

OBJECTIVE

Determine Economic feasibility of sending wastewater from CNR (College of Natural Resources) to UI Power Plant.

BACKGROUND

The Wet Labs use between 1-4 million gallons of water per month that go to drain. Due to the nature of their work they can't reuse the water. Our goal to take this water and redirect it to the UI Power Plant to use in their heating and cooling systems.

VALUE PROPOSITION

Capture wastewater from the Wet Lab and redirect it to the Steam Plant to use in the heating system and cooling towers. This not only conserves water but also provides a valuable and eco-friendly use for wastewater

KEY REQUIREMENTS

- Fully develop piping system with an economic pipe diameter and pump to overcome elevation change and pressure of 7 psi
- Compute economic analysis to determine total cost of implementation and payback period
- Explore Benefits to campus sustainability

ACKNOWLEDGEMENTS

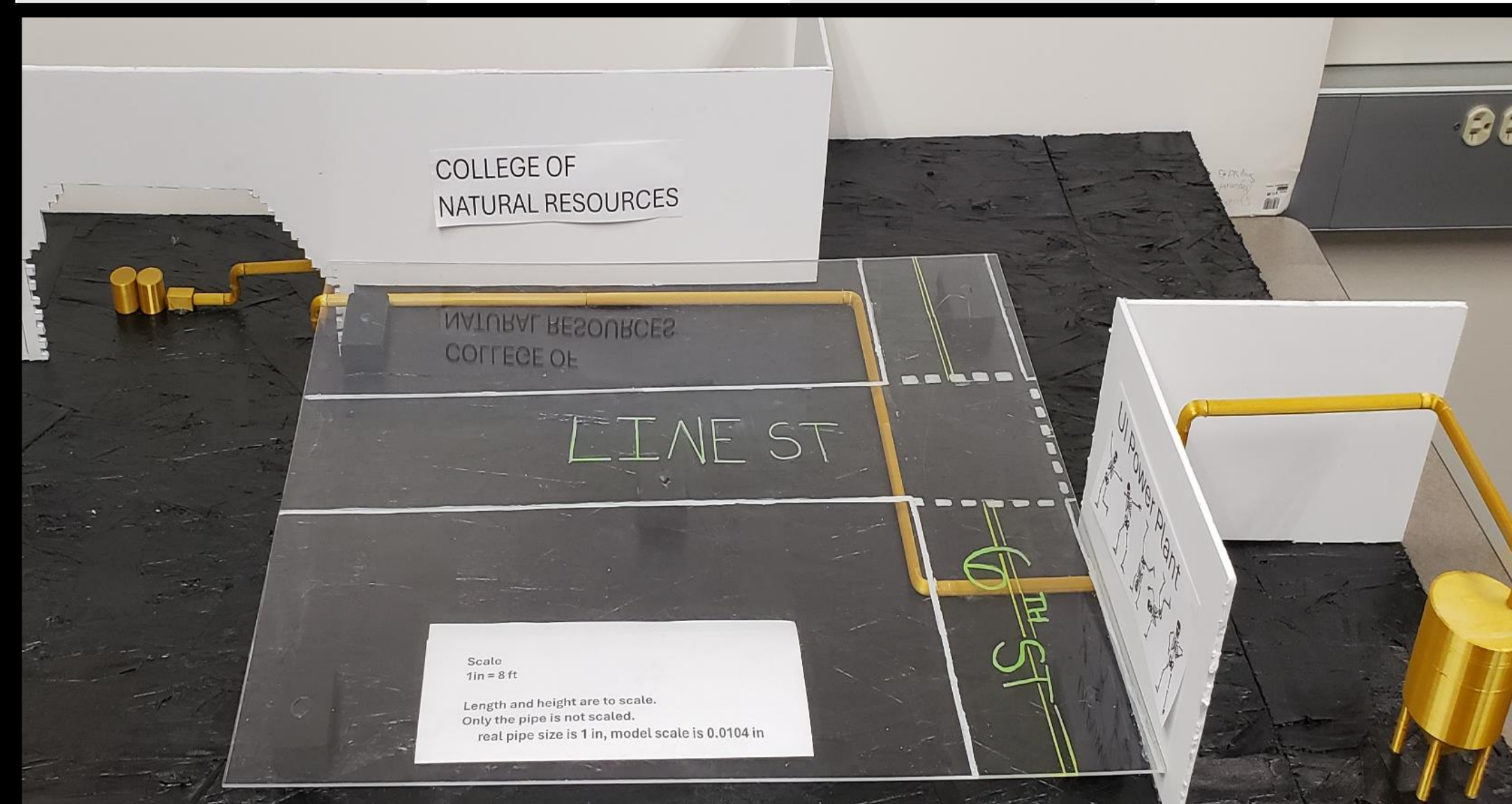
Dr. Yu	Instructor
Ty Sand	Mentor
McKinstry	Client

PIPING SYSTEM DESIGN

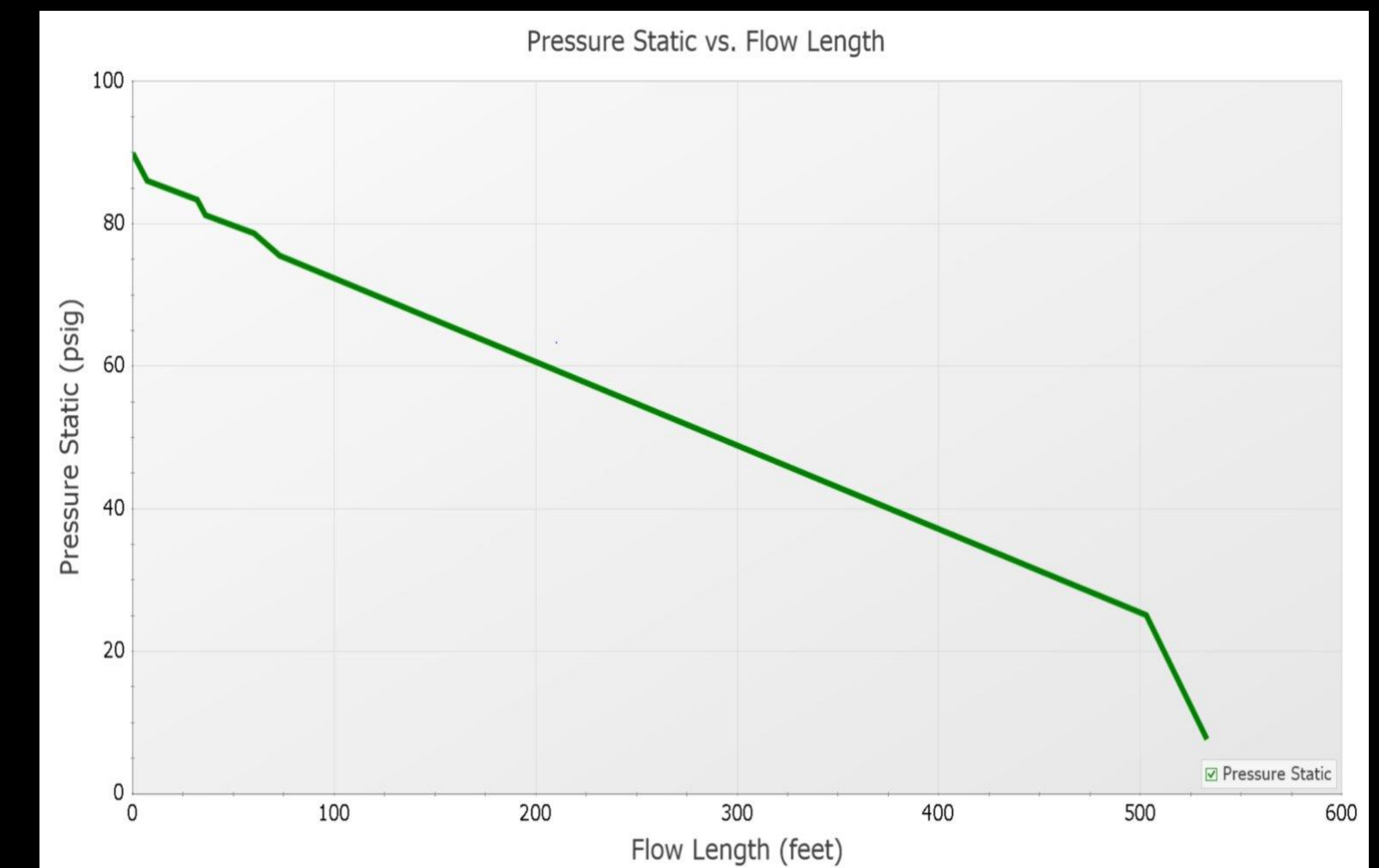
Specifications and Constraints	Target Values
Minimum pressure leaving the pipe.	7 (psi)
Flow rate from CNR to UI Power Plant.	20 (GPM)
Economic pipe diameter.	1 (inch)
Total Length of pipe	516 (feet)

FINAL DESIGN

	Per Month	Per Year	10 Years
Water Saved (Gallons)	98,780	1,185,360	11,853,600
Heat Exchanger	\$1,614	\$19,374	\$193,739
Water Savings	\$792.30	\$9,507	\$95,076
Total Saved	\$2,407	\$28,881	\$288,815



SYSTEM VALIDATION



Used a computational fluid dynamics (CFD) software to validate our pipe diameter. The tank we pumped the water to is pressurized. In order to not have backflow we had to overcome the pressure.

FUTURE WORK

- Determine bypass controls
- Adding a float to the water holding tank
- Control system

CONCLUSION

- The final piping network is economically designed to overcome the end pressure in the tank.
- The economic analysis shows that this system will pay for itself in under a year.
- This would help build campus sustainability while conserving water.