Arcadia Lake Pump Station

Contacts: Kelby Sommer/Schnabel Engineering and John Barrutia/DC Engineering

Background

The Arcadia Lake Pump Station project is located in Edmond, Oklahoma. The project is a 30 mgd (million gallons per day) raw water pump station that can be readily expanded to meet an ultimate capacity of 65 mgd. This is an ongoing project that will allow students to come up with their own design working with professional engineering firms. More information at:

https://www.schnabel-eng.com/projects/arcadia-lake-intake-and-pump-station/

Problem Statement

Arcadia Lake is a multipurpose reservoir facility funded by Edmond, Oklahoma, and the U.S. Army Corps of Engineers. An agreement allows the city's water treatment plant to transmit 12 million gallons per day (mgd) through the facility's low-level outlet works. This is quickly becoming insufficient as the city grows, so they decided to construct a new raw water intake and pump station to meet their current and future demands.

Deliverables

The total project scope is beyond what a four-person Capstone team is able to complete. Therefore the team will work with the project sponsors and mentors to narrow the project scope for this specific team. This is normally done in industry for projects where multiple teams coordinate their design responsibilities with each other. The capstone design team will provide the following deliverables for the agreed upon scope:

1) Preliminary engineering report that outlines:
    a. Executive Summary
    b. Project Background and History (i.e. existing conditions, problem definition, planning, etc.)
    c. Alternative Analysis (using owner-defined Alternative Selection Criteria such as costs and other non-monetary factors)
    d. Summary and Comparison of Alternatives
    e. Recommended Alternative (including conceptual design and expected schedule, sustainability considerations, costs, and annual operating budget)
2) Schematic Design and Equipment Specifications:
    a. 480 Volt 3-phase electrical supply, multiple large pumps and variable frequency drive motor controls, electrical switchgear, standby engine generator, communications, and cyber security considerations
    b. PLC, wet well level, discharge flow, motorized valve controls, and motorized intake slide gate controls.
    c. The hydraulic design includes intake screens & cleaning systems, intake pipelines, intake gates, vertical turbine pumps, discharge piping and valves, and transmission pipelines to deliver raw water from Arcadia Lake to the City's water treatment plant.
    Civil, structural, and geotechnical design will be required for the pump station building, retaining walls, intake structure, and support of equipment in the facility.