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September 19, 2014

Town of Charlotte  
Planning and Zoning Department  
Attn: Jeannine McCrumb  
159 Ferry Road  
Charlotte, Vermont 05445

Subject: John H. Hauenstein, Two-Lot Subdivision and Replacement Wastewater System, 6300 and 6373 Spear Street, Charlotte, Vermont – Wastewater System and Potable Water Supply Permit Application

Dear Jeannine:

Enclosed you will find two (2) copies of the John H. Hauenstein full size design drawings, two (2) copies of the 11" x 17" design drawings, electronic copies of the design drawings in PDF format, and the required supporting documents (paper and electronic copies) for Mr. Hauenstein's two-lot subdivision and replacement wastewater system relative to two (2) separate deeded parcels of land located at 6300 and 6373 Spear Street in Charlotte. Lot No. 10 is 30.98+/- acres in size and is improved with an existing 3-bedroom single-family residence (6373 Spear Street) and former barn structure. The Lot No.10 existing 3-bedroom single-family residence (6373 Spear Street) is served by an off-site (located on Lot No. 14 – Lands of Koener) wastewater system and is provided water by an on-site drilled water supply well. The Lot No. 10 wastewater system was designed and permitted under the Lewis Creek Farms Subdivision. As part of the former Lewis Creek Farms Subdivision, a replacement wastewater system area was identified for the Lot No. 10 existing 3-bedroom single-family residence. Based on information provided by Mr. Hauenstein, the wastewater system that currently serves the Lot No. 10 residence is properly functioning (i.e. the system is not surfacing or backing up). Lot No. 13 is 5.02+/- acres in size and is improved with a 4-bedroom two (2) unit residential structure that is served by an existing in-ground wastewater system and is provided water by an on-site drilled well.

Mr. Hauenstein is applying for a Potable Water Supply and Wastewater Permit from the Town of Charlotte Planning and Zoning Office so Lot No. 10 can be subdivided and a 14.02+/- acre parcel (Lot No. 10A) and a 16.96+/- acre parcel (Lot No. 10B) created. Proposed Lot No. 10A will contain the existing 3-bedroom single-family residence that will continue to be served by the off-site wastewater system and provided water by the on-site drilled water supply well. In accordance with the current State of Vermont EPR, a replacement wastewater disposal system area has already been identified for Lot No. 10A and this replacement wastewater system area is located off-site on Lot No. 14 (Lands of Koener) of the former Lewis Creek Farms Subdivision. Proposed Lot No. 10B will contain the existing barn structure that will be renovated and a portion of the structure will be converted into a 4-bedroom duplex apartment. The Lot No. 10B proposed duplex apartment will be served by a performance-based mound system that will be located on Lot No. 13 (owned by Mr. Hauenstein) and will be provided water by an on-site drilled water supply well. In accordance with the current State of Vermont, EPR, once the Lot No. 10B well has been drilled and the well yield is determined, a water quantity and quality evaluation of the drilled water supply well will be performed. Once the evaluation is complete, the water system design and a permit amendment will be prepared and submitted to the Charlotte Planning and Zoning Office.

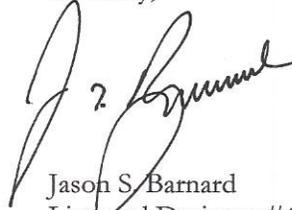
As part of this project, a replacement wastewater disposal system is being proposed for the Lot No. 13 existing 4-bedroom two (2) family dwelling (i.e. duplex). The replacement wastewater disposal system is an on-site prescriptive mound wastewater system. Due to the location of the drilled well that currently provides water to the Lot No. 13 structure relative to the replacement wastewater system, when the replacement mound system is constructed, the current drilled well will be properly abandoned and a second drilled well on the property will be utilized. The second drilled well on Lot No. 13 is adequately isolated from the proposed replacement mound wastewater system.

Included to facilitate your review of this permit application are the following:

1. Check made payable to the Town of Charlotte for the amount of seven hundred and fifty dollars (\$750.00).
2. State of Vermont, Agency of Natural Resources, Potable Water Supply and Wastewater System Permit Application.
3. Adjoining Landowner Notification Exemption Form No. 5.
4. Test Pit Logs.
5. Percolation Tests.
6. Lot No. 10B Effluent Mounding Analysis.
7. Lot No. 10B Primary Mound System Basis of Design.
8. Lot No. 10B Mound System Pressure Distribution Details.
9. Lot No. 10B Required Effluent Pump.
10. Lot No. 13 Replacement Mound System Basis of Design.
11. Lot No. 13 Replacement Mound Pressure Distribution Details.
12. Lot No. 13 Replacement Mound System Required Effluent Pump.
13. Lots No. 10B and No. 13 High Water Level Alarm.
14. Mound System Construction Instructions.
15. Full Size Design Drawings No. 1, 2, 3 and 4 dated September 18, 2014.
16. 11" x 17" Design Drawings No. 1, 2, 3 and 4 dated September 18, 2014.
17. Electronic Copies of the Design Drawings and Supporting Documents in PDF format.

Should you have any questions or comments relative to the information submitted herein, please do not hesitate to call me at (802) 453-2597.

Sincerely,



Jason S. Barnard  
Licensed Designer #600-B

c: John H. Hauenstein

# Drinking Water & Groundwater Protection Division - Permit Application Wastewater System & Potable Water Supply



**For Office Use Only:**

Application#	PIN#	Date Complete Application Received
<input type="text"/>	<input type="text"/>	<input type="text"/>

**Authority:**

10 V.S.A. Chapter 64, the Environmental Protection Rules, Chapter 1, Wastewater System & Potable Water Supply Rules, and Chapter 21, Water Supply Rules, Appendix A. Part 11 - Small Scale Water Systems.

**General Information:**

The organization and/or content of this form may not be altered, however, the form is designed to expand to allow additional information to be entered. Changes in the organization and/or content of the form may result in an invalid application or permit.

In most cases a licensed designer will be required for your project and to help complete this application form. There are also line-by-line instructions available to assist with completing this form.

**NOTE: We strongly suggest referring to the application instructions while completing this application form.**

## Part I Applicant (Landowner) & Project Contact Information

### Section A - Applicant Details (if Landowner is an Individual or Individuals)

1 Last Name		2 First Name (and Middle Initial if appropriate)	
Hauenstein		John H.	
3 Mailing Address Line 1		4 Mailing Address Line 2	
6373 Spear Street			
5 Town/City	6 State/Province	7 Country	8 Zip/Postal Code
Charlotte	Vermont	United States	05445
9 Email Address			10 Telephone
lah112404@gmail.com			802-425-2956

Remove This Applicant

Add Another Applicant

### Section B - Applicant Details (if Landowner is other than an Individual or Individuals, e.g. Corporations, Homeowner's Associations, etc.)

1 Registered Legal Entity or Organization Name			2 Telephone
<input type="text"/>			<input type="text"/>
3 Mailing Address Line 1		4 Mailing Address Line 2	
<input type="text"/>		<input type="text"/>	
5 Town/City	6 State/Province	7 Country	8 Zip/Postal Code
<input type="text"/>	<input type="text"/>	United States	<input type="text"/>

**Certifying Official**

The Certifying Official must be a person who has signatory authority for the legal entity or organization that is the Applicant.

9 Certifying Official Last Name		10 Certifying Official First Name (and MI if appropriate)	
<input type="text"/>		<input type="text"/>	
11 Certifying Official Title			
<input type="text"/>			
12 Certifying Official Email Address			13 Telephone
<input type="text"/>			<input type="text"/>

Remove This Applicant

Add Another Applicant

Section C - Primary Contact Information (if other than Applicant)			
1 Last Name		2 First Name (and Middle Initial if appropriate)	
3 Mailing Address Line 1		4 Mailing Address Line 2	
5 Town/City	6 State/Province	7 Country	8 Zip/Postal Code
		United States	
9 Email Address			10 Telephone
Section D - Building/Business Owner Information			
1 Last Name		2 First Name (and Middle Initial if appropriate)	
3 Mailing Address Line 1		4 Mailing Address Line 2	
5 Town/City	6 State/Province	7 Country	8 Zip/Postal Code
		United States	
9 Email Address			10 Telephone

Part II Certifying Designer(s) Information			
1 Designer Last Name		2 Designer First Name (and Middle Initial if appropriate)	
Barnard		Jason S.	
3 Designer License#	4 Company Name		
430	Jason Barnard Consulting, LLC		
5 Mailing Address Line 1		6 Mailing Address Line 2	
4400 VT Route 17			
7 Town/City	8 State/Province	9 Country	10 Zip/Postal Code
Starksboro	Vermont	United States	05487
11 Email Address			12 Telephone
jbsitotech@hotmail.com			802-453-2597
13 Designer Role(s) (check all that apply)			
<input checked="" type="checkbox"/> Water Supply Designer <input checked="" type="checkbox"/> Wastewater Disposal System Designer			
<span style="background-color: yellow; padding: 2px 10px;">Remove This Designer</span>			

Add Another Designer

Part III Property Location Information	
Section A - Property Location	
1 Please provide the property Town and the property address or a brief description of the location.	
(a) Town or City	(b) Street or Road Location
Charlotte	6300 and 6373 Spear Street

Section B - Center of Property GPS Coordinates	
1 Enter the approximate center of property coordinates using GPS set for NAD83 or as derived from a map (map must be based on NAD83).	
(a) Latitude <i>(in decimal degrees to five decimal places, ex. 44.38181°)</i>	(b) Longitude <i>(in decimal degrees to five decimal places, ex. -72.31392 °)</i>
N <input style="width: 100px;" type="text" value="44.27558"/> °	W (-) <input style="width: 100px;" type="text" value="73.19184"/> °

**Part IV Project Information**

**Section A - General Project Information & Questions**

1 Project Name (if applicable) <input style="width: 95%;" type="text"/>	2 Total Acreage of Property <input style="width: 95%;" type="text" value="36"/>
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3 Business Name (if applicable)

4 Detailed Project Description  
 John H. Hauenstein owns a 30.98+/- acre parcel (Lot 10) and a 5.02+/- acre parcel (Lot 13) located at 6373 and 6300 Spear Street in Charlotte, Vermont. Lot 10 is improved with a 3-bedroom single-family residence and a barn structure. The Lot 10 residence is served by an off-site wastewater disposal system and is provided water by an on-site drilled well. John Hauenstein is proposing to subdivide Lot 10 and create a 14.02+/- acre parcel (Lot 10A) and a 16.96+/- acre parcel (Lot 10B). Proposed Lot 10A will contain the existing 3-bedroom residence and Lot 10B will be improved with a two unit 4-bedroom duplex using the existing barn structure. A replacement area has been identified for Lot 10A and a primary mound wastewater system area has been identified for Lot 10B which is located on Lot 13. As part of this project, a replacement wastewater system has been designed for the Lot 13 two unit (i.e. duplex) 4-bedroom residential structure. Prior to installing the Lot 13 replacement mound system, the existing drilled well will need to be properly abandoned and a second well on the parcel will be utilized that meets applicable isolation distances.

5 (a) Were all existing buildings or structures, campgrounds, and their associated potable water supplies and wastewater systems substantially completed before January 1, 2007? .....  Yes  No  
 (b) Were all existing improved and unimproved lots in existence before January 1, 2007? .....  Yes  No

6 Does this application include subdividing the property? .....  Yes  No

7 Has anyone from the Drinking Water & Groundwater Protection Division's Regional Office been to the property?.....  Yes  No  
 If Yes, enter the staff person's name and the date of the visit.  
 (a) Name of Staff Person  (b) Date of Visit (m/d/yyyy)

8 Will any construction occur within 50 feet of a wetland boundary, mapped or designated? .....  Yes  No  
 If Yes, contact the Wetlands Program of the Watershed Management Division at (802) 338-4835.

9 Will more than one acre be disturbed during the entire course of construction, including all lots and phases? .....  Yes  No  
 If Yes, contact the Stormwater Program of the Watershed Management Division at (802) 241-4320.

10 Will there be any stream crossings by roads, utilities, or other construction? .....  Yes  No  
 If Yes, contact the River Corridor Mgmt. Program of the Watershed Management Division at:  
 Central & Northwest Vermont ..... (802) 879-5631  
 Southern Vermont ..... (802) 786-5906  
 Northeastern Vermont ..... (802) 751-0129

11 Is the project located in a special flood hazard area as designated on the flood insurance maps prepared for a municipality by the Federal Emergency Management Agency? .....  Yes  No  
 If Yes, show the special flood hazard area limits on the site plan.

12 Act 250: Has the Applicant (Landowner) subdivided any other lots of any size within a five mile radius of this subdivision, or within the environmental district within the last five years? .....  Yes  No  
 If Yes, enter the town(s) and the associated number of lots in the table below:

	(a) Town	(b) Number of Lots
<b>X</b>	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>

13 Is there any prior Act 250 jurisdiction on the tract of land?.....  Yes  No

If Yes, enter the Act 250 permit number:

(a) Act 250 Permit Number

4C0698

**Section B - Project Deed Reference**

1 Please provide the Town, Parcel ID, Book, and Page reference for the current landowner's deed(s) to this property:

	(a) Town	(b) Parcel ID	(c) Book	(d) Page(s)
X	Charlotte	M10B01L39-9	72	144-148
X	Charlotte	M10B01L39-9	52	106-107

Add Another Deed Reference

**Section C - Project Plan Reference**

1 Please provide the following information for all water supply and wastewater disposal system plans being submitted.

	(a) Sheet#	(b) Title	(c) Plan Date	(d) Plan Revision Date
X	1	Overall Subdivision and Site Plan	9/18/2014	
X	2	Site Plan and Lot No. 10B Drilled Well Detail	9/18/2014	
X	3	Lot No. 10B Wastewater System Details and Notes	9/18/2014	
X	4	Lot No. 13 Wastewater System Details and Notes	9/18/2014	

Add Another Plan Reference

**Section D - Existing Project Lot/Building Details**

Please provide the existing project details. This section is used to describe what is existing for the project. For example, if you are subdividing an undeveloped 21-acre parcel, you would list the existing parcel. If you are revising the boundary lines of two commercial lots in an industrial park, and constructing an addition to an existing building you would list the existing lot numbers, existing acres, existing buildings, existing uses, construction date(s), prior permits, and answer the compliance questions.

1 Lot#	2 Lot Size (acres)	3 Existing Use of the Lot
10	30.98	Residential

4 Provide the following information for each building on the lot:

	(a) Building ID	(b) Existing Use	(c) Date Construction of Building Substantially Complete	(d) Prior Permits	(e) In compliance with existing permits?
X	Lot 10 House	Residential	Prior to 1-1-07	4C0698	<input checked="" type="radio"/> Yes <input type="radio"/> No

Add Another Building

Remove This Lot

1 Lot#	2 Lot Size (acres)	3 Existing Use of the Lot
13	5.02	Residential

4 Provide the following information for each building on the lot:

	(a) Building ID	(b) Existing Use	(c) Date Construction of Building Substantially Complete	(d) Prior Permits	(e) In compliance with existing permits?
X	Lot 13 Duplex	Residential	Prior to 1-1-07	4C0698	<input checked="" type="radio"/> Yes <input type="radio"/> No

Add Another Building

Remove This Lot

Add Another Lot

**Section E - Proposed Project Lot/BuildingDetails**

This section is used to describe what you are proposing to do in this project. For example, if you were going to create 4 lots for construction of single family residences, you would list each lot, proposed acreage, proposed buildings, and proposed use.

1 Lot#	2 Lot Size (acres)	3 Proposed Use of the Lot
10A	14.02	Residential

4 Is the lot being created as part of a subdivision? .....  Yes  No

5 Are you requesting that the Blood, Marriage, or Civil Union special fee be applied to this lot? .....  Yes  No

6 If the lot is exempt, please indicate the specific exemption from the Wastewater System and Potable Water Supply Rules? .....

7 Provide the following information for each building on the lot:

(a) Building ID	(b) If building is exempt, indicate exemption	(c) Construction or increased flow?	(d) Proposed Use
X Lot 10A House		<input type="checkbox"/>	Residential

Add Another Building

Remove This Lot

1 Lot#	2 Lot Size (acres)	3 Proposed Use of the Lot
Lot 10B	16.96	Residential

4 Is the lot being created as part of a subdivision? .....  Yes  No

5 Are you requesting that the Blood, Marriage, or Civil Union special fee be applied to this lot? .....  Yes  No

6 If the lot is exempt, please indicate the specific exemption from the Wastewater System and Potable Water Supply Rules? .....

7 Provide the following information for each building on the lot:

(a) Building ID	(b) If building is exempt, indicate exemption	(c) Construction or increased flow?	(d) Proposed Use
X Lot 10B Duplex		<input checked="" type="checkbox"/>	4-Bedroom Duplex

Add Another Building

Remove This Lot

1 Lot#	2 Lot Size (acres)	3 Proposed Use of the Lot
13	5.02	4-Bedroom Duplex

4 Is the lot being created as part of a subdivision? .....  Yes  No

5 Are you requesting that the Blood, Marriage, or Civil Union special fee be applied to this lot? .....  Yes  No

6 If the lot is exempt, please indicate the specific exemption from the Wastewater System and Potable Water Supply Rules? .....

7 Provide the following information for each building on the lot:

(a) Building ID	(b) If building is exempt, indicate exemption	(c) Construction or increased flow?	(d) Proposed Use
X Lot 13 Duplex		<input type="checkbox"/>	4-Bedroom Duplex

Add Another Building

Remove This Lot

Add Another Lot

**Part V Water Supply Information**

**Section A - Water Supply Screening Questions**

- 1 Are you proposing a new water supply or water service line or changes to a permitted but not constructed water supply or water service line for this project?  Yes  No
- 2 Are you proposing changes to an existing water supply or water service for this project (including changes to location, design flows, or operational change)?  Yes  No
- 3 Is there an existing connection to a water supply or water service line for this project?  Yes  No

Complete Part V if you answered Yes to any of the above questions. A project with no existing or proposed water supply may skip to Part VI.

**Section B - General Water Supply Questions**

- 1 Does this project involve a failed water supply?  Yes  No
- 2 Will any of the proposed water sources serve 25 or more people or have 15 or more service connections?  Yes  No  
*If Yes, the applicant must contact the Drinking Water & Groundwater Protection Division at (802) 241-3400 for source, construction and an operating permit.*
- 3 Are any of the existing or proposed water sources located within a special flood hazard area?  Yes  No
- 4 Are any of the existing or proposed water sources located within a floodway?  Yes  No
- 5 Are any of the proposed water sources located within 1 mile of a hazardous waste site as designated by the Waste Management Division and identified on the Agency mapping website?  Yes  No  
*If Yes, please submit additional information on the site. The Waste Management Division can be reached at (802) 241-3888.*
- 6 Does this project require an approval letter from the Drinking Water & Groundwater Protection Division for the construction of a public water system, municipal water line extension over 500 feet, or hydrants or sprinkler systems?  Yes  No  
*If Yes, please submit a copy of the approval letter from the Drinking Water & Groundwater Protection Division.*
- 7 Does the proposed or existing water supply(ies) use a water treatment device to obtain compliance with the quality requirements in the Water Supply Rule?  Yes  No  
*If Yes, please submit additional information regarding the constituent(s) that exceeds the standards and plans, details, and specifications of the treatment device.*
- 8 Is any portion of the proposed water supply located in or near a Water Source Protection Area as designated by the Drinking Water & Groundwater Protection Division?  Yes  No  
*If in areas of known interference issues, contact the Drinking Water & Groundwater Protection Division at (802) 241-3400.*

**Section C - Individual Water Supply Details**

Please provide the following information for each of the existing and proposed water supply(ies) serving a building or structure, or campground on the property.

1 Water Supply Name/Identifier <input style="width: 95%;" type="text" value="Lot 10A Drilled Well"/>		2 Water Supply Owner (if not Applicant) <input style="width: 95%;" type="text"/>					
3 Water Source Type <input style="width: 95%;" type="text" value="Non-Public Drilled Bedrock Well"/>		4 Type of Change to Supply <input style="width: 95%;" type="text" value="No Change"/>					
5 Lots/Buildings Served by this Water Supply System							
Design Flows (Gallons Per Day)							
(a) Lot#	(b) Building ID	(c) Type of Change to the Building's Supply	(d) Existing	(e) Change	(f) Total	(g) Rule or Meter Based Flows	
X <input style="width: 30px;" type="checkbox"/>	<input style="width: 100%;" type="text" value="Lot 10A"/>	<input style="width: 100%;" type="text" value="Lot 10A House"/>	<input style="width: 100%;" type="text" value="No Change"/>	<input style="width: 100%;" type="text" value="420"/>	<input style="width: 100%;" type="text" value="0"/>	<input style="width: 100%;" type="text" value="420"/>	<input style="width: 100%;" type="text" value="Rule-based"/>
<input style="width: 100%;" type="button" value="Add Another Lot/Building Served by this Supply"/>				6	7	8	
			<input style="width: 100%;" type="text" value="420"/>	<input style="width: 100%;" type="text" value="0"/>	<input style="width: 100%;" type="text" value="420"/>		

9 Is this water supply located off-lot? .....  Yes  No

10 Is this water supply shared? .....  Yes  No  
*If the water supply is located off-lot or shared, submit a copy of the agreement to provide an easement prior to construction.*

11 Is a variance being requested for this water supply? .....  Yes  No  
*If Yes, please submit additional details related to the variance request.*

Remove This Water Supply

1 Water Supply Name/Identifier Lot 10B Drilled Well	2 Water Supply Owner (if not Applicant)
3 Water Source Type Non-Public Drilled Bedrock Well	4 Type of Change to Supply New System

5 Lots/Buildings Served by this Water Supply System

(a) Lot#	(b) Building ID	(c) Type of Change to the Building's Supply	Design Flows (Gallons Per Day)			(g) Rule or Meter Based Flows
			(d) Existing	(e) Change	(f) Total	
X Lot 10B	Lot 10B Duplex	Connection to New System	0	560	560	Rule-based
Add Another Lot/Building Served by this Supply			6	7	8	
			0	560	560	

9 Is this water supply located off-lot? .....  Yes  No

10 Is this water supply shared? .....  Yes  No  
*If the water supply is located off-lot or shared, submit a copy of the agreement to provide an easement prior to construction.*

11 Is a variance being requested for this water supply? .....  Yes  No  
*If Yes, please submit additional details related to the variance request.*

Remove This Water Supply

1 Water Supply Name/Identifier Lot 13 Drilled Well	2 Water Supply Owner (if not Applicant)
3 Water Source Type Non-Public Drilled Bedrock Well	4 Type of Change to Supply New System

5 Lots/Buildings Served by this Water Supply System

(a) Lot#	(b) Building ID	(c) Type of Change to the Building's Supply	Design Flows (Gallons Per Day)			(g) Rule or Meter Based Flows
			(d) Existing	(e) Change	(f) Total	
X Lot 13	Lot 13 Duplex	Connection to New System	560	0	560	Rule-based
Add Another Lot/Building Served by this Supply			6	7	8	
			560	0	560	

9 Is this water supply located off-lot? .....  Yes  No

10 Is this water supply shared? .....  Yes  No  
*If the water supply is located off-lot or shared, submit a copy of the agreement to provide an easement prior to construction.*

11 Is a variance being requested for this water supply? .....  Yes  No  
*If Yes, please submit additional details related to the variance request.*

Remove This Water Supply

Add Another Water Supply

Section D - Water Supply Design Flows Summary Table				
1 If the project includes more than one water supply, please list each water supply system and provide the total water supply design flows for the project. <b>IMPORTANT:</b> Please don't include systems that were identified in this Part on Section C, Line 4 as a "Replacement Area Designation" in this summary table.				
	(a) Water Supply Name/Identifier	Design Flows (Gallons Per Day)		
		(b) Existing	(c) Change	(d) Total
X	Lot 10A Drilled Well	420	0	420
X	Lot 10B Drilled Well	0	560	560
X	Lot 13 Drilled Well	0	560	560
Add Another Water Supply		2	3	4
		420	1,120	1,540

**Part VI Wastewater Disposal System Information**

**Section A - Wastewater Disposal System Screening Questions**

- 1 Are you proposing a new or replacement wastewater disposal system, a new wastewater service line, or changes to a permitted but not constructed wastewater disposal system or wastewater service line for this project?  Yes  No
- 2 Are you proposing changes to an existing wastewater disposal system, replacement wastewater disposal system, replacement area, or wastewater service line for this project (including changes to location, design flows, or operational change)?  Yes  No
- 3 Is there an existing connection to a wastewater disposal system or wastewater service line for this project?  Yes  No

*Complete Part VI if you answered Yes to any of the above questions.  
A project with no existing or proposed wastewater disposal systems may skip to Part VII.*

**Section B - General Wastewater Disposal System Questions**

- 1 Does this project involve a failed wastewater disposal system?  Yes  No
- 2 Do any of the systems require a curtain or dewatering drain as part of the design?  Yes  No
- 3 Is a hydrogeologic study required for this project?  Yes  No
- 4 For projects using soil-based wastewater systems having a total design flow that exceeds 1,000 gpd, is this project located in a Class A Watershed?  Yes  No  NA  
 If Yes, indicate the Class A Watershed in which the system(s) is located:  
 (a) Class A Watershed Name
- 5 Are there any existing or proposed floor drains as part of this project?  Yes  No  
 If Yes, indicate where the floor drains will discharge:  
 (a) Floor Drain Discharge Point
- 6 If the project utilizes an Innovative/Alternative System or Product, has the applicant received a copy of the Drinking Water & Groundwater Protection Division's approval letter?  Yes  No  NA
- 7 Is any portion of the proposed wastewater disposal system located in or near a Water Source Protection Area as designated by the Drinking Water & Groundwater Protection Division?  Yes  No  
 If Yes, contact the Drinking Water & Groundwater Protection Division at (802) 241-3400.

**Section C - Individual Wastewater Disposal System Details**

Please provide the following information for each of the existing and proposed wastewater disposal systems serving a building or structure, or campground on the property.

1 Wastewater Disposal System Name/Identifier <input style="width:95%;" type="text" value="Lot 10A Replacement Area"/>	2 Wastewater Disposal System Owner (if not Applicant) <input style="width:95%;" type="text"/>							
3 Wastewater Disposal System Type <input style="width:95%;" type="text" value="In-ground"/>	4 Type of Change to System <input style="width:95%;" type="text" value="Replacement Area Designation"/>							
5 Lots/Buildings Served by this Wastewater Disposal System								
Design Flows (Gallons Per Day)								
(a) Lot#	(b) Building ID	(c) Type of Change to the Building's System	(d) Existing	(e) Change	(f) Infiltration	(g) Total	(h) Rule or Meter Based Flows	
<input checked="" type="checkbox"/> X	<input style="width:95%;" type="text" value="Lot 10A"/>	<input style="width:95%;" type="text" value="Lot 10A House"/>	<input style="width:95%;" type="text" value="Replacement Area Designation"/>	<input style="width:95%;" type="text" value="420"/>	<input style="width:95%;" type="text" value="0"/>	<input style="width:95%;" type="text" value="0"/>	<input style="width:95%;" type="text" value="420"/>	<input style="width:95%;" type="text" value="Rule-based"/>
Add Another Lot/Building Served by this System			6	7	8	9		
			<input style="width:95%;" type="text" value="420"/>	<input style="width:95%;" type="text" value="0"/>	<input style="width:95%;" type="text" value="0"/>	<input style="width:95%;" type="text" value="420"/>		
10 Is this wastewater disposal system located off-lot? ..... <input checked="" type="radio"/> Yes <input type="radio"/> No								
11 Is this wastewater disposal system shared? ..... <input checked="" type="radio"/> Yes <input type="radio"/> No								
<i>If the wastewater disposal system is located off-lot or shared, submit a copy of the agreement to provide an easement prior to initiation of construction.</i>								
12 Is a variance being requested for this wastewater disposal system? ..... <input type="radio"/> Yes <input checked="" type="radio"/> No								
<i>If Yes, please submit additional details related to the variance request.</i>								
13 If this wastewater disposal system type is a connection to an Indirect Discharge System, please provide the Indirect Discharge System ID number.								
Indirect Discharge System ID Number <input style="width:95%;" type="text"/>								
14 If this wastewater disposal system type is a connection to a municipal system, please select the town.								
Town <input style="width:95%;" type="text"/>								
15 If this wastewater disposal system is a soil-based system, please select the design approach used.								
Design Approach Used <input style="width:95%;" type="text" value="Prescriptive"/>								
16 For soil-based systems, please check all that apply (Note: Store and dose does not apply to standard pump/pump chamber systems).								
<input type="checkbox"/> Storage and Dose <input type="checkbox"/> Filtrate <input type="checkbox"/> Constructed Wetlands								
17 If this is an Innovative/Alternative soil-based system, please select the system use type.								
Innovative/Alternative System Use Type <input style="width:95%;" type="text"/>								
18 If this is an Innovative/Alternative soil-based system, please select the Innovative/Alternative system or product.								
Innovative/Alternative System or Product <input style="width:95%;" type="text"/>								
Remove This Wastewater System								
1 Wastewater Disposal System Name/Identifier <input style="width:95%;" type="text" value="Lot 10B Wastewater System"/>	2 Wastewater Disposal System Owner (if not Applicant) <input style="width:95%;" type="text"/>							
3 Wastewater Disposal System Type <input style="width:95%;" type="text" value="Mound"/>	4 Type of Change to System <input style="width:95%;" type="text" value="New System"/>							
5 Lots/Buildings Served by this Wastewater Disposal System								

	(a) Lot#	(b) Building ID	(c) Type of Change to the Building's System	Design Flows (Gallons Per Day)				(h) Rule or Meter Based Flows
				(d) Existing	(e) Change	(f) Infiltration	(g) Total	
X	Lot 10B	Lot 10B House	Connection to New System	0	560	0	560	Rule-based
Add Another Lot/Building Served by this System				6	7	8	9	
				0	560	0	560	

10 Is this wastewater disposal system located off-lot?  Yes  No

11 Is this wastewater disposal system shared?  Yes  No

*If the wastewater disposal system is located off-lot or shared, submit a copy of the agreement to provide an easement prior to initiation of construction.*

12 Is a variance being requested for this wastewater disposal system?  Yes  No

*If Yes, please submit additional details related to the variance request.*

13 If this wastewater disposal system type is a connection to an Indirect Discharge System, please provide the Indirect Discharge System ID number.

Indirect Discharge System ID Number

14 If this wastewater disposal system type is a connection to a municipal system, please select the town.

Town

15 If this wastewater disposal system is a soil-based system, please select the design approach used.

Design Approach Used

16 For soil-based systems, please check all that apply (Note: Store and dose does not apply to standard pump/pump chamber systems).

Storage and Dose  Filtrate  Constructed Wetlands

17 If this is an Innovative/Alternative soil-based system, please select the system use type.

Innovative/Alternative System Use Type

18 If this is an Innovative/Alternative soil-based system, please select the Innovative/Alternative system or product.

Innovative/Alternative System or Product

Remove This Wastewater System

1 Wastewater Disposal System Name/Identifier

2 Wastewater Disposal System Owner (if not Applicant)

3 Wastewater Disposal System Type

4 Type of Change to System

5 Lots/Buildings Served by this Wastewater Disposal System

	(a) Lot#	(b) Building ID	(c) Type of Change to the Building's System	Design Flows (Gallons Per Day)				(h) Rule or Meter Based Flows
				(d) Existing	(e) Change	(f) Infiltration	(g) Total	
X	Lot 13	Lot 13 House	Connection to New System	560	0	0	560	Rule-based
Add Another Lot/Building Served by this System				6	7	8	9	
				560	0	0	560	

10 Is this wastewater disposal system located off-lot?  Yes  No

11 Is this wastewater disposal system shared?  Yes  No  
*If the wastewater disposal system is located off-lot or shared, submit a copy of the agreement to provide an easement prior to initiation of construction.*

12 Is a variance being requested for this wastewater disposal system?  Yes  No  
*If Yes, please submit additional details related to the variance request.*

13 If this wastewater disposal system type is a connection to an Indirect Discharge System, please provide the Indirect Discharge System ID number.  
 Indirect Discharge System ID Number

14 If this wastewater disposal system type is a connection to a municipal system, please select the town.  
 Town

15 If this wastewater disposal system is a soil-based system, please select the design approach used.  
 Design Approach Used

16 For soil-based systems, please check all that apply (Note: Store and dose does not apply to standard pump/pump chamber systems).  
 Storage and Dose     Filtrate     Constructed Wetlands

17 If this is an Innovative/Alternative soil-based system, please select the system use type.  
 Innovative/Alternative System Use Type

18 If this is an Innovative/Alternative soil-based system, please select the Innovative/Alternative system or product.  
 Innovative/Alternative System or Product

**Remove This Wastewater System**

**Add Another Wastewater System**

**Section D - Wastewater Disposal Systems Design Flows Summary Table**

1 If the project includes more than one wastewater disposal system, please list each system on this page and provide the total wastewater disposal design flows for the project. **IMPORTANT:** Please don't include systems that were identified in this Part on Section C, Line 4 as a "Replacement Area Designation" in this summary table.

	(a) Wastewater Disposal System Name/Identifier	Design Flows (Gallons Per Day)			
		(b) Existing	(c) Change	(d) Infiltration	(e) Total
X	Lot 10A Replacement Area	420	0	0	420
X	Lot 10B Wastewater System	0	560	0	560
X	Lot 13 Replacement WW System	560	0	0	560
<b>Add Another Wastewater System</b>		2	3	4	5
		980	560	0	1,540

**Part VII Application Fees**

1 Fee Amount

2 Fee Calculation Details

--

**Part VIII Designer Certification & Copyright License**

**Section A - Certifying Designer 1 Certification & Copyright License**

"I hereby certify that in the exercise of my reasonable professional judgment, the design-related information submitted with this application is true and correct, and that the design included in this application for a permit complies with the Vermont Wastewater System and Potable Water Supply Rules and the Vermont Water Supply Rules.

As the individual who prepared this application, including all documents that are marked as copyrighted, I hereby grant a non-exclusive, limited license to the State to allow the documents to be made available for public review and copying in order to properly implement and operate the permitting programs for Wastewater Systems and Potable Water Supplies, and for no other purposes. As a condition to this license, the State agrees that it will not make any changes to such documents, nor will the State delete any copyright notices on such documents."

- 1 Check the design(s) you are certifying. This should be the same as the Designer Role(s) you selected in Part II, Section A, Line 13.
- Water Supply Designer
  - Wastewater Disposal System Designer

1 Designer 1 Name	2 Designer 1 Signature	3 Signature Date
Jason S. Barnard		9.19.14

**Section B - Certifying Designer 2 Certification & Copyright License**

"I hereby certify that in the exercise of my reasonable professional judgment, the design-related information submitted with this application is true and correct, and that the design included in this application for a permit complies with the Vermont Wastewater System and Potable Water Supply Rules and the Vermont Water Supply Rules.

As the individual who prepared this application, including all documents that are marked as copyrighted, I hereby grant a non-exclusive, limited license to the State to allow the documents to be made available for public review and copying in order to properly implement and operate the permitting programs for Wastewater Systems and Potable Water Supplies, and for no other purposes. As a condition to this license, the State agrees that it will not make any changes to such documents, nor will the State delete any copyright notices on such documents."

- 1 Check the design(s) you are certifying. This should be the same as the Designer Role(s) you selected in Part II, Section B, Line 13.
- Water Supply Designer
  - Wastewater Disposal System Designer

1 Designer 2 Name	2 Designer 2 Signature	3 Signature Date

**Part IX Applicant(s) Signature & Acknowledgements**

In order to insure compliance with the requirements of the regulations administered by the Department of Environmental Conservation, Drinking Water & Groundwater Protection Division, it may be necessary to visit the property. As this would involve a Department employee entering private property, we request your approval to do so.

1 If we do visit your property, do you have any special instructions?

"As landowner of the property for which I am requesting a permit from the Department of Environmental Conservation, I understand that by signing this application I am granting permission for the Department employees to enter the property, during normal working hours, to insure compliance of the property with the applicable rules of the Department.

I also understand that I am not allowed to commence any site work or construction on this project without written approval from the Department of Environmental Conservation.

If my project utilizes an Innovative/Alternative System or Product, I have received a copy of the Drinking Water & Groundwater Protection Division's approval letter and agree to abide by the conditions of the approval.

I also certify that to the best of my knowledge and belief the information submitted above is true, accurate and complete."

<input checked="" type="checkbox"/> 2 Print Applicant Name	3 Applicant Signature	4 Signature Date
John H. Hauenstein		

Add Applicant Signature Block

**ANR Form 5: Certification Statement for Wastewater System and Potable Water Supply Permits when there is no Required Notification of Overshadowed Property Owner(s)**

A person submitting an application to the Secretary for a Wastewater System and Potable Water Supply Permit shall use this statement whenever overshadowing notification of affected landowners is not required (see guidance and instructions for examples).

Note: When the property subject to the permit application is owned by more than one person, only one of the landowners must sign this certification statement even though all landowners must sign the permit application itself.

**I hereby certify that “overshadowing” notification is not required either because there is an exemption to the notification requirement or there are no landowners whose property may be affected by the proposed water and wastewater systems.**

Signature \_\_\_\_\_

Name (Printed) John H. Hauenstein

Property Address or Property Tax ID # 6300 and 6373 Spear Street, Charlotte, VT

Date of this certification \_\_\_\_\_

(To Comply with Act 145 and Act 117 - 8-24-12 Last Revised 9-11-12)

## TEST PIT LOG

Client: John H. Hauenstein Date: June 20, 2014 Location: 6300 and 6373 Spear St., Charlotte, Vermont

Project Description: Two-Lot Subdivision and Replacement Wastewater Disposal System Design and Permitting

Logged By: Jason Barnard, Licensed Designer #430-B Topographic Setting: Southerly Sloping Brush Meadow and Wooded Area

Current/Historic Land Use: Residential and Agriculture Slope: 4 - 18% Vegetation: Grass and Wooded

Weather Conditions: 75° Mostly Sunny Method of Excavation: Rubber Tired Backhoe

Test Pit #	Depth (inches)	Dominant Color	Soil Texture	Soil Structure	Consistency	Mottles	Comments
01	0-6"	Brown	Silt loam (topsoil)	Weak sub-angular blocky	Friable	No	Fairly well drained
	6-16"	Brown	Silt loam	Weak sub-angular blocky	Friable	Fine, faint and few at 11", prominent, common and distinct at 13-14"	Fairly well drained
	16-40"	Brown	Clay loam	Sub-angular to angular blocky	Friable	Prominent, common and distinct	No ledge or groundwater to 40"
02	0-6"	Brown	Very fine sandy loam (topsoil)	Granular	Very friable	No	Well drained
	6-17"	Tan-brown	Very fine sandy loam	Weak sub-angular blocky	Friable	Fine, faint and few at 12", prominent, common and distinct at 15"	Fairly well drained
	17-36"	Tan-brown	Very fine sandy loam	Sub-angular blocky	Friable	Prominent, common and distinct	No ledge or groundwater to 36"

Client: John H. Hauenstein Date: June 20, 2014 Location: 6300 and 6373 Spear St. Charlotte, Vermont

Test Pit #	Depth (inches)	Dominant Color	Soil Texture	Soil Structure	Consistency	Mottles	Comments
03	0-8"	Brown	Very fine sandy loam (topsoil)	Granular	Loose to very friable	No	Well drained
	8-28"	Orange-brown	Very fine sandy loam	Weak sub-angular blocky	Friable	Fine, faint few at 25", prominent, common and distinct at 28"	Well drained
	28-40"	Gray	Very fine sandy loam	Sub-angular blocky	Friable	Prominent, common and distinct	No ledge or groundwater to 40"
04	0-4"	Brown	Very fine sandy loam (topsoil)	Granular	Loose to very friable	No	Well drained
	4-15"	Brown	Silt loam	Weak sub-angular blocky	Friable	Fine, faint few at 12", prominent, common and distinct at 15"	Fairly well drained
	15-36"	Brown to gray	Clay loam	Sub-angular blocky	Friable to firm in-place	Prominent, common and distinct	No ledge or groundwater to 36"
05	0-7"	Brown	Very fine sandy loam (topsoil)	Granular	Loose to very friable	No	Well drained
	7-20"	Orange brown	Fine sandy loam	Granular	Loose	No	Well drained
	20-48"	Brown	Fine sandy loam	Granular	Friable	Prominent, common and distinct at 32"	No ledge or groundwater to 48"

Client: John H. Hauenstein Date: June 20, 2014 Location: 6300 and 6373 Spear St. Charlotte, Vermont

Test Pit #	Depth (inches)	Dominant Color	Soil Texture	Soil Structure	Consistency	Mottles	Comments
06	0-6"	Brown	Very fine sandy loam (topsoil)	Granular	Loose to very friable	No	Well drained
	6-13"	Brown	Very fine sandy loam	Granular	Loose	Fine, faint and few at 12"	Well drained
	13-21"	Brown	Silt loam	Weak sub-angular blocky	Friable	Prominent, common and distinct	Fairly well drained
	21-36"	Brown	Clay loam	Sub-angular blocky	Friable to firm in-place	Prominent, common and distinct	No ledge or groundwater to 36"
07	0-8"	Brown	Loamy, very fine sand (topsoil)	Granular	Well drained	No	Well drained
	8-18"	Tan-brown	Very fine sandy loam	Weak sub-angular blocky	Friable	No	Well drained
	18"+	Gray	Ledge, weathered limestone				Ledge at 18"
08	0-6"	Brown	Very fine sandy loam (topsoil)	Granular	Loose	No	Well drained
	6-36"	Brown	Stony, fine sandy loam	Weak sub-angular	Loose to very friable	Fine, faint few at 36"	Well drained
	36-53"	Brown	Fine sandy loam (glacial till)	Sub-angular blocky	Friable	Prominent, common and distinct at 42"	No ledge or groundwater to 53"

Client: John H. Hauenstein Date: June 20, 2014 Location: 6300 and 6373 Spear St. Charlotte, Vermont

Test Pit #	Depth (inches)	Dominant Color	Soil Texture	Soil Structure	Consistency	Mottles	Comments
09	0-8"	Brown	Loamy, fine sand (topsoil)	Granular	Loose	No	Well drained
	8-30"	Tan-brown	Loamy, fine sand	Granular	Loose	No	Well drained
	30-48"	Tan-brown	Fine sandy loam	Granular	Loose to very friable	Fine, faint and few at 36"	No groundwater, ledge at 48"
10	0-10"	Brown	Loamy, fine sand (topsoil)	Granular	Loose	No	Well drained
	10-24"	Tan-brown	Fine sandy loam	Granular	Friable	Prominent, common and distinct at 24"	Well drained
	24-36"	Tan to gray	Fine sandy loam	Weak sub-angular blocky	Friable	Prominent, common and distinct	No ledge or groundwater to 36"
11	0-6"	Brown	Loamy, fine sand (topsoil)	Granular	Loose	No	Well drained
	6-12"	Tan-brown	Fine sandy loam	Granular	Friable	No	Ledge at 12"
12	0-10"	Brown	Fine sandy loam (topsoil)	Granular	Loose	No	Well drained
	10-24"	Tan-brown	Very fine sandy loam	Weak sub-angular blocky	Friable	No	Well drained
	24"+	Gray	Weathered limestone				Ledge at 24"

John H. Hauenstein  
 Two-Lot Subdivision and  
 Replacement Wastewater System  
 6300 and 6373 Spear Street, Charlotte, VT  
 Percolation Tests of July 10, 2014

Table 1

Percolation Tests P-1 Through P-4

P-01	Drop Time (min)	Total Drop Time (min)	Total Drop (inches)	Drop Rate (min/inch)
	7.00	7.00	1	7.00
	7.50	14.50	2	7.25
	9.25	23.75	3	7.92
	10.15	33.90	4	8.48
	11.00	44.90	5	8.98
	11.50	56.40	6	9.40
	12.00	68.40	7	9.77
	---	<b>1440.00</b>	---	<b>15.31</b>

P-03	Drop Time (min)	Total Drop Time (min)	Total Drop (inches)	Drop Rate (min/inch)
	6.00	6.00	1	6.00
	7.20	13.20	2	6.60
	8.00	21.20	3	7.07
	8.15	29.35	4	7.34
	9.00	38.35	5	7.67
	9.25	47.60	6	7.93
	10.00	57.60	7	8.23
	---	<b>1440.00</b>	---	<b>12.69</b>

P-02	Drop Time (min)	Total Drop Time (min)	Total Drop (inches)	Drop Rate (min/inch)
	4.00	4.00	1	4.00
	5.30	9.30	2	4.65
	6.00	15.30	3	5.10
	6.10	21.40	4	5.35
	8.05	29.45	5	5.89
	8.40	37.85	6	6.31
	9.20	47.05	7	6.72
	---	<b>1440.00</b>	---	<b>13.27</b>

P-04	Drop Time (min)	Total Drop Time (min)	Total Drop (inches)	Drop Rate (min/inch)
	4.00	4.00	1	4.00
	5.20	9.20	2	4.60
	7.11	16.31	3	5.44
	8.01	24.32	4	6.08
	9.00	33.32	5	6.66
	8.55	41.87	6	6.98
	9.34	51.21	7	7.32
	---	<b>1440.00</b>	---	<b>16.65</b>

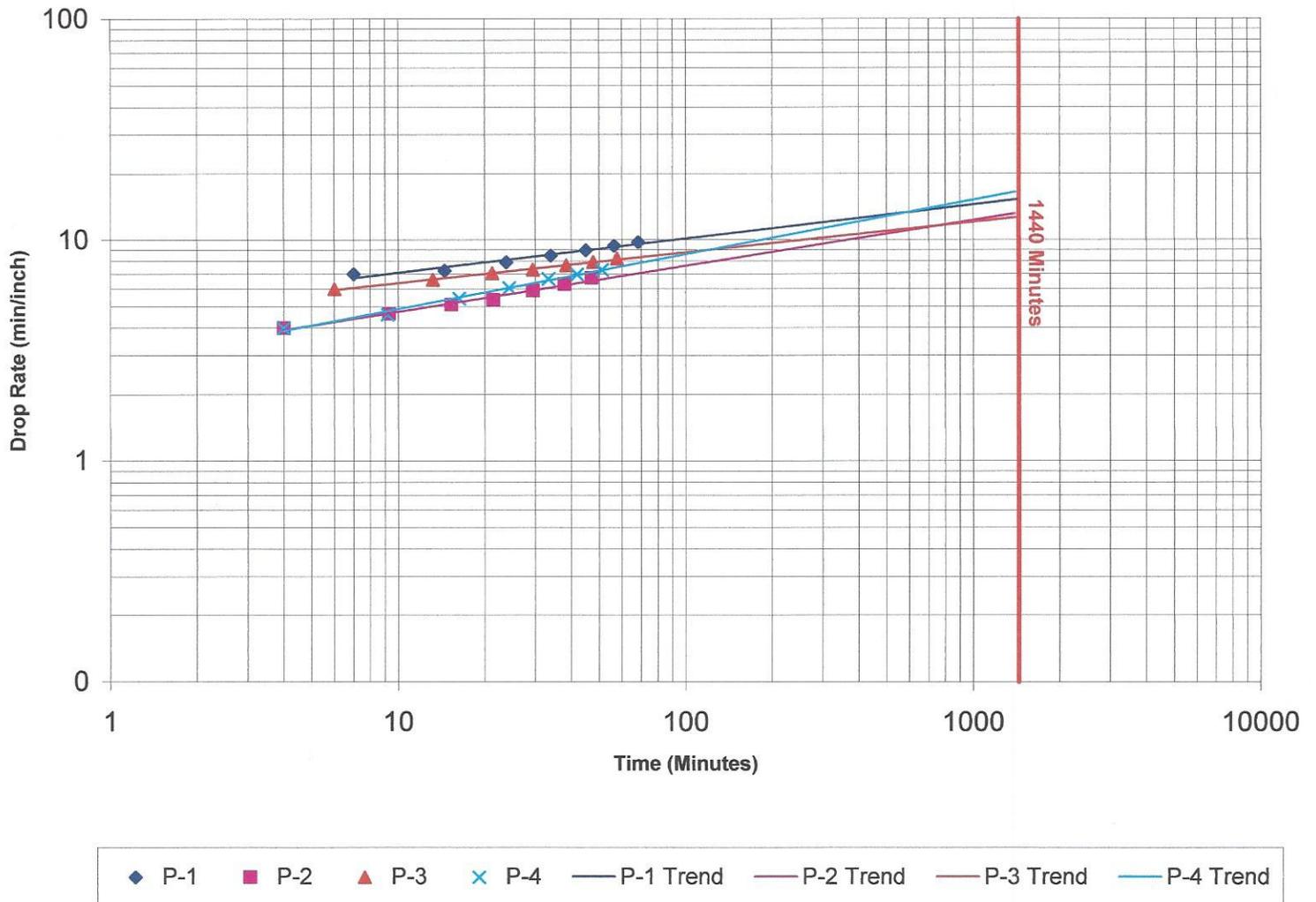
NOTES:

1. Percolation tests performed at 10 to 20 inches below ground surface.

John H. Hauenstein  
Two-Lot Subdivision and  
Replacement Wastewater System  
6300 and 6373 Spear Street, Charlotte, VT  
Percolation Tests of July 10, 2014

Chart 1

Percolation Tests P-1 Through P-4



**John H. Hauenstein  
Two-Lot Subdivision and  
Replacement Wastewater  
Disposal System  
6300 and 6373 Spear Street,  
Charlotte, Vermont**

**Lots No. 10B Primary Mound System  
Desktop Effluent Mounding Analyses**

***Lot No. 10B Primary Mound System:***

- Soils present beneath and down slope of the Lot No. 10B primary performance-based mound system consist of either very fine sandy loam (topsoil) over top of a very fine sandy loam that extends to between 13" and 20" below ground surface. Beneath the very fine sandy loam is a fine sandy loam, silt loam or clay loam that extends to at least 36" below ground surface. The very fine sandy 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 redoximorphic features (i.e. soil mottles) in down slope test pit TP-06.
- The average ground surface slope is 14% in the vicinity of the Lot No. 10B proposed primary performance-based mound system area.

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

$$LLR = (f)(b)$$

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.

Very fine sandy loam soil with a slope of 14%, therefore  $f = 18.7$

$$SHWT = 1.0' (12'') - 0.5' (6'') = 0.5' (6'') = b \text{ (conservative).}$$

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

- $LLR = (0.5)(18.7) = 9.35$  gpd/linear foot.
- $560 \text{ gpd} / 9.35 \text{ gpd/linear feet} = 59.89'$  feet minimum mound length.

- Since loading at 1.0 gpd/ft<sup>2</sup>, 560 gpd/1.0 gpd/ft<sup>2</sup> = 560 ft<sup>2</sup> of trench area is required.
- 560 ft<sup>2</sup> of infiltration area is supplied via one 8 foot by 70 foot absorption bed.
- The actual linear loading rate (ALLR) is: 560 gpd/70 ft = 8.0 gpd/linear foot.
- The actual effluent mounding (AEM) is determined by dividing the actual linear loading rate (ALLR) by the linear loading rate factor ( $f$ ) = AEM = (ALLR/ $f$ ) = (8.0/18.7) = 0.43' or 5.2".
- Then, the amount of unsaturated soil ("freeboard") between the top of the induced groundwater mound and the ground surface is determined by subtracting AEM from the SHWT = 1.0' - 0.43' = 0.57' or 6.87".

### Conclusions

Based on the June 20, 2014 test pit evaluations and the hydrogeologic effluent mounding analysis presented above, the following conclusions are offered:

- Lot No. 10B primary performance-based mound system, if constructed with an 8 foot wide by 70 foot long absorption bed with 2.5 feet (30 inches) of mound sand beneath the absorption trench will maintain the effluent plume at least 6 inches below ground surface at all times of the year and will provide at least 36 inches (6 inches of freeboard + 30 inches of mound sand = 36 inches) of unsaturated soil between the top of the induced groundwater mound and the bottom of the absorption trench at all times of the year. Further, with 2.5 feet of mound sand beneath the trench and at least 36 inches to bedrock in the test pits excavated in the vicinity of Lot No. 10B primary mound system there is greater than 4 feet (48 inches) of vertical separation between the bottom of the absorption trench and any underlying bedrock that may be present.

**MOUND WASTEWATER DISPOSAL SYSTEM BASIS OF DESIGN**

**John H. Hauenstein**  
**Two-Lot Subdivision and Replacement Wastewater System**  
**6300 and 6373 Spear Street, Charlotte, Vermont**  
**September 16, 2014**

**Prepared By: Jason S. Barnard, Licensed Designer #430-B**

**Lot No. 10B Primary Mound Wastewater Disposal System**

**I. WASTEWATER FLOWS AND MOUND DISPOSAL SYSTEM SIZING**

**A. WASTEWATER FLOWS (Q)**

Unit #1	2	Bedrooms	140	gpd/bedroom=	280	gpd
Unit #2	2	Bedrooms	140	gpd/bedroom=	280	gpd
					Total Flows =	<u>560</u> gpd

**B. REQUIRED SEPTIC TANK**

Required Septic Tank Capacity = **1,000 gallons** for a **4-bedroom** duplex apartment.

**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 = **560** / **1.0**

RLA = **560** sf

**F. PROPOSED LEACHFIELD AREA (PLA)**

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

L = **70** ft

W = **8** ft

N = **1** Absorption Bed

PLA = **560** 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 = **560** / **0.74**

RBA = **757** sf

**G3. PROPOSED BASAL AREA (PBA)**

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

L = **70** ft

MT = **37** FT

PBA = **2590** sf

PBA > RBA, therefore the PBA is acceptable

**MOUND WASTEWATER DISPOSAL SYSTEM BASIS OF DESIGN**

**John H. Hauenstein**  
**Two-Lot Subdivision and Replacement Wastewater System**  
**6300 and 6373 Spear Street, Charlotte, Vermont**  
**September 16, 2014**  
**Prepared By: Jason S. Barnard, Licensed Designer #430-B**

**Lot No. 10B Primary Mound Wastewater Disposal System**

**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 = **28** orifices

**C. LEACHFIELD AREA (LA) PER ORIFICE**

LA/Orifice = LA / Total Number of Orifices

LA/Orifice = **20.0** 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 **4-bedroom** duplex apartment.

**B. REQUIRED MOUND SYSTEM DOSE**

Required Dose Volume = **152** Gallons

Pump Station Dimensions: On-Site Septic Solutions 1,000 Gallon Pump Station = 4.67 ft x 7.5 ft

Area of Pump Station = **35.0** sf

Volume per Inch of depth = **21.8** gallons / vertical inch

Pump on/off switch difference setting required for dose: **7.0** inches

**C. REQUIRED PUMP STATION STORAGE**

Storage Required = **560** gallons (1 day's flow)

**D. PUMP STATION STORAGE**

Pump alarm to overflow point height difference = **33.0** inches

Storage Provided = **720** gallons

Storage provided is greater than 1 day's flow, therefore the proposed pump station is adequately sized.

**E. PROPOSED EFFLUENT PUMP**

Champion Model Number **CPSTEP522(A)** **0.5 hp** **230 volt** **1 phase**

**F. PROPOSED PUMP STATION EFFLUENT PUMP**

See Attached Effluent Pump Curve

# Pump Selection for a Pressurized System - Single Family Residence Project

John Hauenstein, Two-Lot Subdivision and Replacement Wastewater System / Lot 10B Mound Pressure Distribution Details

## Parameters

Discharge Assembly Size	2.00	inches
Transport Length	480	feet
Transport Pipe Class	40	
Transport Line Size	2.00	inches
Distributing Valve Model	None	
Max Elevation Lift	40	feet
Manifold Length	4	feet
Manifold Pipe Class	40	
Manifold Pipe Size	2.00	inches
Number of Laterals per Cell	2	
Lateral Length	65	feet
Lateral Pipe Class	40	
Lateral Pipe Size	2.00	inches
Orifice Size	7/32	inches
Orifice Spacing	5	feet
Residual Head	4	feet
Flow Meter	None	inches
'Add-on' Friction Losses	0	feet

## Calculations

Minimum Flow Rate per Orifice	1.19	gpm
Number of Orifices per Zone	28	
Total Flow Rate per Zone	33.3	gpm
Number of Laterals per Zone	2	
% Flow Differential 1st/Last Orifice	1.4	%
Transport Velocity	3.2	fps

## Frictional Head Losses

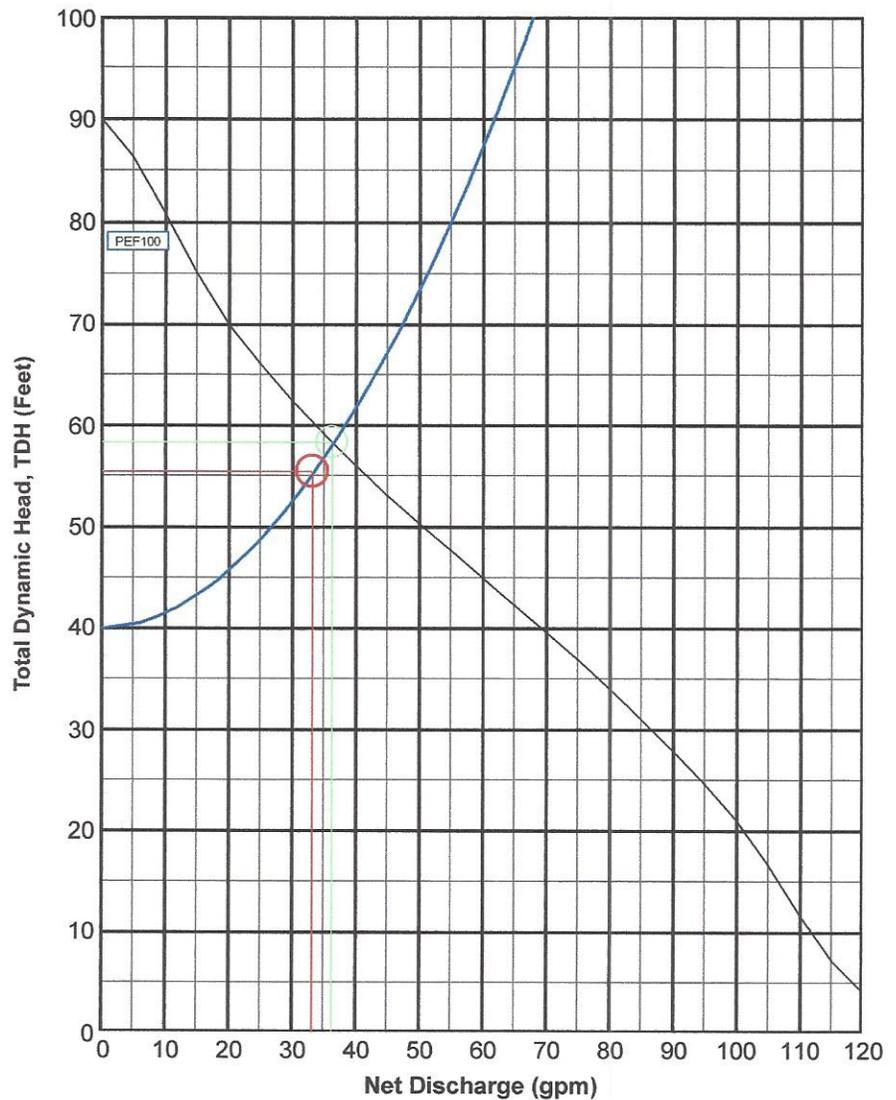
Loss through Discharge	2.2	feet
Loss in Transport	9.0	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.0	feet
Loss in Laterals	0.1	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	0.0	feet

## Pipe Volumes

Vol of Transport Line	83.7	gals
Vol of Manifold	0.7	gals
Vol of Laterals per Zone	22.7	gals
Total Volume	107.0	gals

## Minimum Pump Requirements

Design Flow Rate	33.3	gpm
Total Dynamic Head	55.4	feet



## PumpData

PEF100 Effluent Pump  
1HP, 230V 1Ø

## Legend

System Curve:	—
Pump Curve:	—
Pump Optimal Range:	—
Operating Point:	○
Design Point:	○

John Hauenstein - Two Lot  
Subdivision & Replacement  
WASTEWATER SYSTEM - Lot No. 10 B

Required Effluent Pump  
OR Equal

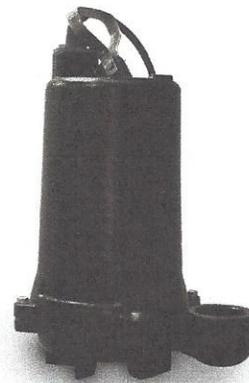
### FEATURES/BENEFITS

- Performances
  - Heads Up To 122' TDH
  - Flows Up To 122 GPM
- Oil Filled High Efficient Motor With Upper & Lower Ball Bearings
  - Maximum Motor Cooling
  - Runs Cooler & Last Longer
  - Internal Overload Protection
- Cast Iron Impeller
  - Pass 3/4" Solids
- Quick Disconnect Power Cord & (Seal Failure Cord) Optional
  - Prevents Water From Entering The Motor Housing
  - Easy To Replace
  - Up To 50' Available
- Heavy Duty Cast Iron Construction
- Piggy-Back Switch Design
  - Defective Switches Can Be Diagnosed By Phone
  - Pump Can Be Operated Manually By Overriding The Switch
- Every Pump Is Performance Tested In Water
  - Ensures That The Pump Meets Head & Flow Requirements

- Optional Double Seal Design With Seal Failure
- Easy To Install
- Quick Delivery
- Complete Packages With Or Without Rail Systems

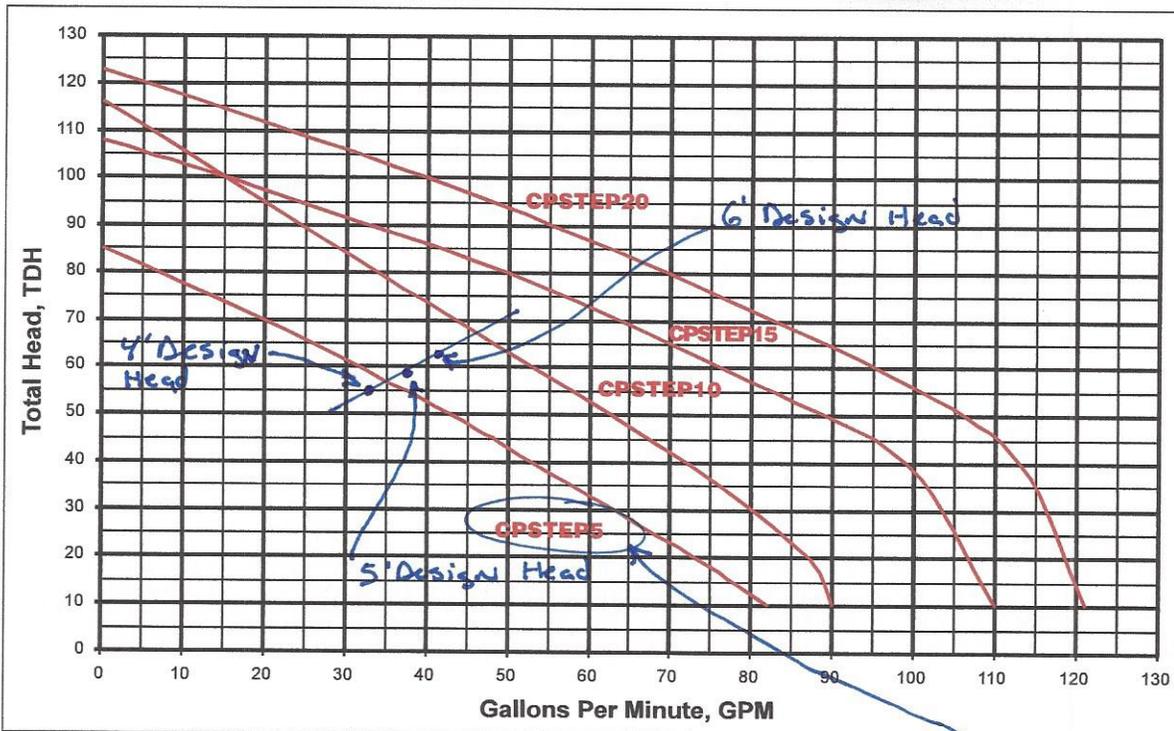
### APPLICATIONS

- Residential Developments, Residential & Commercial STEP Systems, Dewatering, Elevator Pits, Septic Systems



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### CHAMPION PUMP - PUMP PERFORMANCE CURVE



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Phone 419-281-4500 • Toll Free 800-659-4491 • Fax 419-616-1100

Required Effluent Pump

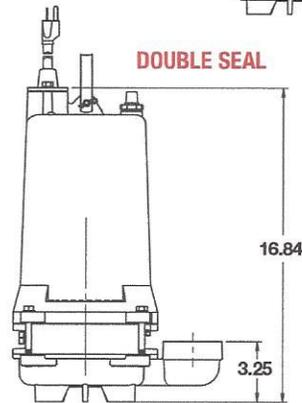
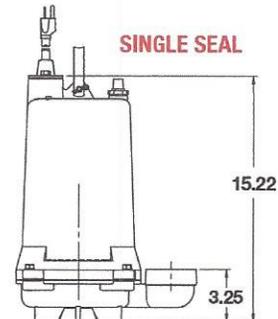
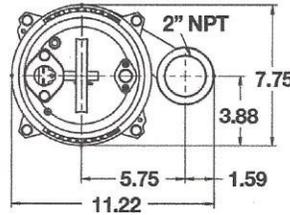
# CPSTEP 1/2 - 2HP

## EFFLUENT

John Hauenstein Two-Lot  
Subdivision & Replacement  
Wastewater Disposal System -

Lot No. 10 B Required  
Effluent Pump  
or Equal

<b>DISCHARGE</b>	2" NPT. Vertical Standard
<b>SOLIDS HANDLING</b>	3/4"
<b>LIQUID TEMPERATURE</b>	140 Degrees F. (Intermittent)
<b>MOTOR HOUSING</b>	Cast Iron
<b>VOLUTE</b>	Cast Iron
<b>SEAL PLATE</b>	Cast Iron
<b>IMPELLER</b>	Cast Iron
<b>SHAFT</b>	416 Stainless Steel
<b>SHAFT SEAL (SINGLE SEAL)</b>	Carbon - Ceramic/ Buna-N-Elastomer 300 Series Stainless Steel - Hardware
<b>SHAFT SEAL (DOUBLE SEAL)</b>	Tandem Double Mechanical Upper & Lower/ Carbon-Ceramic Buna-N-Elastomer 300 Series Stainless Steel - Hardware
<b>BEARING (UPPER &amp; LOWER)</b>	Single Row, Ball, Oil Lubricated
<b>HARDWARE</b>	300 Series Stainless Steel
<b>O-RINGS</b>	Buna-N
<b>CORD</b>	20' Length Standard UL/GSA (SJOW) 14/3 (.3750D) Quick Disconnect Pin Terminals  Up To 50' Available
<b>MOTOR (SINGLE PHASE)</b>	3450 RPM. 60 Hz Includes Overload Protection In The Motor. Oil Filled, Class F PSC Permanent Split Capacitor
<b>OPTIONAL SEAL FAILURE</b>	20' Length Standard UL/ CSA (SJTW) 16/3 (.3300D)



Model	HP	Volts	Phase	Amps	Cord Length	Switch	Wt.
CPSTEP512(A)	1/2	115	1	13.8	20	Manual (Automatic)	64
CPSTEP522(A)	1/2	230	1	6.2	20	Manual (Automatic)	64
CPSTEP532	1/2	230	3	4.6	20	Manual	64
CPSTEP542	1/2	460	3	2.3	20	Manual	64
CPSTEP1022(A)	1	230	1	10.4	20	Manual (Automatic)	72
CPSTEP1032	1	230	3	7.6	20	Manual	72
CPSTEP1042	1	460	3	3.8	20	Manual	72
CPSTEP1522(A)	1-1/2	230	1	12.0	20	Manual (Automatic)	72
CPSTEP1532	1-1/2	230	3	8.4	20	Manual	72
CPSTEP1542	1-1/2	460	3	4.2	20	Manual	72
CPSTEP2022(A)	2	230	1	14.8	20	Manual (Automatic)	72
CPSTEP2032	2	230	3	11.0	20	Manual	72
CPSTEP2042	2	460	3	5.5	20	Manual	72

Required  
Effluent Pump  
or Equal

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**MOUND WASTEWATER DISPOSAL SYSTEM BASIS OF DESIGN**

**John H. Hauenstein  
Two-Lot Subdivision and Replacement Wastewater System  
6300 and 6373 Spear Street, Charlotte, Vermont  
September 16, 2014**

**Prepared By: Jason S. Barnard, Licensed Designer #430-B**

**Lot No. 13 Replacement Mound Wastewater Disposal System**

**I. WASTEWATER FLOWS AND MOUND DISPOSAL SYSTEM SIZING**

**A. WASTEWATER FLOWS (Q)**

Unit #1	3	Bedrooms	140	gpd/bedroom=	420	gpd
Unit #2	1	Bedrooms	140	gpd/bedroom=	140	gpd
					Total Flows =	<u>560</u> gpd

**B. REQUIRED SEPTIC TANK**

Required Septic Tank Capacity = 1,000 gallons for a 4-bedroom duplex apartment.

**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 = 560 / 1.0

RLA = 560 sf

**F. PROPOSED LEACHFIELD AREA (PLA)**

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

L = 56 ft

W = 10 ft

N = 1 Absorption Bed

PLA = 560 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 = 560 / 0.74

RBA = 757 sf

**G3. PROPOSED BASAL AREA (PBA)**

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

L = 56 ft

MT = 28.5 FT

PBA = 1596 sf

PBA > RBA, therefore the PBA is acceptable

**MOUND WASTEWATER DISPOSAL SYSTEM BASIS OF DESIGN**

**John H. Hauenstein  
Two-Lot Subdivision and Replacement Wastewater System  
6300 and 6373 Spear Street, Charlotte, Vermont  
September 16, 2014  
Prepared By: Jason S. Barnard, Licensed Designer #430-B**

**Lot No. 13 Replacement Mound Wastewater Disposal System**

**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 = **28** orifices

**C. LEACHFIELD AREA (LA) PER ORIFICE**

LA/Orifice = LA / Total Number of Orifices

LA/Orifice = **20.0** 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 **4-bedroom** duplex apartment.

**B. REQUIRED MOUND SYSTEM DOSE**

Required Dose Volume = **152** Gallons

Pump Station Dimensions: On-Site Septic Solutions 1,000 Gallon Pump Station = 4.67 ft x 7.5 ft

Area of Pump Station = **35.0** sf

Volume per Inch of depth = **21.8** gallons / vertical inch

Pump on/off switch difference setting required for dose: **7.0** inches

**C. REQUIRED PUMP STATION STORAGE**

Storage Required = **560** gallons (1 day's flow)

**D. PUMP STATION STORAGE**

Pump alarm to overflow point height difference = **33.0** inches

Storage Provided = **720** gallons

Storage provided is greater than 1 day's flow, therefore the proposed pump station is adequately sized.

**E. PROPOSED EFFLUENT PUMP**

Champion Model Number CPSTEP522(A) 0.5 hp 230 volt 1 phase

**F. PROPOSED PUMP STATION EFFLUENT PUMP**

See Attached Effluent Pump Curve

# Pump Selection for a Pressurized System - Single Family Residence Project

John Hauenstein, Two-Lot Subdivision and Replacement Wastewater System / Lot 10B Mound Pressure Distribution Details

## Parameters

Discharge Assembly Size	2.00	inches
Transport Length	360	feet
Transport Pipe Class	40	
Transport Line Size	2.00	inches
Distributing Valve Model	None	
Max Elevation Lift	40	feet
Manifold Length	5	feet
Manifold Pipe Class	40	
Manifold Pipe Size	2.00	inches
Number of Laterals per Cell	2	
Lateral Length	52	feet
Lateral Pipe Class	40	
Lateral Pipe Size	2.00	inches
Orifice Size	7/32	inches
Orifice Spacing	4	feet
Residual Head	5	feet
Flow Meter	None	inches
'Add-on' Friction Losses	0	feet

## Calculations

Minimum Flow Rate per Orifice	1.33	gpm
Number of Orifices per Zone	28	
Total Flow Rate per Zone	37.2	gpm
Number of Laterals per Zone	2	
% Flow Differential 1st/Last Orifice	1.1	%
Transport Velocity	3.6	fps

## Frictional Head Losses

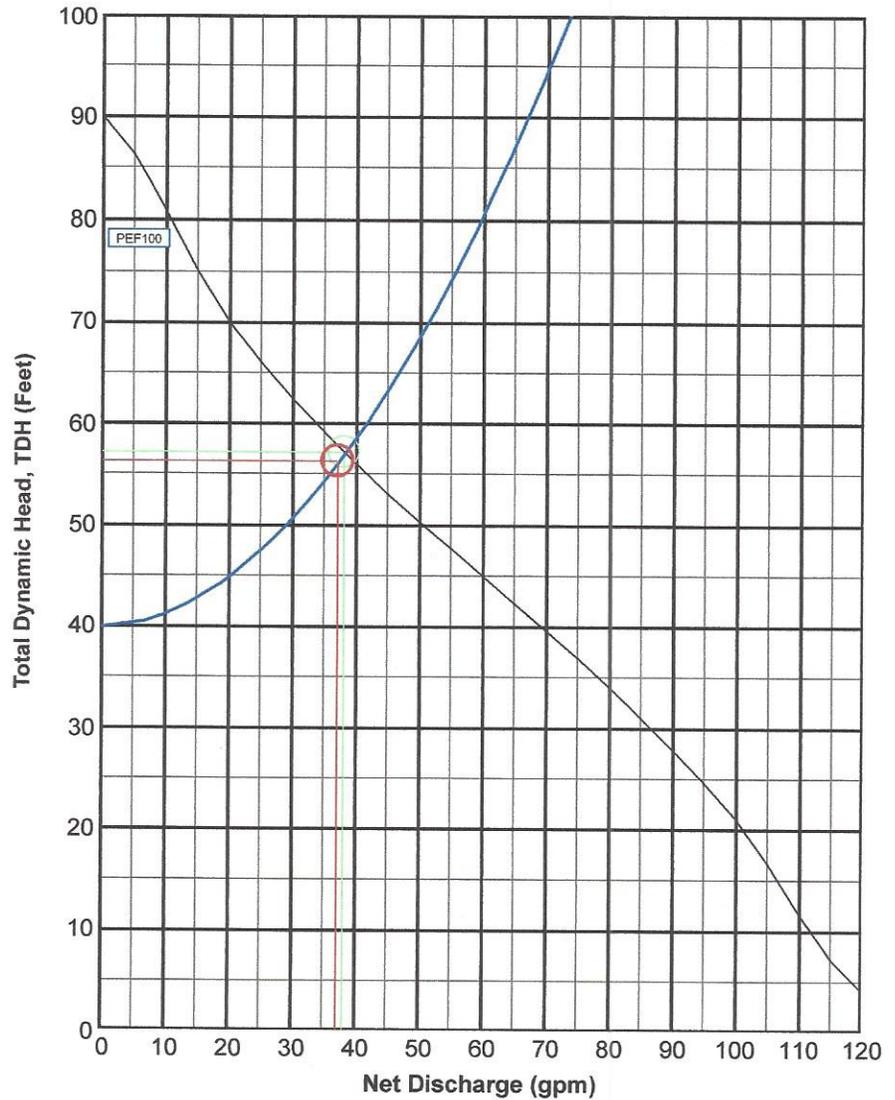
Loss through Discharge	2.8	feet
Loss in Transport	8.3	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.0	feet
Loss in Laterals	0.1	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	0.0	feet

## Pipe Volumes

Vol of Transport Line	62.8	gals
Vol of Manifold	0.9	gals
Vol of Laterals per Zone	18.1	gals
Total Volume	81.8	gals

## Minimum Pump Requirements

Design Flow Rate	37.2	gpm
Total Dynamic Head	56.3	feet



## PumpData

PEF100 Effluent Pump  
1HP, 230V 1Ø

## Legend

System Curve:	—
Pump Curve:	- - - -
Pump Optimal Range:	—
Operating Point:	○
Design Point:	○

John Havenstein Two-Lot  
 Subdivision & Replacement  
 Wastewater System - Lot No. 13

Required Effluent  
 Pump or Equal

### FEATURES/BENEFITS

- Performances
  - Heads Up To 122' TDH
  - Flows Up To 122 GPM
- Oil Filled High Efficient Motor With Upper & Lower Ball Bearings
  - Maximum Motor Cooling
  - Runs Cooler & Last Longer
  - Internal Overload Protection
- Cast Iron Impeller
  - Pass 3/4" Solids
- Quick Disconnect Power Cord & (Seal Failure Cord) Optional
  - Prevents Water From Entering The Motor Housing
  - Easy To Replace
  - Up To 50' Available
- Heavy Duty Cast Iron Construction
- Piggy-Back Switch Design
  - Defective Switches Can Be Diagnosed By Phone
  - Pump Can Be Operated Manually By Overriding The Switch
- Every Pump Is Performance Tested In Water
  - Ensures That The Pump Meets Head & Flow Requirements

- Optional Double Seal Design With Seal Failure
- Easy To Install
- Quick Delivery
- Complete Packages With Or Without Rail Systems

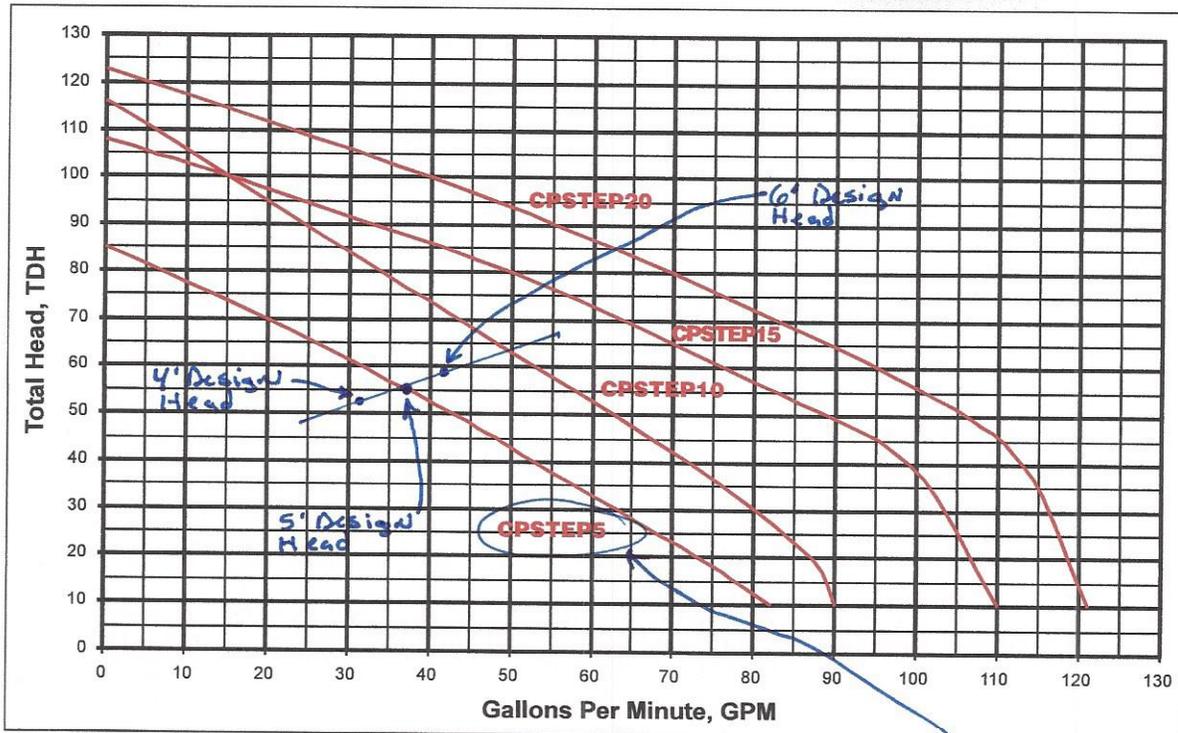
### APPLICATIONS

- Residential Developments, Residential & Commercial STEP Systems, Dewatering, Elevator Pits, Septic Systems



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### CHAMPION PUMP - PUMP PERFORMANCE CURVE



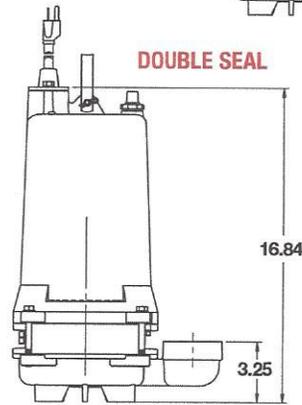
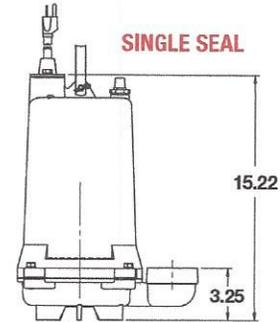
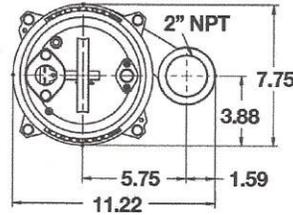
Champion Pump Company, Inc • P.O. Box 528 • Ashland, OH 44805  
 Phone 419-281-4500 • Toll Free 800-659-4491 • Fax 419-616-1100

Required Effluent Pump  
 or Equal

# CPSTEP 1/2 - 2HP

John Havenstein Two-Lot  
 Subdivision & Replacement  
 Wastewater System - Lot No. 13  
 Required Effluent  
 Pump or Equal

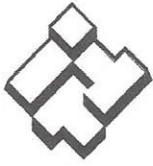
- DISCHARGE** 2" NPT, Vertical Standard
- SOLIDS HANDLING** 3/4"
- LIQUID TEMPERATURE** 140 Degrees F. (Intermittent)
- MOTOR HOUSING** Cast Iron
- VOLUTE** Cast Iron
- SEAL PLATE** Cast Iron
- IMPELLER** Cast Iron
- SHAFT** 416 Stainless Steel
- SHAFT SEAL (SINGLE SEAL)** Carbon - Ceramic/ Buna-N-Elastomer  
300 Series Stainless Steel - Hardware
- SHAFT SEAL (DOUBLE SEAL)** Tandem Double Mechanical  
Upper & Lower/ Carbon-Ceramic  
Buna-N-Elastomer  
300 Series Stainless Steel - Hardware
- BEARING (UPPER & LOWER)** Single Row, Ball, Oil Lubricated
- HARDWARE** 300 Series Stainless Steel
- O-RINGS** Buna-N
- CORD** 20' Length Standard  
UL/CSA (SJOW) 14/3 (.3750D)  
Quick Disconnect Pin Terminals  
  
Up To 50' Available
- MOTOR (SINGLE PHASE)** 3450 RPM. 60 Hz  
Includes Overload Protection In The Motor.  
Oil Filled, Class F  
PSC Permanent Split Capacitor
- OPTIONAL SEAL FAILURE** 20' Length Standard UL/ CSA (SJTW)  
16/3 (.3300D)



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Model	HP	Volts	Phase	Amps	Cord Length	Switch	Wt.
CPSTEP512(A)	1/2	115	1	13.8	20	Manual (Automatic)	64
CPSTEP522(A)	1/2	230	1	6.2	20	Manual (Automatic)	64
CPSTEP532	1/2	230	3	4.6	20	Manual	64
CPSTEP542	1/2	460	3	2.3	20	Manual	64
CPSTEP1022(A)	1	230	1	10.4	20	Manual (Automatic)	72
CPSTEP1032	1	230	3	7.6	20	Manual	72
CPSTEP1042	1	460	3	3.8	20	Manual	72
CPSTEP1522(A)	1-1/2	230	1	12.0	20	Manual (Automatic)	72
CPSTEP1532	1-1/2	230	3	8.4	20	Manual	72
CPSTEP1542	1-1/2	460	3	4.2	20	Manual	72
CPSTEP2022(A)	2	230	1	14.8	20	Manual (Automatic)	72
CPSTEP2032	2	230	3	11.0	20	Manual	72
CPSTEP2042	2	460	3	5.5	20	Manual	72

Required Effluent  
 Pump or Equal



# ITT

John Hauenstein  
Two-Lot Subdivision  
ANA Replacement Wastewater  
System - Lots No. 10B & No. 13  
Pump Station High Water Alarm

## CENTRIPRO

### Wastewater and Water Systems

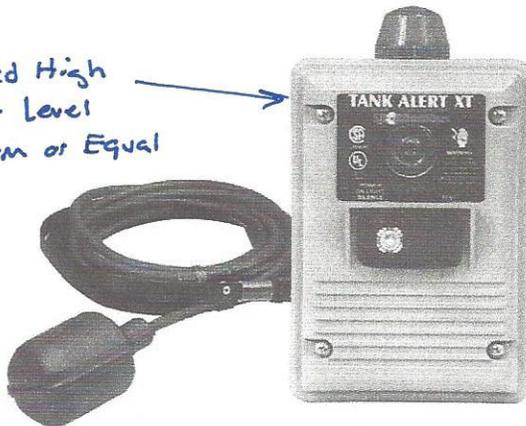
#### TAN3M (XT Alarm System)

- 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.

Required High  
Water Level  
Alarm or Equal



LR54245 LISTED



LISTED

## 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  $\frac{3}{4}$  to  $1\frac{1}{2}$  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. Inspection required at this point.
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.