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## Wastewater Feasibility Study

# ALTERNATIVE SEWAGE TREATMENT SYSTEM REPORT

FOR

Bruno Tasting Room

APN 030-160-007

BY

CAB CONSULTING ENGINEERS

DATE: January 23, 2019

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## II. INTRODUCTION

The purpose of this design report is to provide supporting calculations and data for a proposed commercial alternative sewage treatment system. The project is located on Rutherford Crossroad approximately 500' west of the Rutherford Road and Highway 29 intersection. The site is served by city of St. Helena water and has an on-site irrigation well that is proposed to be demolished per the septic plans. The existing project area use is commercial/office with proposed use as commercial/winery tasting room. The proposed project includes remodel and construction of the existing building, new parking, new landscape and new septic system. A site location map is shown on Sheet WW1.0 for reference.

## III. SITE EVALUATION DATA AND FIELD SIZING

A site evaluation was conducted on May 4<sup>th</sup>, 2016 with representatives of CAB Consulting Engineers and Kim Withrow of Napa County Environmental Health Department. In total, 2 test holes were dug with consistent results throughout, primarily Sandy Clay Loams to a minimum of 36" depth. Test Pits 1 and 2 are used in development of this system design. The CABCE Site Evaluation proposed a loading rate of 0.6 gallons/sf-day with typical soils texture being Sandy Clay Loam with Moderate Structure classified as Subangular/Blocky. For the 240 gallon per day system, the required dispersal primary field and reserve field are 400 square feet and 800 square feet respectively. The proposed primary and reserve areas are shown as a dashed box on the plans. The site evaluation data and Geoflow Design Guideline Table 2 are provided in Appendix A.

## IV. SYSTEM DESCRIPTION

### A. SEPTIC TANKS, RECIRCULATION TANK AND ADVANTEX AX-20 TREATMENT SYSTEM

Influent from the tasting room will enter a 1,500-gallon septic located south of the building. The septic tank provides primary treatment and is sized in accordance with Napa County Standards. Wastewater then flows to an Orenco AX-RT20 Pod that provides treatment and recirculation of secondary effluent. single 50 gallon per minute, ½ horsepower recirculating pump will be installed in AX-RT20 pod to provide recirculation. The pump is programmed to provide 12 doses daily to the single AX-20 pod located on top of the tank. The single AX-RT20 pod has enough capacity to treat 600 gallons per day.

### B. DOSING BASIN

A single 10-gallon per minute ½ horsepower pump is installed in the AX-RT20 pod to convey effluent from the pod to a single zone Geoflow field. The combined septic tank and AX-RT20 pod have sufficient capacity for a minimum of 400 gallons of emergency storage. Dosing Basin pump calculations and pump curve are provided in Appendix B.

### C. DISPERSAL FIELD

Water from the AX-RT20 pod will be conveyed through a Geoflow Headworks controller prior and then dual flow meters to the dispersal field. The dispersal field is a single zone with 7 x 29' Geoflow Wasteflow PC drip dispersal lines supplied by a 1" manifold located approximately 23' west of the eastern property line. The single zone is to be flushed on every fifth cycle and the flush line will be plumbed to the cleanout short of the main residence septic tank. An 800 square foot reserve area is located within landscape proposed as lawn south of the treatment system as shown on the plans. Dispersal field calculations are provided in Appendix C.

### V. CONCLUSION

This report shows that the proposed system, as designed, meets current Napa County requirements for an Alternative Sewage Treatment System to support the development of a 240 gallon per day commercial winery tasting room.

## VI. APPENDIX A

**Napa County Department of  
 Environmental Management**

**SITE EVALUATION REPORT**

Please attach an 8.5" x 11" plot map showing the locations of all test pits triangulated from permanent landmarks or known property corners. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities.

Permit #: E16-00222	
APN: 030-160-007	
(County Use Only) Reviewed by:	Date:

**PLEASE PRINT OR TYPE ALL INFORMATION**

Property Owner Oliver	<input type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Remodel <input type="checkbox"/> Relocation <input checked="" type="checkbox"/> Other:						
Property Owner Mailing Address PO Box 306	<input type="checkbox"/> Residential - # of Bedrooms:    Design Flow :    gpd						
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">City</td> <td style="width: 33%;">State</td> <td style="width: 33%;">Zip</td> </tr> <tr> <td>St. Helena</td> <td>CA</td> <td>94574</td> </tr> </table>	City	State	Zip	St. Helena	CA	94574	<input checked="" type="checkbox"/> Commercial – Type: Sanitary Waste: 800 gpd    Process Waste: gpd
City	State	Zip					
St. Helena	CA	94574					
Site Address/Location 1151 Rutherford Road, 200' east of Highway 29 and Rutherford Rd intx.	<input type="checkbox"/> Other: Sanitary Waste: gpd    Process Waste: gpd						

**Evaluation Conducted By:**

Company Name CAB Consulting Engineers	Evaluator's Name Carl Butts	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist)
Mailing Address: 851 Napa Valley Corporate Way, Suite D		Telephone Number 707.694.6479
City Napa	State CA	Zip 94558
		Date Evaluation Conducted 05/04/2016

<u>Primary Area</u>	<u>Expansion Area</u>
Acceptable Soil Depth: 36 in.    Test pit #'s: 1, 2	Acceptable Soil Depth: 36 in.    Test pit #'s: 1,2
Soil Application Rate (gal. /sq. ft. /day): 0.6	Soil Application Rate (gal. /sq. ft. /day): 0.6
System Type(s) Recommended: Subsurface Drip (Engineered)	System Type(s) Recommended: Subsurface Drip (Engineered)
Slope: 0.5%.    Distance to nearest water source: 10 ft.*	Slope: 0.5%.    Distance to nearest water source: 10 ft.*
Hydrometer test performed?    No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)	Hydrometer test performed?    No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)
Bulk Density test performed?    No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)	Bulk Density test performed?    No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)
Percolation test performed?    No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)	Percolation test performed?    No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)
Groundwater Monitoring Performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)	Groundwater Monitoring Performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)

\*Site constraints/Recommendations: Irrigation well was located on site in vicinity of test pits the morning of the evaluation and is shown on site exhibit. No record existed of the well in the county files. Well will need to be abandoned per county guidelines to make septic system design and installation feasible.

Test Pit # 1

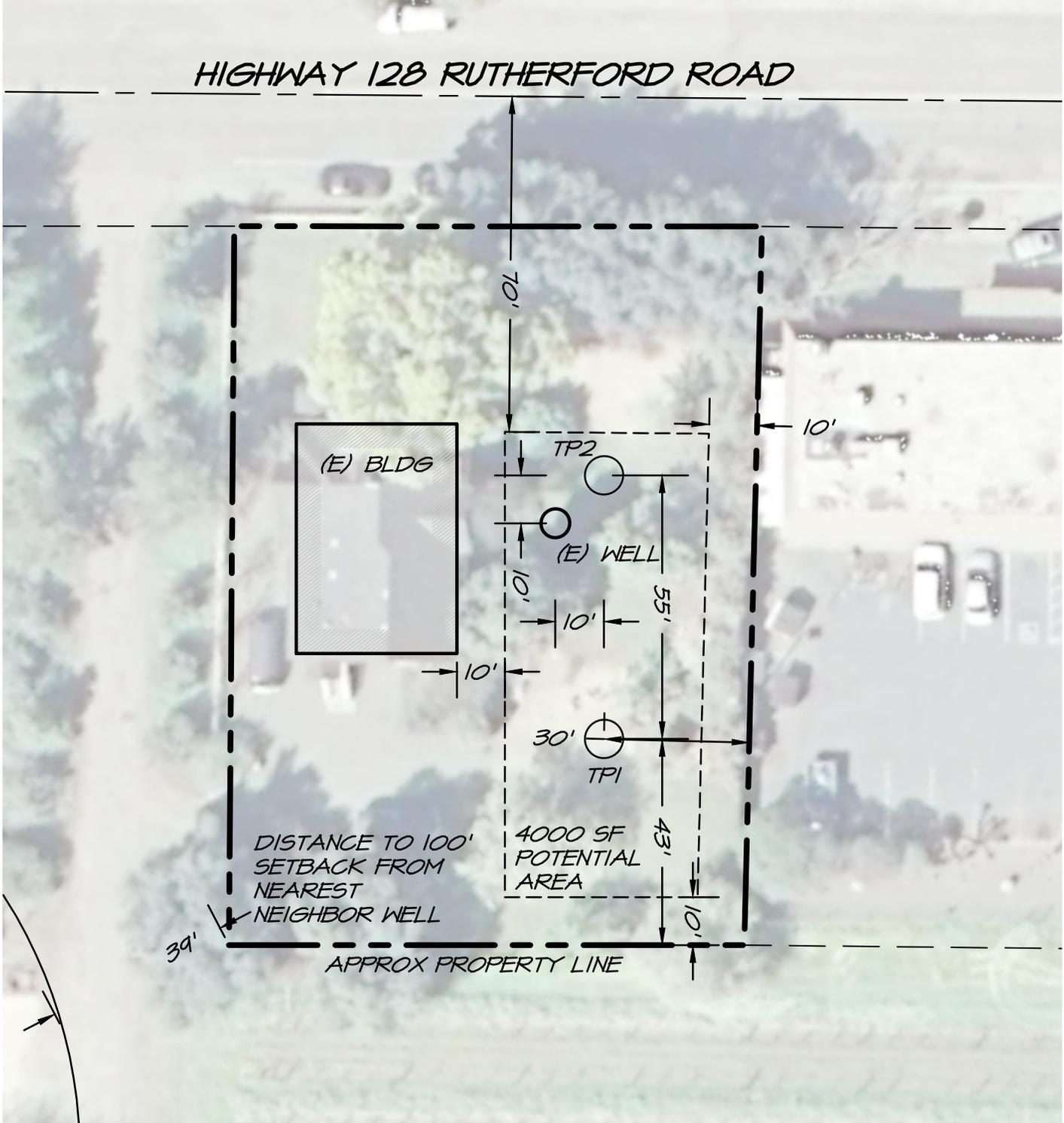
X = Limiting Condition	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-12		5	SCL	S/SB	H	FRB	NS	CM	CF	--
	12-36	G	20	SCL	M/SB	SH	FRB	SS	CF	FM	--
X	36+	G	60	SCL	M/SB	SH	FRB	SS	FF	FM	--
<b>Notes: 2" MINUS COBBLE AT 36"</b>											

Test Pit # 2

X = Limiting Condition	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-12		5	SCL	M/SB	H	FRB	NS	CM	CF	--
	12-40	G	10	SCL	M/SB	SH	VFRB	SS	CF	FM	--
	40-50	G	10	SCL	M/SB	SH	VFRB	SS	CF	FM	--
<b>Notes: ACCEPTABLE FOR STANDARD SYSTEM</b>											

Test Pit # 3

X = Limiting Condition	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
<b>Notes:</b>											



APN 030-160-007



851 NAPA VALLEY CORPORATE WAY  
 SUITE D  
 NAPA, CA 94558  
 V 707.252.2011  
 C 707.694.6479

**1151 RUTHERFORD ROAD**  
**SEPTIC SITE EVALUATION**  
 RUTHERFORD CALIFORNIA  
 1" = 30'

**TABLE 2**

**DRIP LOADING RATES CONSIDERING SOIL STRUCTURE.**

Table 2 is taken from the State of Wisconsin code and was prepared by Jerry Tyler.

Soil Textures	Soil Structure	Maximum Monthly Average
		BOD <sub>5</sub> <30mg/L
		TSS<30mg/L
		(gallons/ft <sup>2</sup> /day)
Course sand or coarser	N/A	1.6
Loamy coarse sand	N/A	1.4
Sand	N/A	1.2
Loamy sand	Weak to strong	1.2
Loamy sand	Massive	0.7
Fine sand	Moderate to strong	0.9
Fine sand	Massive or weak	0.6
Loamy fine sand	Moderate to strong	0.9
Loamy fine sand	Massive or weak	0.6
Very fine sand	N/A	0.6
Loamy very fine sand	N/A	0.6
Sandy loam	Moderate to strong	0.9
Sandy loam	Weak, weak platy	0.6
Sandy loam	Massive	0.5
Loam	Moderate to strong	0.8
Loam	Weak, weak platy	0.6
Loam	Massive	0.5
Silt loam	Moderate to strong	0.8
Silt loam	Weak, weak platy	0.3
Silt loam	Massive	0.2
Sandy clay loam	Moderate to strong	0.6
Sandy clay loam	Weak, weak platy	0.3
Sandy clay loam	Massive	0.0
Clay loam	Moderate to strong	0.6
Clay loam	Weak, weak platy	0.3
Clay loam	Massive	0.0
Silty clay loam	Moderate to strong	0.6
Silty clay loam	Weak, weak platy	0.3
Silty clay loam	Massive	0.0
Sandy clay	Moderate to strong	0.3
Sandy clay	Massive to weak	0.0
Clay	Moderate to strong	0.3
Clay	Massive to weak	0.0
Silty clay	Moderate to strong	0.3
Silty clay	Massive to weak	0.0



## VII. APPENDIX B

Job Description:	BRUNO TASTING ROOM
Contact:	CARL BUTTS
Prepared by:	CARL BUTTS
Date:	19/1/2019

Pressure losses may be grossly overstated, particularly if designing with WASTEFLOW Classic  
The letters on the diagram(right) match the letters in section 2 below.

**Worksheet - Pump Sizing**

Section 1 - Summary from Worksheet 1		
Flow required to dose field	0.88	gpm
Flow required to flush field	10.36	gpm
Flow required to dose & flush field	11.24	gpm
Filter	AP4E-1F	
No. of Zones	1 zones	
Zone valve	-	
Dripline	Wasteflow PC - 1/2gph	
Dripline longest lateral	28.57	ft.

Section 2	Ft of head	Pressure
<b>A. Flush line - Losses through return line</b>		
Size of flush line in inches	1 inch	
Length of return line	40 ft.	
Equivalent length of fittings	20 ft.	
Elevation change. (if downhill enter 0)	0 ft.	
Pressure loss in 100 ft of pipe	8.48 ft.	3.67 psi
<i>Total pressure loss from end of dripline to return tank</i>	<i>5.1 ft.</i>	<i>2.20 psi</i>
<b>B. Dripline - Losses through Wasteflow dripline</b>		
Length of longest dripline lateral	29 ft.	
Minimum dosing pressure required at end of dripline	23.10 ft.	10.00 psi
Loss through dripline during flushing	19.64 ft.	8.50 psi
<i>Total minimum required dripline pressure</i>	<i>42.74 ft.</i>	<i>8.50 psi</i>
<b>A+B. Minimum Pressure required at beginning of dripfield</b>		
<i>CALCULATED</i> pressure required at beginning of dripfield	<i>47.83 ft.</i>	<i>20.70 psi</i>
<i>SPECIFIED</i> pressure at beginning of dripfield (from worksht 1)	<b>92.4 ft.</b>	<b>40.00 psi</b>
<i>Great! SPECIFIED Pressure is greater than CALCULATED Pressure requirement. Go to next step</i>		
<b>C. Drip components - Losses through headworks</b>		
Filter	9.0 ft.	3.90 psi
Zone valve pressure loss (not in diagram)	- ft.	- psi
Flow meter pressure loss (not in diagram)	ft.	- psi
Other pressure losses	ft.	- psi
<i>Total loss through drip components</i>	<b>9.01 ft.</b>	<b>3.90 psi</b>
<b>D. Supply line - Minimum Pressure head required to get from pump tank to top of dripfield</b>		
Size of supply line in inches	1 inch	
Length of supply line	80 ft.	
Equivalent length of fittings	20 ft.	
Height from pump to tank outlet	6 ft.	
Elevation change. (if downhill enter 0)	0 ft.	
Pressure loss/gain in 100 ft. of pipe	9.87 ft.	4.27 psi
<i>Total gain or loss from pump to field</i>	<i>15.9 ft.</i>	<i>6.87 psi</i>
<b>Total dynamic head</b>	<b>117.3 ft.</b>	<b>50.77 psi</b>
<b>Pump capacity *</b>	<b>11.2 gpm</b>	
<b>Pump Model Number</b>	<b>PF100512</b>	
<b>Voltz / Hp / phase</b>	<b>230/0.5/1</b>	

\* Note: Pump capacity flow assumes flow in dripline does not change during a dose cycle. With Wasteflow For more accurate flows please see Geoflow's **Flushing worksheet**.

If you need assistance designing for this additional flow, please

a. See Geoflow flushing worksheet or

# PF Series High-Head Effluent Pumps

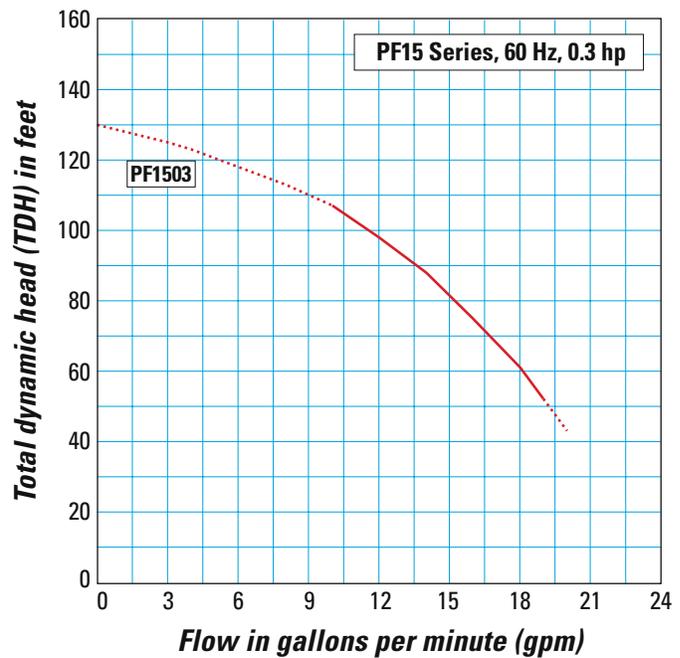
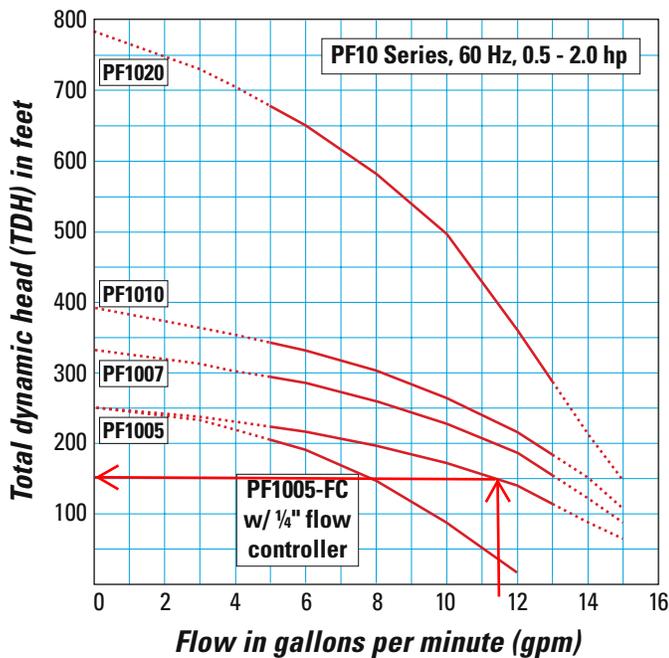
## Materials of Construction

Discharge:	Glass-filled polypropylene or stainless steel
Discharge bearing:	Engineered thermoplastic (PEEK)
Diffusers:	Glass-filled PPO (Noryl GFN3)
Impellers:	Celcon® acetal copolymer on 10-, 20, and 30-gpm models; 50-gpm impellers are Noryl GFN3
Intake screen:	Polypropylene
Suction connection:	Stainless steel
Drive shaft:	7/16 inch hexagonal stainless steel, 300 series
Coupling:	Sintered stainless steel, 300 series
Shell:	Stainless steel, 300 series
Motor:	Franklin motor exterior constructed of stainless steel. Motor filled with deionized water and propylene glycol for constant lubrication. Hermetically sealed motor housing ensures moisture-free windings. All thrust absorbed by Kingsbury-type thrust bearing. Rated for continuous duty. Single-phase motors and 200 and 230 V 3-phase motors equipped with surge arrestors for added security. Single-phase motors through 1.5 hp (1.11 kW) have built-in thermal overload protection, which trips at 203-221° F (95-105° C).

## Using a Pump Curve

A *pump curve* helps you determine the best pump for your system. Pump curves show the relationship between flow (gpm or L/sec) and pressure (total dynamic head, or TDH), providing a graphical representation of a pump's optimal performance range. Pumps perform best at their *nominal flow rate* — the value, measured in gpm, expressed by the first two numerals in an Orenco pump nomenclature. The graphs in this section show optimal pump operation ranges with a solid line. Flow flow rates outside of these ranges are shown with a dashed line. For most accurate pump specification, use Orenco's PumpSelect™ software.

## Pump Curves, 60 Hz Models



## VIII. APPENDIX C



## Field Flow

Job Description:	BRUNO TASTING ROOM
Contact:	CARL BUTTS
Prepared by:	CARL BUTTS
Date:	19/1/2019

Please fill in the shaded areas and drop down menus:  
This spreadsheet serves as a guide, and is not a complete hydraulic design.

### Worksheet 1- Field Flow

#### Total field

Total Quantity of effluent to be disposed per day	240	gallons / day
Hydraulic loading rate	0.6	gallons / sq.ft. / day
Minimum Dispersal Field Area	400	square ft.
Total Dispersal Field Area	400	square ft.

#### Flow per zone

Number of Zones	1	zone(s)
Dispersal area per zone	400	square ft.
Choose line spacing between WASTEFLOW lines	2	ft.
Choose emitter spacing between WASTEFLOW emitters	2	ft.
Total linear ft.per zone (minimum required)	200	ft. per zone
Total number of emitters per zone	100	emitters per zone
Select Wasteflow dripline (16mm)	Wasteflow PC - 1/2gph	dripline
Pressure at the beginning of the dripfield	40	psi
Feet of Head at the beginning of the dripfield	92.4	ft.
What is the flow rate per emitter in gph?	0.53	gph
Dose flow per zone	0.88	gpm

**Note: A few States or Counties require additional flow for flushing. Please check your local regulations. Flush velocity calculation below is for PC dripline. Classic dripline requires less flow to flush than PC.**

**Please refer to Geoflow's spreadsheet "Design Flow and Flush Curves" at [www.geoflow.com](http://www.geoflow.com) or call 800-8**

If required, choose flush velocity	2	ft/sec
How many lines of WASTEFLOW per zone?	7	lines
Fill in the <i>actual</i> length of longest dripline lateral	29	ft.
Flush flow required at the end of each dripline	1.48	gpm
Total Flow required to achieve flushing velocity	10.36	gpm
Total Flow per zone- worst case scenario	11.24	gpm

#### Select Filters and zone valves

Select Filter Type	Vortex Screen Filter	
Recommended Filter (item no.)	AP4E-1F	1" Screen Filter 0-20gpm
Select Zone Valve Type	None	-
Recommended Zone Valve (item no.)	0	0

#### Dosing

Number of doses per day / zone:	12	doses
Timer ON. Pump run time per dose/zone:	22.38	mins:secs
Timer OFF. Pump off time between doses	1:37	hrs:mins
Per Zone - Pump run time per day/zone:	4:31	hrs:mins
All Zones - Number of doses per day / all zones	12	doses / day