“E”

Wastewater Feasibility Study

Gateway East Winery P18-00389-UP
Planning Commission Hearing Date November 6, 2019

WINERY WASTEWATER FEASIBILITY REPORT

(PRELIMINARY FOR USE PERMIT ONLY)

GATEWAY EAST WINERY
NAPA, CALIFORNIA

APN 057-210-039 & APN 057-210-040

PROPERTY OWNER:

Scannell Properties, LLC
3569 Mt. Diablo Blvd, Suite 220
Lafayette, CA 94549

Project# 4117062.0
October 5, 2018

1515 Fourth Street, Napa, CA 94559 www.rsacivil.com 707.252.3301.v 707.252.4966.f

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INTRODUCTION

The owner is applying to the County of Napa for a Winery Use Permit. The permit will allow a production of 230,149 gallons of wine per year. The Gateway East Winery project is on 2 parcels located at Gateway Road East, Napa, California 94559. The APNs are 057-210-039 and 057-210-040. Water to the site will be from Napa City Water. Access to the property is via Gateway Road East.

The property is currently undeveloped. Most of the property is level, sloping gently towards Sheehy Creek, which flows east to west along the northern boundary of the site. Appendix 1 contains a reduced version of the proposed development plan set.

Winery process wastewater will be treated on-site to reduce Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) to acceptable levels. Process wastewater will then be combined with domestic wastewater before discharging to the municipal sewer system operated by Napa Sanitation District (NapaSan). Details of the proposed on-site treatment system are included in this report and in Appendix 2.

This report will evaluate the disposal of wastewater consisting of winery process wastewater, and domestic wastewater.

WINERY PROCESS WASTEWATER CHARACTERISTICS

The following is a summary of the winery wastewater characteristics:

Wine Production:	230,149 gallons of wine per year 2.38 gallons of wine per case 96,700 cases/year
Wastewater Production:	5 gallons of wastewater/gallon of wine 1,150,745 gallons/year
Peak Daily Waste Water Flow:	Crush Period = 60 days Annual wine production x 1.5 / 60 5,754 gallons/day
Average Daily Flow:	1,150,745/365 = 3,152 gallons/day

Monthly Wastewater Flows:

TABLE 1

Sep	15%	172,611	Gal/Month
Oct	15%	172,611	Gal/Month
Nov	11%	120,828	Gal/Month
Dec	8%	86,305	Gal/Month
Jan	4%	46,030	Gal/Month
Feb	6%	69,045	Gal/Month
Mar	6%	69,045	Gal/Month
Apr	5%	51,783	Gal/Month
May	6%	69,045	Gal/Month
Jun	7%	80,552	Gal/Month
Jul	9%	97,813	Gal/Month
Aug	10%	115,074	Gal/Month
Totals	100%	1,150,745	Gal/Year

According to NapaSan District Code, winery process wastewater must be treated prior to discharge to municipal sewer or be treated as a high strength waste. Based on our experience, and the District Code, average winery wastewater characteristics are assumed to be as follows: .

TABLE 2

Characteristics	Units	Average
pH		3.5
BOD5	mg/l	7000
TSS	mg/l	600
Nitrogen	mg/l	20
Phosphorus	mg/l	10

The treatment goal is 175 mg/l BOD, 200 mg/l TSS, and pH between 6.0 and 9.0. To meet this treatment goal, a proposed treatment train design is described below. The final treatment train may be updated to utilize current practices during the design development and construction document project phase.

WINERY PROCESS WASTEWATER TREATMENT – MEMBRANE BIOREACTOR

The proposed membrane bioreactor treatment train will include a collection sump/equalization tank, with rotary screen, an above-ground treatment system with Moving Bed Biofilm Reactor (MMBR) unit, and an underground pump tank. The following sections describe this process in more detail. This system will be designed by Lyve Systems LLC. A full proposal from Lyve Systems is included in Appendix 2.

Collection Sump/Equalization Tank

The collection sump/equalization tank will serve for buffering peak flows and pH monitoring and adjustment. A rotary screen will filter solids from the wastewater. A new underground tank will be provided.

Treatment Unit

The treatment unit will be above ground in the waste processing area. The wastewater flows will be treated using a Moving Bed Biofilm Reactor (MMBR), Activated Sludge Aeration Basin, and Membrane Bio Reactor (MBR). Wastewater will be automatically tested here for BOD, TSS, and pH. Detailed description of the treatment processes can be found in the Lyve Systems Proposal and Design Memo in Appendix 2.

Pump Tank

The pump tank will serve to hold wastewater prior to discharge to NapaSan. A new underground tank will be provided. The pump tank will include a composite sampling system as required by NapaSan.

DOMESTIC WASTEWATER CHARACTERISTICS

The winery domestic wastewater system has been sized to accommodate the unit values in Table 3 below. The number of visitors and employees is based on information provided by the applicant. The projected flow is based on Napa County Environmental Management guidelines. The following is a summary of the estimated flows from the proposed winery. The number of visitors is based on a maximum expected daily visitor count.

Table 3

DOMESTIC WASTEWATER PRODUCTION						
Use	**Number**	**Projected Peak Flow (gpd)**	**Peak Day Demand (gpd)**	**Average Day Demand (gpd) [5]**	**Annual Peak Flow (gpy)**	**Annual Average Flow (50% of Peak) (gpy) [4]**
Full-time Employees[1]	15	15	225	112.5	82,125	41,063
Part-time Employees[2]	5	15	75	37.5	9,000	4,500
Daily Visitors[3]	30	5	150	75	54,750	27,375
Event Visitors[4]	200	5	1,000	500	13,000	6,500
TOTAL	250		1,450	725	158,875	79,438

Notes:
1. Assuming winery open and fully staffed 365 days/yr (assume vacations and overtime offset each other)
2. Assuming that part-time employees are employed for a 120 day harvest/crush period
3. Assuming visitors accepted 365 days/year
4. Based on 13 events per year with 200 guests
5. Annual average flow = 50% of peak projected flow. Reference Viessman and Hammer, Water Supply and Pollution Control, Table 4.7 Maximum Daily Flow to average ratio of 2:25: 1. A ratio of 2:1 was conservatively adopted.

COMBINED WASTEWATER – DISCHARGE TO NAPASAN

The peak daily discharge, combining domestic and winery process wastewater, in gallons per day will be;

5,754 + 1,450 = 7,204 GPD

Applying a peaking factor of 3.65 (see fig. 10-1 of NapaSan Standards for pipe design flows of less than 10 MGD) gives a peak design discharge of

7,204 GPD x 3.65 = 26,295 GPD

Which equates to

$26,295 \times 1.5472 \times 10^{-6} = 0.041$ cfs.

This will discharge to an existing 6 inch sanitary sewer pipe in Gateway Road East. The peak flow depth in a 6 inch pipe will be 0.11 ft, or 0.22 d_n/D, which is less than the NapaSan limit for existing pipes of 0.85.

OPERATION AND MAINTENANCE

The winery process wastewater system will be fully automated and will be designed so minimal input from winery staff is required.

CONCLUSION

This report demonstrates that through on-site treatment of winery process wastewater, it is feasible to combine domestic and winery process wastewater and safely discharge to NapaSan municipal sanitary sewer within acceptable limits for quality and quantity.

The above methodology results in a design that meets the Napa Sanitation District standards for the treatment and disposal of winery and domestic wastewater.

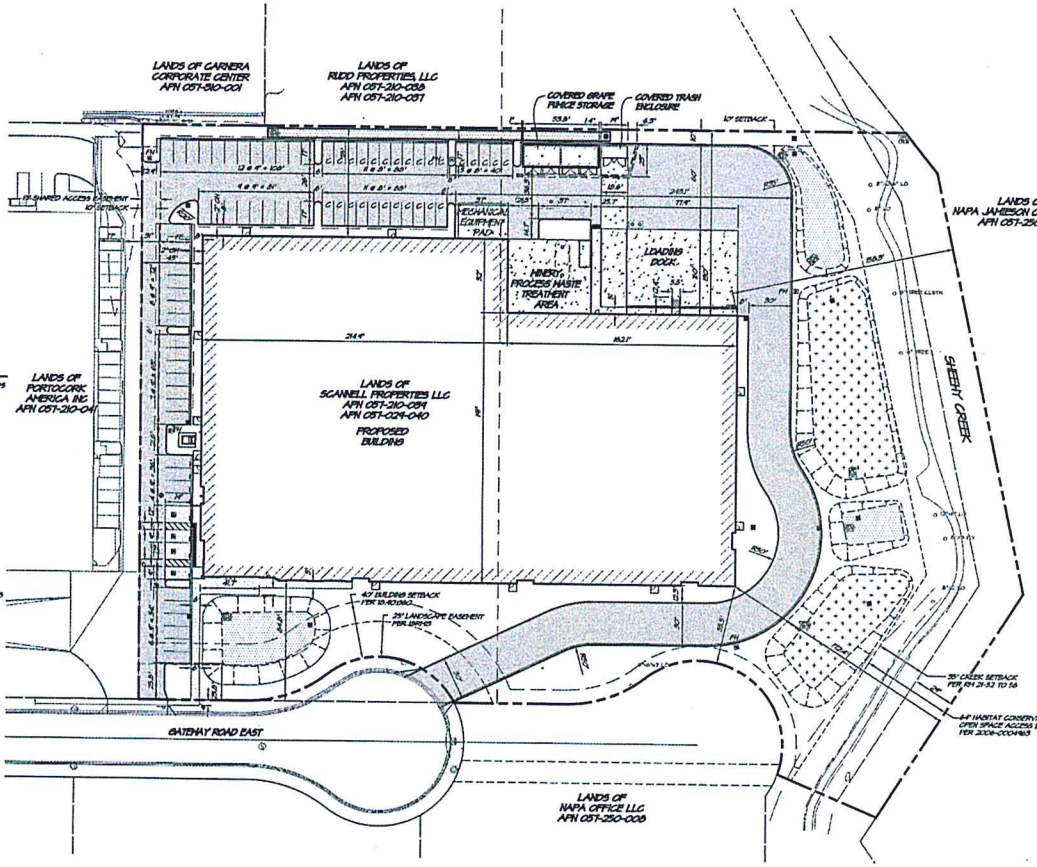
Appendix 1

Reduced Use Permit Plan Set

GATEWAY EAST WINERY

USE PERMIT PLANS

NAPA COUNTY CALIFORNIA



SYMBOL LEGEND

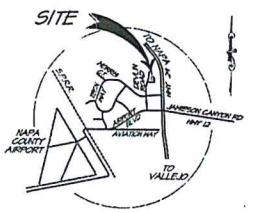
EXISTING SYMBOL	EXISTING DESCRIPTION	PROPOSED SYMBOL	PROPOSED DESCRIPTION
CB	CATCH BASIN	DI	DRAIN INLET
	CURB AND GUTTER		CURB & GUTTER
DI	DROP INLET		6" VERTICAL CURB
67	EXISTING CONTOUR	FH	FIRE HYDRANT ASSEMBLY
	WIRE FENCE		GRADE BREAK
	WOOD FENCE	SCO	SANITARY SEWER CLEAN OUT
	POWER POLE W/ GUY WIRE	SCO	STORM DRAIN CLEANOUT
	ROADSIDE SIGN		SANITARY SEWER LINE
	SANITARY SEWER LINE		PROPERTY LINE
SMH	SANITARY SEWER MANHOLE		EASEMENT
143.2	SPOT ELEVATION		SLOPE (2:1 UNLESS OTHERWISE SHOWN)
	STORM DRAIN LINE		STORM DRAIN LINE
	STREET CENTERLINE		STREET CENTERLINE
	WATER LINE		FIRE WATER LINE
WM	WATER METER	DW	DOMESTIC WATER LINE
SL	STREET LIGHT	WM	WATER METER
			WATER TEE
		WV	WATER VALVE
	TREE TO BE REMOVED		VALLEY GUTTER

ABBREVIATIONS

AB	AGGREGATE BASE	NCRSS	NAPA COUNTY ROADS & STREET STANDARDS
AC	ASPHALT CONCRETE	NSD	NAPA SANITATION DISTRICT
APN	ASSESSORS PARCEL NUMBER	PA	PLANTING AREA
BR	BIO-RETENTION	POC	POINT OF CONNECTION
BW	BACK OF WALK	PRKG	PARKING
CB	CATCH BASIN	PL	PROPERTY LINE
CH	CHANNEL	ROW	RIGHT OF WAY
CO	CLEANOUT	RPD	REDUCED PRESSURE DEVICE
C	COMPACT PARKING	RWL	RAIN WATER LEADER
℄	CENTER LINE	RW	RETAINING WALL
CONC	CONCRETE	S	SOUTH
CV	CHECK VALVE	SAD	SEE ARCHITECTURAL DRAWINGS
DDCV	DOUBLE DETECTOR CHECK VALVE	SD	STORM DRAIN
DI	DROP INLET	S=	SLOPE EQUALS
DW	DOMESTIC WATER	SDE	STORM DRAIN EASEMENT
E	EAST	SDMH	STORM DRAIN MANHOLE
(EXIST)	EXISTING	SF	SQUARE FOOT
EP	EDGE OF PAVEMENT	SPR	SPRINKLER
FDC	FIRE DEPT. CONNECTION	SLAD	SEE LANDSCAPE ARCHITECTURAL DRAWINGS
FF	FINISH FLOOR ELEVATION	SL	SEWER LATERAL
FG	FINISH GRADE	SS	SANITARY SEWER
FH	FIRE HYDRANT	SSD	SEE STRUCTURAL DRAWINGS
FL	FLOW LINE	SSCO	SANITARY SEWER CLEANOUT
FS	FIRE SERVICE LATERAL	SSE	SANITARY SEWER EASEMENT
FW	FIRE WATER	SSMH	SANITARY SEWER MANHOLE
GB	GRADE BREAK	STD	STANDARD
HP	HIGH POINT	SW	SIDEWALK
INV	INVERT	TC	TOP OF CURB
IRR	IRRIGATION	TW	TOP OF WALL
JB	JUNCTION BOX	TYP	TYPICAL
JP	JOINT POLE	U.O.N.	UNLESS OTHERWISE NOTED
LG	LIP OF GUTTER	V.I.F.	VERIFY IN FIELD
MH	MANHOLE	W	WEST
NEW	NEW	WM	WATER METER
N	NORTH	WV	WATER VALVE

HATCH LEGEND

- (P) BUILDING
- ASPHALT CONCRETE SURFACED ROAD DESIGNED AND MAINTAINED TO SUPPORT LOAD EQUIVALENT TO TI=0.44
- 12" THICK CONCRETE WITH #4 @ 12" O.C. EACH WAY OVER CLASS 2 AB COMPACTED TO 95% RELATIVE COMPACTION
- 6" THICK CONCRETE WITH #4 @ 12" O.C. EACH WAY OVER CLASS 2 AB COMPACTED TO 95% RELATIVE COMPACTION
- BIORETENTION AREA
- MITIGATED WETLANDS PER BIOLOGICAL REPORT



LOCATION MAP

NOT TO SCALE

PROJECT INFORMATION

DEVELOPER:	SCANNELL PROPERTIES, LLC 3445 MT. DIABLO BLVD., SUITE B1B LAFAYETTE, CA 94549
CONTACT:	TODD BERRYHILL todd@scannellproperties.com
SITE ADDRESS:	GATEWAY ROAD EAST NAPA, CA
CIVIL ENGINEER:	RSA+ 515 FOURTH STREET NAPA, CA 94559
CONTACT:	HUGH LEIN TEL: (707) 252-3301
ARCHITECT:	TERESA GOODWIN / HPA, INC. 503 4TH STREET, SUITE 101 OAKLAND, CA 94607 TEL: (949) 413-6848
(E) PARCEL NO & AREA:	057-210-039 & 057-210-040 (3.52 ACRES) (THO PARCEL NUMBERS ARE FOR ASSESSORS PURPOSES ONLY)
EXISTING USE:	VACANT
PROPOSED USE:	COMMERCIAL / INDUSTRIAL
NAPA COUNTY ZONING:	IP:AC INDUSTRIAL PARK WITH AIRPORT COMPATIBILITY OVERLAY
AIRPORT AREA SPECIFIC PLAN LAND USE:	BUSINESS/INDUSTRIAL PARK
WATER:	CITY OF AMERICAN CANYON
RECLAIMED WATER:	NAPA SANITATION DISTRICT
SEWER:	NAPA SANITATION DISTRICT
GAS & ELECTRIC:	PG&E
TELEPHONE:	AT&T

BOUNDARY NOTE

THE BOUNDARY SHOWN HEREIN IS BASED ON THE MAP ENTITLED FINAL MAP OF NAPA VALLEY GATEWAY, UNIT THREE, PHASE 5 IN BOOK 21 OF MAPS AT PAGES 52 - 56.

TOPOGRAPHIC MAP

TOPOGRAPHIC MAP PREPARED BY RSA+, DATE: JUNE, 2017

SHEET INDEX

GRAPHIC SCALE

40 0 40 80

(IN FEET)
1 inch = 40 FT

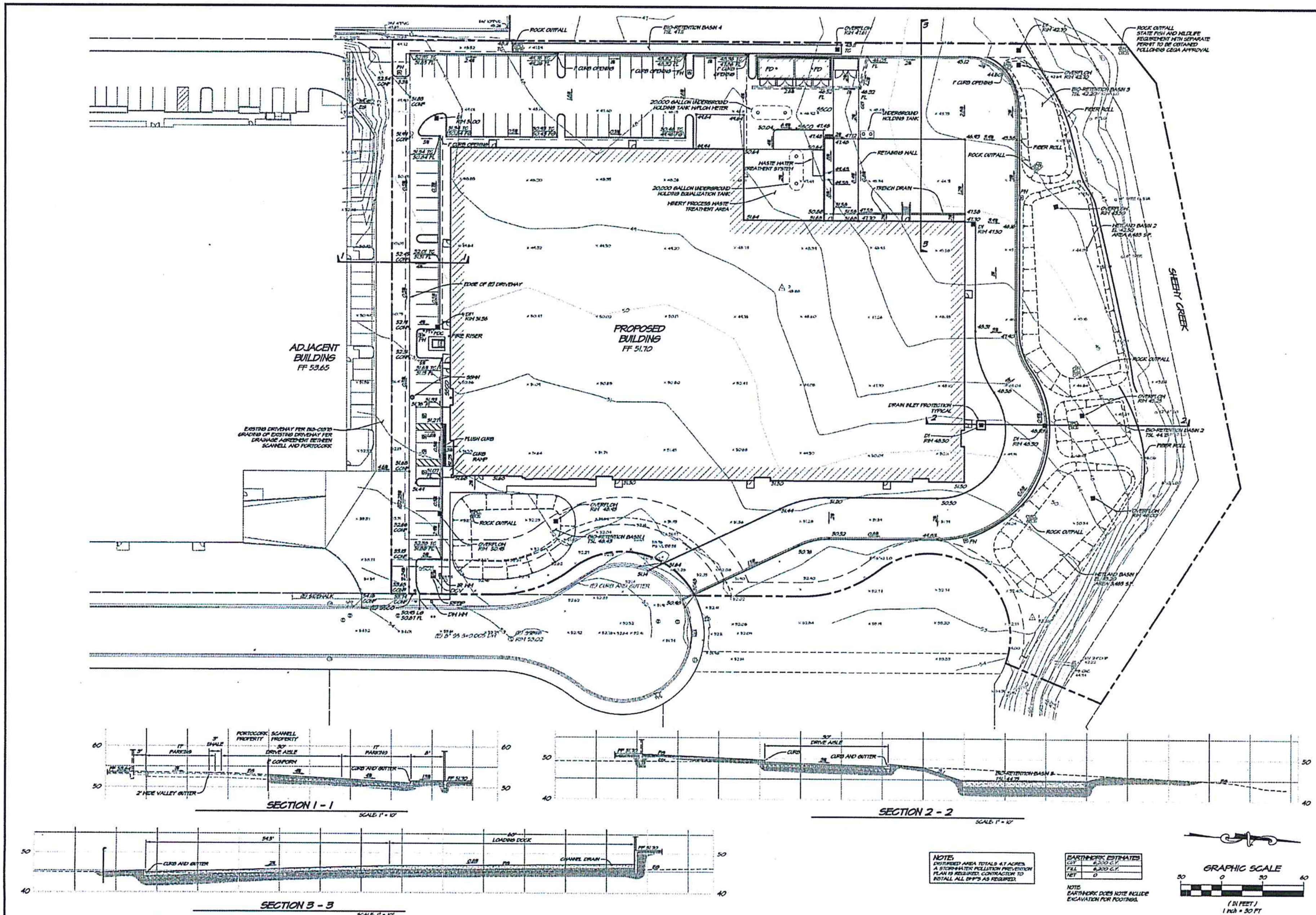
NO.	DATE	REVISIONS	BY

RSA+ CIVIL ENGINEERS • SURVEYORS • PLANNERS
515 FOURTH STREET
NAPA, CA 94559
OFFICE (707) 252-3301
www.RSAcivil.com

GATEWAY EAST WINERY
COVER SHEET
NAPA COUNTY CALIFORNIA

DATE	OCT. 8, 2018
DRAWN	DCB
DESIGNED	ZEB/DCB
CHECKED	HAL
JOB NO.	417.003.0
SHEET NO.	UP1.0
	1 OF 3 SHEETS

USE PERMIT - NOT FOR CONSTRUCTION



GATEWAY EAST WINERY
GRADING PLAN AND SECTIONS

NAPA COUNTY CALIFORNIA

RSA+
1515 FOURTH STREET
NAPA, CALIF. 94559
OFFICE (707) 252.3301
www.RSAcivil.com

RSA+ CONSULTING CIVIL ENGINEERS • SURVEYORS • 1980

NO.	DATE	REVISIONS	BY	APPD

DATE	OCT. 8, 2018
DRAWN	DCB
DESIGNED	ZEB
CHECKED	WAL
JOB NO.	4170620

SHEET NO.
UP2.0
2 OF 3 SHEETS

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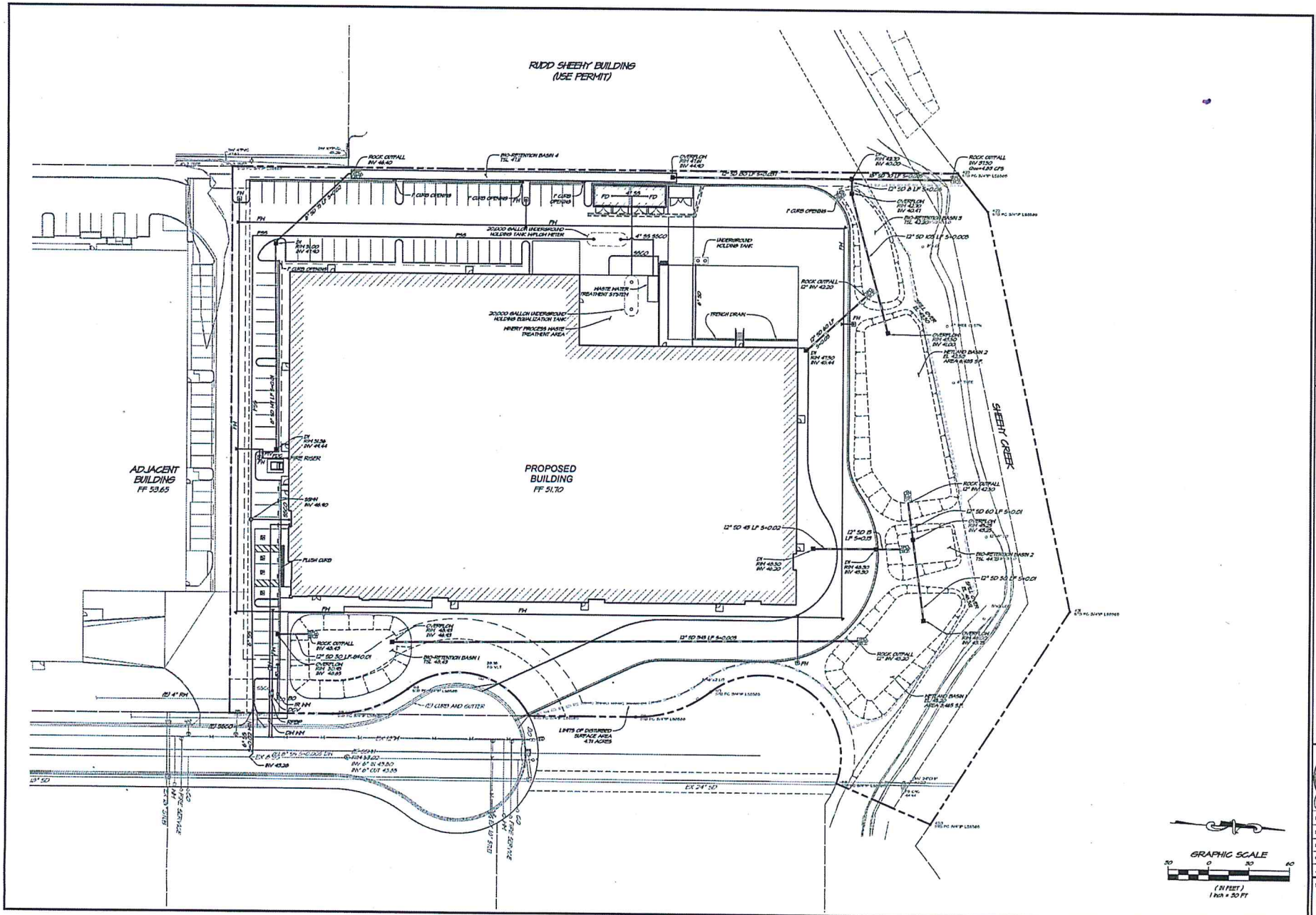

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1115 FOURTH STREET NAPA, CALIF. 94559 OFFICE (707) 252-3306 • www.RSANAPA.com

NO.	DATE	REVISIONS	BY	APP'D

GATEWAY EAST WINERY
UTILITY PLAN
NAPA COUNTY CALIFORNIA

DATE	OCT. 8, 2018
DRAWN	DCB
DESIGNED	EDGED
CHECKED	HAL
JOB NO.	4170620

SHEET NO. UP3.0
3 OF 3 SHEETS

USE PERMIT - NOT FOR CONSTRUCTION

Appendix 2

Lyve Systems Proposal and Design Memo

Lyve WASTEWATER TREATMENT

Lyve Wastewater Treatment System Design Information

TREATMENT SYSTEM FLOW DIAGRAM

SYSTEM COMPONENTS

The Lyve Wastewater Treatment System entails a collection Sump, Screening, an Equalization (EQ) Tank with a pH adjustment system, a Moving Bed Biofilm Rector (MBBR), an Activated Sludge Aeration Basin, a Membrane Bio Reactor, an Effluent Storage tank, and Sludge Digestion Tanks.

Sump

The raw process wastewater generated by the winery is collected an underground sump and pumped directly to the Rotary Screen.

Screening

Removal of solids from the process wastewater stream is vital for the operation of the Lyve System. A Rotary Screen, designed with a 1 mil wedgewire screen, screens the wastewater. The screened influent gravity flows directly to the EQ Tank. The solids generated by the Rotary Screen are collected in a bin located below the screen and disposed of according to Napa County regulations.

Equalization Tank

Equalization (EQ) is required for the buffering of peak loads, pH monitoring and adjustment, and for the prevention of surges or uneven flow patterns, which is key to operation of the wastewater treatment system. The EQ Tank is aerated and mixed constantly to prevent the contents from becoming septic, thus avoiding the production of pungent hydrogen sulphide gases. A pumping system, regulated by the Lyve Control Center, transfers the wastewater at a constant flow rate to the next stage of treatment.

pH Adjustment System

The pH of raw winery process wastewater can be quite variable. The EQ Tank provides the opportunity to balance the varying pH of the wastewater stream, allowing time to monitor the pH and correct it to be within the acceptable range required for the biological process. An automated system, regulated by the Lyve Control, is programmed to start and stop dosing chemicals at specific pH levels.

Moving Bed Biofilm Reactor (MBBR)

Following the EQ Tank is the Moving Bed Biofilm Reactor (MBBR). The MBBR contains specially designed biofilm carriers (media) which provide a large protected surface area for the biofilm to grow and thrive. The media has a unique design which allows the mass transfer of oxygen and wastewater flow across the biofilm creating optimal conditions for the degradation of BOD. Due to the unique design of the media, the bacterial cultures are protected from operating excursions (pH, temperature and toxic shocks) to yield a very robust system capable of coping with variable load fluctuations experienced by wineries. The reactor is continuously mixed and aerated via a course bubble diffused air system. The aeration agitates the

submerged media and creates the aerated environment which supports the biofilm growth.

Activated Sludge Aeration Basin

The Activated Sludge Aeration Basin is the next stage of treatment after the MBBR. This basin removes the balance of the BOD and takes up the suspended solids (TSS) in the wastewater. Oxygen is provided by a diffused air system for the respiration requirements of the bacteria and for the continued biological degradation. The aeration system evenly distributes oxygen across the basin, preventing the formation of localized areas of low dissolved oxygen concentration. As part of the activated sludge system, sludge is continually returned to the basin (RAS) from the MBR, maintaining the optimum sludge age.

Membrane Bio Reactor (MBR)

The final stage of the treatment process is the Membrane Bio Reactor (MBR). Once the BOD removal is completed by the previous treatment stages, the mixed liquor suspended solids (MLSS) overflows to the MBR. The MBR contains submerged hollow fiber membrane which are used to physically separate the suspended solids from the wastewater, producing high-quality effluent. The membranes require constant aeration to transport solids that could cause fouling away from the membrane surface. The accumulating solids found in the MBR are returned (RAS) to the Activated Sludge Aeration Basin or wasted (WAS) to the Sludge Digester. A permeate pumping system, regulated by the Lyve Control Center, pulls the mixed liquor through the membranes, sending the clean effluent to the Effluent Storage Tank.

Sludge Digester

The excess sludge from the system is wasted and stored in aerobic Sludge Digesters which are aerated and mixed constantly, preventing the contents from becoming septic and allowing for the endogenous respiration process to occur.

LYVE CONTROL CENTER

The Lyve Treatment System includes an integrated Control Panel and Monitoring System, or Control Center. The SCADA software, included with all Lyve Wastewater Treatment Systems, provides full control and monitoring of all operating functions of the system. It delivers real time information on the status of various components of the system and provides complete remote control of the system. This remote accessibility allows the operator to monitor and control the system from remote locations via computer or any Smart technology. Trend graphs provide valuable analytical data for record keeping and system management. Dissolved oxygen (DO), pH, Trans Membrane Pressure, and flow measurements are recorded and logged on a continual basis. The following monitoring and control features are included:

- pH and DO monitoring.
- Influent and Effluent flow meter with flow recording.
- All Tank and Sump level indicators and alarms.
- Low water alarms for protection of pumps.
- User email/ text messaging of alarm conditions.
- Blower and Pump speed adjustment capability.
- Full system process graphics with user defined control functions.
- Graphical data logging and storing of system and operator functions.

WASTEWATER TREATMENT SOLUTION

FOR

SCANNELL PROPERTIES

Gateway Road East
Napa, CA

October 2, 2018

Lyve WASTEWATER TREATMENT

Confidential Document

Lyve Systems, LLC
707.931.5225

3031 California Blvd
Napa, CA 94558

LYVE WASTEWATER TREATMENT

CONTENTS

CONFIDENTIALITY

EXECUTIVE SUMMARY

Lyve Systems is excited about the opportunity to present Scannell Properties our state-of-the-art system in winery wastewater treatment. The goal of this proposal is to provide Scannell Properties with a solution that will allow their winery, located in Napa, CA, to discharge of its winery process wastewater in accordance with the provisions of Napa County Planning, Building and Environmental Services and Napa Sanitation District. Included in this document is the preliminary wastewater design and associated budgetary price estimate on a Lyve Systems, LLC Winery Wastewater Treatment System.

Our core competency continues to be designing, manufacturing, integrating and delivering the highest quality water, process and wastewater technology in the field. Lyve's technology focuses on providing a project's required water quality cost effectively while recovering resources such as energy and/or reusing water whenever possible.

FEATURES & BENEFITS

- Napa based Service and Support since 2008
- Full Performance Guarantee
- Award Winning Technology
- Effluent Quality discharge of <30 mg/L BOD and <30 mg/L TSS
- Treated Effluent to be Discharged to Napa Sanitation District
- Treated Effluent may reduce the discharge costs to Napa Sanitation District
- Computer Controlled System Functions with Remote Monitoring
- Proven Technology, Simple Installation and Energy Efficient Operation
- One Full Year Parts Warranty
- One Full Year Remote System Monitoring by Lyve Systems
- Three months Operations, Maintenance and Training by Lyve Systems
- On-going Training and Support via Telephone and Internet
- Minimal Daily Attention Required
- Efficient Sludge Handling

DESIGN CRITERIA

The design criteria for the proposed Lyve Wastewater Treatment System is based on correspondence with RSA+ Civil Engineers. The design criteria are summarized in the table below.

DESIGN CRITERIA			
Annual Wine Production	=	140,000	cases/yr
Annual Wine Production	=	336,000	gal/yr
Design Peak PW Flow Rate	=	8,400	gpd
Average PW Flow Rate	=	4,600	gpd

Influent Parameters			
BOD_5 (Average)	=	6,000	mg/L
TSS (Average)	=	500	mg/L

Effluent Parameters		Napa San Standard	Lyve WW Treatment System	
BOD_5	≤	175	30	mg/L
TSS	≤	200	30	mg/L
pH		6 < pH < 8	6 < pH < 8	

During operations, if daily wastewater flows exceed the maximum design capacity of the system for more than two consecutive days and the system cannot be managed to process the excess, it is the responsibility of the winery to off-haul excess wastewater. Lyve Systems will not be responsible for off-hauling fees.

Napa Sanitation District

Lyve Wastewater Treatment Systems offers many benefits when discharging to Napa Sanitation District. Wineries can experience reduced capacity charges and monthly user waste charges. Charges from Napa San are based upon the flow, BOD and TSS values in the discharged effluent. Lyve Wastewater Treatment System produces the high quality of effluent with BOD and TSS values below the minimum requirement of Napa San. The lower values of BOD and TSS can lead to reduced fees. Discussions with Napa San will be required to establish the fee structure.

TREATMENT SYSTEM FLOW DIAGRAM

Sump → Screening → EQ → MBBR → Activated Sludge → MBR → Effluent Storage → Disharge to Napa San

SYSTEM COMPONENTS

The Lyve Wastewater Treatment System will entail a collection Sump, Screening, an Equalization (EQ) tank with a pH adjustment system, a Moving Bed Biofilm Rector (MBBR), an Activated Sludge Aeration Basin, a Membrane Bio Reactor, Effluent Storage tank, and Sludge Digestion Tanks.

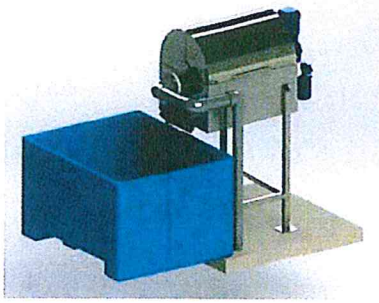
Wastewater Collection Sump

The raw process wastewater generated by the winery will be collected an underground sump. A 2-compartment 20,000 gallon underground fiberglass tank will be used for the sump and equalization (equalization discussed below). Approximately 3,000 gallons of the tank is used for the sump. The wastewater will be pumped from the sump to the Rotary Screen (screening discussed below). Pumping system will be regulated by the Lyve Control Center.

20,000 gallon fiberglass tank, risers, H-25 lids, and transfer pumping system to Rotary Screen is in included.

Process Wastewater Screening

Removal of solids from the process wastewater stream is vital for the operation of the Lyve system. A Rotary Screen, able to process 0 GPM to 150 GPM with a 1 mil wedgewire screen, will be used to screen the wastewater prior to entering the EQ tank. The screened influent will gravity flow to the underground EQ tank, discussed below.



Rotary Screen

The Rotary Screen has an automatic high-pressure, low-volume self-cleaning system. The self-cleaning system eliminates the time an operator must spend cleaning the screen. A hose tap capable of providing a fresh water supply at a rate of 1.4 GPM is required for the operation of the self-cleaning system.

The solids generated by the Rotary Screen will be collected in a bin located below the screen and be disposed of according to Napa County regulations. Bin is supplied by others.

Equalization Tank

Equalization (EQ) is required for the buffering of peak loads, pH monitoring and adjustment, and for the prevention of surges or uneven flow patterns. This ability is key to the operation of the wastewater treatment system. The EQ Tank will be aerated and mixed constantly to prevent the contents from becoming septic, thus avoiding the production of pungent hydrogen sulphide gases.

A 2-compartment 20,000 gallon underground fiberglass tank will used for the sump and equalization (sump discussed above). Approximately 17,000 gallons of the tank is used for equalization.

A transfer pumping system, regulated by the Lyve Control Center, is utilized to transfer the wastewater at a constant flow rate from the EQ Tank to the next stage of treatment. The motor on the transfer pump is controlled by a Variable Frequency Drive (VFD).

20,000 gallon fiberglass tank, risers, H-25 lids, aeration system and transfer pumping system is included.

pH Adjustment System

The pH of raw winery process wastewater can be quite variable. Generally, the pH of the raw process wastewater tends to be acidic by nature. However, occasionally due to caustic washing, extreme alkaline conditions can occur. The EQ Tank provides an opportunity balance the varying pH of the wastewater stream, allowing time to monitor the pH and correct it to be within the acceptable range for the biological process.

An automated system used to maintain the pH at an acceptable range is part of the turn-key configuration of the plant. The pH adjustment system is comprised of a Hach pH probe, Hach Analyzer, and chemical dosing pumps. The system is regulated automatically by the Lyve Control Center. The system is programmed to start and stop dosing chemicals at specific pH levels. It operates the chemical dosing pumps to inject the acid-based or caustic-based chemicals, as required, to raise or lower the pH of wastewater stream.

The pH probe and analyzer are included. The chemicals, storage tanks, and dosing pumps are not included and will be provided by a third-party vendor.

Nutrients

The biological process requires a certain amount of nutrients which is typically lacking in winery process wastewater. Thus, nutrients, in the form of urea, are added to the EQ Tank and controlled by a time-dosing system. The ammonia in the EQ Tank should be tested regularly and the time-dosing system adjusted as needed. The nutrients, storage tank and dosing pumps are not included and will be provided by a third-party vendor.

Moving Bed Biofilm Reactor (MBBR)

Following the EQ Tank is a Moving Bed Biofilm Reactor (MBBR). The MBBR contains specially designed biofilm carriers (media) which provide a large protected surface area for the biofilm to grow and thrive. The media has a unique design which allows the mass transfer of oxygen and wastewater flow across the biofilm creating optimal conditions for the degradation of BOD. Due to the unique design of the media, the bacterial cultures are protected from operating excursions (pH, temperature and toxic shocks) to yield a very robust system capable of coping with variable load fluctuations experienced by wineries. The reactor is continuously mixed and aerated via a course bubble diffused air system installed at the bottom of the tank. The aeration agitates the submerged media and creates the aerated environment which supports the biofilm growth.

MBBR Media

The media is retained in the reactor by a screen located at tank outlet where the wastewater flows to the MBR. A DO sensor is located in the MBBR to monitor the DO level so that it is maintained at a minimum of 2 ppm.

One 10,000 gallon poly tank, media, aeration system, the media retention screen, and DO sensor are included.

Activated Sludge Aeration Basin

The Activated Sludge Aeration Basin is the next stage of treatment after the MBBR. This basin serves as the traditional activated sludge system and is designed to remove the balance of the BOD and take up the suspended solids (TSS) in the wastewater. To accomplish this, sufficient dissolved oxygen must be present to provide for the respiration requirements of the bacteria.

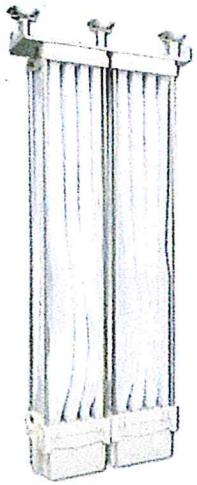
A fine-bubble diffused air system is installed at the bottom of the basin, the air being supplied by a blower. This provides the required oxygen for the continued biological degradation of the wastewater BOD and mix the contents of the Aeration Basin. The aeration system is designed to evenly distribute oxygen across the basin preventing formation of localized areas of low dissolved oxygen concentration within the basin. As part of the activated sludge system, sludge must be continually returned to the basin (RAS) from the MBR, discussed below, to maintain an optimum sludge age.

A steel tank, discussed in detail below, will be used to house the Activated Sludge Aeration Basin and the the Membrane Bio Reactor (MBR).

The steel tank and aeration system are included.

Membrane Bio Reactor (MBR)

The final stage of the treatment process is the Membrane Bio Reactor (MBR) for final polishing and solids separation prior to storage and disposal. Once the bulk of the removal of the BOD is completed by the previous treatment stages, the mixed liquor suspended solids (MLSS) overflows in to the MBR. The MBR contains GE ZeeBlok 500S submerged hollow fiber membrane which are used to physically separate the suspended solids from the wastewater, producing a high-quality treated wastewater.



ZeeBlok 500S

The membranes require constant aeration to transport solids that could cause fouling away from the membrane surface. The membranes have a built-in air manifold that transfers air to a course bubble diffuser located at the bottom of the cassette. Air is supplied by a blower. To limit the build-up of the solids, keeping the MBR at peak performance, the accumulating solids will be returned (RAS) to the Activated Sludge Aeration Basin or wasted (WAS) to the Sludge Digester.

A permeate pumping system pulls the mixed liquor through the membranes, sending the clean effluent to the Effluent Storage Tank. The motor on the permeate pump is controlled by a Variable Frequency Drive (VFD).

The MBR chamber, located in the steel tank, membranes with integrated aeration system, permeate pumping system, Trans Membrane Sensor, RAS pump, and WAS pump are included.

Sludge Digester

The excess sludge from the system is wasted and stored in dual aerobic Sludge Digesters. The Sludge Digesters are aerated and mixed constantly to prevent the contents from becoming septic and allow for the endogenous respiration process to occur. To ensure adequate mixing and aeration, a diffused air system is installed at the bottom of each tank, air being supplied by a blower.

To manage and reduce the amount of sludge to be stored, the sludge digesters require regular decanting. The decant process isolates the sludge digester, allows the solids to settle and then the clear water formed above the solids is sent back to the EQ Tank for reprocessing. The thickened sludge that remains after the final decanting is stored and ultimately disposed of. The sludge decanting system is designed for remote or onsite operation. The process waste sludge is typically hauled off by a third-party septic hauler.

Two 5,000 gallon poly tanks, decanting system, and aeration system are included.

Blowers and Aeration

The Lyve Wastewater Treatment System includes blowers to provide aeration to various zones within the system. The motor on each blower is controlled by a Variable Frequency Drive (VFD) which drives the motor by varying the frequency and voltage supplied to the electric motor to adjust the blower speed. A control valve, supplied and installed by Lyve, is fitted on the air line at each tank. These two components allow for the adjustment of the air flow to the system, increasing or decreasing the volume of air provided to maintain the oxygen requirements of the system and to maximize energy efficiency.

Regenerative blowers and positive displacement blowers are included.

Effluent Storage Tank, pH verification & Composite Sampler

The clean effluent, after completing the treatment system is pumped to an underground effluent storage tank via the permeate pumping system, included with the MBR. A pH sensor will be installed after the MBR to verify that the pH of the effluent is still in-line with Napa San requirements. If is it out-of-spec, then the effluent will be returned to the EQ tank for re-processing.

The effluent storage tank will be a 15,000 gallon underground fiberglass tank, able to hold 1.5 days of wastewater generation. A transfer pumping system, regulated by the Lyve Control Center, will be used to transfer the effluent to the Napa San sewer system.

A composite sampler will be used to collect samples of the effluent in the effluent storage tank per Napa San requirements.

15,000 gallon underground fiberglass tank, risers, H-25 lids, pumping system, pH sensor, and composite sampler are included.

LYVE CONTROL CENTER

The Lyve Treatment System includes an integrated Control Panel and Monitoring System, or Control Center. All power for equipment and devices utilized by the Lyve System will be supplied through the control panel. Monitoring and operation of the system is provided by a Windows based PC with touch screen that hosts the Lyve SCADA software program. Internet connectivity of the PC provides remote access to the control and monitoring system.

The control panel and PC with SCADA software are included.

Power Requirements

High Voltage Power (provided by others):	480V, 3 Phase, TBD Amps
Control Power:	24 VDC and 24 VAC

The Lyve Control Center is equipped with a step-down transformer for a 120V, 1 phase supply. Main power to serve the Lyve System will be provided by others and will be bought to and terminated at the Lyve Control Center.

Internet Requirements

Internet Supply:	CAT5 or Fiber Cable
NIC Requirements:	IP address via DHCP, Standard 10/100/1000 type with RJ45 connection

The PC does not need to have any access to any other device on the network and includes a network interface card (NIC) that is dedicated to internet access. Internet to serve the Lyve System will be provided by others and will be bought to and terminated at the Lyve Control Center.

SCADA System

The SCADA software provides full control and monitoring of all operating functions of the system. It delivers real time information on the status of various components of the system. It also provides complete remote control of the system. This remote accessibility allows the operator and Lyve technicians to monitor and control the system from remote locations via computer or any Smart technology. Trend graphs provide valuable analytical data for record keeping and system management. Dissolved oxygen (DO), pH, Trans Membrane Pressure, and flow measurements are recorded and logged on a continual basis.

The following monitoring and control features area included as standard in the Lyve Control System:

- pH and DO monitoring.
- Influent and Effluent flow meter with flow recording.
- All Tank and Sump level indicators and alarms.
- Low water alarms for protection of pumps.
- User email/ text messaging of alarm conditions.
- Trans Membrane pressure for proper operating of the MBR.
- Blower speed adjustment capability.

- Pump speed adjustment capability.
- Full system process graphics with user defined control functions.
- Graphical data logging and storing of system and operator functions.

TREATMENT SYSTEM LAYOUT

The major components of the Lyve Wastewater Treatment System and their dimensions and footprints are as follows:

- Sump/EQ underground tank: 20,000 gallons, 10' diameter, 37'-8 ¾" long
- Rotary Screen with bin: 7' long by 3' wide
- MBBR tank: 10,000 gallon poly tank, 12' diameter
- Steel tank (Activated Sludge, MBR, Equipment Cabinet): 28.5' long by 8' wide by 10'-6" tall
- Sludge Digesters: two (2) 5,000 gallon poly tanks, 8.5' diameter
- Chemical tanks: two (2) poly tanks, 3' diameter
- Composite Sampler: 30" wide by 32" long
- Blower: 37" wide by 44" long
- Effluent Storage underground tank: 15,000 gallons, 10' diameter, 29'-5 ¾" long

The overall footprint required for the above ground equipment is 34'-6' long by 30' wide. See preliminary layout included at the end of this proposal.

Steel Tank

Original Lyve System above ground package plants are constructed of mild steel. The Activated Sludge Aeration Basin, MBR, and Equipment Cabinet are integrated in the steel tank. The footprint of the steel tank with cabinets is 28.5 feet long by 8 feet wide by 10.5 feet high. A concrete foundation, designed by others, is required to support the tank.

The external walls and bulkheads will be ¼" mild steel plate construction, fabricated in the shop for field installation and protected by a painting system. The painting system allows the steel package plant to weather the outdoor elements, limit corrosion and rust, and be aesthetically pleasing. The final color of the steel package plant can be customized to any color chosen by the client. All steel surfaces of the package plant are protected by the following painting system:

Interior Coating: Sandblast SA2.5~3

1st Coat Altex Devran 201 Polyamide Epoxy Primer

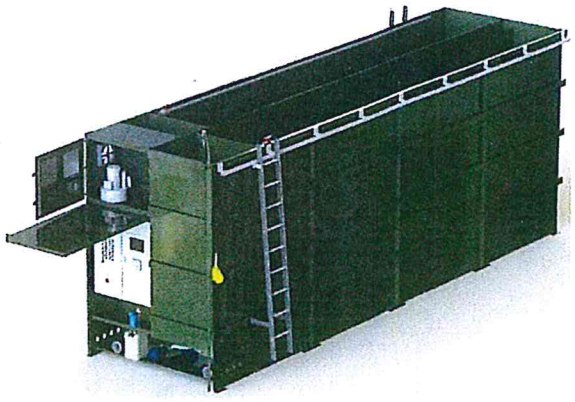
2nd Coat Altex Devchem 253 Chemical Resistant Lining

Top Coat Devchem 253 Chemical Resistant Lining

Exterior Coating: Sandblast SA2.5~3

1st Coat Altex Devran 201 Polyamide Epoxy Primer

2nd Coat Altex E Line 929 Isocyanate Free Gloss Finish



Foundation

The Lyve System must be supported on a concrete slab foundation. The steel package plant includes an anchoring system which is bolted into the foundation. In addition, it is recommended that all above grade plastic tanks also be located on a concrete slab and anchoring provided to resist overturning movements.

It is the responsibility of the winery to supply a foundation suitable to resist overturning movements and ensure the sub-grade conditions are suitable to support the structure. Lyve Systems will provide the information required for the structural design of the foundation.

Roof for Steel Tank

Napa Sanitation requires a roof or covering over any open-top wastewater system tanks or connections. As the design for this system is still preliminary, the roof or covering is not included.

DESIGN, DRAWINGS & PROJECT MANAGEMENT

Design & Drawings

The design of these systems typically undergoes a few iterations in order to fully coordinate the treatment system design with the site design. Included in this proposal are a few options for layout of the treatment system. Thus, in this early stage of the project, it is difficult to anticipate what drawings will be required for permitting and installation. Typically, Lyve System provides the following drawings and information:

- General Equipment Layout Plan.
- Underground Piping and Conduit Plan.
  - Prepared for and used by contractors to stub pipes and conduits.
- System Schematic.
- Steel tank weights and dimensions.
  - For use by Structural engineer to design foundation.
- Underground Tank equipment installation plans.

60 hours for design and drawings is estimated and included in the total price. Any time spent beyond this will be billed separately by Lyve on a Time and Material basis. Engineer labor rate is $140 per hour.

Project Management

Lyve Systems will work directly with engineers, consultants, contractors and governing agencies as required for a smooth design, permitting, construction and installation process. Field and construction coordination is required, even when detailed drawings are provided.

60 hours of project management is estimated and included in the total price. Any time spent beyond this will be billed separately by Lyve on a Time and Material basis. Engineer labor rate is $140 per hour.

INSTALLATION

The aboveground Lyve System tanks and associated equipment will be installed by Lyve Technicians. Lyve's included installation scope is limited to the pipework and equipment located on top of the concrete pad or in the equipment cabinets.

Piping and conduit stubs will be provided for Lyve according to the drawings provided by Lyve. All underground piping and conduit will be installed by others. Lyve technicians will connect to the provided stubs and complete the pipework to the various Lyve System components and equipment.

Underground tanks, risers and lid installation will be performed by others. The assembly and installation of all equipment provided by Lyve inside the underground tanks will be performed by others under the direction of Lyve technicians.

Depending on the installation location of the underground tank, the height of ground water, and bury depth of the tank, an anchoring system may be required for the underground tank. The fiberglass tank supplier can review the site information and provide the calculations and design for anchoring system, if required. The cost for the anchoring system is not included.

Costing associated with work performed by Lyve technicians is included. Costing of work to be performed by others is not included.

COMMISSIONING

Lyve will be responsible for commissioning all Lyve mechanical and electrical equipment as well as establishing the biological process so that the system treats and discharges effluent to the standard required.

OPERATIONS AND TRAINING

As part of our Service and Management Policy, three (3) months of full operations and maintenance of the Lyve System is included in this proposal, which begins at the completion of commissioning of the system. During these 3 months, a Lyve technician will train one winery operator on the mechanical and biological operation of the system. The winery and Lyve are to make a reasonable amount of time available to complete this training. Lyve has included 40 hours of time during this 3-month period for operations and training. Training may occur during any and all site visits that a Lyve technician will make during this period, which is typically twice a week. An operator's manual will be provided to the winery during the course of operator training.

Lyve technicians will also continue to monitor your Lyve System on a daily basis using the system's integral web-based monitoring and control system for the first year of system operations. This service is designed to assist the onsite operator and to help ensure the system continues to operate reliably and in accordance with Local Regulations.

All service, support and maintenance will be provided by Lyve Systems' Napa based personnel or their nominated and trained service providers. Service plan options for on-going operation and monitoring beyond what is included are available.

- Blower oil changes, filter and belt replacements
- Pump seal and impeller replacements
- pH/DO sensor maintenance and replacement
- Membrane cleaning

With proper care and maintenance, it is expected that this allowance would cover any replacement costs for the first 10 years, not including blower or membranes.

Treatment System Design Life

The Design Life for the major components of the system are as follows:

- Above ground Steel Packaged Plant: 25 years
- Membranes: 8 to 10 years
- Blowers: 8 to 10 years
- Pumps: 3 to 5 years
- Sensors: 1 to 2 years

Chemicals Consumed

For proper operation of the Lyve System, chemicals are required for pH adjustment and nutrient addition. How much and what specific chemicals are required can vary greatly with each individual wine production process. The use of chemicals can be mitigated by the winery's practices. Typically, Urea is used for nutrients, sodium hydroxide is used to raise the pH and caustic soda is used to lower the pH.

Power Consumption

The main power use is from the blowers for the aeration systems which operate continually, whereas the pumps typically require less than one (1) hp and are operated intermittently. The total hp draw for the blowers and aeration system is estimated to be 11HP, or 8.25 kW. The motor on each is controlled by a Variable Frequency Drive (VFD) which drives the motor by varying the frequency and voltage supplied. Through out the year, greater or lesser power will be required by the blowers. The annual power consumption of the is estimated to be 38,080 kW.

The following are the assumptions made to in order to estimate the annual the power consumption:

- For 60 days during harvest the equipment will operate at full capacity, using 11,880 kW.
- For 60 days of non-harvest activity, the equipment will operate at 60% capacity, using 7,200 kW.
- For the rest of the year with minimal activity, the equipment will operate at 40% capacity, using 19,200 kW.

PERFORMANCE GUARANTEE

Lyve Systems (LS) guarantees compliance with the winery's discharge permit(s) (the "Performance Requirements") as described below. Influent quantity and quality ("Window Limits") are as defined in the section titled DESIGN CRITERIA.

1) If the Influent is within the Window Limits.

a) If the influent quantity and quality are inside the Window Limits and the system fails to meet Performance Requirements, LS will, at its cost, make all necessary changes and/or adjustments to bring the system into compliance within 15 days of notification of such non-compliance with Performance Requirements; or

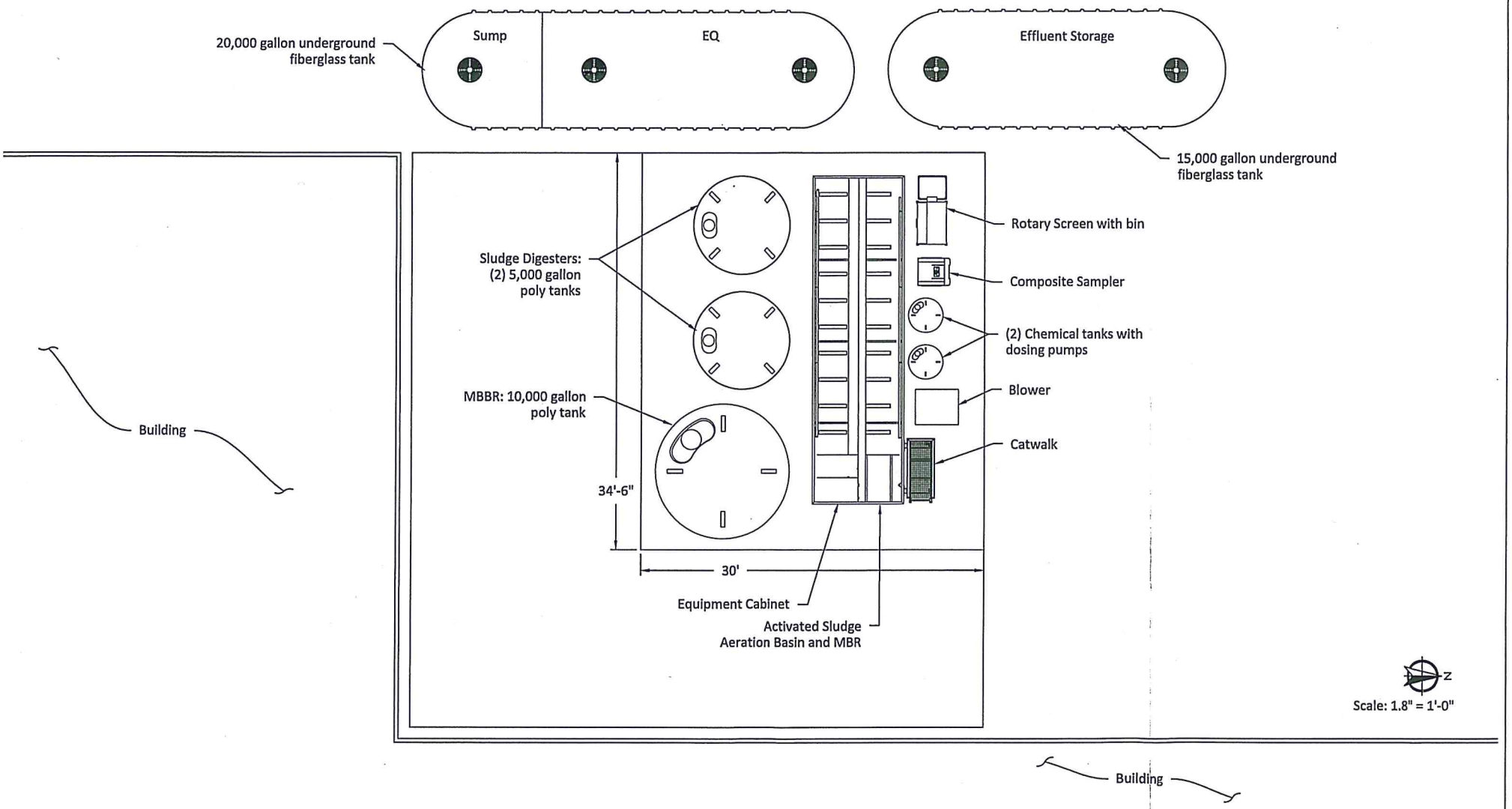
2) If the Influent is not within the Window Limits.
   a) If the influent quality and/or quantity are not within the Window Limits and cause the Lyve System to not meet Performance Requirements, LS will not be financially responsible for such failure to meet system Performance Requirements. LS will work with the winery to make all modifications and /or process changes necessary to bring the Lyve system into compliance with Performance Requirements.
   b) LS will not be financially responsible for Performance Requirements and/or any permit violation should the system be subjected to toxic shock caused by the excessive use of or spillage of chemicals, or the addition of chemicals toxic to the biological system that were not previously approved by LS or otherwise approved by the U.S. Alcohol and Tobacco Tax and Trade Bureau for use in winemaking in the United States.
   c) Time and materials spent to bring the system into compliance will be billed to the winery.
3) LS will not be financially responsible should the system not meet its performance requirements due to factors relating to routine service and maintenance, power failure, or other outside influences preventing the normal operation of the system.

INTELLECTUAL PROPERTY

All devices, designs, drawings and other documentation or information disclosed to the winery or it's Engineers or Associates will remain the property of Lyve Systems. Lyve Systems grants the winery and it's engineers an irrevocable, perpetual and royalty-free license and right to the use of any such information for the sole purpose of operating the Lyve Wastewater System located at the winery designated location for only so long as the LS Winery Wastewater System will be installed and operated at said location. The winery and its engineers will not disclose any such information and intellectual property or material to any third parties without Lyve Systems' written consent.

Any intellectual property from improvements or modifications made by Lyve Systems to the Lyve Wastewater Treatment System will be owned by Lyve Systems but made available to the winery and its engineers under this Intellectual Property section.

Lyve Systems agrees to indemnify, defend and hold the PURCHASER harmless from any and all third-party claims resulting from any alleged infringement of U.S. patents, copyrights or other third-party intellectual property rights, or the misuse of third-party trade secrets by the system.



Lyve Systems, LLC
3031 California Blvd
Napa, CA 94558
707.931.5225
www.lyvesystems.com

Filename

Lyve Wastewater Treatment System

Preliminary Layout

Scale	Sheet Size	Sheet Number	Revision
1/8" = 1'-0"	11x17	1 OF 1	0

Client Details

Scannell Properties
Gateway Road East
Napa, CA 94558

	Initials	Signature	Date
Drawn By	KH		10/02/2018
Checked By			
Approved By			

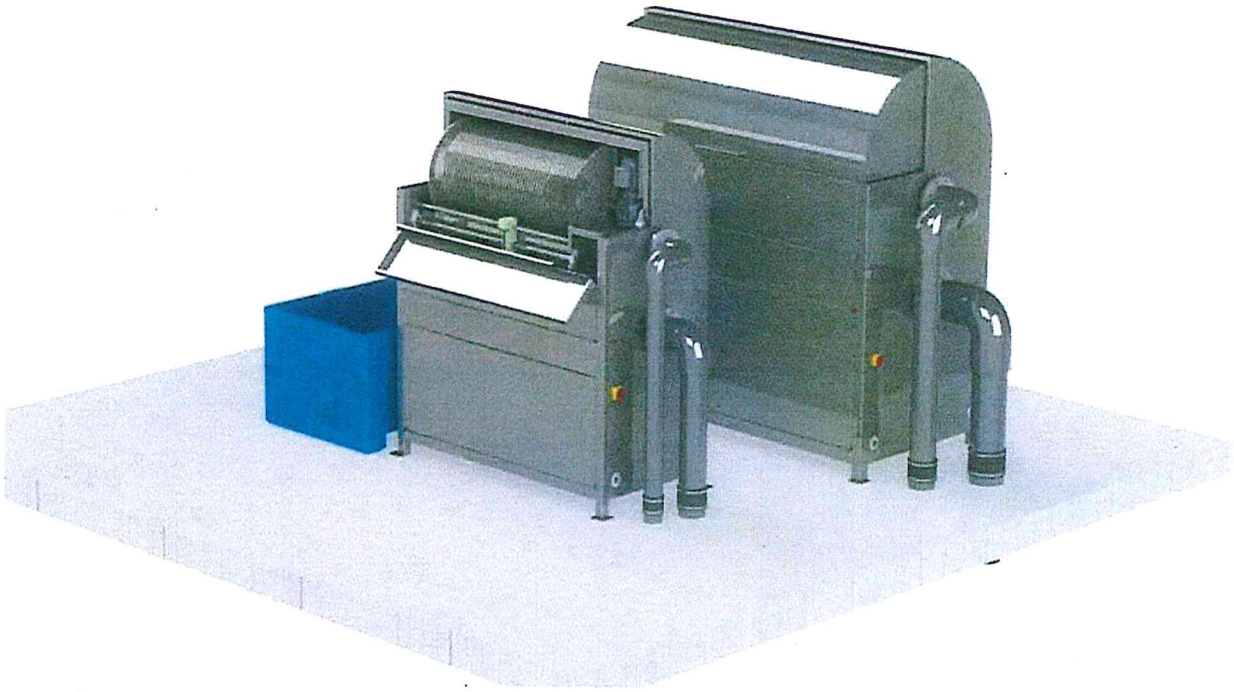
ROTARY SCREEN SC100, SC200 & SC500

Lyve WASTEWATER TREATMENT

Check out the FEATURES of the new LYVE SYSTEMS Rotary Screen for continuous separation of solids from a wastewater stream.

FEATURES:

- 304 Stainless Steel Construction
- Efficient and Low Maintenance Direct Drive System (no chains, gears or belts)
- 316 SS Wedge Wire Screen – slot sizes 0.027" to 0.375"
- Low Flow - Ultra High Pressure Spray Wash System (1000 psi at less than 2 gpm)
- Automatic Start/Stop/Overrun Control Panel Included
- Full Length Continuous Auger
- Perforated Screens Available
- Optional Inline Flowmeter (with 4-20 mA Analog Output)
- Includes 1 Year Warranty
- Models Available:
  - 100 GPM
  - 200 GPM
  - 500 GPM



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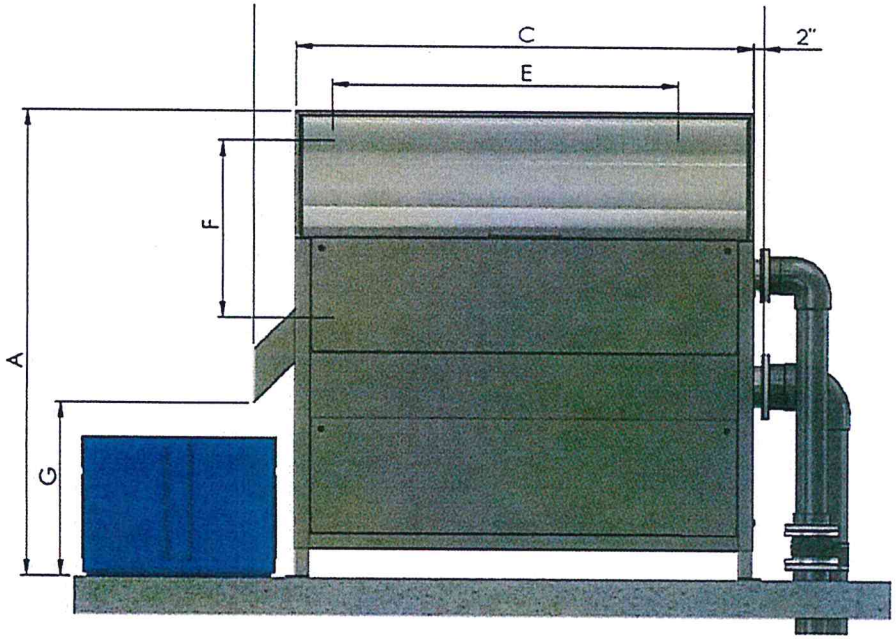
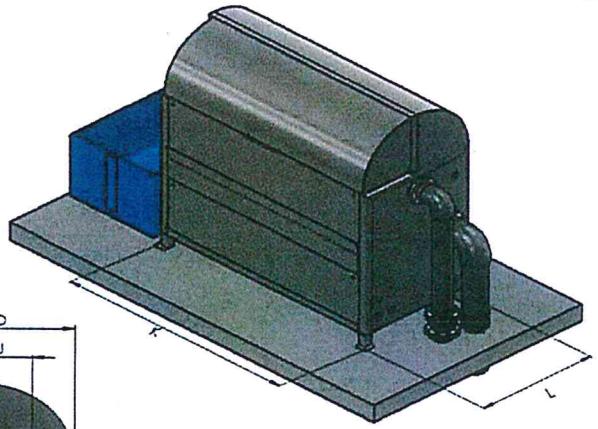
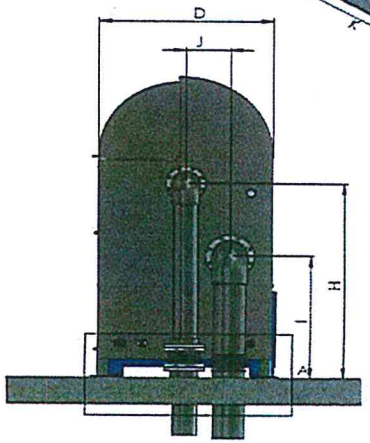
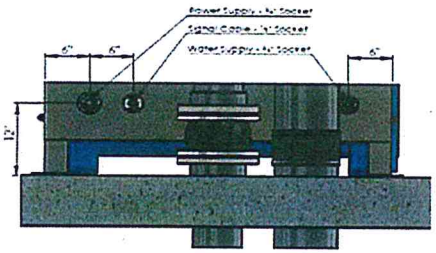




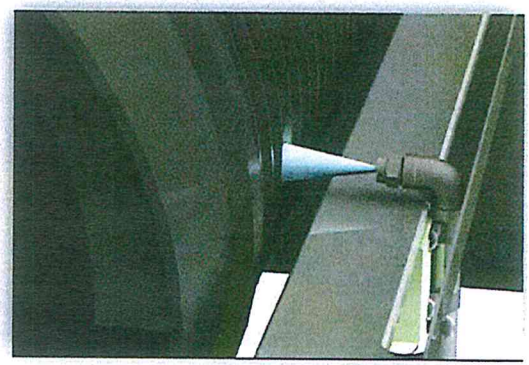




	MODEL	SC100	SC200	SC500
A	Overall Height	76"	84"	96"
B	Overall Length	53"	82"	105"
C	Body Length	44"	71"	95"
D	Body Width	30"	36"	48"
E	Screen Length	24"	48"	72"
F	Screen Diameter	18"	24"	36"
G	Solids Chute Clearance	36"	36"	36"
H	Inlet Height	55"	59"	63"
I	Outlet Height	40"	40"	40"
J	Outlet Offset from Centre	6"	9"	12"
K	Anchor Centers (Length)	46"	74"	96"
L	Anchor Centers (Width	31"	38"	49"
	Anchor Size	3/8"	3/8"	1/2"
	Inlet Size	3" (ANSI 150)	4" (ANSI 150)	6" (ANSI 150)
	Outlet Size	4" (ANSI 150)	6" (ANSI 150)	8" (ANSI 150)
	Mass	750 lbs	1400 lbs	2300lbs
	Screen Drive motor	.37kW	.37kW	1.1kW
	Spray Jet Drive Motor	.09kW	.09kW	.18kW
	Spray jet inlet Connection	3/4"NPT Female	3/4" NPT Female	3/4" NTP Female

APPLICATIONS:

- Winery & Brewery Wastewater
- Food & Beverage Processors
- Sanitary/Municipal Applications
- Chemical Processing
- Membrane Bioreactor Protection
- Dairies/Creameries
- Canneries
- Pulp & Paper
- Textiles
- Poultry Processors



1000psi – 1.8GPM Spray Nozzle continuously travels length of screen for ultra effective cleaning using much less water than conventional spray bars