MOUND WASTEWATER DISPOSAL SYSTEM BASIS OF DESIGN

George W. III and Amy C. Rohrbaugh
Replacement Wastewater System Design
1627 Dorset Street, Charlotte, Vermont
April 21, 2008
Prepared By: Jason S. Barnard, Licensed Designer #430-B

Mound Wastewater Disposal System Basis of Design

I. WASTEWATER FLOWS AND MOUND DISPOSAL SYSTEM SIZING

A. WASTEWATER FLOWS (Q)

3	Bedrooms	140	gpd/bedroom=	420	gpd
			Total Flows =	**420**	gpd

B. REQUIRED SEPTIC TANK

Required Septic Tank Capacity = **1,000 gallons** for a 3-**bedroom** single-family residence.

C. PERCOLATION RATE (PR)

All percolation tests were less than 60 min/inch, therefore a basal area application rate of **0.74** gallons per day (gpd) per square foot (sf) is used.

D. MOUND SYSTEM APPLICATION RATE (AR)

AR = Application rate for sizing the mound system leachfield area (LA)
Ra maximum = 1.0 gpd/sf for Mounds
Selected Ra = **1.0** gpd/sf

E. REQUIRED LEACHFIELD AREA (RLA)

RLA = Q / AR
RLA = 420 / 1.0
RLA = **420** sf

F. PROPOSED LEACHFIELD AREA (PLA)

PLA = LENGTH (L) x WIDTH (W) x NUMBER OF TRENCHES or BEDS (N)

L =	65	ft
W =	6.5	ft
N =	1	absorption bed

PLA= **422.5** sf
PLA > RLA therefore PLA is acceptable

G. MOUND SYSTEM BASAL AREA (BA)

G1. BASAL AREA APPLICATION RATE (BAAR)

BAAR = Application rate for sizing basal area (BA)
BAAR = 0.74 gpd/sf for PR<60 min/inch
BAAR = 0.24 gpd/sf for 60 min/inch < PR < 120 min/inch
Selected BAAR = **0.74** gpd/sf

G2. REQUIRED BASAL AREA (RBA)

RBA = Q / BAAR
RBA = 420 / 0.74
RBA = **568** sf

G3. PROPOSED BASAL AREA (BA)

PBA = Trench or Seepage Bed Length (L) x Distance from uphill side of trench to downhill mound toe (MT).

L =	65.0	ft
MT =	35.5	FT

PBA = **2308** sf
PBA > RBA, therefore the PBA is acceptable

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II. MOUND SYSTEM PRESSURE DISTRIBUTION DETAILS

A. PROPOSED MOUND SYSTEM DISTRIBUTION SYSTEM

SEE THE ATTACHED ORENCO SYSTEMS, INC. PUMP SELECT SPREAD SHEET FOR THE PROPOSED MOUND SYSTEM PRESSURE DISTRIBUTION DETAILS.

B. TOTAL NUMBER OF ORIFICES IN THE DISTRIBUTION SYSTEM

Number of Orifices = **26** orifices

C. LEACHFIELD AREA (LA) PER ORIFICE

LA/Orifice = LA / Total Number of Orifices
LA/Orifice = **16.3** sf
LA/Orifice is less than 25 SF per Orifice, therefore the proposed number of orifices is in accordance with the current State of Vermont, EPRs.

III. PROPOSED PUMP STATION DESIGN

A. REQUIRED PUMP STATION

Required Pump Station Capacity = **1,000 gallons** for a 3-**bedroom** single-family residence.

B. REQUIRED MOUND SYSTEM DOSE

Required Dose Volume = **85** Gallons
Pump Station Dimensions: Camp Precast 1,000 Gallon Pump Station = 4.67 ft x 7.38 ft
Area of Pump Station = 34.5 sf
Volume per Inch of depth = 21.5 gallons / vertical inch
Pump on/off switch difference setting required for dose: 4.0 inches

C. REQUIRED PUMP STATION STORAGE

Storage Required = 420 gallons (1 day's flow)

D. PUMP STATION STORAGE

Pump alarm to overflow point height difference = 32.0 inches
Storage Provided = **688** gallons
Storage provided is greater than 1 day's flow, therefore the proposed pump station is adequately sized.

E. PROPOSED EFFLUENT PUMP

Goulds Model Number WE0311M 1/3 hp 115 volt 1 phase

F. PROPOSED PUMP STATION EFFLUENT PUMP

See Attached Effluent Pump Curve

MOUND CONSTRUCTION INSTRUCTIONS

Mound construction procedures are just as important as the mound design. Good design with poor construction will result in the mound operating poorly and may result in failure. Proper equipment is essential. Small track type excavators work best. Wheel type tractors are too difficult to maneuver in the fill. The following is a step by step procedure for mound construction which has been tried and proven. Other techniques could be used as long as the basic principles of mound design, operation, and construction are not violated.

1. Submit a *representative* sample (enough to fill a 5 gallon bucket) of mound sand from the intended source for testing according to ASTM D 422 (Knight Consulting Engineers and Vermont Testing can perform this test). Submit a copy of the results to the designer.

2. Stake out the mound on this site so that the trenches or bed run perpendicular to the direction of the slope. Reference stakes are recommended in case corner stakes are disturbed.

3. Stake out corners of the bed and determine the bottom elevation of the bed.

4. Determine where the force main from the pump chamber connects to the distribution system in the mound.

5. Trench and lay the force main from the pump chamber to the mound. Lay the pipe 5.5' below the ground surface for frost protection. Where there is less than 5.5' of cover, insulate with 2" of rigid polystyrene insulation 4' wide (2' either side of pipe, placed in two 1" layers with staggered joints). Alternatively, where there is less than 5.5' of soil cover, the force main can be sloped *uniformly* back to the pumping chamber so that it drains after each dosing. Cut and cap the pipe one foot beneath the ground surface. Backfill and compact soil around the pipe to prevent back seepage of effluent along pipe. This step must be done before plowing to avoid compacting and disturbance of surface.

6. Install the curtain drain (if shown on plans).

7. Check the moisture content of the soil at 7 – 8 inches deep. If it is too wet, smearing and compaction will result, thus reducing the infiltration capacity of the soil. Soil moisture can be determined by rolling a soil sample between the hands. If it rolls into a ribbon, the site is too wet to prepare. If it crumbles, soil preparation can proceed.

8. Cut trees to ground level, remove excess vegetation by mowing. Prepare the site by using a moldboard plow to create 8 – 10 inch deep furrows perpendicular to the slope. Furrows must be thrown up hill. Chisel plowing may be used if a

moldboard plow is not available. Rototilling must not be done on heavy soils but can be used on non-structural soil such as sands. Alternatively, plowing can be done by using an excavator bucket to pull the soil into furrows parallel with the ground contours (the resulting surface must look as though it had been plowed with a moldboard plow, as outlined above). Immediate construction after plowing is necessary. Avoid rutting of plowed area with vehicular traffic. Inspection required at this point.

9. Extend the effluent pipe to several feet above the ground surface.

10. Place the approved fill material around the edge of the plowed area. Keep wheels of truck off plowed areas. Minimize the traffic on the downslope side of the mound. Work from the end and upslope side.

11. Move the fill material into place using a small track type tractor with a blade. Always keep a minimum of 6 inches of sand beneath tracks to prevent compaction of the natural soil.

12. Place the fill material to the required depth which is the top of the trenches or bed. Shape sides to the desired slope. Inspection required at this point.

13. With the blade of the tractor form the bed or trenches. Hand level the bottom of the bed. Make sure bottom is at the same elevation and level.

14. Place the coarse aggregate in the trenches or bed. It should be ¾ to 1 ½ inch, washed, durable aggregate (i.e. **not** limestone or marble). Level aggregate to the design depth.

15. Place the distribution system on the aggregate. Connect the manifold to the force main from the pump chamber or siphon chamber. Slope manifold slightly toward distribution laterals. Lay laterals level, removing rises and dips. Place orifices upwards until pressure testing is complete. Inspection required at this point (to observe discharge rate and pressure testing).

16. Rotate orifices downward and properly cement all components. Place 2 inches of aggregate over the distribution pipe.

17. Place a synthetic non-woven filter fabric (Mirafi 140N or equivalent) over the entire stone bed. Overlap joints by 12" minimum. Place an 8'x8' mat of rigid polystyrene insulation, 2 inches thick, centered over force main riser. Place insulation in two layers (1" each) and stagger the joint pattern.

18. Place soil on top of the bed or trench to a depth of 1 foot in center and 6 inches at outer edge of bed or trenches. This may be a subsoil or topsoil.

19. Place 6 inches of good quality topsoil over the entire mound surface. This will raise the elevation at the center of the mound to a minimum of 1.5 feet and the outside edges of bed or trenches 1 foot. <u>Inspection required at this point.</u>

20. Landscape the mound by planting grass, using the best vegetation adaptable to the area. A mixture of 90% birdsfoot trefoil and 10% timothy may be desirable if the mound is not manicured. If manicuring is desired, a combination of 60% bluegrass, 30% creeping red fescue and 10% annual rye grass may be the desired vegetative cover. Shrubs can be planted around the base and up the sideslopes. They should be somewhat moisture tolerant since the toe of the mound may be somewhat moist during various times of the year. Keep all trees and shrubs away from the top of the mound, as root systems can destroy the distribution network.

21. Mound maintenance involves pumping the septic tank and pump chamber every 1 to 3 years to avoid carryover of solids into the mound. A good water conservation plan within the house assures that the mound will not be overloaded. Avoid excess traffic on the mound area. Winter traffic on mound should be avoided to minimize the frost penetration. Inspect pump chamber and septic tank each year to determine the level of sludge accumulation.

George W. III and Amy C. Rohrbaugh
Wastewater System Design and Permitting,
1627 Dorset Street
Charlotte, Vermont

Replacement Mound Wastewater Disposal System
Desktop Effluent Mounding Analysis

Replacement Mound Wastewater System:

- Soils present directly beneath the proposed mound system consist of a friable silt loam topsoil over top of a friable silt loam soil that extends to between 14" and 19" below ground surface. Beneath the fine sandy loam soil unit is a friable clay loam that extends to at least 42" below ground surface. The silt loam was used in the effluent mounding analysis.

- Depth to the SHWT is 12" (1.0') below ground surface (conservative), based on the presence of soil mottling in test pit TP-02 and 04.

The average ground surface slope is 17% in the vicinity of the mound system area.

The following equation is used from the ANR "Simplified Procedure for Prescriptive Desktop Mounding Analysis", dated January 30, 2003:

$LLR = (f)(h)$

where: LLR = linear loading rate, gpd/ft.

h = soil thickness available for groundwater mounding in feet.

f = the LLR factor from Table 1 of the January 30, 2003 ANR document, which is based on soil texture and slope.

from Table 1:

Silt loam soil with a slope of 17%, therefore $f = 13.1$

SHWT = 1.0' (12") – 0.5' (6") = 0.5' = h (conservative).

Using the formula above, the linear loading rate and minimum mound size is determined as follows:

- LLR= (0.5)(13.1) = 6.55 gpd/linear foot.

- 420 gpd/6.55 gpd/linear feet = 64.12 feet minimum mound length.

- Since loading at 1.0 gpd/ft^2, 420 gpd/1.0 gpd/ft^2 = 420 ft^2 of infiltration area is required.

- 422.5 ft^2 of infiltration area is supplied via one 6.5 foot by 65 foot absorption bed.

- The linear loading rate is: 420 gpd/65 ft = 6.46 gpd/linear foot.

- The actual effluent mounding is determined as follows:

  $h = LLR/f = 6.46/13.1 = 0.49$ feet or 5.9-inches.

Conclusions

Based on the April 7, 2008 test pit evaluations and the hydrogeologic effluent mounding analysis presented above, the proposed mound system if constructed with a 6.5-foot wide by 65-foot long absorption bed with 2.5-feet (30-inches) of mound sand beneath the bed will maintain the effluent plume at least 6-inches below existing grade at all times of the year. Furthermore, with a minimum of 2.5-feet of mound sand beneath the absorption bed and greater than 3-feet (36-inches) to bedrock in the test pits excavated in the proposed mound system area, there is greater than 4-feet (48-inches) of vertical separation between the bottom of the mound absorption bed and any underlying bedrock that may be present.

Table 1

George W. III and Amy C. Rohrbaugh
1627 Dorset Street,
Charlotte, Vermont
Percolation Tests of April 18, 2008
Replacement Wastewater
System Design

P-01	Drop Time (min)	Total Drop Time (min)	Total Drop (inches)	Drop Rate (min/inch)
	27.42	27.42	1	27.42
	31.02	58.44	2	29.22
	37.45	95.89	3	31.96
	40.23	136.12	4	34.03
	40.25	176.37	5	35.27
	45.47	221.84	6	36.97
	52.33	274.17	7	39.17
	---	**1440.00**	---	**49.35**

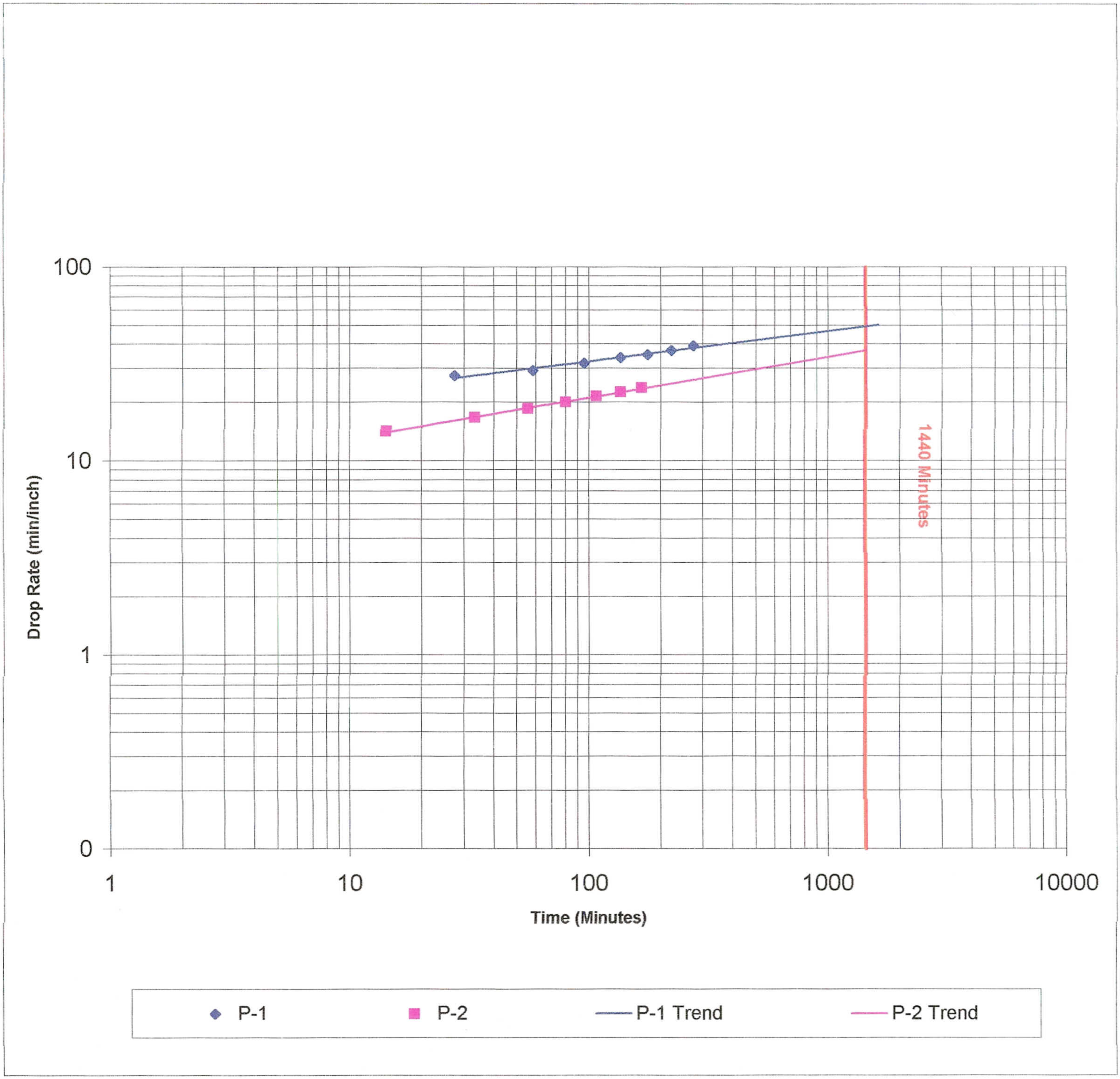
P-02	Drop Time (min)	Total Drop Time (min)	Total Drop (inches)	Drop Rate (min/inch)
	14.22	14.22	1	14.22
	19.07	33.29	2	16.65
	22.37	55.66	3	18.55
	24.51	80.17	4	20.04
	27.40	107.57	5	21.51
	28.30	135.87	6	22.65
	30.57	166.44	7	23.78
	---	**1440.00**	---	**37.05**

NOTES:

1. Percolation tests performed at 6 to 14-inches below ground surface.

Chart 1

George W. III and Amy C. Rohrbaugh
1627 Dorset Street,
Charlotte, Vermont
Percolation Tests of April 18, 2008
Replacement Wastewater
System Design



Pump Selection for a Pressurized System

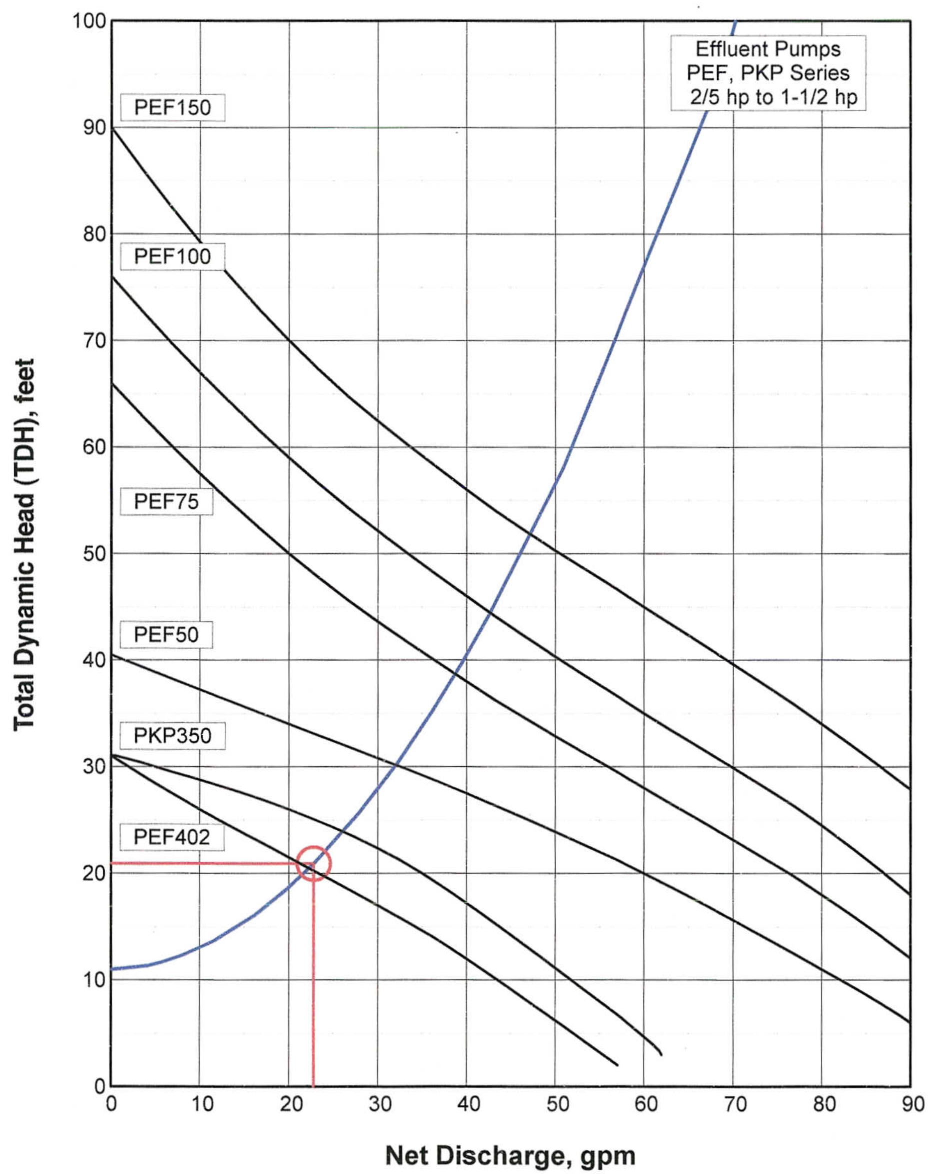
Input Parameters

Orifice Size	3/16	inches
Residual Head at Last Orifice	4.00	feet
Orifice Spacing	5.0	feet
Number of Laterals per Cell	2	
Lateral Length	60.0	feet
Lateral Line Size	1.50	inches
Lateral Pipe Class/Schedule	40	
Distributing Valve Model	None	
Manifold Length	3.0	feet
Manifold Line Size	1.50	inches
Manifold Pipe Class/Schedule	40	
Lift to Manifold	11.0	feet
Transport Length	130.0	feet
Transport Line Size	1.50	inches
Transport Pipe Class/Schedule	40	
Discharge Assembly Size	1.50	inches
Flow Meter	None	inches
'Add-on' Friction Losses	0.0	feet

Calculations

Minimum Flow Rate per Orifice	0.87	gpm
Number of Orifices per Zone	26	
Total Actual Flow Rate	22.8	gpm
Number of Lines per Zone	2	
% Flow Differential 1st and Last Orifice	2.2	%
Lift to Manifold	11.0	feet
Residual Head at Last Orifice	4.00	feet
Head Loss in Laterals	0.2	feet
Head Loss Through Distributing Valve	0.0	feet
Head Loss in Manifold	0.0	feet
Head Loss in Transport Pipe	4.1	feet
Head Loss Through Discharge	1.6	feet
Head Loss Through Flow Meter	0.0	feet
'Add-on' Friction Losses	0.0	feet
Total Flow Rate	**22.8**	**gpm**
TDH	**20.9**	**feet**

Rohrbaugh 5.4 Acre Parcel, Dorset St. Charlotte
Mound Pressure Distribution Details



Orenco Systems Incorporated

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(541) 459-2884

www.orenco.com

Rohrbaugh Replacement
Mound Required Effluent
Pump or Equal

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Wastewater

Goulds Pumps

WE Series Model 3885

Submersible Effluent Pump

PROSURANCE AVAILABLE FOR
RESIDENTIAL APPLICATIONS.

FEATURES

- **Impeller:** Cast iron, semi-open, non-clog with pump-out vanes for mechanical seal protection. Balanced for smooth operation. Silicon bronze impeller available as an option.
- **Casing:** Cast iron volute type for maximum efficiency. 2" NPT discharge.
- **Mechanical Seal:** Silicon Carbide vs. Silicon Carbide sealing faces. Stainless steel metal parts, BUNA-N elastomers.
- **Shaft:** Corrosion-resistant, stainless steel. Threaded design. Locknut on all models to guard against component damage on accidental reverse rotation.
- **Fasteners:** 300 series stainless steel.
- Capable of running dry without damage to components.
- Designed for continuous operation when fully submerged.

GOULDS PUMPS

Goulds Pumps is a brand of ITT
Residential and Commercial Water.

www.goulds.com

Engineered for life

Rohrbaugh Replacement
Mound Required
Effluent Pump or
Equal

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GOULDS PUMPS
Wastewater

APPLICATIONS

Specifically designed for the following uses:

- Homes, Farms, Trailer Courts, Motels, Schools, Hospitals, Industry, Effluent Systems

SPECIFICATIONS

Pump

- Solids handling capabilities: ¾" maximum.
- Discharge size: 2" NPT.
- Capacities: up to 140 GPM.
- Total heads: up to 128 feet TDH.
- Temperature:
  104°F (40°C) continuous, 140°F (60°C) intermittent.
- See order numbers on reverse side for specific HP, voltage, phase and RPM's available.

MOTORS

- ■ Fully submerged in high-grade turbine oil for lubrication and efficient heat transfer.
- ■ Class B insulation on ⅓-1½ HP models.
- ■ Class F insulation on 2 HP models.

Single phase (60 Hz):

- Capacitor start motors for maximum starting torque.
- Built-in overload with automatic reset.
- SJTOW or STOW severe duty oil and water resistant power cords.
- ⅓ – 1 HP models have NEMA three prong grounding plugs.
- 1½ HP and larger units have bare lead cord ends.

Three phase (60 Hz):

- Class 10 overload protection must be provided in separately ordered starter unit.
- STOW power cords all have bare lead cord ends.

■ **Designed for Continuous Operation:** Pump ratings are within the motor manufacturer's recommended working limits, can be operated continuously without damage when fully submerged.

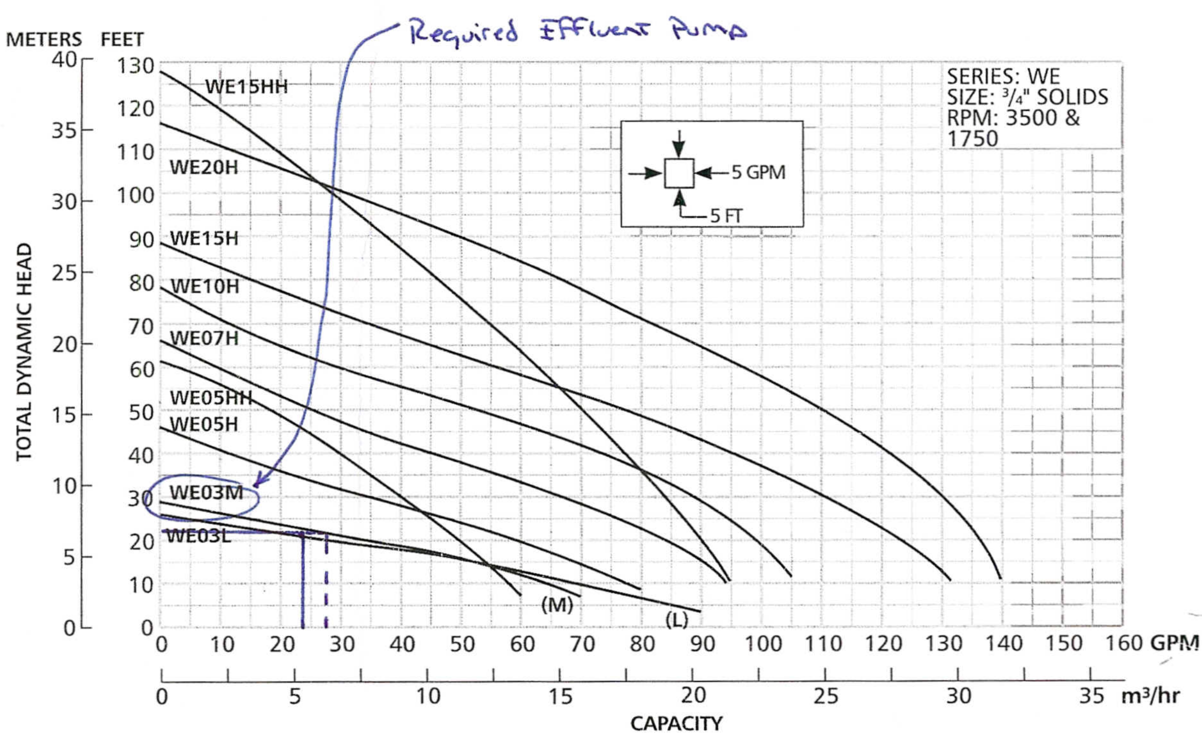
■ **Bearings:** Upper and lower heavy duty ball bearing construction.

■ **Power Cable:** Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. Standard cord is 20'. Optional lengths are available.

■ **O-ring:** Assures positive sealing against contaminants and oil leakage.

AGENCY LISTINGS

Tested to UL 778 and CSA 22.2 108 Standards
By Canadian Standards Association File #LR38549
Goulds Pumps is ISO 9001 Registered.



Rohrbaugh Replacement
Mound Required Effluent
Pump or Equal

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GOULDS PUMPS
Wastewater

MODELS

Order Number	HP	Phase	Volts	RPM	Impeller Diameter (in.)	Maximum Amps	Locked Rotor Amps	KVA Code	Full Load Efficiency %	Resistance Start	Resistance Line-Line	Power Cable Size	Weight (lbs.)
WE0311L	0.33	1	115	1750	5.38	10.7	30.0	M	54	11.9	1.7	16/3	56
WE0318L			208			6.8	19.5	K	51	9.1	4.2		
WE0312L			230			4.9	14.1	L	53	14.5	8.0		
WE0311M			115			10.7	30.0	M	54	11.9	1.7		
WE0318M			208			6.8	19.5	K	51	9.1	4.2		
WE0312M			230			4.9	14.1	L	53	14.5	8.0		
WE0511H	0.5		115	3450	3.56	14.5	46.0	M	54	7.5	1.0	14/3	60
WE0518H			208			8.1	31.0	K	68	9.7	2.4	16/3	60
WE0512H			230			7.3	34.5	M	53	9.6	4.0		
WE0538H		3	200			4.9	22.6	R	68	NA	3.8	14/4	60
WE0532H			230			3.3	18.8	R	70	NA	5.8		
WE0534H			460			1.7	9.4	R	70	NA	23.2		
WE0537H			575			1.4	7.5	R	62	NA	35.3		
WE0511HH		1	115		3.88	14.5	46.0	M	54	7.5	1.0	14/3	60
WE0518HH			208			8.1	31.0	K	68	9.7	2.4	16/3	60
WE0512HH			230			7.3	34.5	M	53	9.6	4.0		
WE0538HH		3	200			4.9	22.6	R	68	NA	3.8	14/4	60
WE0532HH			230			3.6	18.8	R	70	NA	5.8		
WE0534HH			460			1.8	9.4	R	70	NA	23.2		
WE0537HH			575			1.5	7.5	R	62	NA	35.3		
WE0718H	0.75	1	208		4.06	11.0	31.0	K	68	9.7	2.4	14/3	70
WE0712H			230			10.0	27.5	J	65	12.2	2.7		
WE0738H		3	200			6.2	20.6	L	64	NA	5.7	14/4	70
WE0732H			230			5.4	15.7	K	68	NA	8.6		
WE0734H			460			2.7	7.9	K	68	NA	34.2		
WE0737H			575			2.2	9.9	L	78	NA	26.5		
WE1018H	1	1	208		4.44	14.0	59.0	K	68	9.3	1.1	14/3	70
WE1012H			230			12.5	36.2	J	69	10.3	2.1		
WE1038H		3	200			8.1	37.6	M	77	NA	2.7	14/4	70
WE1032H			230			7.0	24.1	L	79	NA	4.1		
WE1034H			460			3.5	12.1	L	79	NA	16.2		
WE1037H			575			2.8	9.9	L	78	NA	26.5		
WE1518H	1.5	1	208		4.56	17.5	59.0	K	68	9.3	1.1	14/3	80
WE1512H			230			15.7	50.0	H	68	11.3	1.6		
WE1538H		3	200			10.6	40.6	K	79	NA	1.9	14/4	80
WE1532H			230			9.2	31.7	K	78	NA	2.9		
WE1534H			460			4.6	15.9	K	78	NA	11.4		
WE1537H			575			3.7	13.1	K	75	NA	16.9		
WE1518HH		1	208		5.50	17.5	59.0	K	68	9.3	1.1	14/3	80
WE1512HH			230			15.7	50.0	H	68	11.3	1.6		
WE1538HH		3	200			10.6	40.6	K	79	NA	1.9	14/4	80
WE1532HH			230			9.2	31.7	K	78	NA	2.9		
WE1534HH			460			4.6	15.9	K	78	NA	11.4		
WE1537HH			575			3.7	13.1	K	75	NA	16.9		
WE2012H	2	1	230		5.38	18.0	49.6	F	78	3.2	1.2	14/3	83
WE2038H		3	200			12.0	42.4	K	78	NA	1.7	14/4	83
WE2032H			230			11.6	42.4	K	78	NA	1.7		
WE2034H			460			5.8	21.2	K	78	NA	6.6		
WE2037H			575			4.7	16.3	L	78	NA	10.5		

Rohrbaugh Replacement
Mound High Water
Level Alarm or Equal

ITT

CENTRIPRO
Wastewater and Water Systems

TAN3M (XT Alarm System)

- The Tank Alert® XT can be used as a high level alarm in lift chambers, sump pump basins and holding tanks.
- UL Listed (for indoor and outdoor use) and CSA Certified.
- Voltage: 120 VAC, 50/60 Hz, 8.5 watts maximum, (alarm condition)
- Enclosure meets Type 3R water-tight standards, listed for indoor or outdoor use under UL standard 864. Dimensions are 6.5" x 4.5" x 3.0"
- Premounted terminal block so enclosure can also be used as a junction box for splicing pump, pump switch and pump power. Meets NEC standard for junction boxes.
- N.O. float switch has a 15' long, 18 gauge, 2 conductor SJOW (UL) cord
- Mechanical SignalMaster® Float on TAN3M, switches are rated for a maximum fluid temperature of 140° F (60° C)
- Automatic alarm reset, alarm test switch and horn silence switch
- Alarm Horn: 85 decibels at 10 feet (3 meters)
- Does not control or interface with pump
- Operates even if pump circuit fails when wired on separate circuit
- No power cord.

TAN4M (4X Alarm System)

- The Tank Alert® 4X can be used as a weatherproof high level alarm in lift chambers, sump pump basins and holding tanks.
- UL and cUL Listed
- Single phase, 120 volt, 60/50 hertz power supply required, 7 watts max. during alarm condition
- NEMA 4X enclosure rated for indoor or outdoor use.
- No power cord.
- Float Switch: Sensor Float® control switch with mounting clamp, 15' long, 18 gauge, SJOW.
- Stainless steel alarm horn sounds at 88db @ 10' (3 meters)
- NEMA 4X alarm beacon
- Automatic alarm reset and alarm test/normal/horn silence switch
- Dimensions are 6.4" x 5.3" x 5.0"
- Switches are rated for a maximum fluid temperature of 140° F (60° C)
- Does not control or interface with pump
- Operates even if pump circuit fails when wired on separate circuit.

LR54245 LISTED

Hydraulic LISTED

STATE MOUND SAND SPECIFICATIONS

(c) Fill Material: The fill material from the natural soil plowed surface to the top of the trench or bed shall be sand texture with one of the following sieve analyses:

(1).

Sieve Number	Opening (mm)	Percent Passing, by Weight
10	2.000	85-100
40	0.420	25-75
60	0.240	0-30
100	0.149	0-10
200	0.074	0-5

(2).

Sieve Number	Opening (mm)	Percent Passing, by Weight
4	4.750	95-100
8	2.380	80-100
16	1.190	50-85
30	0.590	25-60
50	0.297	10-30
100	0.149	2-10

(3).

Sieve Number	Opening (mm)	Percent Passing, by Weight
10	2.000	85-100
40	0.420	30-50
200	0.074	0-10

The material must meet specifications 1, 2, or 3 above. Interpolation of analyses is not permitted. Fill material 2 is ASTM Specification C-33 and is intended for manufactured material.

TEST PIT LOG

Client: George and Amy Rohrbaugh   Date: April 7, 2008   Location: 1627 Dorset Street, Charlotte, VT

Project Description: Replacement Wastewater System Design and Permitting

Logged By: Jason Barnard, Licensed Designer #430-B   Topographic Setting: Westerly Sloping

Current/Historic Land Use: Residential   Slope: 17-18%   Vegetation: Brushland and Wooded

Weather Conditions: 50^0 Sunny   Method of Excavation: Tracked Excavator

Test Pit #	Depth (inches)	Dominant Color	Soil Texture	Soil Structure	Consistency	Mottles	Comments
01	0-10"	Dark Brown	Silt loam topsoil	Crumb blocky	Friable	No	
	10-18"	Tan-brown	Silt loam with a trace of very fine sand	Crumb blocky	Friable	Fine, faint, few at 15-16"	
	18-42"	Brown	Clay loam	Crumb blocky	Friable	Prominent, common and distinct.	Groundwater seeps at 24". No bedrock to 42".
02	0-10"	Dark brown	Silt loam topsoil	Crumb blocky	Friable	No	
	10-19"	Tan-brown	Silt loam	Crumb blocky	Friable	Fine, faint, few at 12-13"	
	19-60"	Brown	Clay loam	Crumb blocky	Friable	Prominent, common and distinct.	Groundwater seeps at 22". No bedrock to 60".

Client: George and Amy Rohrbaugh Date: April 7, 2008 Location: 1627 Dorset Street, Charlotte, VT

Test Pit #	Depth (inches)	Dominant Color	Soil Texture	Soil Structure	Consistency	Mottles	Comments
03	0-11”	Dark Brown	Silt loam topsoil	Crumb blocky	Friable	No	
	11-15”	Tan-brown	Silt loam	Crumb blocky	Friable	Fine, faint, few at 14”.	
	15-60”	Brown	Clay loam	Crumb blocky	Friable	Prominent, common and distinct.	Groundwater seeps at 21-22”. No bedrock to 60”.
04	0-6”	Dark brown	Silt loam topsoil	Crumb blocky	Friable	No	
	6-14”	Tan-brown	Silt loam	Crumb blocky	Friable	Fine, faint, few at 12-13”	
	14-48”	Brown	Clay loam	Crumb blocky	Friable	Prominent, common and distinct.	Groundwater seeps at 24”. No bedrock to 48”.
05	0-12”	Dark brown	Silt loam topsoil	Crumb blocky	Friable	No	
	12-16”	Brown	Silt loam	Crumb blocky	Friable	Fine, faint, few at 14-15”.	
	16-50”	Brown	Clay loam	Crumb blocky	Friable	Prominent, common and distinct.	Groundwater seeps at 20”. No bedrock to 50”.