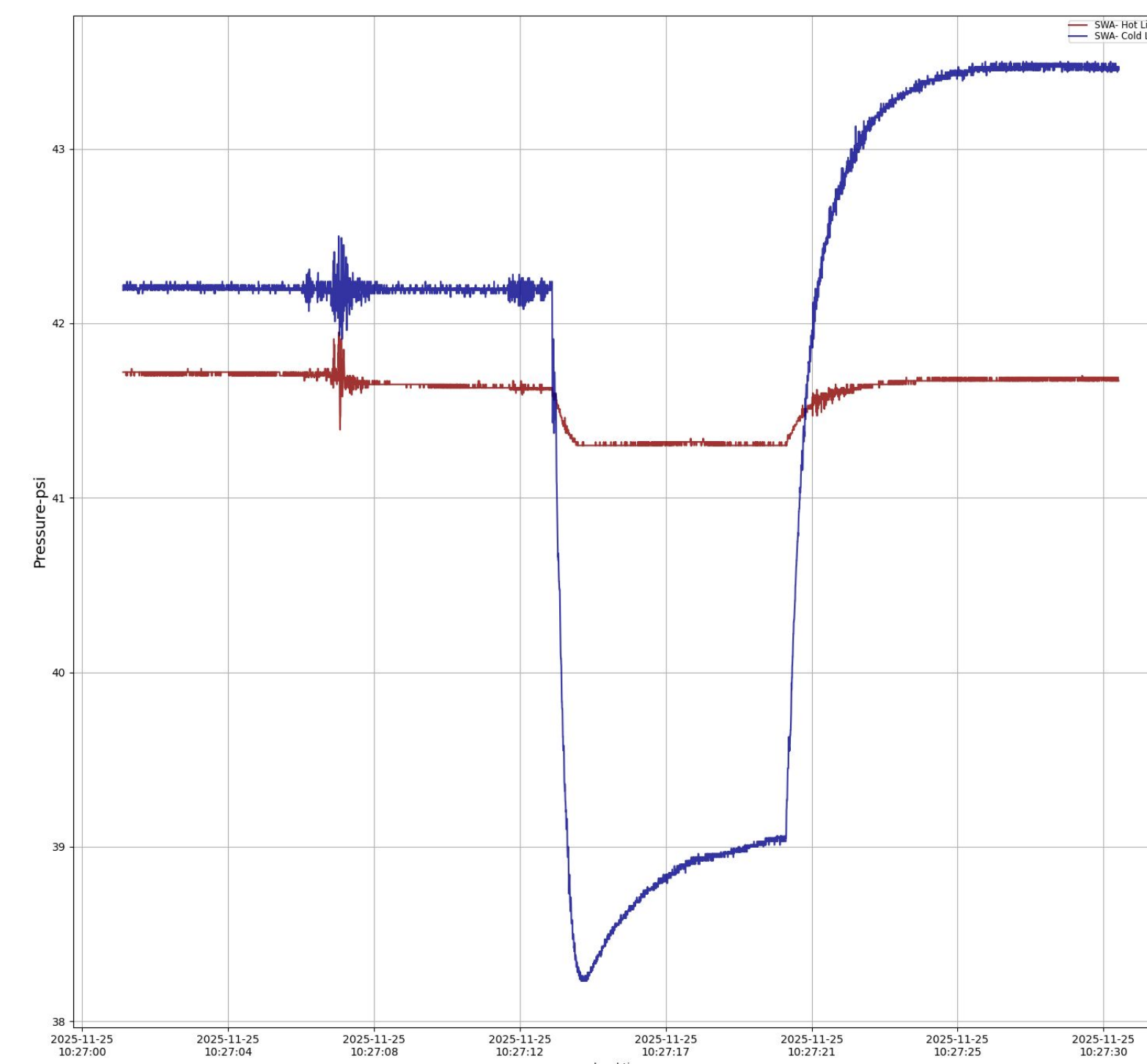
## Testing

Testing was conducted by connecting the device to a home where water events like turning on faucets or flushing toilets were monitored. The blue line shows the upstream pressure change resulting from water usage, while red shows the pressure change after passing through the membrane.

## Across PRV



## Across Membrane



## Requirements

- Increase signal-to-noise ratio (SNR) from irrigation leaks to the Phyn device by 10%.
- Build out of NSF compliant material
- Withstand up to 120 PSI



## Design

A low-density polyethylene (LDPE) membrane is sandwiched between two pipe flanges which allows pressure changes caused by leaks to transfer from irrigation lines across the PRV where the Phyn device is located. LDPE is used due to its density and material speed of sound which minimize the attenuation of signal across.

## Conclusion

The membrane solution successfully transmits the required SNR across the PRV, allowing the Phyn device to accurately monitor upstream water sources. All materials are NSF compliant and built from off the shelf components.

## The Team

Evan Ansgarius, Ty Kim, Austin McDowell