CHAVEZ TIFFANY & AYERS
ENGINEERING CORPORATION

611 N. Nevada Ave. • Colorado Springs, CO 80903 • (719)636-0021 • Fax (719)636-2547

Feasibility Report for John Street Pond

PROJECT: John Street Pond
REPORT BY: Josh Ayers, Matt Crosby

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Report Type: Draft
DISCIPLINE: Electrical

REPORT:

Site Utilities

Coordination with the local electric utility company will need to occur during the design phase to confirm that 3-phase power is available in the area. As well as coordination for a new 277/480V 3Ø transformer from the local electric utility company is available.

Electric/power requirements for Pump Configurations

Power requirements for each pump configuration are shown below. Loads for Control Systems, Lighting, Instrumentation, and Miscellaneous Loads are all assumed loads.

Power Requirements for Pump Configuration 1

Description	Voltage	Horsepower	kVA
Sump Pump	460V/3Ø	5	5.4 kVA
Main Pump	460V/3Ø	90	129.9 kVA
Redundant Pump	460V/3Ø	90	129.9 kVA
Control Systems	Varies		15 kVA
Lighting	120V/1Ø		2 kVA
Instrumentation	120V/1 Ø		2 kVA
Miscellaneous Loads	Varies		30 kVA
		Total Load	314.2 kVA

Per the assumed loads above for 480V 3Ø service the total amperage is 377.9A. The recommended size of the electrical service is 600A 277/480V 3 Ø 4W. This would allow for both the main pump and redundant pump to operate simultaneously if required in the future. A 600A service in this scenario will allow for pumps to be upgraded in the future as well.

Power Requirements for Pump Configuration 2

Description	Voltage	Horsepower	Volt-Amperes
Sump Pump	460V/3Ø	5 HP	5.4 kVA
Main Pump	460V/3Ø	34 HP	34.3 kVA
Main Pump	460V/3Ø	34 HP	34.3 kVA
Redundant Pump	460V/3Ø	34 HP	34.3 kVA
Control Systems	Varies		15 kVA
Lighting	120V/1Ø		2 kVA
Instrumentation	120V/1Ø		2 kVA
Miscellaneous Loads	Varies		30 kVA
		Total Load	155.9 kVA

Per the assumed loads above at 480V 3Ø service the total amperage is 197.4A. The recommended size of the electrical service is 400A 277/480V 3 Ø 4W. This would allow for both the main pump and redundant pump to operate simultaneously if required in the future. A 400A service in this scenario will allow for pumps to be upgraded in the future as well.

Power Requirements for Pump Configuration 3

Description	Voltage	Horsepower	Volt-Amperes
Sump Pump	460V/3Ø	5 HP	5.4 kVA
Main Pump	460V/3Ø	20 HP	20.8 kVA
Main Pump	460V/3Ø	20 HP	20.8 kVA
Main Pump	460V/3Ø	20 HP	20.8 kVA
Main Pump	460V/3Ø	20 HP	20.8 kVA
Control Systems	Varies		15 kVA
Lighting	120V/1Ø		2 kVA
Instrumentation	120V/1Ø		2 kVA
Miscellaneous Loads	Varies		30 kVA
		Total Load	137.6 kVA

Per the assumed loads above at 480V 3Ø service the total amperage is 165.5A. The recommended size of the electrical service is 400A 277/480V 3 Ø 4W. A 400A service in this scenario will allow for pumps to be upgraded in the future.

The Pumps and VFD's will be fed from a 277/480V 3Ø panel. The 277/480V 3Ø panel will also feed a step- down transformer that will serve the lighting requirements and any 120V or 240V loads that are also required.

Control Systems

The control systems will be designed by a controls specialist. Power for the required controls will be provided once these systems have been designed. The VFD's will most likely be powered from the 480V panel. The Loads above assume that the Pump Controls will have a soft start.

Lighting Requirements

Exterior and Site Lighting will be provided as required. A site plan will be required to be able to provide direction for exterior and site lighting. Interior Lighting will be required if a building is provided to house the pumps and electrical equipment.

Instrumentation

Instrumentation such as Magnetic Flow Meters, Butterfly Valve with Electric Actuator, Turbidimeter Assembly, etc. will have to be designed by a control specialist. The required instrumentation will be powered from the 120/240V 1Ø panel.

Miscellaneous Loads

Possible miscellaneous loads will be more relevant with the building for the pumps and the electrical equipment. Possible miscellaneous loads could be the addition of a crane for the pumps, electric heaters, exhaust fan and louver, etc. that will be required with an equipment building.

Back-up Power

If Back-up power is required, then a generator and automatic transfer switch will need to be added. Size and type of generator will be coordinated during design.

Equipment Building

Respec will confirm if a building to house electrical equipment and pumps is desired.