



## CIVIL ENGINEERING ASSOCIATES, INC.

10 Mansfield View Lane  
South Burlington, VT 05403

Phone: 802-864-2323  
Fax: 802-864-2271  
E-Mail: mail@cea-vt.com

April 22, 2009

Mr. Tom Mansfield, Sewage Control Officer  
Town of Charlotte Offices  
PO Box 119  
Charlotte, Vermont 05445

**Re: Old Town Trail Associates Community Wastewater System  
214 Upper Old Town Trail, Charlotte  
State Wastewater & Potable Water Supply Permit Application**

Dear Mr. Mansfield:

In support of the proposed subdivision of a 10.3 acre parcel located off of Upper Old Town Trail, Old Town Trail Associates is seeking to abandon the existing in-ground wastewater disposal system for the existing house in favor of a community wastewater disposal field design to serve Lots 1 and 2 with some additional unallocated capacity.

The proposed disposal system is a Performance Base design which utilizes a 10-wide bed within a mound configuration. The acquisition on an easement from the abutting property owner to the north to site allows the proposed system to take full advantage of the suitable site conditions while avoiding the over-steep slopes to the west.

The dosing of the system has been designed with a master pump station located on Lot #1 with a small conveyance pump station to move effluent from Lot #2 to master pump station on Lot #1.

This phase of permitting seeks approval for 2-BR of disposal capacity for the existing house (which matches the water supply historic supply capacity from a shared off-site well) and a new 3-bedroom house on Lot #2. A Future application will likely increase the number of permitted bedrooms in the new house to three once the additional water supply capacity in the existing shared well has been demonstrated. The remaining unallocated disposal capacity in the community disposal would meet the needs for a 3-BR proposed as part of a subdivision of lands to the north/east.

Mr. Tom Mansfield  
Page 2 of 2  
April 22, 2009

This completes our summary of the proposal associated with this application. Please find enclosed two copies of the supporting plans for your review. If you should have any questions, please feel free to contact me at 864-2323 x310.

Respectfully,

A handwritten signature in black ink, appearing to read "David S. Marshall", enclosed within a large, hand-drawn oval shape.

David S. Marshall, P.E.  
Project Engineer

/dsm

Enclosures: Application (w/ \$1,000 fee), Two sets of full size and one 11x17 Plan set (Sheets C1-C4), Basis of Design, Perc Test Data, pdf files of Application package (via e-mail)

cc: CEA File 07239 (w/enclosures); Don Welch (w/ enclosures, 1 set of plans);

# Wastewater Management 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.

**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)	
Old Town Trail Associates, LLC		<input type="text"/>	
3 Mailing Address Line 1		4 Mailing Address Line 2	
86 Lake Street		<input type="text"/>	
5 Town/City	6 State/Province	7 Country	8 Zip/Postal Code
Burlington	Vermont	United States	05401
9 Email Address			10 Telephone
dfinspac@aol.com			244-5876
<input type="button" value="Remove This 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"/>
<p><b>Certifying Official</b>  <small>The Certifying Official must be a person who has signatory authority for the legal entity or organization that is the Applicant. A copy of the document authorizing this person to act as a signatory authority must be attached to this application.</small></p>			
9 Certifying Official Last Name		10 Certifying Official First Name (and MI if appropriate)	
Weich		Don	
11 Certifying Official Title			
Owner			
12 Certifying Official Email Address			13 Telephone
dfinspac@aol.com			244-5876
<input type="button" value="Remove This Applicant"/>			

Section C - Primary Contact Information (if other than Applicant)			
1 Last Name NA		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 United States	8 Zip/Postal Code
9 Email Address			10 Telephone

Section D - Building/Business Owner Information			
1 Last Name NA		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 United States	8 Zip/Postal Code
9 Email Address			10 Telephone

Part II Certifying Designer(s) Information			
1 Designer Last Name Marshall		2 Designer First Name (and Middle Initial if appropriate) David	
3 Designer License# 06019	4 Company Name Civil Engineering Associates, Inc.		
5 Mailing Address Line 1 10 Mansfield View Lane		6 Mailing Address Line 2	
7 Town/City South Burlington	8 State/Province Vermont	9 Country United States	10 Zip/Postal Code 05403
11 Email Address dmarshall@cea-vt.com			12 Telephone 863-2323
13 Designer Role(s) <input checked="" type="checkbox"/> Water Supply Designer <input checked="" type="checkbox"/> Wastewater Disposal System Designer			
Remove This Designer			

Part III Property Location Information		
Section A - Property Parcel ID#(s) and Location(s)		
1 Please provide the property location information including Town or City Parcel ID#, Town/City, and Street or Road location in the table below:		
(a) Town/City Parcel ID#	(b) Town or City	(c) Street or Road Location
X 00130-0214	Charlotte	214 Upper Old Town Trail

**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 (in decimal degrees to five decimal places, ex. 44.38181°) (b) Longitude (in decimal degrees to five decimal places, ex. -72.31392°)

N  ° W (-)  °

**Part IV Project Information**

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

1 Project Name (if applicable) 2 Total Acreage of Property

3 Business Name (if applicable)

4 Detailed Project Description

Two Lot Subdivision of 10.32 acre parcel into Lot#1 of 5.1acres and Lot #2 of 5.22 acres. Take the existing wastewater disposal system out of service and construct a new community mound system based on the performance based design approach. Lot #1 is serviced by a community well shared with the neighbor to the west and will continue so. Lot #2 will be served by a new drilled well.

5 Were all buildings or structures, campgrounds, and their associated potable water supplies and wastewater systems substantially completed before January 1, 2007 and all 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 Wastewater Management 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

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 Water Quality Division at (802) 241-3770.

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 Water Quality 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 Water Quality 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
X	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input 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

**Section B - Project Deed Reference**

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

	(a) Town	(b) Book	(c) Page(s)
X	Charlotte	168	422-423

**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	C-1	Overall Site Plan	March, 2008	
X	C-2	Site Plan	March, 2008	
X	C-3	System Details	March, 2008	
X	C-4	System Details	March, 2008	

**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
1	10.32	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	Main House	Residential	01-01-1970	None	<input checked="" type="radio"/> Yes <input type="radio"/> No
X	Garage	Residential	01-01-1970	None	<input checked="" type="radio"/> Yes <input type="radio"/> No

Remove This Lot

**Section E - Proposed Project Lot/Building Details**

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
#1	5.32	Existing House & Garage-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	Main House		<input checked="" type="checkbox"/>	Residential - 4 Bedroom

<input checked="" type="checkbox"/>	Garage		<input type="checkbox"/>	Residential Accessory Building
Remove This Lot				
1 Lot#	2 Lot Size (acres)	3 Proposed Use of the Lot		
2	5	Residential		
4 Is the lot being created as part of a subdivision? <span style="float:right"><input checked="" type="radio"/> Yes <input type="radio"/> No</span>				
5 Are you requesting that the Blood, Marriage, or Civil Union special fee be applied to this lot? <span style="float:right"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>				
6 If the lot is exempt, please indicate the specific exemption from the Wastewater System and Potable Water Supply Rules? <span style="float:right">[ ]</span>				
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
<input checked="" type="checkbox"/>	New House	[ ]	<input checked="" type="checkbox"/>	Residential - 4 Bedroom
Remove This Lot				

<b>Part V</b>	<b>Water Supply Information</b>
<b>Section A - Water Supply Screening Questions</b>	
1 Are you proposing a new water supply for this project? <span style="float:right"><input checked="" type="radio"/> Yes <input type="radio"/> No</span>	
2 Are you proposing changes to an existing water supply for this project? <span style="float:right"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>	
3 Is there a connection to an existing water supply for the project? <span style="float:right"><input checked="" type="radio"/> Yes <input type="radio"/> No</span>	
<i>If you answered No to all three of the above questions, skip to Part VI. Otherwise, proceed with Part V.</i>	
<b>Section B - General Water Supply Questions</b>	
1 Does this project involve a failed water supply? <span style="float:right"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>	
2 Will any of the proposed water sources serve 25 or more people or have 15 or more service connections? <span style="float:right"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>	
<i>If Yes, the applicant must contact the Water Supply Division at (802) 241-3400 for source, construction and operating</i>	
3 Are any of the existing or proposed water sources located within a special flood hazard area? <span style="float:right"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>	
4 Are any of the existing or proposed water sources located within a floodway? <span style="float:right"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>	
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? <span style="float:right"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>	
<i>If Yes, please submit additional information on the site. The Waste Management Division can be reached at (802) 241-3888.</i>	
6 Does this project require an approval letter from the Water Supply Division for the construction of a public water system, municipal water line extension over 500 feet, or hydrants or sprinkler systems? <span style="float:right"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>	
<i>If Yes, please submit a copy of the approval letter from the Water Supply Division.</i>	
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? <span style="float:right"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>	
<i>If Yes, please submit additional information regarding the constituent(s) that exceeds the standards and plans, details, and specifications of the treatment device.</i>	

8 Is any portion of the proposed water supply located in or near a Water Source Protection Area as designated by the Water Supply Division?  Yes  No

*If in areas of known interference issues, please contact the Water Supply 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"/>	2 Water Supply Owner (if not Applicant) <input style="width:95%;" type="text"/>
3 Water Source Type Non-Public Drilled Bedrock Well	4 Type of Change to Supply New Connection or Increased Flow

5 Lots/Buildings Served by this Water Supply System

	(a) Lot#	(b) Building ID	(c) Type of Change to the Building's Supply	(d) Existing	(e) Increase	(f) Total	(g) Rule or Meter Based Flow
<b>X</b>	1	Main House	Increased Flow (no construction)	280	0	280	Rule-based
				280	0	280	

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 #2 Drilled Well	2 Water Supply Owner (if not Applicant) 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	(d) Existing	(e) Increase	(f) Total	(g) Rule or Meter Based Flow
<b>X</b>	2	New House	Connection to New System	0	420	420	Rule-based
				0	420	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

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	(b) Existing	(c) Increase	(d) Total
X Off-Lot(for Lot #1) and Lot #2	280	420	700
	2	3	4
	280	420	700

**Part VI Wastewater Disposal System Information**

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

- 1 Are you proposing a new wastewater disposal system or replacement area for this project?  Yes  No
  - 2 Are you proposing changes to an existing wastewater disposal system for this project?  Yes  No
  - 3 Is there a connection to an existing wastewater disposal system for the project?  Yes  No
- If you answered No to all three of the above questions, skip to Part VII. Otherwise, proceed with Part VI.*

**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 If the project has a soil-based wastewater disposal system with design flows that exceed 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 Wastewater Management 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 Water Supply Division?  Yes  No  
 If Yes, contact the Water Supply 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 Community System for Lots #1 and #2	2 Wastewater Disposal System Owner (if not Applicant) <input type="text"/>
3 Wastewater Disposal System Type Mound	4 Type of Change to System 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	(d) Existing	(e) Increase	(f) Infiltration	(g) Total	(h) Rule or Meter Based Flows
X	1	Main House	Connection to New System	0	280	0	280	Rule-based
X	2	New House	Connection to New System	0	420	0	420	Rule-based
				6	7	8	9	
				0	700	0	700	

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.  
 Storage and Dose  Filtrate

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

**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	(b) Existing	(c) Increase	(d) Infiltration	(e) Total
X	Community System	0	700	0	700
		2	3	4	5
		0	700	0	700

<b>Part VII Application Fees</b>	
1 Fee Amount	<input type="text" value="\$1,000.00"/>
2 Fee Calculation Details	
<input type="text" value="State - Greater of 700 GPD x \$0.50 = \$350 or 2 lots x 210/Lot = \$420, but this is administered by the Town of Charlotte @ \$500 per unit x 2 lots = \$1,000"/>	

**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 David S. Marshall	2 Designer 1 Signature 	3 Signature Date 4-22-09
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**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 <input style="width: 90%;" type="text"/>	2 Designer 2 Signature <input style="width: 90%;" type="text"/>	3 Signature Date <input style="width: 90%;" type="text"/>
---	--	--

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

*In order to insure compliance with the requirements of the regulations administered by the Department of Environmental Conservation, Wastewater Management 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 Wastewater Management 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."*

<b>X</b>	2 Print Applicant Name	3 Applicant Signature	4 Signature Date
	<div style="border: 1px solid black; height: 20px;"></div>	<div style="border: 1px solid black; height: 20px;"></div>	<div style="border: 1px solid black; height: 20px;"></div>

## **Basis of Design**

### Design Flow:

One two bedroom Homes 1 x 280 GPD = 280 GPD

One three bedroom Homes 1 x 420 GPD = 420 GPD  
700 GPD

### Required Trench Area

Bed application 1.0 GPD/SF

Required Area = 700/1.0 = 700 SF

Area Provided = 126 x 10 = 1,260 SF

### Hydrogeology

Prop. Applic. Rate = 700/126 = 5.6 GPD/LF

Limiting Locations (max. applic. rates assume 6" of unsaturated soil)

TP #6A 12.1 GPD/LF (under application area)

TP #8A 10.1 GPD/LF (south of application area)

TP #3A 14.1 GPD/LF (Under Toe downgradient of application area)

TP #4A 17.1 GPD/LF (Downgradient of Toe)

Actual unsaturated soil at TP #4A

Fine Sandy Loam at slope between 10.1% and 15% = 18.7 GPD/LF

5.6 GPD/LF application rate yields 0.30' (4") of saturation.

Resulting unsaturated depth = 17" - 4" = 13"  $\geq$  6" okay

### Distribution

Bed Design - one orifice per 25 SF

Bed Area = 10' x 126' = 1,260 SF

Required number of orifices = 1260/25 = 50.4

Number provided = 52

Spacing - 26 per lateral at 126/26 = 4' 10.5" o.c.

**Upper Old Town Trail Subdivision  
Maximum Linear Loading Rate  
February 29, 2008**

6 Retained Unsaturated Depth (in)								
						Phase I	Phase II	
Test						Maximum	Proposed	Proposed
Pit	SHGWT	Soil Type	Slope	LLR/FT	LLR	LLR	LLR	
1A	15	Fine Sandy Loam	20.0%	26.2	19.65	5.6	10.0	
2A	15	Loam	13.3%	14	10.50	5.6	10.0	
3A	15	Fine Sandy Loam	13.3%	18.7	14.03	5.6	10.0	
4A	17	Fine Sandy Loam	11.0%	18.7	17.14	5.6	10.0	
5A	14	Fine Sandy Loam	10.0%	13.5	9.00	0	0	
6A	17	Fine Sandy Loam	9.5%	13.5	12.38	5.6	10.0	
7A	6	Fine Sandy Loam	5.9%	7.5	0.00	0	0	
8A	15	Fine Sandy Loam	9.6%	13.5	10.13	0	0	
9A	7	Fine Sandy Loam	5.3%	7.5	0.63	0	0	
10A	11	Fine Sandy Loam	5.4%	7.5	3.13	0	0	
106	10	Fine Sandy Loam						
108	13	Fine Sandy Loam						

**Wastewater Disposal System Design  
Phase I Proposal  
February 10, 2009**

700 Design Flow (GPD)  
0.73 Average Daily Flow (GPM)  
  
10.1 Allowable application per linear foot (GPD/LF)  
69 Linear feet of Trench Required (FT)  
126 Equivalent Linear feet of Trench Proposed (FT)

**Dosing Requirements**

1.5 Diameter of Distribution Pipe (Inches)  
244 Length of Distribution Pipe (FT)  
22 Distribution System Volume (Gallons)  
5 Required Dose Volume Factor  
112 Required Minimum Dose Volume (Gallons)  
4 Minimum Required Doses per Day  
175 Maximum Dose Allowed (Gallons)  
120 Chosen Dose Volume (Gallons)  
5 Recommended Pumping Duration per Dose (Minutes)  
24.00 Recommended Pumping Rate w/o Inflow (GPM)  
24.73 Recommended Pumping Rate with Inflow (GPM)

**Distribution Requirements**

10 Trench width (FT)  
630 Total Trench Area (SF)  
25 Maximum Area per orifice Hole (SF)  
25 Required Number of Orifice Holes  
52 Number of Orifice Holes Proposed  
0.46 Avg. Flow per Orifice (GPM)

395.3 Effluent Elevation Head

**TRENCH 1**

52 Total # of orifices  
26.58 Total Flow (GPM)  
700 Total Design Flow (GPD)  
126 Total Length of Trench (FT)  
  
27 Chosen Design Flow (GPM)  
26.58 Total Actual Design Flow (GPM)  
1.58% Percent Delta from Design  
4.64 Actual Duration of Pumpng Cycle (minutes)

# Distribution System Design

## February 10, 2009

### Distribution Pipe #1 and #2

1 Maximum Allowable application Rate per Square Foot (GPD/SF)  
27 Design Pumping Rate to Entire Field (GPM)  
700 Total Design Flow to Site (GPD)

392.7 Invert Elevation

#### Section 1

9 Depth of Stone (inches)  
1 Application Rate per Square Foot  
126 Length of Section  
700 Design Flow (GPD)  
27.00 Design Flow (GPM)  
25 Required Number of Orifices

#### Orifice Design

0.125 Diameter of orifice (Inches)  
22 Number of orifices  
2.6 Residual pressure (FT)  
0.30 Design Flow per head (GPM)  
6.53 Subtotal flow (GPM)

0.1875 Diameter of orifice (Inches)  
30 Number of orifices  
2.6 Residual pressure (FT)  
0.67 Design Flow per head (GPM)  
20.05 Subtotal flow (GPM)

0.25 Diameter of orifice (Inches)  
0 Number of orifices  
2.6 Residual pressure (FT)  
1.19 Design Flow per head (GPM)  
0.00 Subtotal flow (GPM)

52 Total # of orifices  
26.58 Total Flow  
-1.55% Percent Delta from Design

122 Length of Distribution Pipe (FT)  
2.39 Spacing of orifice holes (FT)

27.00 Total Recommended Design Flow This Trench (GPM)  
26.58 Total Actual Design Flow for this Trench (GPM)  
1.58% Percent Delta from Design  
25 Required Number of Orifice Holes  
52 Number of Orifice Holes Proposed  
700 Total Design Flow (GPD)  
126.00 Total Length of Trench (FT)

# Main Wastewater Pump Station Analysis

## Phase I Proposal

### February 10, 2009

		Design Conditions
Design Flow		700 GPD
Infiltration		0 GPD
20% Municipal Credit		0
Total Design Flow		<u>700</u> GPD
Average Daily Flow		0.73 GPM
Peaking Factor		5.00
Peak Flow		3.65 GPM
Required Storage		700 gallons
Storage Provided		1,260 gallons
Force Main Dia.		2.00 Inches
Min. Cleansing Velocity		2.50 FPS
Min. Pumping Rate		24.47 GPM
Chosen Pumping rate		27.00 GPM
Length of FM		129.00 feet
Friction Losses		1.95 feet
High Point of FM		392.80 feet
Low elev. in PS		<u>378.00</u> feet
Elevation Change		14.80 feet
Minor headlosses		3.00 feet
Residual		2.30 feet
TDH		22.05 feet
Pump Cycle Storage		120 Gallons
Run Cycle		4.57 Minutes
Wet Well Detention Time		164.57 Minutes
Pump Efficiency		20 %
Pump Size		0.75 Hp
System Curve	GPM	TDH
	20	21.2
	25	21.8
	30	22.5
	35	23.3

**Main Wastewater Pump Station Analysis**  
**Phase II - Full Build-out**  
**February 10, 2009**

<b>Design Conditions</b>		
Design Flow	1,260	GPD
Infiltration	0	GPD
20% Municipal Credit	0	
Total Design Flow	1,260	GPD
Average Daily Flow	1.31	GPM
Peaking Factor	5.00	
Peak Flow	6.56	GPM
Required Storage	1,260	gallons
Storage Provided	1,260	gallons
Force Main Dia.	2.00	Inches
Min. Cleansing Velocity	2.50	FPS
Min. Pumping Rate	24.47	GPM
Chosen Pumping rate	27.00	GPM
Length of FM	129.00	feet
Friction Losses	1.95	feet
High Point of FM	392.80	feet
Low elev. in PS	378.00	feet
Elevation Change	14.80	feet
Minor headlosses	3.00	feet
Residual	2.30	feet
TDH	22.05	feet
Pump Cycle Storage	120	Gallons
Run Cycle	4.67	Minutes
Wet Well Detention Time	91.43	Minutes
Pump Efficiency	20	%
Pump Size	0.75	Hp
System Curve	GPM	TDH
	20	21.2
	25	21.8
	30	22.5
	35	23.3

# Distribution System Design

## February 10, 2009

### Distribution Pipe #1 and #2

1 Maximum Allowable application Rate per Square Foot (GPD/SF)  
27 Design Pumping Rate to Entire Field (GPM)  
1,260 Total Design Flow to Site (GPD)

392.7 Invert Elevation

#### Section 1

9 Depth of Stone (inches)  
1 Application Rate per Square Foot  
126 Length of Section  
1,260 Design Flow (GPD)  
27.00 Design Flow (GPM)  
50 Required Number of Orifices

#### Orifice Design

0.125 Diameter of orifice (Inches)  
22 Number of orifices  
2.6 Residual pressure (FT)  
0.30 Design Flow per head (GPM)  
6.53 Subtotal flow (GPM)

0.1875 Diameter of orifice (Inches)  
30 Number of orifices  
2.6 Residual pressure (FT)  
0.67 Design Flow per head (GPM)  
20.05 Subtotal flow (GPM)

0.25 Diameter of orifice (Inches)  
0 Number of orifices  
2.6 Residual pressure (FT)  
1.19 Design Flow per head (GPM)  
0.00 Subtotal flow (GPM)

52 Total # of orifices  
26.58 Total Flow  
-1.55% Percent Delta from Design

122 Length of Distribution Pipe (FT)  
2.39 Spacing of orifice holes (FT)

27.00 Total Recommended Design Flow This Trench (GPM)  
26.58 Total Actual Design Flow for this Trench (GPM)  
1.58% Percent Delta from Design  
50 Required Number of Orifice Holes  
52 Number of Orifice Holes Proposed  
1,260 Total Design Flow (GPD)  
126.00 Total Length of Trench (FT)

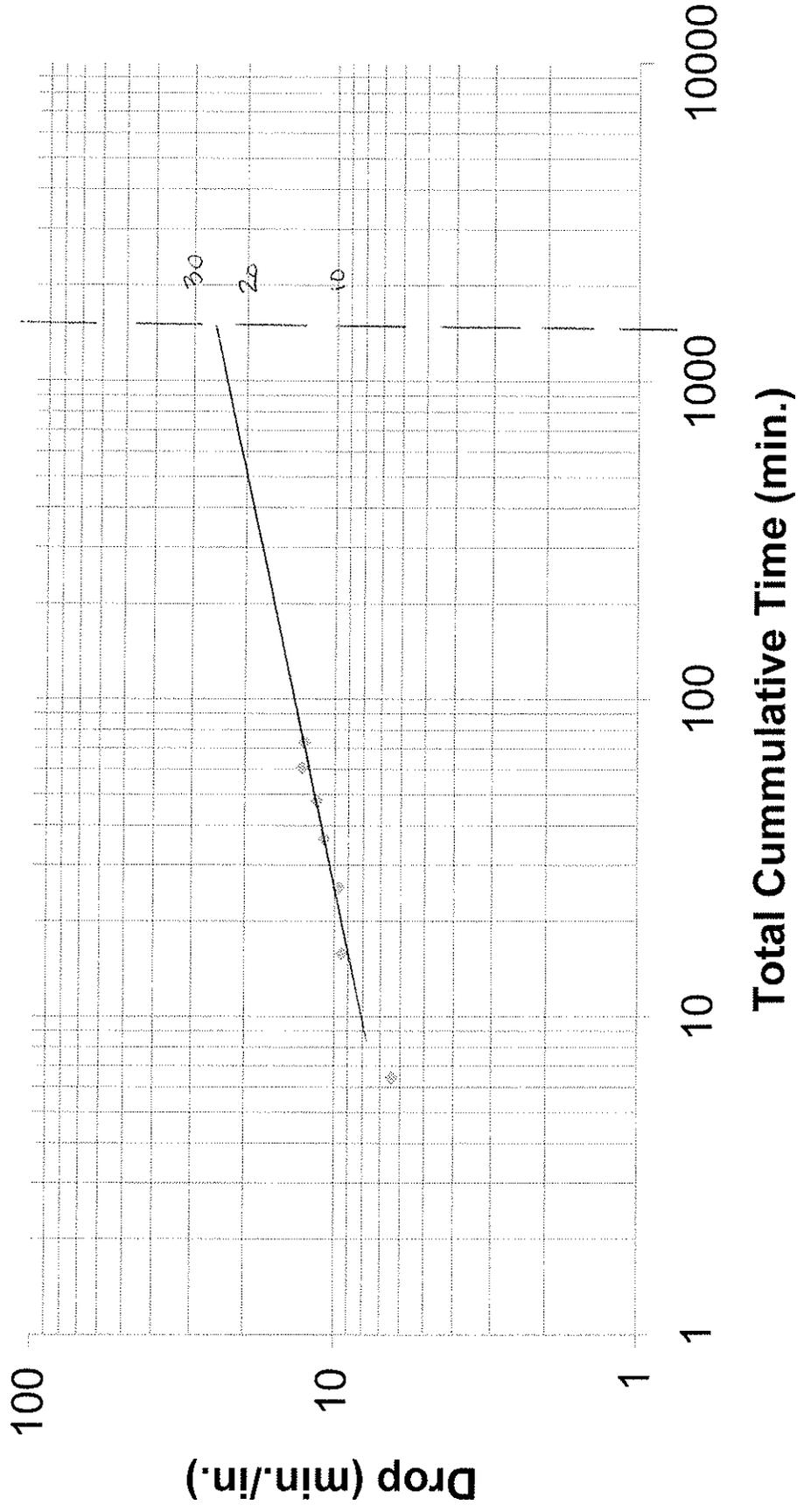
# Small Wastewater Pump Station Analysis

March 14, 2008

## Design Conditions

Design Flow	490	GPD
Infiltration	0	GPD
20% Municipal Credit	0	
Total Design Flow	<u>490</u>	GPD
Average Daily Flow	0.51	GPM
Peaking Factor	5.00	
Peak Flow	2.55	GPM
Required Storage	490	gallons
Storage Provided	500	gallons
Force Main Dia.	2.00	Inches
Min. Cleansing Velocity	2.50	FPS
Min. Pumping Rate	24.47	GPM
Chosen Pumping rate	38.00	GPM
Length of FM	480.00	feet
Friction Losses	13.64	feet
High Point of FM	383.00	feet
Low elev. in PS	<u>366.00</u>	feet
Elevation Change	17.00	feet
Minor headlosses	3.00	feet
Residual	0.00	feet
TDH	33.64	feet
Pump Cycle Storage	120	Gallons
Run Cycle	3.20	Minutes
Wet Well Detention Time	235.10	Minutes
Pump Efficiency	60	%
Pump Size	0.54	Hp
System Curve	GPM	TDH
	20	24.2
	25	26.3
	30	28.8
	35	31.7
	40	35

**Welch/Charlotte # 07239**  
**Perc Test #2**



**Welch/Charlotte # 07239**  
**Perc Test #1**

