Vibration Analysis of UAJA- Wastewater Plant Backup Pumps

Overview
The UAJA wastewater plant has been experiencing issues with the backup pump system used in their wastewater facility. The backup pumps have never been tripped on their own, but when they are activated manually, a concerning noise resembling the sound of gravel being run through the system can be heard. UAJA and KCF Technologies have partnered to improve the motor-pump system.

Objectives
The object of this project is to analyse the backup pump system run by UAJA and make an educated and thought-out suggestion on how to improve the system. We also were tasked with mapping out the system in a program called PipeFLO. KCF provided vibration sensors to monitor the pumps on a program called Smart Diagnostics.

Approach
- Communicated with KCF Technologies to gather customer needs
- Made an initial site visit to investigate backup pumps at UAJA wastewater plant
- Installed eight vibration sensors on each of the backup pump at the visit
- Modelled system on PipeFLO using measurements and data collected on site visit
- Analysed the vibration data from sensors on Smart Diagnostics and discovered that main problem was cavitation in pumps
- Updated KCF Technologies on problem and communicated with PipeFLO experts to perfect model of the system
- Meet with members from PipeFLO, KCF Technologies, and UAJA to discuss possible solutions
- Test possible solutions on PipeFLO
- Created and completed a test plan at UAJA wastewater plant to investigate one possible solution
- Evaluated vibration data from test plan
- Used information from test plan analyse and the PipeFLO model to suggest ways to improve the system to KCF Technologies and UAJA

Outcomes
- We suggested a short-term solution, based of our test plan data, of opening a peak in the system to atmospheric pressure to prolong the life of the pumps by reducing cavitation. We also offered long-term suggestions, based off solutions tested in the PipeFLO model, to solve the problem of cavitation in the pumps. These solutions included installing a backpressure device in the system and to incorporate a discharge storage tank at a higher elevation.