

General Notes

- The Contractor shall be responsible for the complete systems as shown and detailed.
- The location of underground utilities is not warranted to be exact or complete. All blasting, off-site backfill, sheeting and shoring, dewatering, clearing and grubbing, erosion control, dust control, traffic control, grading and landscaping and all other incidentals shall be included as part of the required work.
- Repair of all disturbed areas, grading, seeding, mulching, repair of roads and curbs, paving and other incidentals are included as part of the required work.
- The methods and materials of construction shall conform to the Environmental Protection Rule specifications and shall be in conformance with all permits and approvals issued for this project.
- All disturbed areas shall be loamed, seeded, mulched and maintained by the Contractor until permanent ground cover is established.
- Once new subgrade is exposed, Contractor shall take every precaution to keep equipment off exposed area and to avoid compaction of the soil.

System Maintenance Notes

- At least twice a year, depth of sludge and scum in septic tanks should be measured. The tank should be pumped if: 1) The sludge is closer than (12") twelve inches to the outlet baffle; 2) The scum layer is closer than (3") three inches to septic tank outlet baffle. Following septic tank cleaning in units over 1000 gallons, all interior surfaces of the tank shall be inspected for leaks and cracks.
- At least twice a year dosing tanks, pump stations and distribution boxes should be opened and settled solids removed as necessary and checked for levelness. Thoroughly clean any components with solids buildup.
- Toxic or hazardous materials should, in general, not be disposed of in septic systems. These substances may pass through the system in an unaltered state and contaminate groundwater or remain in the septic and subsequently contaminate the soil.
- Use of garbage disposal is prohibited. Water softeners can adversely affect the operation of the wastewater system, connection to the wastewater system is not part of this design.
- A continuous log of inspections and observations shall be kept. The log shall note oil cleanings and other required maintenance.
- The owner assumes full responsibility for the continued proper use and maintenance of the systems.

Force Main Pressure/Leakage Test

Upon completion of construction of a force main, the line shall be pressure and leakage tested in accordance with the following procedure.

Pressure Test

After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 x the highest working pressure in the section.

Test Pressure Restrictions. Test pressures shall:

- Not to be less than 50 psi at the highest point along the test section.
- Not exceed pipe or thrust restraint design pressures.
- Be of at least 2 hour duration.
- Not vary by more than 5 psi.
- Not exceed twice the rated pressure of the valves when the pressure boundary of the test section includes closed gate valves.

Pressurization. Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe.

Air Removal. Before applying the specified test pressure, air shall be expelled completely from the pipe and valves.

Examination. All exposed pipe, fittings, valves, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, or valves, that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated.

Leakage Test

A leakage test shall be conducted concurrently with the pressure test.

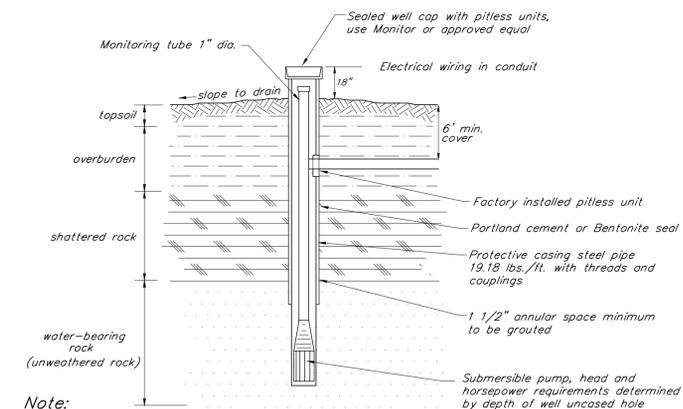
Leakage Defined. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

Allowable Leakage. No pipe installation will be accepted if leakage is greater than that determined by the following formula:

$$L = \frac{N \cdot D \cdot \sqrt{P}}{7400}$$

L is the allowable leakage, in gallons per hour; N is the number of joints in the length of pipeline tested; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gage.

Sections which fail the pressure/leakage test shall be repaired and retested by the contractor at no additional expense to the owner.



Well shall be constructed in accordance with State of Vermont, Agency of Natural Resources Department of Environmental Conservation, Environmental Protection Rules, Chapter 21 Water Supply Rule, Appendix A, Part 12, Original Effective Date September 24, 1992, Revision Date December 1, 2011

Typical Drilled Well Section

N.T.S.

Basis of Design

Design Flow:

1 single family 4 bedrooms = (3 bedrooms • 140 G.P.D.) + (1 bedrooms • 70 G.P.D.) = 490 G.P.D.

Simplex Pump Station Design:

Volume of wetwell = 1264 gals
Volume of wetwell per foot = 1264 gals/4.67 feet = 271 gals/foot
4 pump cycles per day
Volume of pump cycles = 490 gals/4 cycles = 122.5 gals/cycle
Height of pump cycle = (122.5 gals)/(271 gals/foot) = 0.45 feet
Minimum volume of emergency storage = 490 gal (volume for 1 day)
Emergency storage will be in wetwell
Height of emergency storage = 490 gals/(271 gals/foot) = 1.8 feet
Elevation floor and rim to be determined before construction
Elevation of invert in = 4.67' above floor
Elevation of Alarm = 1.33' (16.0") above floor
Elevation of Pump off = 0.33' (4") above floor
Elevation of Pump on = .83' (10") above floor
Volume of emergency storage provided = (4.67' - 1.8') • 271 gals/foot = 778 gallons > 490 gallons, therefore OK
Volume of Dose versus 5 times volume of Distribution Network

Total Length Distribution Network = 124 of 1 1/2" PVC
Volume = (.75/12)' • 2 x 3,1415 x 7.48 = .0917 gal/ft
Volume of Distribution System = .0917 gal/ft x 124 = 11.4 gallons

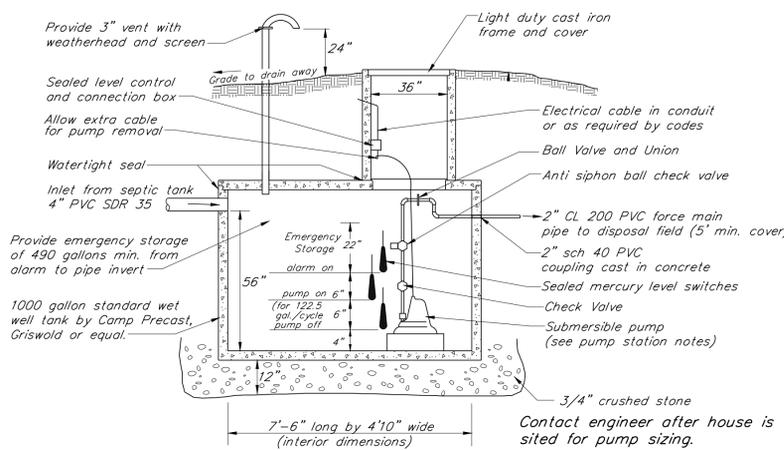
Design flow = 490 GPD

Dose Volume = 490 GPD / 4 doses per day = 122.5 gals per dose
Per dose volume 122.5 gals is > 56.8 gal (5 X distribution network)

Testing Notes - Pump Station

1. The Contractor shall leak test the new pump station tank utilizing one of the following procedures:

- If groundwater is above any joint or penetration, the Contractor shall test the septic tank infiltration. The test shall consist of observing the structures for any sign of infiltration for 2 hours with the sidewalls exposed. Any sign of infiltration shall be repaired from the outside with hydraulic cement in a manner approved by the Engineer. The Contractor shall then backfill the structures and provide anchorage against floatation and test an additional 24 hours.
- If groundwater is below the bottom of the tanks, the Contractor shall conduct a 24 hour exfiltration test with the sidewalls of the structure exposed. The Contractor shall be responsible for all anchorage against floatation. There shall be no infiltration or exfiltration.
- The Contractor shall provide all necessary manpower, materials and equipment for testing and shall notify the Engineer, the Town of Charlotte and the Owner 24 hours in advance of testing. All re-testing and repairs, if needed, shall be provided by the Contractor at no expense to the Owner.

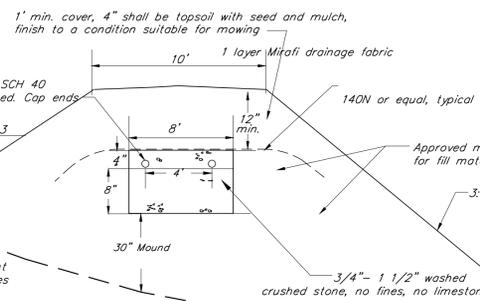


490 GPD Simplex Pump Station

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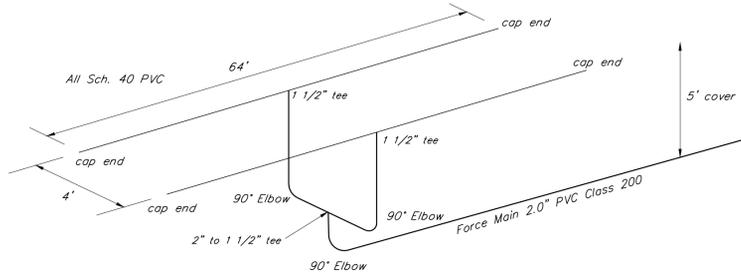
Pump Station Notes

- The Contractor shall test tank for water tightness prior to backfill and shall anchor tank as required due to high seasonal groundwater table.
- All penetrations and joints on tank shall have watertight seals.
- The Contractor shall provide all necessary unions, fittings, etc. for easy pump removal.
- The pump station shall include all the necessary controls, switches, fittings and appurtenances to make the station complete.
- The Contractor shall provide an audible and flashing alarm and fused disconnect switch to be installed inside house or building. All necessary cable and wiring shall be supplied by the Contractor.
- Provide a 4" solid concrete block under pump.
- The Contractor shall use Schedule 80 PVC with solvent weld joints for all piping inside pump station.
- All electrical equipment shall comply with the National Electric Code and other applicable codes.
- Any modifications to pump station design or location must be approved by the Engineer.



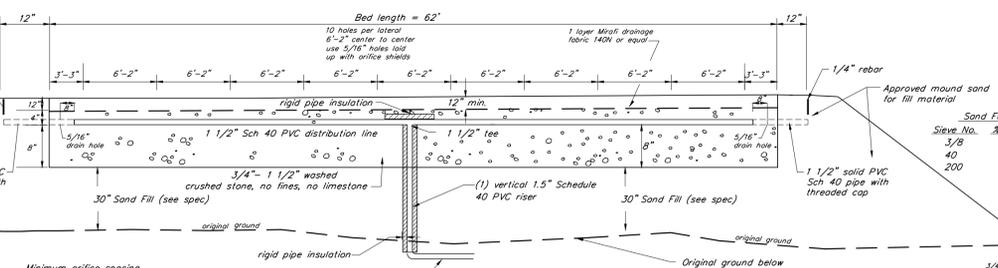
Wastewater Mound Bed Section

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Pipe Layout Wastewater System

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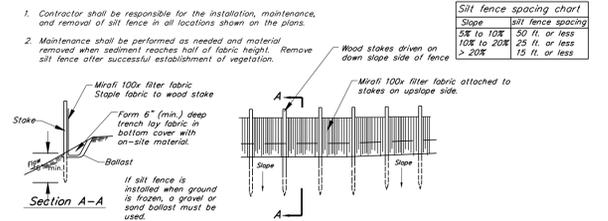
Minimum orifice spacing
Total Leach Area = 62' x 8' = 496 s.f.
Minimum one orifice/25 s.f.
496/25 = 19.8, use 10 orifices per lateral.

Mound System Distribution Lateral For Mound Style Wastewater System

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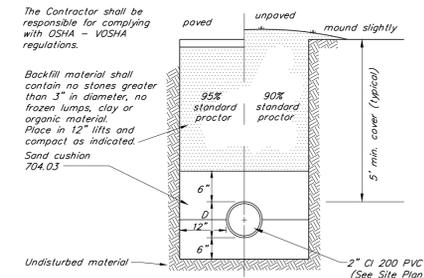
Construction Procedure

- The Contractor shall arrange a meeting at the site with the Engineer and a representative of the Town of Charlotte. This meeting shall occur before any construction can begin. The purpose of this meeting is to review the layout, construction methods, scheduling of construction and testing of the proposed septic system.
- The site shall be cleared. All stumps shall be cut flush with the ground surface.
- Install the force main and riser that will be in and under the above ground mound.
- Flow the area to a depth of 7" to 8", parallel to the land contours with the pipe throwing the soil uphill.
- The approved mound sand (sieve analysis; 85% passing the No. 10 sieve, 30% to 50% passing the No. 40 sieve, and 5% to 10% passing the No. 200 sieve) shall be placed in the mound area. Work from the outside of the plowed area and drive equipment over the mound as little as possible. It is very important to avoid compacting the plowed native soil any more than is absolutely necessary. Bring fill to the elevation of the top of the trenches. Shape side slopes as shown on the approved plans. Dig out the trenches (or bed). Pay close attention to keeping the trenches (or bed) level. Shape by hand if necessary.
- Fill trenches (or bed) with approved stone. Bring stone to the elevation of the bottom of the distribution lines. Carefully level the stone.
- Dry fit distribution lines. Drill holes and turn holes up for testing. The discharge from the holes in the distribution lines must be checked before the mound construction can proceed. Both the Engineer and a representative of the Town must be present for this test. The system must be pressurized with water. The discharge rate from each hole will be measured to ensure an even distribution of the effluent.
- After the discharge test is complete and approved by both the Town and the Engineer add the remaining stone. The stone shall be a minimum of 2" over the top of the distribution lines.
- Mirafit filter fabric shall be placed over the stone in the trenches.
- Cover the mound (18" above the trenches in the center and 12" at the sides) with material that is less permeable than the mound sand. The top 4" of this material shall be topsoil.
- The soil uphill of the mound shall be shaped to divert surface runoff away from the mound.
- The entire mound construction area shall be seeded and mulched.



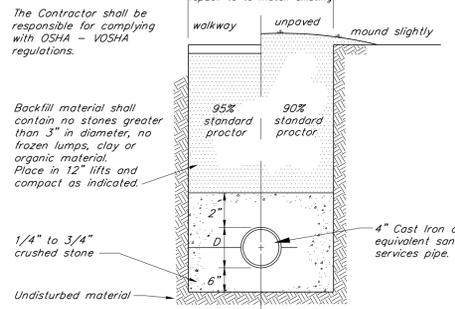
Typical Temporary Silt Fence

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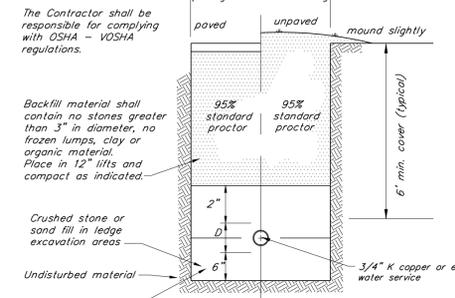
Force Main Trench Detail

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Typical Sanitary Trench Detail

N.T.S.



Typical Water Trench Details

N.T.S.

For Permit Review

Date revised	Description	Checked	Date
Design	JAR		
Drawn	JAR		
Checked	WHN		
Scale	N.T.S.		
Date	May 9, 2016		
Project	16113	700 Mount Philo Road	Charlotte, Vermont

Wastewater Design Details

Morris Residence

KREBS & LANSING Consulting Engineers, Inc.
164 Main Street, Colchester, Vermont 05446

C-3