

Soils investigation conducted on August 7, 2013 by William M. Kules, PE and Carl Fuller, PE
Regional Engineer, Drinking Water and Ground Water Protection Division, ANR.

- Test Pit #1**
0 - 15" Very Dark Grey, 10YR3/1, fine sandy loam, structureless, moist, loose
15" - 34" Olive Brown, 2.5Y4/3, silty loam, moderate subangular structure, moist, firm
15" Mottles - many, coarse, prominent
- Test Pit #2**
0 - 12" Very Dark Grey, 10YR3/1, silty loam, structureless, moist, loose
12" - 36" Olive Grey, 5Y4/2, fine sandy loam with cobbles and stones, moderate subangular structure, moist, firm
12" Mottles - many, coarse, prominent
- Test Pit #3**
0 - 10" Very Dark Grey, 10YR3/1, fine sandy loam, structureless, moist, loose
15" - 34" Olive Brown, 2.5Y4/3, fine sandy loam with cobbles and stones, moderate subangular structure, moist, firm
10" Mottles - many, coarse, prominent
- Test Pit #4**
0 - 10" Very Dark Grey, 10YR3/1, fine sandy loam, structureless, moist, loose
10" - 31" Dark Grayish Brown, 2.5Y4/2, silty loam with stones, moderate subangular structure, moist, firm
10" Mottles - many, coarse, prominent
- Test Pit #5**
0 - 10" Very Dark Grey, 10YR3/1, fine sandy loam, structureless, moist, loose
10" - 44" Dark Grayish Brown, 2.5Y4/2, silty loam with stones, moderate subangular structure, moist, firm
10" Mottles - many, coarse, prominent
44" Seep
- Test Pit #6**
0 - 8" Black, 5YR2.5/2, very fine sandy loam, structureless, moist, loose
8" - 34" Olive Brown, 2.5Y4/4, medium sandy loam, weak subangular structure, very moist, firm
8" Mottles - many, coarse, prominent
- Test Pit #7**
0 - 10" Black, 5YR2.5/2, very fine sandy loam, structureless, moist, loose
10" - 30" Olive Brown, 2.5Y4/4, medium sandy loam, weak subangular structure, very moist, firm
10" Mottles - many, coarse, prominent

Percolation Tests
P1 = 9.0 min/in
P2 = 6.5 min/in

Wastewater Disposal System Design

Lateral Design
Minimum 1 hole per 25 sf trench
324 sf/25 sf = 13 holes
Required: 13 holes
Using: 2 Laterals @ 39.5 ft ea
holes per lateral = 6
Lateral hole spacing: 6.58' = 6'-7"

Hole diameter = 1 1/4 in
hole discharge rate = 1.47 gal/min
Lateral flow 7 holes @ 1.47 gal/hole = 10.29 gal/min
Total lateral flow 13 holes @ 1.47 gal/hole = 19.1 gpm
gal/min

Use: 20 gal/min
1 1/2 in diameter PVC Sch 40 distribution pipe
2 in diameter PVC Sch 40 force main

Pump Station Design
Existing 1000 gal seamless concrete tank
Vertical capacity = 22.6 gal/in

Tank capacity
560 gal / day @ 4 doses / day = 140 gal/dose
140 gal / 22.6 gal/in = 6.2 in

Pump time
105 gal/21 gal/min = 5 min
USE: 6 in, 5 min, 21 gal/min

Emergency storage and float settings
Pump on: 10.2 in
Pump off: 4.0 in
Alarm: 11.2 in
Required minimum storage above alarm = 560 gal
Actual storage 41 in @ 22.6 gal/in = 922 gal

Pump Size
Distal Pressure
Elev. distribution pipe 498.5
Elev. intake 492.0
Static Head = 6.5 ft

Station fittings equivalent feet of 2" pipe
Check valve 13 ft
Ball valve 55 ft
(2) 45 elbows 5 ft
(4) 90 elbows 22 ft
(4) tees 16 ft
Total Friction head loss 2" pipe = 111 ft
Friction head loss 2" pipe = 1.1 ft
Length 2" force main 85 ft
Length 2" manifold 5 ft
Total 2" pipe = 90 ft
Friction head loss 1 1/2" distribution pipe 38.5 ft
@ 10.3 g.p.m. Hf = 0.9 ft/100 ft
Head loss 2" pipe = 1.0 ft
Total Dynamic Head = 14.6 ft
Pump Specifications
20 gal/min @ 15 ft TDH

MOUND WASTEWATER DISPOSAL SYSTEMS

Above ground vegetation shall be cut close to the ground and removed from the mound fill area. Tree stumps should be cut flush with the surface of the ground and roots should not be pulled. Construction and/or plowing shall not be initiated when the soil moisture content is high. If a sample of soil obtained from approximately nine (9) inches below the surface can be easily rolled into a wire, the soil moisture content is too high for construction purposes. If the site cannot be plowed, a backhoe bucket filled with chisel teeth may be used to "kill" the site by creating furrows that are parallel to ground contour.

The area shall then be plowed to a depth of seven (7) to eight (8) inches, parallel to the land contour with the plow throwing the soil upslope to provide a proper interface between the fill and natural soils.

Once plowing is complete, construction should be initiated immediately by placing the sand fill. If the fill material is not going to be in place within 24 hours of plowing, the area should be fenced to prevent vehicles and equipment from entering the plowed area. To prevent compaction, construction equipment shall not be moved across the plowed surface or the effluent disposal area. However, after placement of a minimum of six (6) inches of sand fill over the plowed area, construction equipment may be driven over the protected surface to expedite construction.

Sand fill material shall meet one of the following sieve analyses:

(1)	Sieve Number	Percent Passing, by Weight	Opening (mm)
	10	2.000	85 - 100
	40	0.420	25 - 75
	60	0.250	0 - 30
	100	0.145	0 - 10
	200	0.074	0 - 5

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

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

Interpolation of analyses is not permitted. Fill material (2) is ASTM Specification C-33 and is intended for manufactured material. Upon completion of the sand placement, the contractor shall excavate and place the stone bedding. The crushed stone shall be clean, durable and no smaller than three-fourths or larger than one and one-half inches in diameter.

The pressure distribution pipe shall be smooth rigid plastic pipe, Schedule 40 to 80 with a minimum diameter of one and one-half (1 1/2) inch. The pipe shall provide a single row of holes, minimum 1/4 inch diameter, on center along the length of the pipe with the last hole in the end cap.

There shall be a maximum 10% difference in the discharge rate between any two orifices in a single absorption trench or absorption bed. The design shall provide even distribution throughout the leach field. All joints and connections shall be solvent welded.

The pressure distribution pipe shall be placed in crushed stone with the orifices upward. The holes shall be covered with an orifice shield. One or more additional orifices may be added to allow drainage of the piping when freezing may be a problem. One layer of filter fabric shall be used to cover the top of the stone prior to placing native soil.

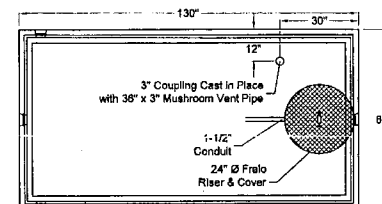
The ends of all distribution pipes shall have a threaded cap to allow for access to the piping system for flushing of the piping system.

Pressure distribution pipe shall be smooth, rigid pipe and the pipe network shall be designed to allow for periodic cleaning. The distribution pipe shall be constructed so that there is access to the piping system for flushing of the piping system. All distribution pipe shall be laid level.

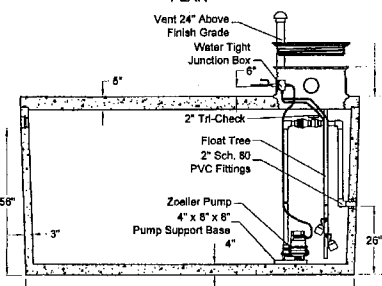
After construction of the distribution system, and prior to covering the distribution system, a Engineer shall observe the testing of the distribution system. The network shall be tested with clean water to assure that distribution is complete and meets the Rule requirements.

Filter fabric shall be placed over the crushed stone prior to placing native fill.

The entire mound wastewater disposal system is to be covered with topsoil native to the site, or of similar characteristics, to support vegetation found in the area. The installer shall crown the entire mound wastewater disposal system with a cover of soil less permeable than the mound fill, covering with 12" on the sides of the mound. Native soil from the site is normally suitable for cover material, though the top 2-4" of this cover must be topsoil. The entire mound shall be seeded or sodded to assure stability of the installation. This grass cover shall be maintained and should be mowed on at least an annual basis. The area surrounding the mound wastewater disposal system shall be graded to provide diversion of surface run-off waters.

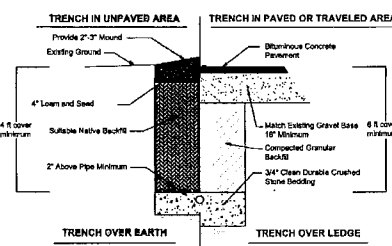


PLAN



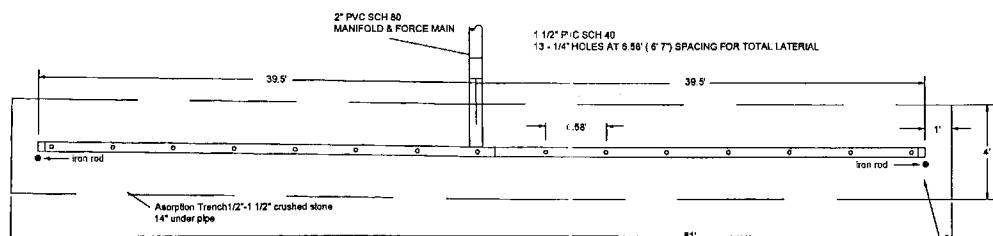
SECTION
1000 GALLON PUMP STATION

Notes:
1. Final Settings: (245 gallon dose required)
Pump On: 10.2"
Pump Off: 4"
Alarm On: 11.2"



TYPICAL PIPE TRENCH DETAIL

Notes:
1. If minimum cover is not available pipe is to be installed with a minimum of 2" of rigid styrofoam insulation on top and sides.

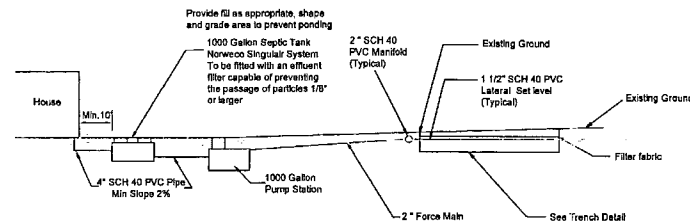


Typical Pressure Pipe Detail

NOTE: Drilled holes next to be sharp, and clear. Remove all plastic burns and drippings from pipe and around holes.

TYPICAL SYSTEM PROFILE

- Notes:
1. Provide joint in pipeline 5' from structure typical.
2. All pipe deflections are to be made with 45 degree bends or less. 90 degree elbows are not acceptable.
3. Provide at grade access to each tank with minimum 24" diameter PVC doors.
4. Septic tank & pumpstation locations and elevations are to be confirmed by contractor prior to construction.



Basis of Design Wastewater Disposal Facility

5 Bedroom house
3 Bedrooms @ 140 gal/bedroom/day = 420 gal/day
2 Bedrooms @ 70 gal/bedroom/day = 140 gal/day
Total daily flow = 560 gal/day

Prescriptive Design Mound

Application rate
560 gpd @ 1.0 g/sf = 560 sf leach field area
560sf/4 ft wide trench = 140 ft trench
Use 2 trenches at 70 ft
With Filtrate Effluent use 1 trench at 70ft

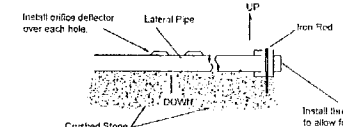
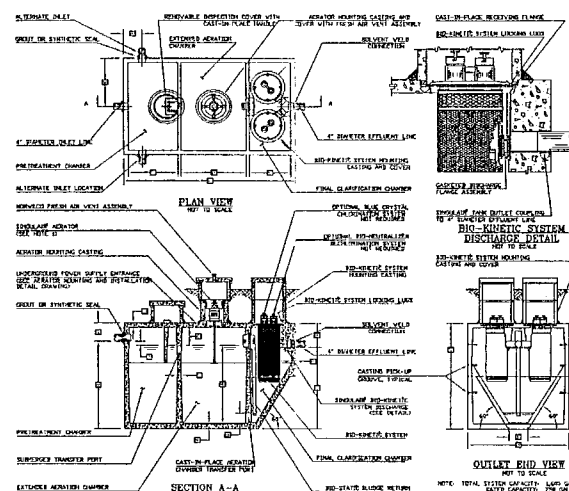
Performance Design Mound

Desktop Analysis
LLR = h (f)
Fine Sandy Loam @ 8% = 10.5
SHW @ 10"
LLR = 10"-6" = 0.33' x 10.5
LLR = 3.46 w/ filtrate effluent USE 6.92 gal/ft/day

Min trench length
L = GPD/LLR
560 GPD / 6.92 g/d = 81 ft

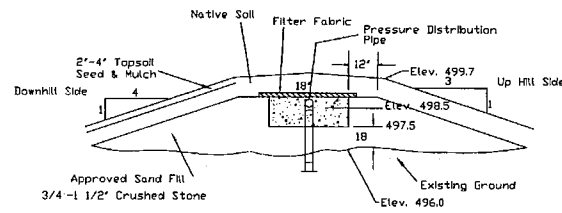
USE: 81 ft Exceeds Prescriptive Design Length

Actual Induced Mounding
h = LLR/f 6.92/10.5 = 0.66ft x 12 = 7.9"



END CAP DETAIL

NOTES:
1. Holes shall be placed along top of pipe and covered with orifice deflectors.
2. Place one hole on bottom of pipe behind cap to allow pipe to drain.
3. Place iron rod along side of cap to facilitate location for maintenance.



MOUND TRENCH CROSS SECTION

NTS

Drinking Water and
Groundwater Protection Division

THIS IS SUBJECT TO
PROVISIONS OR CONDITIONS
LISTED IN PERMIT
Form Number: 119-5-6516
Date: 1/18/14



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Survey Company LLC
P.O. Box 1289, 3893 Rucker Street
Stowe, Vermont 05672
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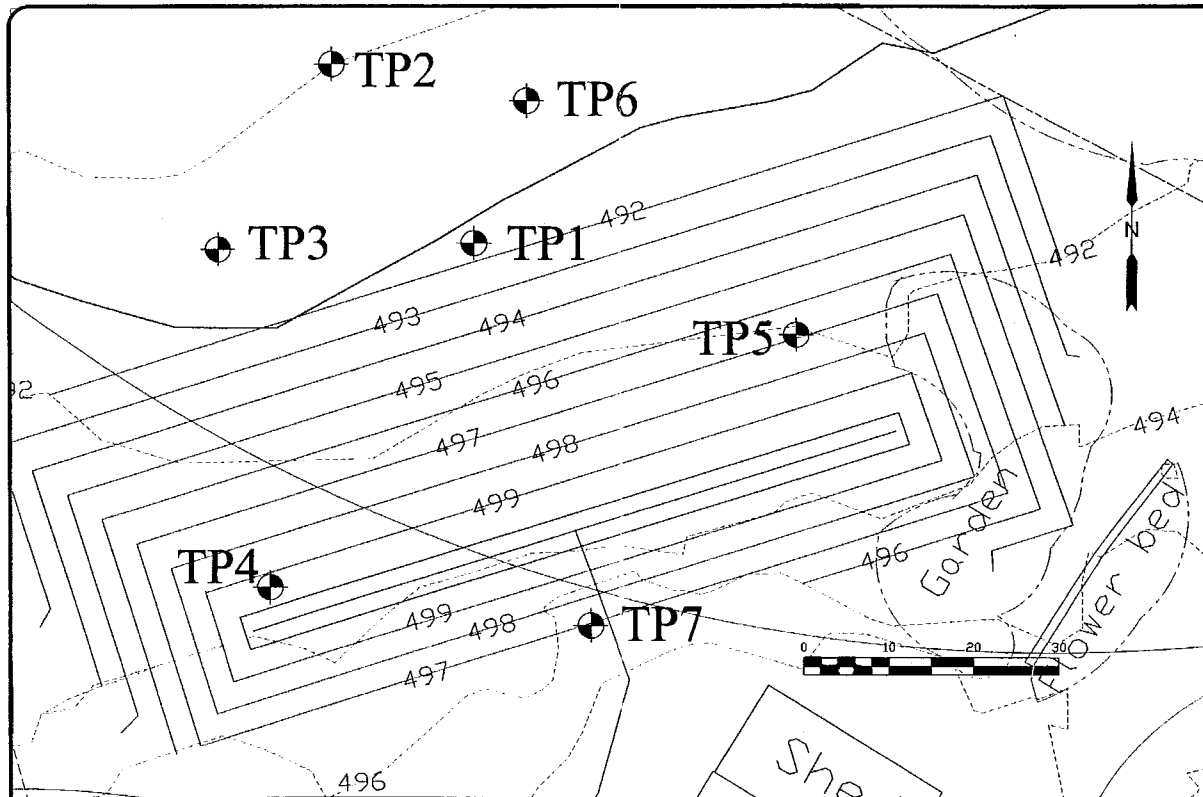
Water Supply and
Wastewater Plan

Details
FOR
173945 Canada, Inc.
455 Pinnacle Road
Stowe, Lamoille County, Vermont

REVISIONS

December 29, 2013
January 3, 2014

SCALE
HORIZ: NTS
VERT: NTS
DRAWN BY: DAS
CHECKED BY: WHK
DATE: October 2013
JOB#: 11816
2 OF 2



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Vertical capacity = 22.6 gal/in
- Tank capacity**
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140 gal / 22.6 gal/in = 6.2 in
- Pump time**
105 gal/21 gal/min = 5 min
USE: 6 in, 5 min, 21 gal/min
- Emergency storage and float settings**
Pump on: 10.2 in
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Actual storage 41 in @ 22.6 gal/in = 922 gal
- Pump Size**
Distal Pressure
Elev. distribution pipe 498.5
Elev. intake 492.0
Static Head 6.5 ft
- Station fittings equivalent feet of 2" pipe**
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Total Friction head loss 2" pipe 111 ft
Friction head loss 2" pipe
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Total 2" pipe 90 ft
• 21 g.p.m. Hf = 0.95 ft/100 ft
Head loss 2" pipe = 1.1 ft
Friction head loss 1 1/2" pipe
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Head loss 1 1/2" pipe = 1.0 ft
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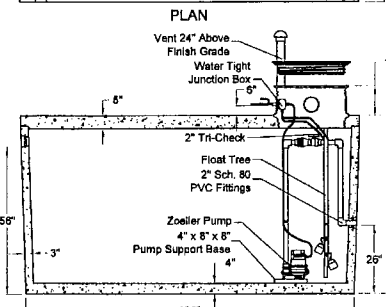
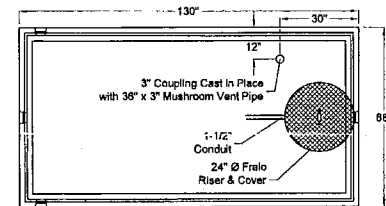
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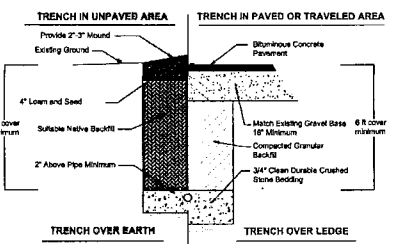
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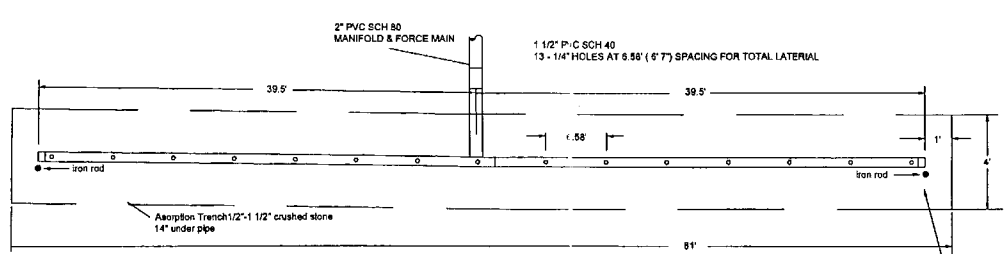
1000 GALLON PUMP STATION

- Notes:
1. Float Settings: (245 gallon dose required)
Pump On: 10.2"
Pump Off: 4"
Alarm On: 11.2"



TYPICAL PIPE TRENCH DETAIL

- Notes:
1. If minimum cover is not available pipe is to be installed with a minimum of 2' of rigid structural insulation on top and sides.

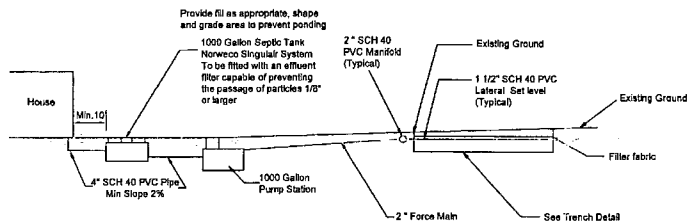


Typical Pressure Pipe Detail

- NOTE: Drilled holes next to be shown and clear. Remove all plastic burns and drillings from pipe and around holes.

TYPICAL SYSTEM PROFILE

- Notes:
1. Provide joint in pipeline 5' from structures typical.
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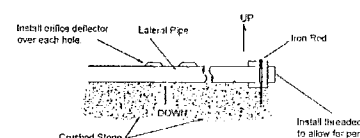
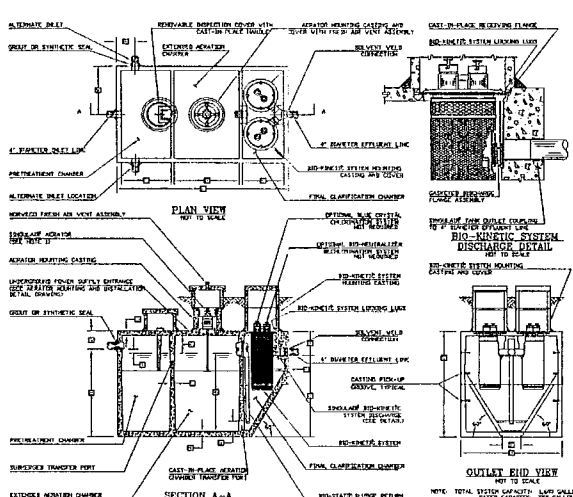
Basis of Design

- Wastewater Disposal Facilities
5 Bedroom house
3 Bedrooms @ 140 gal/bedroom/day = 420 gal/day
2 Bedroom @ 70 gal/bedroom/day = 140 gal/day
Total daily flow = 560 gal/day

Prescriptive Design Mound

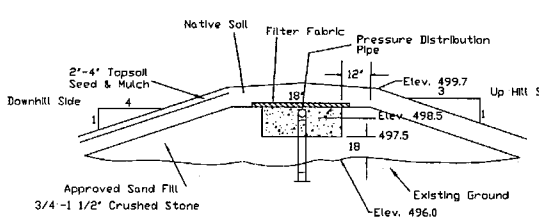
- Application rate
560 gpd @ 1.0 g/sf = 560 sf leach field area
560sf/4 ft wide trench = 140 ft trench
Use 2 trenches at 70 ft
With Filtrate Effluent use 1 trench of 70ft
- Performance Design Mound
Desktop Analysis
LLR = h (f)
Fine Sandy Loam @ 8% = 10.5
SHW @ 10"

- LLR = 10"-6" = 0.33' x 10.5
LLR = 3.46 w/ filtrate effluent USE 6.92 gal/ft/day
Min trench length
L = GPD/LLR
560 GPD / 6.92 g/d = 81 ft
USE: 81 ft Exceeds Prescriptive Design Length
Actual Induced Mounding
h = LLR/f 6.92/10.5 = 0.66ft x 12 = 7.9"



END CAP DETAIL

- NOTES
1. Holes shall be placed along top of pipe and covered with orifice deflectors.
2. Place one hole on bottom of pipe behind cap to allow pipe to drain.
3. Place iron rod along side of cap to facilitate location for maintenance.



MOUND TRENCH CROSS SECTION

NTS

Drinking Water and Groundwater Protection Division
THIS IS SUBJECT TO PROVISIONS OR CONDITIONS LISTED IN PERMIT
Form 1 Number: 1142-5-6516
Date: 1/18/14



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Little River
Survey Company LLC
P.O. Box 1289, 2893 Rucker Street
Stowe, Vermont 05672
Tel: (802) 253-8214 Fax: (802) 253-2269

Water Supply and
Wastewater Plan

Details
FOR
173945 Canada, Inc.
455 Pinnacle Road
Stowe, Lamoille County, Vermont

REVISIONS

December 29, 2013
January 3, 2014

SCALE
HORIZ: NTS
VERT: NTS
DRAWN BY: DAS
CHECKED BY: WMK
DATE: October 2013
JOB: 11816
2 OF 2

