KAP - LMRP

ASMF-1000 Water Treatment

Engineering Specification

AltaStream Power Systems
PROJECT NAME: KAP LMRP - WTP
CUSTOMER NAME: KAP

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ASMF-1000 ENGINEERING SPECIFICATION

Contents

Note: Specifications Subject change without Notice

1. Overview

This potable water treatment system is designed to provide clean potable water from "relatively clean" well water as specified in the Scope of Work. The system is modular in design and the treatment plant fits into a single 20 ft high cube shipping container. The system is fully automated to reduce the need for operator maintenance and includes pressure, flow, chlorine and UV monitors to ensure clean water. System design capacity is 220,000 Litres per day (270 Litres per person per day) In addition to the treatment plant the system includes 22,500 litres of raw water storage as well as 130,000 litres of potable water storage and 65,000 litres of potable water for the fire pump in cases of emergency.

1.1. General Description

The system is a multimedia filtration ("MMF") system, using filters to reduce the amount of suspended solids in the feed water by filtering the water through a multi-layered zeolite filter bed and then through micron cartridge filters to remove suspended particles more than 5 microns in size. The multimedia filters performance for turbidity or particulate removal shall depend on the flow rate and size of the particulates. The two multilayer zeolite filtration modules remove odour, suspended particles, iron and hardness from the water. The filtration rate is applicable for effective turbidity removal to achieve particle size of 25 micron at the outlet.

The filters contain separate layers of media. Underlying layers support the top active filter layers. Media specific gravity and size gradations account for the natural layering, which occurs within the filter following backwashing. This layered media profile provides a higher sediment holding capacity as compared to conventional single and dual media sand filters. The larger incoming particles are trapped on the upper layers allowing the smaller particles to continue through the bed where they are trapped in the lower layers. The depth profile of the bed increases the filtering surface area and the capacity of the unit. A Sodium Hypochlorite Dosing System and Dual redundant Ultra Violet modules are positioned past the micron Polishing Cartridge Filters to provide disinfection and sterilization prior to use.

1.2. Mechanical Description

The multimedia vessels are a corrosion resistant composite, constructed of a polyethylene liner wound with continuous re-enforced fibreglass shell. The shell height is designed to allow for expansion of the media during the regeneration cycle. The top vessel opening is used for media loading and connection for the multipart control valve.

The filters are supplied with high quality zeolite filtration media and drain support media. The support media ensures even distribution and prevents attrition of the filter media. The inlet diffuser evenly distributes the influent water and collects backwash water. The lower hub and lateral or single point distributor (depending upon tank: size) collects effluent and distributes backwash water.

Each multimedia vessel is fitted with multiple, multi port electrically actuated control valves to accomplish the operational steps of backwash and rinse cycles. The valve seals are static o-rings and separated by precision positioned spacers. The piston is the only moving part in the main control valve.

2. Design Specification

This system has been designed based upon a single raw well water sample that is within an undetermined radius of the proposed supply wells. Based upon the lack of data on seasonal fluctuations and inability to determine if this sample represents normal conditions we have designed the system to have flexibility to add additional filtration modules to ensure it meets the design requirements.

2.1. Water Source Classification

The source of water for the system will be drilled wells located on the property near the water treatment building. The well needs to be a cased; deep drilled well and is expected to have similar raw water quality as the test well at the Smoky Falls site.

Characterization of a water source is a key task for water system assessments. Wells are broadly classified as groundwater or groundwater under the direct influence of surface water (GUDI). Water systems supplied from GUDI wells must meet more stringent treatment and testing requirements than systems supplied from secure groundwater wells. Well classification affects several aspects of a water system, including minimum treatment requirements, water testing requirements, and system operation.

In accordance with Schedule 2 Treatment Equipment of Ontario Ministry of the Environment (MOE) Regulation 170/03, minimum required treatment for a water system supplied from groundwater is disinfection. The primary disinfection component of treatment for groundwater sources must be capable of achieving at all times at least 99% (2-log) removal or inactivation of viruses before treated water enters the distribution system. The minimum level of treatment required for systems supplied from GUDI wells must be equivalent to chemically-assisted filtration plus disinfection. The primary disinfection component of treatment for GUDI wells must be capable of achieving at all times at least 99% (2-log) removal or inactivation of cryptosporidium oocysts, 99.9 % (3-log) removal or inactivation of giardia cysts, and 99.99% (4-log) removal or inactivation of viruses before treated water enters the distribution system.

Preliminary design of the treatment system is currently based on the well being considered as a secure groundwater source rather than being potentially under the direct influence of surface water. If it is determined after the well is drilled and developed that there is evidence of surface water influence, and then additional treatment may apply.

2.2. Water Source Test Results

The following is a summary of the test well report parameters that were identified as areas that need to be addressed in the design of the water treatment solution.

Parameter	Reg. Value	Result	RDL	MDL	Reg. Units
Iron (r)	300	663	150	20	ug/L
Iron	300	647	150	20	ug/L
Sodium (r)	20000	27000	2000	100	ug/L
Sodium	20000	27100	2000	100	ug/L
Total Hardness (as CaCO3)	100	254	10	.1	Mg/L
True Colour	5	5.8	2.5	2.5	TCU

Based upon the test well report the well water is moderately hard with the need to reduce the Iron content of the water. It is also necessary to improve the colour of the water to ensure that the water colour is within expectations. Sodium content of the water is also moderately high. To the extent required water softening can be added depending upon the requirements of the Customer.

Similar to all treatment systems it is critical to ensure those viruses and other organisms such as cryptosporidium cysts and giardia cysts are removed from the water and that disinfection of the water system is maintained at all times.

2.3. Water Source Treatment

Based upon the test results and the expectation of a cased deep well system resulting in a secure groundwater source we recommend a multimedia filtration system with a multiple barrier approach to disinfection as the best fit for achieving the potable water needs for this site. The media filtration is designed to reduce turbidity, iron and hardness of the raw water as well as soften the water to a certain extent.

TREATMENT TECHNOLOGIES FOR CONTAMINANTS OF DRINKING WATER - IN**ORGANICS**

Compound/ Chemical	MCL (mg/L)	Granular Activiated Carbon	Advanced Oxidation	Air Stripping	Sand Filtration	Reverse Osmosis	Ion Exchange
Iron	*0.3*	**X**	**X**	**X**	**X**	**X**	**X**
Sodium						**X**	**X**

For the Multi Media filtration we recommend Zeolite filtration media which provides excellent filter flows as well as turbidity and sediment removal. Within the water there are heightened levels of iron, hardness and colour. Due to the anionic nature of zeolite it is able to selectively remove iron, calcium and magnesium from the water, effectively reducing the iron and partially reducing the hardness content in the effluent. This filtration will also

remove any particles down to 5 microns. By removing all of these from the water the colour will also be clarified to acceptable levels.

It is not recommended that the hardness be reduced any further than this by ion exchange as this process would require very high amounts of expended sodium to replace the calcium and magnesium carbonate that make up water hardness. The amount of consumables required would lead to increased operational cost as well as significantly more labour component to maintain the system. Municipal water treatment plants distribute water in excess of 500 mg/L of hardness, as it is primarily an esthetic parameter of water quality.

The current sodium level will not change water taste or quality and is also primarily an esthetic parameter. The main technology that is used to reduce sodium in the water is reverse osmosis. This approach is a much more expensive filtration technology and requires significantly higher volume of source water and has large amount of backwash that needs drainage facilities. Given the level of the sodium and the minimal impact of it to potable water we do not recommend using these approaches.

3. Functional Description

The water supply system will generally consist of low-lift pumping from wells to a raw water storage tank. Raw water will then be pumped from the raw water tank through the treatment system with treated water discharging into a treated water reservoir. Treated water with be delivered into the distribution system serving each building across the site with filtered and disinfected water that meets potable water standards in accordance with The Procedure for Disinfection of Drinking Water in Ontario. The water treatment system is installed in the low-lift side of the system and generally consists of 2 parallel treatment trains, each consisting of a backwashable media filtration, cartridge filtration, and ultra-violet (UV) disinfection followed by injection of sodium hypochlorite prior to water discharging to an above-ground reservoir. Treated water is pumped from the reservoir into the distribution system by 2 equivalent high lift pumps operating in parallel. Operation of the well pump will be controlled by liquid level in the reservoir and operation of the high lift pumps will be controlled by pressure in the distribution system. Operation of the chemical feed system is interlocked with a flow monitor so that water receives an appropriate dose of chlorine.

3.1. Filtration

The system will have 2 stages of filtration consisting of multi-media pressure filters that will be periodically backwashed, followed by direct filtration through cartridge filters. The purpose of filtration will be to remove suspended particles from the water to ensure low turbidity water with high UV transmittance to enhance the effectiveness of the UV systems.

3.2. Primary Disinfection

Primary disinfection will be achieved by ultra-violet (UV) radiation. A UV dosage or fluence of 40 mJ/cm^2 at peak design flow is a typical minimum treatment target currently accepted in the water treatment industry to inactivate a wide range of pathogens including protozoa, cysts, and viruses that may be present in water. UV (ultra-violet) disinfection has become well established in the Canadian water treatment industry as an effective method for achieving primary disinfection for public drinking water supplies. UV disinfection systems use the invisible, ultra-violet range of light to prevent harmful micro-organisms from reproducing, effectively rendering them harmless. The water passes by the UV lamps and the UV light irradiates the harmful micro-organisms in the water.

The following table summarizes the results of research into the minimum required dose of ultra-violet radiation for inactivation of several common pathogenic micro-organisms including cryptosporidium and giardia.

TABLE 1: Average UV Dose in mJ/cm^2 to Inactivate Pathogens

Name of Pathogen	1-log 90%	2-log 99%	3-log 99.9%	4-log 99.99%
cryptosporidium oocysts	3	5	6	8
giardia lamblia cysts	NA	5	10	10
giardia muris cysts	2	5	NA	NA
E. Coli. O157:H7	2	3	4	6
Vibrio Choerae	1	2	2	3
Salmonella Typhi	3	5	6	8
Salmonella Enteritidis	5	7	9	10
Shigella Dysenteriae	3	2	2	3
Shigella Sonnei	3	5	7	8
Hepatitis A Virus	6	14	22	30
Poliovirus Type 1	6	14	23	30
Rotavirus SA11 40	9	19	22	36
Adenovirus 40	40	78	119	160

Primary disinfection with UV is supplemented by chlorination with partial contact time in the reservoir. The chlorination system consists of a chemical metering pump with a solution tank to feed liquid sodium hypochlorite into the feed line after UV sterilization. The reservoir is a rectangular tank. High lift pumps draw water from the bottom of the tank and pump into distribution.

The basic formula for calculating "CT" in a chlorination system is as follows.

$$CT = C\ (mg/L) \times \left(\frac{Volume....m^3}{Flow...Rate..\frac{m^3}{day}} \right) \times 1440 \frac{\min}{day} \times BF$$

where:

C = Residual Chlorine Concentration in milligrams per litre (mg/L)

T = Theoretical Contact Time in minutes (min.)

BF = Baffling Factor

Theoretical Contact Time = (Contact Volume) / (Peak Flow Rate) * (Baffling Factor)

CT values from the "Procedure for Disinfection of Drinking Water in Ontario" using free chlorine are summarized below.

TABLE 2: "CT" Values for 3-log (99.9%) Inactivation of Giardia Lamblia Cysts Using Free Chlorine

Free Chlorine Concentration (mg/L)	"CT" Values (mg/L – min.)	
	pH = 7.5	pH = 8
Temperature = 5 C		
<= 0.4	166	198
0.6	171	204
0.8	175	210
1.0	179	216
Temperature = 10 C		
<= 0.4	125	149
0.6	128	153
0.8	131	158
1.0	134	162

TABLE 3: "CT" (mg/L – min.)Values for of Viruses Using Free Chlorine

Water Temperature (C)	3-log (99.9%) Inactivation		4-log (99.99%) Inactivation	
	pH = 6 to 9	pH = 10	pH = 6 to 9	pH = 10
0.5	9	66	12	90
5	6	44	8	60
10	4	33	6	45
15	3	22	4	30
20	2	16	3	22
25	1	11	2	15

It is noted that using chlorine in combination with UV provides a multiple barrier approach to disinfection, which is considered very favourable. Chlorine and UV have complementary strengths; with chlorine being very effective against viruses and less effective against crypto and giardia, while UV is very effective against crypto and giardia and less effective against viruses.

3.3. Secondary Disinfection

Secondary disinfection is provided by maintaining a free chlorine residual throughout the distribution system across the work camp and to all buildings using liquid sodium hypochlorite.

3.4. Water Demand

The following table is a calculated estimate of the total peak flow rate for the system.

TABLE 4: Calculated Water Demands

Maximum Number of People	Average Daily Water Use/Person	Total Daily Water Use	Average Daily Water Flow Rate	Babbitt Peaking Factor	Peak Flow Rate	
					(L/min)	(USgpm)
812	270 litres	219,240 L/day	152 L/min.	5	794	210

4. Specifications

4.1. Raw Water Feed Pumps

Quantity	Two
Type	centrifugal pump
Material of construction	Stainless Steel
Make	Goulds SSH Close Coupled Pumps
Capacity	11.5m^3/Hr@3.7 bar (50 gpm @ 125ft head)
Power	208 Volts, 3 Phase, 60 Hz

4.2. Multi Media Filtration

Quantity	Two
Type /Make	Zeolite multi layer filtration bed
Material of construction	FRP
Capacity	11.5m^3/Hr (50 gpm)
Power	24 Volt DC

4.3. Micron Cartridge Filtration

Quantity	Two
Type	5 micron
Material of construction	Stainless Steel Hosing/ Polypropylene filter
Make	Pure Aqua – SSC 12
Capacity	11.5m^3/Hr (50 gpm)

4.4. Backwash Pumps

Quantity	Two
Type	centrifugal pump
Material of construction	Stainless Steel
Make	Goulds SSH Close Coupled Pumps
Capacity	11.5m^3/Hr@3.7 bar (50 gpm @ 125ft head)
Power	208 Volts, 3 Phase, 60 Hz

4.5. Chlorine Dosing System

Quantity	One
Type	Liquid Sodium Hypochlorite
Material of construction	PVC and Polyethylene
Make	Pure Aqua CDS-6
Capacity	0.023m^3/Day (6 gpd)
Power	120 Volts, 1 Phase, 60 Hz

4.6. UV Sterilization System

Quantity	Two
Type	UV Sterilization lamp and housing
Material of construction	Stainless Steel, with Quartz lamp sleeve

Make	Sterilight SV50
Capacity	11.5m^3/Hr@40mJ/cm^2 (50 gpm @ .072 mWatt hr/in^2)
Power	120 Volts, 1 Phase, 60 Hz

4.7. Potable Water boost Pumps

Quantity	Two (One duty & one assist)
Type	centrifugal pump
Material of construction	Stainless Steel
Make	Goulds SSH Closed Coupled Pump
Capacity	23.0m^3/Hr@5.5 bar (100 gpm @ 185ft head)
Power	208 Volts, 3 Phase, 60 Hz

4.8. Pressure Vessels

Quantity	Two
Type	Internal Diaphragm Bladder
Material of construction	FRP, Butyl Rubber Diaphragm
Make	Goulds V350 Diaphragm Tank
Capacity	435 Litres / 115 Gallons

4.9. Control Panel

Quantity	One
Type	PLC Control Panel
Material of construction	Steel
Make	AltaStream / Allen Bradley
Power	120 Volts, 1 Phase, 60 Hz

5. System Layout

The system is designed to provide redundant treatment loops. This redundancy is maintained through the filtration and UV sterilization system but is utilizing a single chlorination system to simplify maintenance of the system.

The following ASMF-1000/KAP drawings provide the system layout for the treatment plant:

- General View
    - This view provides the physical layout of the major components of the plant including sizes of the inputs and outputs to the plant.
    - The plant is a modular standard 20 foot high cube container insulated with 3" Roxul Rockwool insulation on the ceilings and floors and spray foam below the floor to maintain temperature control within the unit.
- Process and Instrumentation Diagram (P&ID)
    - The P&ID drawing provides a detailed view of the various components of the system and the associated instrumentation. Please note that the Control panels are virtual and will be physically housed in a PLC controlled main control panel.

6. Electrical Layout

The electrical layout of the plant is presented in the following drawings:

- House Electrical
- Power Distribution
- Pumps
- Media Filtration
- Sensors

7. Control Description

The control system will manage all of the pumps, valves, treatment elements (UV lamp, Sodium Hypochlorite Doser) and a number of sensing elements (flow rate, tank levels, Chlorine level, and pressure). The control system will use an Allen Bradley CompactLogix PLC to monitor pressure, various levels and rates in the system and operate the pumps and valves to maintain the water levels and quality. Remote Access and Monitoring is optional.

7.1. Operating Modes

The control system is designed to operate in three modes based upon access level. They are:

- AUTO – In auto mode the PLC will control the water treatment plant to maintain water quality and the levels necessary.
- SEMIAUTO - In semi-auto mode the operator can control sub-systems individually. This is meant for routine maintenance or testing operations and would a maintenance technician to operate certain portions of the plant while performing maintenance on other portions.
- MANUAL - In manual mode the operator can control any device individually. This is meant for advanced maintenance or diagnostic operations and would not typically be the operational mode.

7.2. Well Pump Control

There are multiple well pumps which are connected together and represented as a single pump in the system. The pump group is turned On/Off via a digital output. There is feedback on the contactor state of the motor contactor that drives the entire group, but no feedback from individual pumps. Additional control can be added depending upon well Pump controller.

7.3. Water Tank Control

Raw Water Tank / Feed Pump

The feed pump is used to perform several functions. The main function is to provide continuous supply of raw water to the Multimedia filter, activated carbon filter and micron filter. In this case the feed pump is protected from dry running via a level switch located in the raw water tank.

The raw water tank is maintained and controlled by a well pump shutoff level switch which will shut off the incoming well water if the tank is full. A raw water pumps shutoff level switch turns off the feeder pumps if the water level in the tank is too low. A level switch indicates the actual raw water level for additional control options.

Potable Water Storage Tanks

The potable water tank is maintained and controlled by a well pump shutoff level switch which will shut off the incoming treated water if the tank is full. A booster and fire pump shutoff level switch turns off the booster and fire pumps if the water level in the tank is too low. A level switch indicates the actual treated water level for additional control options.

7.4. Media Filter Control

There are 2 media filters in the system with an option for two more. Each filter has five valves that can put the filter into one of 3 possible states (Filtration, Backwash, and Flush).

7.5. Chlorination Control

There is a PLC controlled Sodium Hypochlorite Doser that has on/off control. There is also a Chlorine sensor to read the chlorine level in the water to ensure it meets requirements.

7.6. UV Sterilization Control

There is a UV solenoid valve in the system. The valve is set to Open/Close via a digital output. There are two UV lamps in the systems that are set to On/Off via a digital output. There is a UV sensor in the system to ensure operation.

7.7. Booster Supply Control

The duty assist booster pumps are used to perform several functions. The main function is to provide the correct pressure to the camp supply. The pumps can provide for normal operation with the ability to meet peak flow for intermittent periods.

7.8. User Interface

There is a user interface to operate and maintain the potable water system. There are controls to initialize the system, start and stop it as well as backwash the filters. The panel displays the flow status of the system and values of all parameters. Alarm and warning states can be monitored

7.9. Control Panel

The PLC based control panel has an Allen Bradley CompactLogix PLC that controls all operations of the system and the user interface. The PLC maintains all pump control functions as well as logic for associated with operations. The control panel has an hour meter to monitor run time, a common fault alarm, emergency push button and indicators for operational status.

8. Water Storage

Water storage will be provided by one raw water storage tank in front of the water treatment plant and 3 water storage tanks for potable water storage after the treatment plant. Tanks will be interconnected with insulated and heat traced piping and tanks will have immersion heaters and be Polyurethane coated for winter operation.

Raw Water

Raw water storage is provided to maintain constant pressure on the Feeder pumps and allow large particles to settle in tank.

Potable Water

The potable water storage is designed to provide a minimum of 12 hours of potable water without the system operating as well as water for operation of the Fire Pump.

Tanks

- Raw Water – 25,000 litres
- Potable Water – 130,0000 litres
- Pre-fabricated concrete allows for minimal install time
- In ground installation reduces footprint
- NSF 61 Approved for potable water

9. Preventive / Routine Maintenance

It is important to carry out a routine maintenance program to ensure your plant consistently produces good quality potable water and to extend the life of the plant. Failure to routinely maintain your plant will lead to a small problem developing into larger problems. The filtration / disinfection water treatment plant has a nominal capacity of 220,000 litre per day, and has the following stages of treatment.

1. Feed pumps operating as duty / standby, cyclic changeover for even ware.
2. Multimedia filters with backwash & rinse facility, filtering water to 5 micron.
3. Activated Carbon Filter with backwash & rinse facility, removing bad taste & odours.
4. Chlorine injection pump, which dose the filtered water prior to discharge into the 130,000 litre potable water storage tank. The chlorine ensures no cultivation of bacteria occurs while the treated water is held in the storage tank.
5. Replaceable 5 micron cartridge filters.
6. Booster pump set, operating as the duty/standby, cyclic changeover for even ware.
7. UV sterilizer kills all bacteria by passing the filtered water through a lamp which burns the bacteria, just prior to use.

DAILY ROUTINE

1. Clean Water Treatment Plant & Enclosure.
2. Check all piping connections & joints for leaks and tighten when necessary. Do not over tighten.
3. Check UV is operating by observing the blue light in the sight port of the UV stainless steel housing.
4. Check Sodium Hypochlorite level in tank.

EVERY 360 hours (15 Days)

1. Change 5 micron cartridge filters.

EVERY YEAR

1. Change UV lamps. Despite the lamps working, it will lose its intensity after a year, thereby reducing its ability to kill bacteria.

EVERY 3 TO 5 YEARS

1. Change multimedia & activated carbon in filter vessels. The duration will depend on raw water quality & frequency of backwashing.

10. Major Components

9SH2J52B0

Raw water and Backwash: Goulds Close Coupled SSH Pumps

Engineering Data:

- Pump Code: 9SH2J52B0
- Pump Shut Off Head: 155FT
- Max. Temperature: 100 °C
- Pump Size:1 X 2 - 6
- Motor Speed: 3450 RPM
- Liquid: Water
- Motor Code: C10742
- System Input Power: 3~ 208V
- Max. Frequency: 60
- Electrical Enclosures: TEFC
- Discharge: 1” 316SS
- Approximate Net Weight: 76 lb
- Suction Size: 2” 316 SS
- Impeller Type: Radial Impeller
- Impeller Size: 6 7/16"
- Sense of Rotation: Clockwise from the drive end
- Motor Standard: NEMA
- Suction Flange Rating: Class 150
- Discharge Flange Rating: Class 150
- Impeller Construction: Closed
- Motor Rated Horsepower: 5.00 hp
- Shaft Seal: Carbon/Sil-Carbide/Viton
- Suction Flange Standard: ANSI
- Discharge Flange Standard: ANSI
- Pump Max Horsepower: 5.2185 hp
- 316L Stainless Steel
- Pump Horsepower at Rating Point: 4.09 hp

Standard Equipment / Capability:

- Close coupled or frame mounted end suction pump.
- All liquid handling components of AISI 316L statinless steel.
- Flanged connections to mate with standard ANSI 150 lb raised face flange.
- Discharge is top centerline for piping flexibility.
- Close coupled version uses standard NEMA JM frame motors.
- Uses standard John Crane Type 21 mechanical seal.
- Maximum working pressures to 230 PSI
- Maximum temperatures to 121 °C
- Enclosed impeller with replaceable wear ring for high efficiency and long

MMF – 24 FRP – Multi media filtration unit

FRP Tanks

- 24" x 72" fibre reinforced polyethylene tanks
- 2" flanged top and bottom openings
- Maximum operating pressure: 150 psi
- Maximum operating temperature: 66 °C
- Safety Factor: 4:1 (600 psi minimum burst pressure)
- Cycle Test: 100000 cycles without leakage

Zeolite Filtration Media

- High internal and external surface area @ 25m^2/g
- High pore space permeability for water transmission
- Neutralizes acidic water
- Discoid shape presents large surface area
- 55 lb/ft^3 density
- 14x40 mesh size
- Uniformity Coefficient 1.8
- NSF Standard 61
- 2.8X Solids Loading capacity
- Nominal Filtration rating of 5 microns
- 29-37 m^3/h per m^2 flow rate range

Electrically Actuated Ball Valves

- 1.5" PVC
- 120V, 1 Phase, 60 Hz
- Threaded NPT
- EPDM seals
- Integrated manual override
- Overload protection

SSC – 12 Cartridge Filters

- Stainless Steel Housing
- (4) – 30" cartridges
- Removable cartridge post lifts out for easy cleaning
- Filtration for silt, taste odor and sediment
- Air vent allows venting before start up or draining
- Accepts range of standard filter media
- 150 psi maximum operating pressure

- 0 – 149 °C operating temperature
- Pentek P5-30 5 micron polypropylene cartridge filter

Sterilight SV50 Ultra violet disinfection unit

- Stainless steel chamber material
- 2 year rated lamp service life
- 2" MNPT inlet and outlet
- 2 RJ45 Communication ports
- UV intensity monitor with diagnostics test
- 120V, 1 Phase, 60 Hz
- 10 – 100 psi operating pressure
- 0 – 40 °C ambient air temperature
- 40 mj/cm^2 dose @ 189 LPM
- NSF Standard 61
- 200 watt UV lamp @ 254 nm
- Quartz lamp sleeve
- Controller with lamp age and operation indicator
- Sensor reading indicator
- Ballast operation indicator

CDS – 6 Sodium Hypochlorite Dosing System

- Fully adjustable output capacity to 23 LPD
- Manual function control for stroke rate and length
- 3/8" PVC tubing connection
- 15% liquid sodium hypochlorite solution
- Highly reliable timing circuit
- EMI resistant
- Thermally protected solenoid with auto-reset
- Bleed valve assembly
- PVC head and fittings
- 60 Liter Polyethylene chemical tank

10SH2L52B0 Booster Pump: Goulds Close Coupled SSH Pumps

Engineering Data:

- Pump Code: 10SH2L52B0
- Pump Shut Off Head: 239FT
- Max. Temperature: 100 °C
- Pump Size: 1 X 2 - 8
- Motor Speed: 3450 RPM
- Liquid: Water
- Motor Code: C12742
- System Input Power: 3~ 208V
- Max. Frequency: 60
- Electrical Enclosures: TEFC
- Discharge: 1” 316SS
- Approximate Net Weight: 76 lb
- Suction Size: 2” 316 SS
- Impeller Type: Radial Impeller
- Impeller Size: 8 1/16"
- Sense of Rotation: Clockwise from the drive end
- Motor Standard: NEMA
- Suction Flange Rating: Class 150
- Discharge Flange Rating: Class 150
- Impeller Construction: Closed
- Motor Rated Horsepower: 10.00 hp
- Shaft Seal: Carbon/Sil-Carbide/Viton
- Suction Flange Standard: ANSI
- Discharge Flange Standard: ANSI
- Pump Max Horsepower: 10.783 hp
- 316L Stainless Steel
- Pump Horsepower at Rating Point: 9.16 hp

Standard Equipment / Capability:

- Close coupled or frame mounted end suction pump.
- All liquid handling components of AISI 316L stainless steel.
- Flanged connections to mate with standard ANSI 150 lb raised face flange.
- Discharge is top centerline for piping flexibility.
- Close coupled version uses standard NEMA JM frame motors.
- Uses standard John Crane Type 21 mechanical seal.
- Maximum working pressures to 230 PSI
- Maximum temperatures to 121 °C
- Enclosed impeller with replaceable wear ring for high efficiency and long

V350 Goulds Diaphragm Pressure Tank

- Deep drawn steel shells
- Inner Shell prevents diaphragm from over expanding
- Heavy duty butyl rubber diaphragm
- Polypropylene liner
- Maximum 125 psi operating pressure
- Maximum 50 °C operating temperature
- 1 1/4” FNPT connection
- High Density Polypropylene base
- NSF Standard 61

11. Drawings

Referenced in this Document are the following ASMF-1000/KAP drawings:

- General View
- Process and Instrumentation Diagram
- House Electrical
- Power Distribution
- Pumps
- Media Filtration
- Sensors