File #
28598

THIS IS NOT A PERMIT TO INSTALL THE SEPTIC SYSTEM
THE SEPTIC TANK INSTALLER IS REQUIRED TO OBTAIN AN INSTALLATION LAYOUT FROM THE MECKLENBURG COUNTY HEALTH DEPARTMENT PRIOR TO THE INSTALLATION OF THE SEPTIC TANK SYSTEM. THE SEPTIC TANK CONTRACTOR MUST BE REGISTERED WITH MECKLENBURG COUNTY.

PLAN APPROVED 7/9/99 D. Clark

GCI
GEO-ENVIRONMENTAL
CONSULTANTS, INC.

A Common Sense Approach To A Cleaner Environment

11704 Reames Road, Charlotte, NC 28269-7637 • 704-596-8788 • FAX: 704-596-8770

RESIDENTIAL LOW PRESSURE PIPE SYSTEM FOR SUBSURFACE WASTEWATER DISPOSAL LOT #35 - COBBLER DRIVE MINT HILL, NORTH CAROLINA

PREPARED FOR
MR. STEPHEN BAYZIK
12422 BENTCREEK LANE
MATTHEWS, NC 28105

PREPARED BY
GEO-ENVIRONMENTAL CONSULTANTS, INC.
11704 REAMES ROAD
CHARLOTTE, NC 28269

GCI PROJECT NO. 99088

JUNE 1999

GEO-ENVIRONMENTAL
CONSULTANTS, INC.

June 29, 1999

Mr. Larry Thompson
Environmental Health Division
700 North Tryon Street, Suite 211
Charlotte, NC 28202

RE: Residential Low Pressure Pipe System
Lot 35 - Cobbler Drive
Mint Hill, North Carolina
GCI Project No. 99088

Dear Mr. Thompson:

On behalf of Mr. Stephen Bayzik, Geo-Environmental Consultants, Inc. (GCI) is pleased to present the attached application and design package for the above project. If you have any questions concerning this submittal, please contact us at 596-8788.

Sincerely,

GEO-ENVIRONMENTAL CONSULTANTS, INC.

Keith A. Anthony, P.E.
Principal Engineer

NORTH CAROLINA PROFESSIONAL SEAL 11260 ENGINEER KEITH A. ANTHONY

6/29/99

Jennifer A. Martin
Staff Engineer

Attachment

cc: Mr. Stephen Bayzik

BACKGROUND

The property is planned for single family 5-bedroom residence.

Mecklenburg County Soil Scientist, Mr. William Marlin, performed a site investigation on February 25, 1999. He classified the site as provisionally suitable in some areas with a LTAR of 0.275 gpd/ft^2 and 0.25 gpd/ft^2. See attached Soil/Site Evaluation report.

The residence will be served by a private well which will be located at least 100 feet away from the disposal system.

The location of the nitrification field is on a relatively flat portion of the site. Care shall be taken to ensure minimum land disturbance. The nitrification field along with the designated repair area is shown on the attached figure.

The repair area is located adjacent to the primary drain field. A similar line layout using two manifolds would work for the repair area. Undulation in the ground surface would need to be filled in as part of the final landscaping over the area in order to avoid surface water collection and ponding areas over the drain field.

APPLICATION INFORMATION

1) Application for Improvement Permit has been submitted to Mecklenburg County Health Department by the property owner, Mr. Stephen Bayzik.
2) Property is shown on attached portion of development survey. The MCHD file number is 2859B.
3) Owner: Mr. Stephen Bayzik
   12422 Bentcreek Lane
   Matthews, NC 28105
   (704) 841-1395 (Home)

   Engineer: Mr. Keith A. Anthony, P.E.
   Geo-Environmental Consultants, Inc.
   11704 Reames Road
   Charlotte, NC 29269
   (704) 596-8788 (Office)
   (704) 596-8770 (Fax)

4) Project described herein is a new project.
5) Water supply for residence will be provided by a private well.
6) Facility to be served by the proposed system is a 5-bedroom single family residence.
7) Wastewater system components are described herein.
8) With most systems, MCHD requires that the house and nitrification lines be located and marked prior to their final approval.

LOCATION

The property is located in the cul-de-sac of Cobbler Drive located off Camden Road in Mint Hill, North Carolina.

REFERENCES

1) Design and Installation of Low Pressure Pipe Waste Treatment System by: Craig Cogger, Bobby L. Carlile, Dennis Osborne, Ed Holland; published by UNC Sea Grant College Pub. UNC-SG-82-03, May 1982
2) Laws and Rules for Sewage Treatment and Disposal Systems, 15A NCAC 18A, Section .1900, Department of Environment Health and Natural Resources, August 1, 1998

PLANS AND SPECIFICATIONS FOR SPECIFIC SYSTEM COMPONENTS

Septic Tank

1) The septic tank receives wastewater directly from the house.
2) A septic tank shall be watertight, structurally sound, and not subject to excessive corrosion or decay.
3) The 1500 gallon septic tank must be of two-compartment design for maximum solids retention. The inlet compartment of a two-compartment tank shall hold between two-thirds and three-fourths of the total tank capacity.
4) Effluent from the two-compartment septic tank flows by gravity through a four-inch solid PVC pipe to the pumping tank.
5) Both the septic tank and pumping tank must be provided with aboveground concrete or masonry manhole risers to provide easy access for clean-out and pump service.
6) When prefabricated concrete tanks or tanks of other material are used, they shall be constructed in accordance with the plans which have been approved by the State and shall comply with all requirements of Section .1953 of 15A NCAC 18A.
7) On the outlet tee of the septic tank a filter should be installed. This filter should be equivalent to a Zabel Model A1800. An access port over the filter should be installed. See attached product sheet from Zabel Environmental Technology.

Pumping Tank

1) 1500 gallon pumping tank shall have an access manhole extending at least 6 inches above finished grade.
2) Pump and control circuits shall be provided with manual circuit disconnects within a watertight, corrosion-resistant, outside enclosure (NEMA 4X or equivalent) adjacent to the pump tank, securely mounted at least 12 inches above finished grade. The pump(s) shall be manually operable without requiring the use of special tools or entrance into the tank for testing purposes. Conductors shall be conveyed to the disconnect enclosure through waterproof, gasproof, and corrosion-resistant conduits, with no splices or junction boxes provided inside the tank. Wire grips, duct seal or other suitable material shall be used to seal around wire and wire conduit openings inside the pump tank and disconnect enclosure.
3) The pumping tank shall have a properly functioning high-water alarm. The alarm circuit shall be supplied ahead of any pump overload and short circuit protective devices. The alarm shall

be audible and visible by system users and included in the pump and control enclosure (Simplex or Duplex Control Panel).

4) Float switch for the high water alarm shall be set no more than 3 inches above the high water level of pump cycle.
5) Pump floats should be set so that level of water at end of pump cycle is above the top of the pump.
6) Float switch tie downs to be made of corrosion resistant material, no tape or metal hose clamps.
7) Pump discharge piping shall be of Schedule 40 PVC and shall have a check valve.
8) Anti-siphon hole (three-sixteenth inch) is required between the pump and the check valve.
9) Watertight testing will be required on two piece pump tanks.

Pipe and Fittings

1) All pipes and fittings should be made of PVC plastic.
2) All joints must be sealed with an appropriate PVC-solvent cement. The supply manifold from the pumping tank to the LPP distribution field is two-inch Schedule 40 PVC.
3) There should be a threaded PVC union above the pump to allow easy removal or replacement. Lateral lines are made of 1 1/4-inch PR160 PVC. Holes in the laterals are drilled on site.
4) A globe valve for final pressure adjustment is installed in the supply manifold inside the pumping tank.
5) The end of each lateral line is equipped with a capped "turn-up" that provides aboveground access for clean-out or back-flushing. Using 45-degree elbows rather than 90-degree elbows for the turn-ups will make clean-out easier to do.

Pump, Float Controls and Alarm System

1) A septic-tank effluent pump or a submersible sump pump that will not be corroded by sewage should be used in the pumping tank. A Little Giant Model #10SH-CIM by Tecumseh Products, or equivalent, should be used to pump 42 gpm at 15 feet of head. See attached product sheet from the "USA Blue Book."
2) The controls for the pumping system include a switching control for turning the pump on and off and a high water alarm to signal pump malfunctions.
3) The controls must also be sealed against entry of corrosive and explosive gases from the effluent and should have NEMA (National Electrical Manufacturing Association) approval.
4) Mercury switches are activated by a sealed float which contains a tube of mercury in contact with power leads. Best performance has been obtained using two switches - one to close the pump circuit and the other to open it. See attached product sheet from the "USA Blue Book".
5) In addition to the on and off control floats, there must be a separate float control for the high-water alarm. This may be a sealed, mercury-float switch mounted several inches above the on float. The high-water alarm should be located within the house and consist of a light bulb and/or audible signal mounted over a sign marked "wastewater system alarm". It should be on a separate electrical circuit from the pump power line, and be equipped with a test switch. The alarm is activated if the water level in the pumping tank rises above the "pump-on" float control. The tank provides at least one day or more of excess storage capacity (depending

on water use in the home) during which time the system must be repaired.

Home Water-Saving Devices

Any home with an LPP system must be equipped with low-flow showerheads (three gallons per minute) and low-flush commodes (3 ½ gallons or less per flush) in order to minimize the hydraulic load on the system. Those devices are a simple, low-cost way of reducing water consumption with no inconvenience to the homeowner.

CONSTRUCTION INSTALLATION

Site Preparation

1) One of the most important concerns for an LPP system is to protect the site from soil disturbance by heavy equipment.
2) As soon as the absorption area has been designed, it should be flagged, roped off and "quarantined" from construction traffic. No site preparation or LPP construction work should occur if the soil is wet.
3) After the location is staked out and the soil is dry enough the site should be cleared of brush and small trees. If larger trees are removed, they should be cut off rather than uprooted in order to avoid creating depressions and damaging the soil-pore network.
4) Provisions must be made for intercepting or diverting surface water away from the absorption area.
5) After the area has been cleared and shaped, the location of the lateral lines and supply manifold should be accurately staked out according to design specifications. Each lateral line must be laid out along a level contour using a transit.

Tank Installation

1) The two-compartment septic tank is installed.
2) The pumping tank is installed next to the septic tank.
3) The tanks are connected with an appropriate length of solid, four-inch PVC pipe.

Supply Manifold

1) The supply manifold conveys effluent from the pump to the distribution laterals.
2) The manifold joins each lateral through a short riser pipe connecting a reducing tee on the manifold to a 1 1/4 inch elbow or tee on the lateral. This assembly places each lateral pipe about six inches higher than the supply manifold and helps prevent the back-flow of effluent from a higher lateral to a lower lateral. Use a 2" x 2" x 1 1/4" tee rather than "bushing down" when connecting laterals to the manifold.
3) After the supply manifold has been placed in its trench and lateral lines connected, it should be backfilled with tightly tamped soil. The supply-manifold trench must not be backfilled with gravel, or the trench may become a conduit for downslope flow of effluent from the laterals.

Lateral Lines

1) Laterals will be placed at 5' minimum separation.
2) The depth of a given lateral trench should be uniform from the manifold to the end of the lateral. In no case should the trench bottom be allowed to slope away from the manifold.
3) Small earthen dams are placed at the beginning of each lateral trench to help maintain uniform distribution of effluent along each trench.
4) Lateral trench bottoms are then lined with three to six inches of gravel.
5) The 1 1/4-inch PVC pipes should be laid out and cut to proper lengths for the lateral lines. Holes are drilled (in a straight line) facing upwards (except for a hole 1/3 of the way from beginning and end of each line) after the laterals have been cut to proper length.
6) Holes are only drilled through one side of the pipe.
7) Sleeve laterals in 4" diameter perforated corrugated pipe. The corrugated pipe shall have three rows of holes, each hole between ½" and 3/4" in diameter and spaced longitudinally approximately 4" on centers. The rows of holes may be equally spaced 120° on centers around the periphery, or three rows may be located in the lower portion of the pipe, the outside rows being approximately on 120° centers.
8) A short turn-up with a capped end is at the end of each lateral. The capped end must be brought up above or flush with the final grade. Using two 45 degree bends for constructing cleanouts is recommended.
9) Rock used in nitrification trench shall be clean, washed gravel or crushed stone and graded or sized between 3/8" to 1". The rock shall be placed a minimum of 12" deep with at least 6" between the pipe and the trench bottom and 2" over the pipe, and distributed uniformly across the trench bottom and over the pipe.
10) Use geotextile fabric over the trench at the gravel-backfill interface to prevent soil intrusion.

Pump and Controls

1) The pump must be placed on two concrete blocks set next to each other on the bottom of the tank. This prevents the pumping of any solid particles which can clog the LPP system
2) A piece of nylon rope or other non-corrodible material should be attached to the pump and to the outlet pipe for lifting the pump in and out of the chamber.
3) The lower level control or "pump-off" must be positioned above the pump, so that the pump remains submerged at all time.
4) The pump outlet pipe should be connected to the supply manifold with a threaded PVC union to allow quick removal.
5) A 1/4-inch siphon breaker hole must be drilled in the bottom of the supply line before it leaves the pump tank. This breaks any vacuum in the system and prevents the inadvertent siphoning of effluent out of the tank.

Electrical Connections

1) The pump and high-water alarm must be placed on separate electrical circuits.
2) All electrical connections must be made outside the pumping tank. Power cords from the pump and controls should be plugged into a NEMA-approved outdoor receptacle mounted outside of the pumping tank.

3) Wiring between the pumping tank and the house should meet state and local code requirements.

PROPER OPERATION CHECK

1) After all connections have been installed and connected, the system should be checked for proper operation. With electrical power turned off, fill the pumping tank with a garden hose (or allow effluent to accumulate) until the liquid rises to the level of the high-water alarm float.
2) Turn on the electrical power. The alarm light should go on in the house, and the pump should start operating. The alarm light should go off when the liquid level falls below the high-water float. The pump should turn off when the liquid reaches the lowest float control. Be sure the pump is still completely submerged.

PRESSURE HEAD ADJUSTMENT

1) The pressure head must be adjusted to match that specified in the design. The pressure head is measured as the height liquid will rise above the turn-up elbow when the pump is running. To adjust the head:
   - Glue a four-foot length of pipe (preferably clear) to a threaded adapter that will screw onto the turn-up adapters at the end of each lateral.
   - Replace the turn-up cap with the pipe and adapter
   - Turn the power on to allow liquid to rise in the pipe
   - Adjust the gate or globe valve in the pumping tank until the effluent reaches the desired height in the pipe. Remember to include the distance below the ground surface to the lateral line when measuring the height.

X SEE PLOT PLAN - GATE VALVES ON @ EACH MANIFOLD

FINAL LANDSCAPING

1) After the LLP system is installed, the following should be checked to ensure that the system will not be overloaded with excess rainwater and runoff:
   - The distribution field is shaped to shed rainwater and is free of low areas
   - Grassy swales or ditches for diverting surface water are properly installed
   - Gutter and downspout drains are directed away from the system.

2) Finally, the entire area should be planted with grass in order to prevent erosion. The soil should be properly tilled, limed (if necessary) and fertilized before planting. After applying an appropriate grass seed, the area should be heavily mulched with straw or other suitable material.

QUALITY ASSURANCE REQUIREMENTS

The LPP system must be installed by a qualified, contractor that is on the Mecklenburg County list of competent contractors. GCI also recommends that the construction and installation of the LPP system be spot checked by an independent design engineer recognized by Mecklenburg County to have experience in the design of LPP systems. Critical stages of the installation which should be

checked are:

1. System layout
2. Septic and pump tank installation prior to backfilling
3. Manifold and lateral installation prior to backfilling.
4. Final landscaping, operation and pressure head check.

If quality assurance is not provided by GCI, then the homeowner and/or installation contractor assumes liability for proper system operation.

The system design is based on a maximum waste flow of 600 gallons per day. Homeowners should pay particular attention to the section titled Homeowner Suggestions for ways to minimize the burden on the system.

MAINTENANCE

1) Any person owning or controlling the property upon which a ground absorption sewage treatment and disposal system is installed shall be responsible for the following items regarding the maintenance of the system:
   - Ground absorption sewage treatment and disposal systems shall be maintained at all times to prevent seepage or discharge of sewage or effluent to the surface of the ground or to surface waters.
   - Ground absorption sewage treatment and disposal systems shall be checked and the contents of the septic tank removed periodically to ensure proper operation of the system.
2) A contract shall be executed between the system owner and a management entity prior to the issuance of an Operation Permit for a system required to be maintained by a public or private management entity. The contract shall include the specific requirements for maintenance and operation, responsibilities of the owner and system operator, provisions that the contract shall be in effect for as long as the system is in use, and other requirements for the continued proper performance of the system. It shall also be a condition of the Operation Permit that subsequent owners of the system execute such a contract.

OPERATION AND MAINTENANCE PROCEDURE

The system is classified as Type IV. The Regulations require that the system be operated by a person certified by the N.C. Department of Environmental Health to operate this type of system.

Operating, Maintenance and Inspection procedures shall include but not be limited to the following:

- Minimum inspection/maintenance frequency shall be 2 times per year, with reporting frequency every 6 months to the local Health Department.
- Septic system shall be pumped every 4 years or when solids accumulate to 1/3 the volume of the tank.
- On a two- to five-year basis, clean and inspect filter. When washing the filter, debris must be sprayed directly back into the septic tank and not onto the lawn.
- The LPP system should be observed by the regulatory agency one, three, six and nine months after initial installation, and then every 3 years. An inspection report should be completed and filed each time the system is checked.
- All laterals shall be pressure flushed annually with clean water.

- Pressure head for laterals should be checked and adjusted one month after installation and annually thereafter.
- All piping, fittings, turn-ups and valve boxes shall be checked annually for damage and/or proper operation and corrections made immediately.
- The property should be inspected to insure all surface water is deflected away from the fields and tank. Any ponding of surface water should be corrected.
- Grasses shall be mowed and maintained and any erosion shall be corrected promptly.
- The nitrification field area shall be checked for leakages, blowouts or malfunction, indications of damp or mushy areas compared to surrounding area or evidence of noticeable odor of sewage. Repairs shall be made immediately.
- The pump electrical should be checked to insure tight, clean connections with no corrosion and proper operation.
- Pump switches shall be checked for free operation and proper level set.
- Pump draw down depth and delivery rate shall be checked twice a year.
- Check septic tank and pump tank for evidence of damage or leakage. Check the quality of effluent including grease and sludge accumulation.

The system operator in conjunction with the local Health Department shall establish an operation and maintenance program and procedure based on experience obtained from similar installations.

HOMEOWNER SUGGESTIONS

Most low pressure pipe systems do not require much effort to operate and maintain. Even though the effort is small, the system must be maintained properly so that it operates reliably and at a minimum cost. Following are suggestions for the home owner to minimize the burden on a low pressure pipe system.

1) Garbage disposals should not be used in on-site systems. The ground garbage adds large amounts of solids to a septic tank, causing sludge to build up very quickly.
2) Grease, cooking oils and coffee grounds should never be put into a septic tank.
3) Items such as disposable diapers, cigarettes, facial tissues and other solid or paper wastes should not be flushed into the on-site system.
4) Used motor oil and other such oily liquids should not be put into a septic tank.
5) Using less water can reduce the amount of water flowing to the treatment and disposal field.
6) Water-saving fixtures and devices can be installed on sinks, toilets and showers to reduce the rate at which the water flows from the fixture.
7) Dishwashers and washing machines should only be run with full loads.
8) Leaky faucets and toilets can add large volumes of water to the daily flow of water into the on-site system. Repair the leaks to save water and give the treatment and disposal field a rest.
9) Roof drains, basement sump pumps, foundation drains, and other such drains should not empty into the on-site system. These drains should be directed to another part of the lot away from the treatment and disposal field.

APPENDIX

DESIGN SPECIFICATIONS
Low Pressure Piping System
Cobbler Drive - Lot #35

Daily waste flow	600 gal
Septic tank size	1500 gal
Pumping tank size	1500 gal
Effluent loading rate	0.275 gal/ft^2/day
Absorption area	4364 ft^2
Total length of laterals	880 ft
Lateral diameter	1 1/4 in dia. PVC
Lateral configuration	16 x 55 ft lines
Supply line length	100 ft
Supply line diameter	2 in dia. sch 40 PVC
Manifold placement	side
Hole size	5/32 in
Hole spacing	Varies, see Table 1
Number of holes	Varies, see Table 1
Flow per hole	Varies, see Table 1
Total flow	41.5 gpm
Elevation head	12 ft
Friction head	0.89 ft
Pressure head	2 ft
Total head	15 ft
Pump requirements	42 gpm, 15 ft of head
Storage volume in laterals	79.2 gal
Storage volume in supply line	38.8 gal
Total storage volume	118 gal
Dosing volume	450 gal
Dosing depth*	15 1/4 in
Pump run per dose	10 minutes, 43 seconds
Check valve	Yes
Siphon break hole	Yes

* Double check dosing depth against pump tank dimensions

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TABLE 1
RESIDENTIAL LOW PRESSURE PIPE SYSTEM
LOT #35 - Cobbler Drive
GCI Project No. 99088

Lateral	Length (FT)	Elevation (FT)	Pressure Head (FT)	Flow Rate/ Hole (GPM)	Hole Spacing (FT)	# of Holes	Flow/Line (GPM)
A1	55	91.3	4.1	0.58	10	5	2.90
A2	55	91.5	3.9	0.57	10	5	2.85
A3	55	91.9	3.5	0.54	10	5	2.70
A4	55	92.4	3.1	0.51	10	5	2.55
A5	55	92.8	2.6	0.46	8	6	2.76
A6	55	93.2	2.2	0.43	8	6	2.58
A7	55	93.4	2.0	0.41	7	7	2.87
						Zone A Total	***19.21***
B1	55	91.4	4.9	0.64	12	4	2.56
B2	55	91.9	4.5	0.61	12	4	2.44
B3	55	92.4	4.2	0.59	12	4	2.36
B4	55	92.8	4.0	0.58	12	4	2.32
B5	55	93.1	3.7	0.56	12	4	2.24
B6	55	93.4	3.4	0.54	10	5	2.70
B7	55	93.6	3.0	0.50	10	5	2.50
B8	55	93.9	2.5	0.45	8	6	2.70
B9	55	94.3	2.0	0.41	8	6	2.46
						Zone B Total	22.28
						Total	41.49

GEO-ENVIRONMENTAL CONSULTANTS, INC.

BY KAA DATE 6-23-99

CHKD. BY _____ DATE _____

CLIENT	STEVE BAYZIK	SHEET	1 OF 2
PROJECT	COBBLER DRIVE – LOT #35	PROJECT NO.	99088
SUBJECT	LPP DESIGN		

SIZE OF ABSORPTION AREA

5 BEDROOMS $5 \times 120\ gPD = 600\ gPD$

LOADING RATE (FROM W. MARLIN 2-25-99) = $0.275\ gPD/FT^2$

$600\ gPD / 0.275 (1/2) = 4364\ FT^2$

TOTAL LENGTH OF DISTRIBUTION LINES

$4364\ FT^2 / 5' = 873\ FT$

USE 16 LINES, 55' EACH, 5' SPACING

SIZE SEPTIC AND PUMPING TANKS

$2 \times 600\ gPD = 1200\ gAL$

USE 1500 gAL SEPTIC TANK

USE 1500 gAL PUMPING TANK

DOSING RATE → SEE TABLE

PUMP SELECTION

ASSUME 2" SUPPLY LINE 100' LONG

ASSUME FRICTION HEAD = 1.2 X PIPE FRICTION

FROM TABLE 3, pg 9, DESIGN MANUAL → ~20 gpm, 2" ϕ

$(100'/100') \times 0.74 = 0.74\ FT$

FRICTION HEAD = $1.2 \times 0.74\ FT = 0.89\ FT$

FIND TOTAL HEAD

ASSUME 12' ELEVATION FROM PUMP TO END OF LINES

ASSUME 2' PRESSURE HEAD

$12' + 2' + 0.89' = 14.89$ FEET

PUMP 42 gPM AGAINST 15 FEET

USE LITTLE GIANT MODEL 10SH-CIM

GEO-ENVIRONMENTAL CONSULTANTS, INC.

BY KDA DATE 6-29-99

CHKD. BY _____ DATE _____

CLIENT	STEVE BAYZIK	SHEET	2 OF 2
PROJECT	COBBLER DRIVE - LOT # 35	PROJECT NO.	99088
SUBJECT	LPP DESIGN		

DOSING VOLUME

DETERMINE MINIMUM DOSING VOLUME

$V_{MIN} = V_{SUPPLY} + 5\,V_{LATERALS}$

2" SUPPLY LINES $\left(\frac{100' + 100'}{100'}\right) \times 19.4\ gAL = 38.8\ gAL$

1 1/4" LATERALS $16\left(\frac{55'}{100'}\right) \times 9.0\ gAL = 79.2\ gAL$

$V_{MIN} = 38.8\ gAL + 5(79.2\ gAL) = 434.8\ gAL$

USING A DOSING VOLUME OF 450 gAL/DOSE GIVES ABOUT 1 1/3 DOSES PER DAY

DOSING DEPTH

1500 GALLON PUMP TANK → 118" LONG, 58" WIDE

$118" \times 58" \times 1"\text{DEPTH} \times \frac{1\ FT^3}{1728\ IN^3} \times 7.48\ gAL/FT^3 = 29.6\ gAL/IN.\ DEPTH$

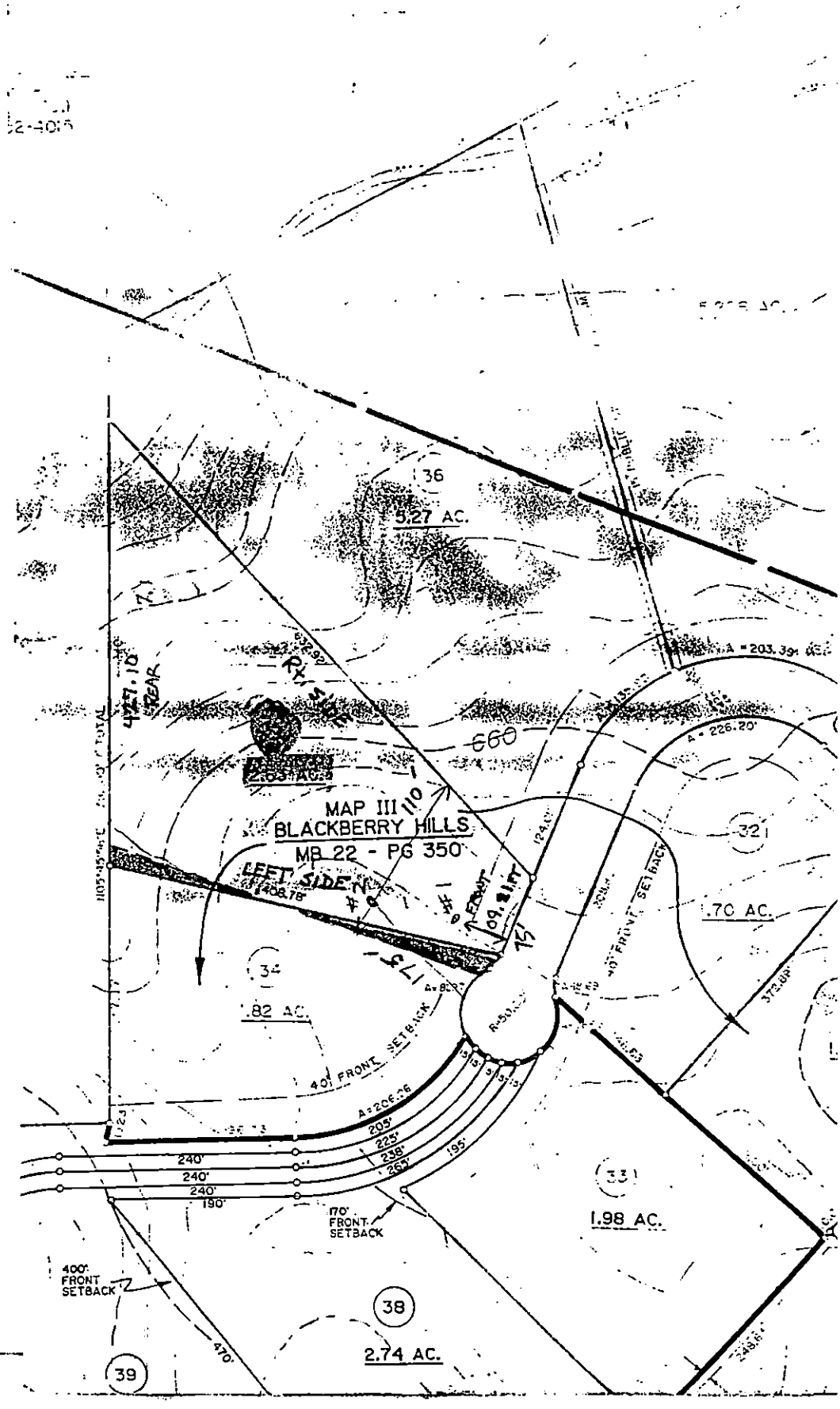
$\frac{450\ gAL/DOSE}{29.6\ gAL/IN.\ DEPTH} =$ 15.2 INCH DOSING DEPTH

PUMP RUN PER DOSE

$\frac{450\ gAL}{42\ gpm} =$ 10 MINUTES, 43 SECONDS

REPAIR AREA

REPAIR AREA IS LOCATED ADJACENT TO THE PRIMARY DRAIN FIELD. MANY OF THE LINES FOR A REPAIR AREA WERE LAID OUT, UNDULATIONS IN THE GROUND SURFACE WOULD HAVE TO BE FILLED IN DURING INSTALLATION IN ORDER TO AVOID SURFACE WATER COLLECTION AREAS.



LOT #35
COBBLER DRIVE

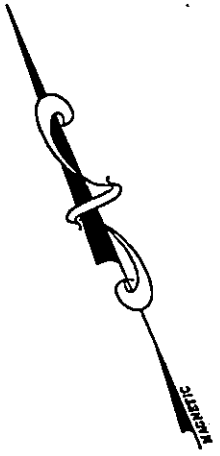
REF. FROM STEPHEN BAYZIK

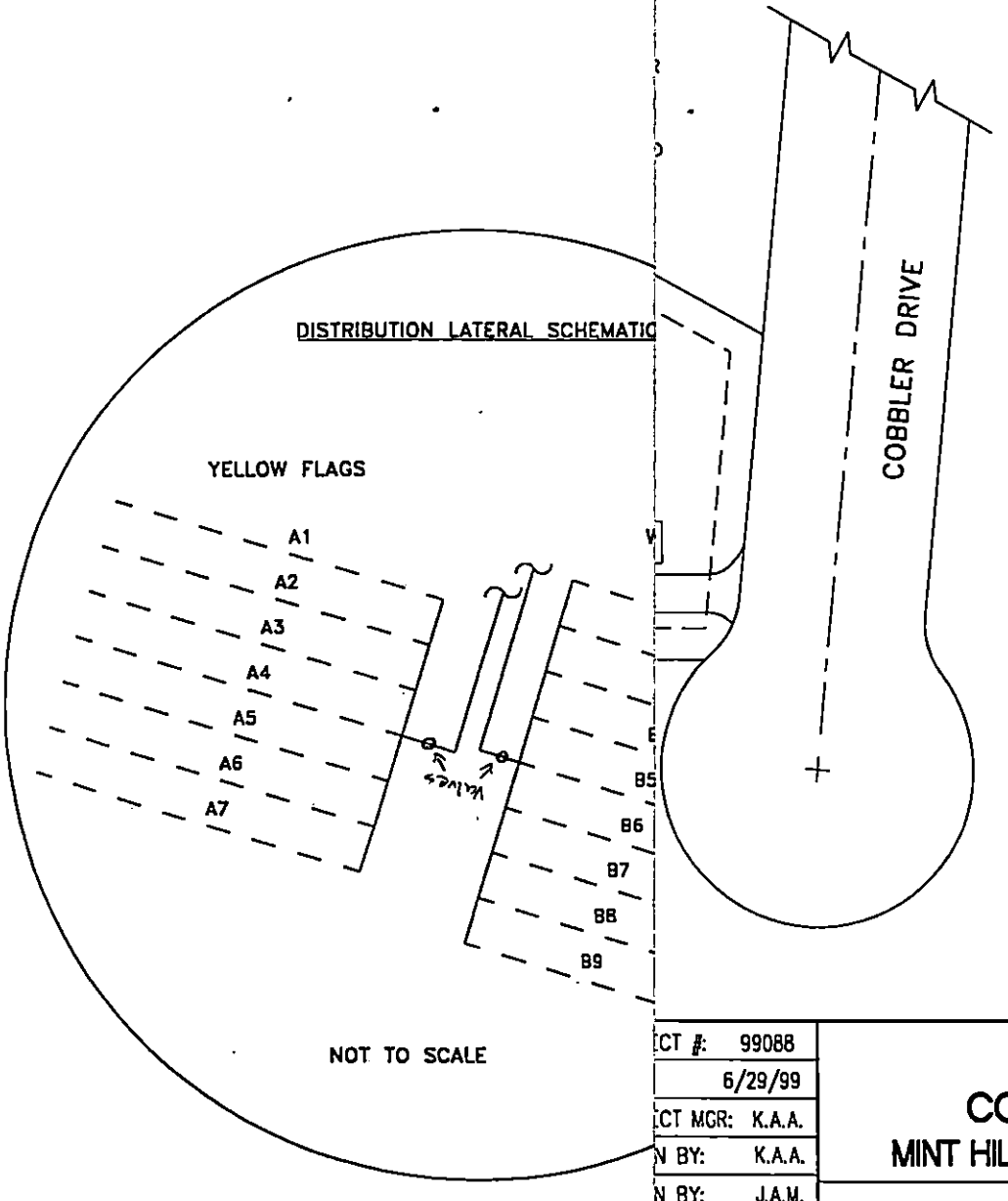
FIGURE 1

VATER LEGEND:

1-1/4" PR160 PVC DISTRIBUTION PIPING

SCH 40 PVC CONVEYANCE PIPE





CT #:	99088
	6/29/99
CT MGR:	K.A.A.
N BY:	K.A.A.
N BY:	J.A.M.
:	~1" = 60'

LOT #35

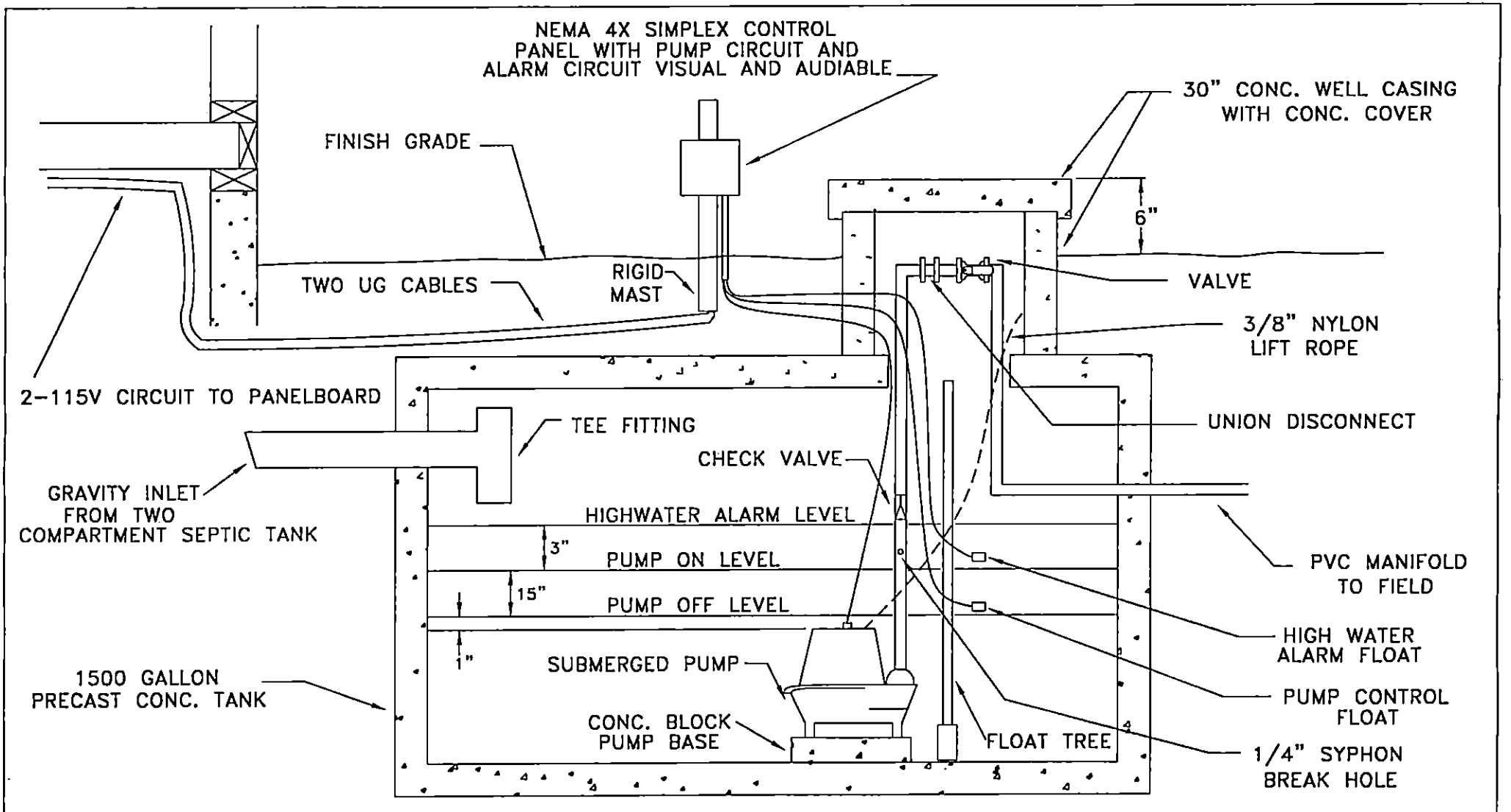
COBBLER DRIVE

MINT HILL, NORTH CAROLINA

LPP SYSTEM LAYOUT

FIGURE 2

P:/PROJ/99088/FINAL.DWG



GCI

GEO-ENVIRONMENTAL CONSULTANTS, INC.

GEOTECHNICAL/ENVIRONMENTAL ENGINEERS & SCIENTISTS

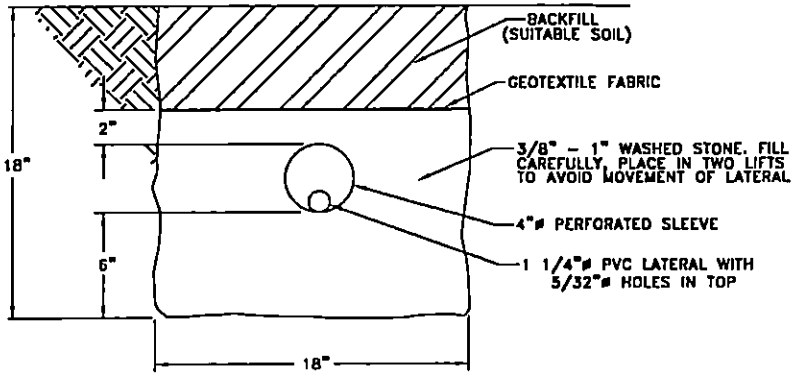
11704 REAMES ROAD, CHARLOTTE, NC 28269-7637
PHONE (704)596-8788 FAX (704)596-8770

PROJECT #:	99088
DATE:	6/99
PROJECT MGR:	K.A.A.
DESIGN BY:	K.A.A.
DRAWN BY:	J.A.M.
SCALE:	NOT TO SCALE

LOT #35
COBBLER DRIVE
MINT HILL, NORTH CAROLINA

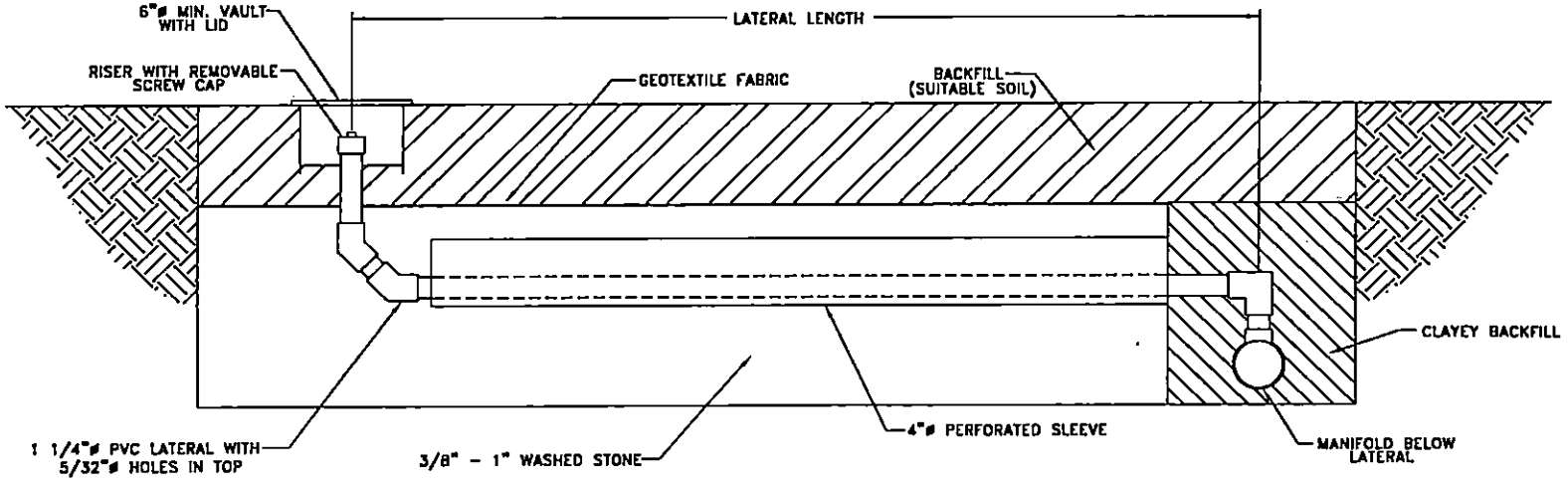
PUMPING TANK DIAGRAM

FIGURE 3



LATERAL TRENCH

NOT TO SCALE



MANIFOLD AND LATERAL

NOT TO SCALE

GEO–ENVIRONMENTAL CONSULTANTS, INC.
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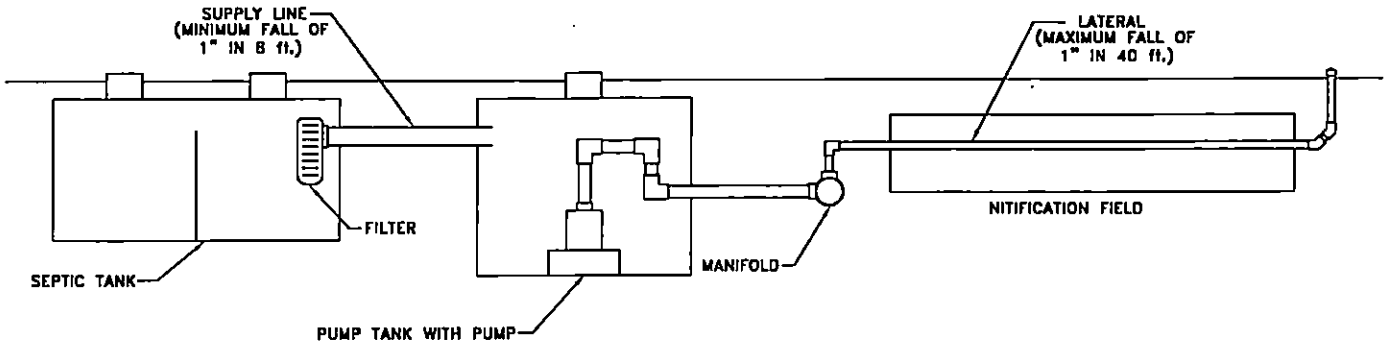
PROJECT #:	99088
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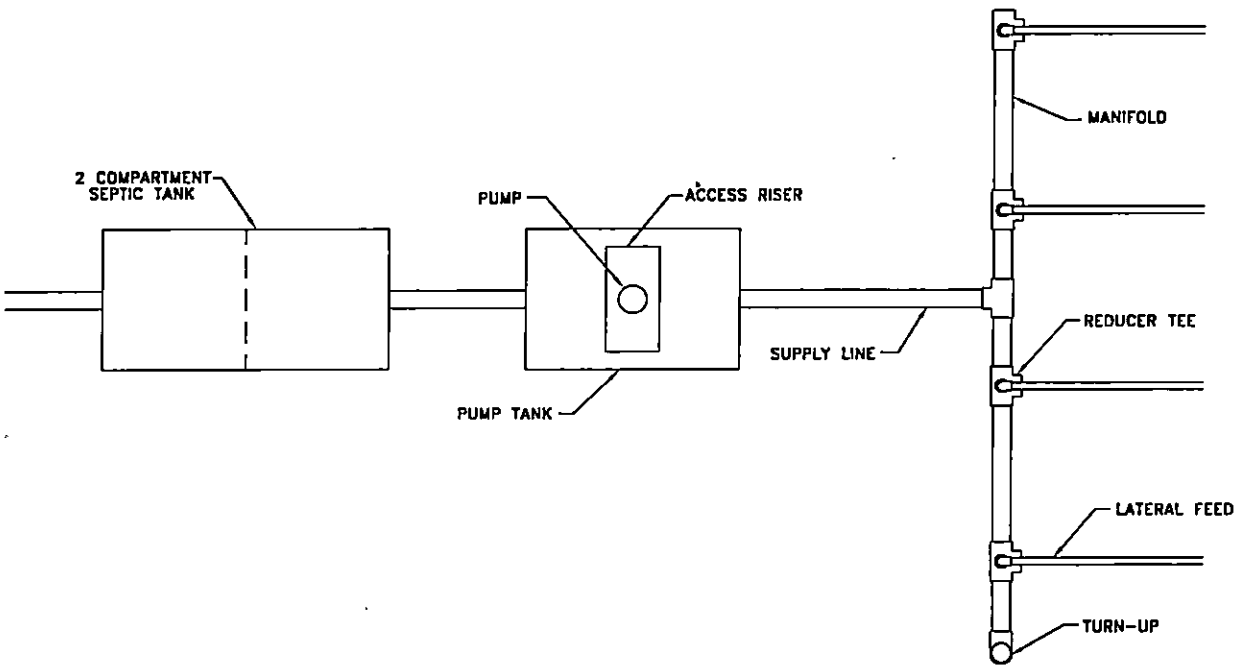
LOT #35
COBBLER DRIVE
MINT HILL, NORTH CAROLINA

LPP LATERALS

FIGURE 4

P:\PROJ\99088\DTL-LPP.DWG





GCI
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MINT HILL, NORTH CAROLINA

PRESSURE MANIFOLD SYSTEM

FIGURE 5

P:\PROJ\99088\DTL-MNFLD.DWG

MECKLENBURG COUNTY HEALTH DEPARTMENT JRCES

Sheet: _____

#2 4/0 a

Property ID: 134-113-34

Lot #: 35

File # 25716

LARRY THOMPSON, R.S.
Environmental Health Specialist

700 North Tryon Street
Suite 211
Charlotte, NC 28202

Telephone: (704) 336-5568
FAX: (704) 336-6894

VALUATION EWATER SYSTEM

APPLICANT: _____

by Mullikin DATE EVALUATED: 2-25-99

PROPOSED FACILITY: residence PROPOSED DESIGN FLOW (.1949) 600gpd PROPERTY SIZE: 2.4

LOCATION OF SITE: 16509 Cobble Dr. PROPERTY RECORDED: _____

WATER SUPPLY: ☒Private ☐Public ☐Well ☐Spring ☐Other _____

EVALUATION METHOD: ☒Augur Boring ☐Pit ☐Cut

TYPE OF WASTEWATER: ☐Sewage ☐Industrial Process ☐Mixed

PROFILE	Slopes 6-15% .1940 Landscape Position/ Slope %	Horizon Depth (IN.)	SOIL MORPHOLOGY (.1941) .1941 STRUCTURE/ TEXTURE	.1941 CONSISTENCE MINERALOGY	OTHER PROFILE FACTORS .1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	PROFILE CLASS &LTAR
1	R	0-7"	gr/sl	Fr/SE XPl SS/SP	>26" TO soil wetness	26"	N/A	None	US
		7-24"	SAB/C	Fi-vFi/Mixed/ US/VP					
		24-26"	M/C	Fi-vFi/Mixed/ US/VP					
2	LS	0-5"	gr/sl	Fr/SE XPl SS/SP	>42" TO soil wetness	42"	N/A	None	PS IV .2739/F2
		5-42"	SBK/C	Fi/SE XPl SP					
3	LS	0-3"	gr/sl	Fr/SE XPl SS/SP	>36" TO soil wetness	36"	N/A	None	US
		3-28"	SBK/C	Fi/SE XPl SP					
		28-36"	M/C	Fi-vFi/Mixed/ US/VP					
4	LS	0-2"	gr/sl	Fr/SE XPl SS/SP	>35" TO soil wetness	35"	N/A	None	US
		2-18"	SBK/C	Fi/SE XPl SP					
		18-35"	SBK/C	Fi-vFi/Mixed/ US/VP					
5	LS	0-3"	gr/sl	Fr/SE XPl SS/SP	>27" TO soil wetness	27"	N/A	None	US
		3-27"	ABK/C	vFi/Mixed/ US/VP					
6	LS	0-4"	gr/sl	Fr/SE XPl SS/SP	>32" TO soil wetness	32"	N/A	None	US IV .2739/F3
		4-32"	SBK/C	Fi/SE XPl SP					

DESCRIPTION	INITIAL SYSTEM	REPAIR SYSTEM
Available Space (.1945)	US	US
System Type(s)		
Site LTAR		

OTHER FACTORS (.1946): _____

SITE CLASSIFICATION (.1948): Unsuitable

EVALUATED BY: W.R. Mullis 2-2-99

OTHER(S) PRESENT: LSS

FILE # 20[illegible]

100% Repair

LANDSCAPE POSITION	GROUP	TEXTURE	.1955 LTAR
UIDGE	I	S-SAND	1.2-0.8
S-SHOULDER SLOPE		LS-LOAMY SAND	
-LINEAR SLOPE			
-FOOT SLOPE	II	SL-SANDY LOAM	0.8-0.6
N-NOSE SLOPE		L-LOAM	
H-HEAD SLOPE			
C-CONCLAVE SLOPE	III	SI-SILT	0.6-0.3
V-CONVEX SLOPE		SICL-SILTY CLAY LOAM	
T-TERRACE		CL-CLAY LOAM	
P-FLOOD PLAIN		SCL-SANDY CLAY LOAM	
	IV	SC-SANDY CLAY	0.4-0.1
		SIC-SILTY CLAY	
		O-ORGANIC	

CONSISTENCE	
MOIST	WET
VFR-VERY FRIABLE	NS-NON-STICKY
FR-FRIABLE	SS-SLIGHTLYSTICKY
FI-FIRM	S-STICKY
VFI-VERY FIRM	VS-VERY STICKY
EFI-EXTREMELY FIRM	NP-NON-PLASTIC
	SP-SLIGHTLYSTICKY
	P-PLASTIC
	VP-VERY PLASTIC

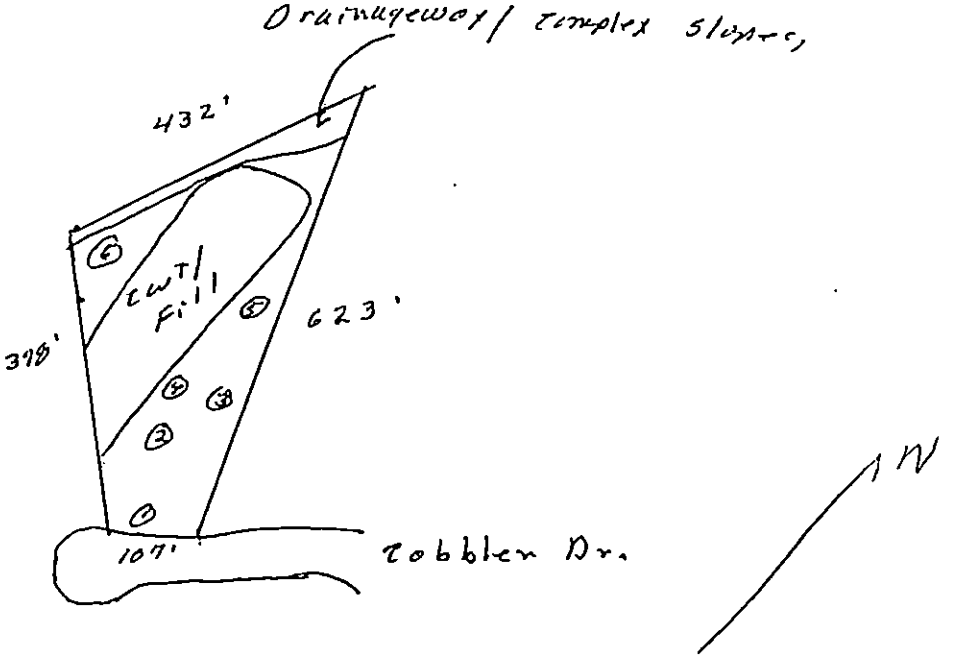
STRUCTURE

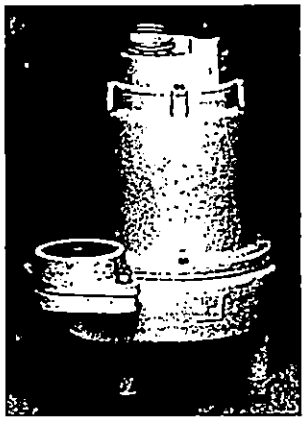
SG-SINGLE GRAIN
M-MASSIVE
CR-CRUMB
GR-GRANULAR
SBK-SUBANGULAR BLOCKY
ABK-ANGULAR BLOCKY
PL-PLATY
PR-PRISMATIC

MINERALOGY

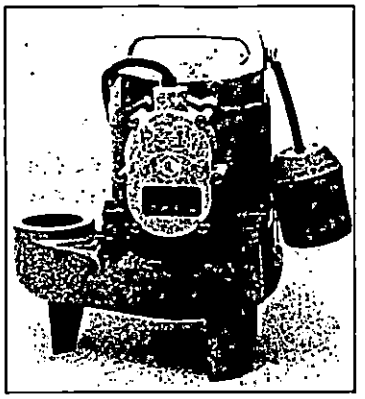
SLIGHTLY EXPANSIVE

EXPANSIVE

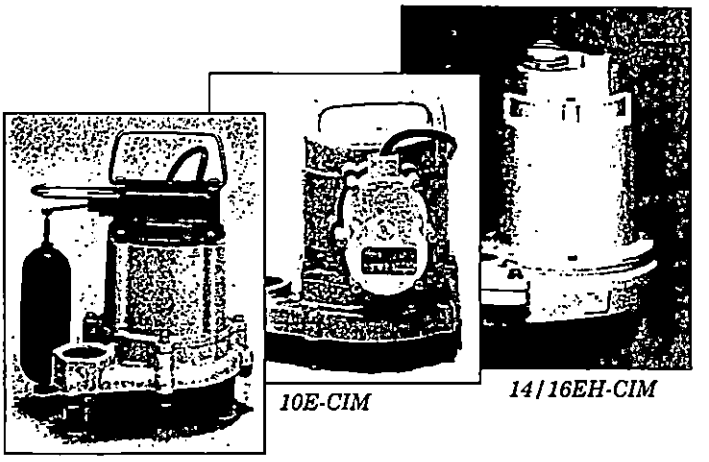




14S-CIM



10S-CIA-RFS
10SH-CIA-RFS



6E-CIA-SFS

10E-CIM

14/16EH-CIM

Sewage Ejector Pumps

- Continuous Duty - UL Listed, CSA Approved
- 2" NPT discharge

Little Giant PUMP COMPANY SUBSIDIARY TECUMSEH PRODUCTS COMPANY

Submersible sewage pumps for extended or continuous use. Move large volumes of wastewater and sewage up to 2" in diameter (1¼" on 10SH). For heavy duty residential, commercial, and general industrial applications.

Heavy duty oil-filled cast iron housing provides for cooler running and longer motor life. Epoxy coated for corrosion and rust resistance. Mechanical seal (stainless steel spring, nitrile parts, carbon and ceramic face). Vortex impeller (nylon on 9S/10S/10SH; cast iron on 14S/16S). Thermal overload protection. Maximum fluid temperature: 140°F. Minimum sump is 18" diameter and 24" deep, except for 14S/16S units which require 30" deep sump.

Automatic models have piggy back float switch that allows you to set on/off levels. These pumps can also be used manually. 115V models come with 3-prong plug. **10SH Series Pumps**—*Excellent alternatives to Hydromatic model SP-40.* High head for loading dock sumps, elevator pits, and applications where sump screen normally clogs.

PUMP	PERFORMANCE GPM @ FEET OF HEAD					
	5	10	15	20	30	SHUTOFF
9S SERIES	80.0	50.0	24.0	-	-	18.0'
10S SERIES	110.0	85.0	50.0	-	-	20.0'
10SH SERIES	120.0	100.0	80.0	55.0	-	28.0'
14S SERIES	135.0	100.0	70.0	35.0	-	25.0'
16S SERIES	180.0	160.0	125.0	100.0	40.0	35.0'

MODEL	TYPE	V	PH	HP	CORD	STOCK#	EACH
9S-CIM*	MANUAL	115V	1PH	.40	15'	66140	$19.087
10S-CIM*	MANUAL	115V	1PH	1/2	15'	66142	291.20
10SH-CIM*	MANUAL	115V	1PH	1/2	15'	66163	262.79
14S-CIM*	MANUAL	115V	1PH	1/2	20'	66144	402.12
16S-CIM*	MANUAL	230V	1PH	1	20'	66146	501.59
16S-CIM*	MANUAL	208V**	1PH	1	20'	66145	518.47
9S-CIA-RFS	AUTO	115V	1PH	.40	15'	66148	232.36
10S-CIA-RFS	AUTO	115V	1PH	1/2	15'	66150	331.95
10SH-CIA-RFS	AUTO	115V	1PH	1/2	15'	66165	297.54

3 Phase 16S-CIM pumps available upon request. Call for details.
** Manual Operation Pumps can be converted to automatic operation by using float switches found in the "Electrical" section.*
*** These models rated 200-208V.*

Heavy Duty Dewatering and Effluent Pumps

- Continuous Duty - UL Listed, CSA Approved
- 1½" NPT discharge

Submersible sump/effluent pumps have non-clogging impeller that handles liquids and solid waste up to ¾" in diameter (½" on 6E series). Designed for heavy duty commercial, municipal and general industrial applications. Ideal for areas that accumulate light debris that would clog a standard sump pump. All pumps have epoxy-coated, oil-filled cast iron motor housing for cooler running and longer life. All have mechanical seals (stainless steel spring, nitrile parts, carbon and ceramic face). Thermal overload protection. Maximum fluid temperature: 140°F. Use with nonflammable liquids compatible with pump materials. 115V models have 3-prong plug.

14EH and 16EH units have cast iron impeller. All others have nylon impeller. 8E, 9E, and 10E series have vortex impeller and piggy back remote float switches which allow you to set on/off levels. These pumps can also be used manually. 6E automatic has factory preset snap-action float switch that turns on at 8½" and off at 3½". Minimum sump is 18" diameter and 24" deep. 14EH and 16EH pumps are high head and require 30" sump depth.

PUMP	PERFORMANCE GPM @ FEET OF HEAD						
	5	10	15	20	40	60	SHUTOFF
6E SERIES	50.0	42.0	27.0	-	-	-	20.0'
8E SERIES	52.0	45.0	34.0	-	-	-	21.0'
9E SERIES	57.0	53.0	40.0	30.0	-	-	23.0'
10E SERIES	80.0	67.0	52.0	33.0	-	-	26.0'
14EH SERIES DON'T USE UNDER 20'				60.0	20.0	-	50.0'
16EH SERIES HIGH HEAD; DON'T USE UNDER 30'					70.0	30.0	81.0'

MODEL	TYPE	V	PH	HP	CORD	STOCK#	EACH
6E-CIM-25*	MANUAL	115V	1PH	1/3	25'	66160	$111.63
10E-CIM*	MANUAL	115V	1PH	1/2	15'	66162	249.31
14EH-CIM*	MANUAL	115V	1PH	1/2	20'	66164	416.41
16EH-CIM*	MANUAL	230V	1PH	1	20'	66166	511.73
6E-CIA-SFS	AUTO	115V	1PH	1/3	10'	66168	126.06
8E-CIA-RFS	AUTO	115V	1PH	1/3	10'	66170	161.89
9E-CIA-RFS	AUTO	115V	1PH	.40	15'	66172	194.74
10E-CIA-RFS	AUTO	115V	1PH	1/2	15'	66174	286.00

3 Phase 16EH-CIM pumps available upon request. Call for details.
** Manual Operation Pumps can be converted to automatic operation by using float switches found in the "Electrical" section.*

Note: This is a condensed catalog. Some items are not shown. Our 448 page master catalog will be sent to you free of charge with your first order.

Junior Super Single® pump switch



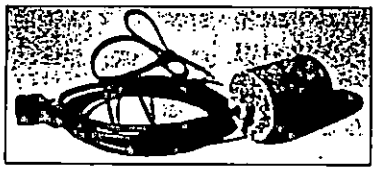
- Directly controls pumps
- Switch inside float
- No panel needed

Mercury switch is rated at 13 amps for ½ HP 120V or 1HP 230V motors. Equipped with 16/2 neoprene cord. Designed to attach to a pipe, float is 2.81" dia. x 3.42" long and is constructed of PVC. Pump range can be set 3.5 to 17 inches.

Switches are stocked with 110V plugs, which can be cut off for 230V or hard wire installations. Not intended to operate pump controller. Normally open contacts for pump down. Normally closed contacts also available. Attaches to pipe.

CONTACTS	CORD LENGTH	STOCK #	EACH
NO	20'	29278	$45.90
NO	30'	29279	49.70
NC	30'	29280	49.70

SJE PumpMaster® pump switch



- Mechanical action
- No mercury
- 120/230V

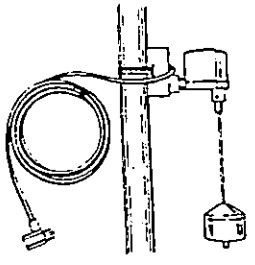
Designed to control motors directly as long as they are equipped with integral thermal O.L. Pumping range is 7" to 36". Float is 3.05" dia. x 3.56" long. PVC construction. Equipped with 110V plug that can be cut off for 230V or hard wire installation. Attaches to pipe.

13AMP MAX. ½ HP @ 120V/ 1 HP @ 230V

CONTACTS	CORD	STOCK #	EACH
NO	20'	29240	$45.31
NO	30'	29241	49.11
NC	30'	29243	49.11

15AMP MAX. ¾ HP @ 120V/ 2 HP @ 230V

CONTACTS	CORD	STOCK #	EACH
NO	20'	29250	$60.58
NO	30'	29251	65.38
NO	20' W/ 230V PLUG	29254	61.98
NC	30'	29253	65.38



Vertical Float Pump Down Switch

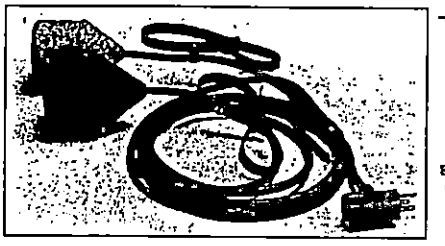
- Ideal for applications with limited space

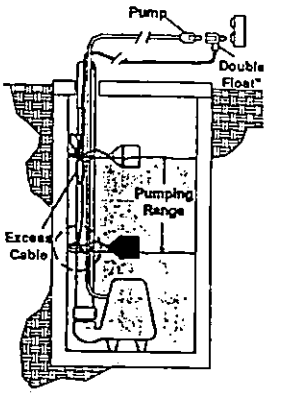
Mounts on 1¼" to 3¾" O.D. pipe and extends out only 5.93". 13 Amp rating is suitable ½ HP @ 115V or 1 HP @ 230V motors. 15 ft. cord has piggy-back plug which can be removed for direct wiring. Impact resistant PVC switch and housing, PVC mounting bracket, and an acetal plastic lift rod provide excellent corrosion resistance. Float adjusts for ¾" to 6½" travel.

Use this level control only with pumps equipped with integral thermal overload protection and do not use it in locations classified as hazardous.

115V VERTICAL FLOAT SWITCH	43811	44.16
230V VERTICAL FLOAT SWITCH	43813	45.56

Double Float™ pump switch





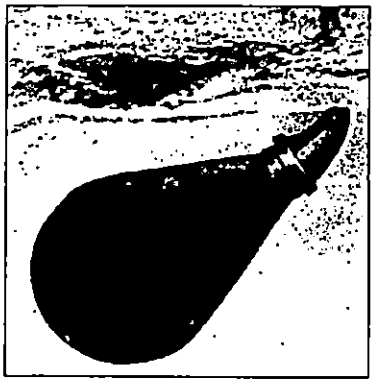
- Wide pumping range-1" to 48"
- Suitable for turbulent applications

Replaces need for small control panel by directly switching pumps with internal circuitry. Patented holding relay circuitry is also designed to eliminate chattering due to turbulent conditions. Floats are thick wall PVC with mercury contacts for use in liquids up to 140°F. 14 ga 2 and 3 conductor neoprene cables. Floats are mounted to pump discharge pipe with releasable pipe clamps.

UL Listed for water and sewage and CSA Certified. 120V switches are rated for pumps 1HP and less; 230V switches for 2HP or less. For direct use only with pumps with integral thermal overload protection or they may be wired to operate control panels for larger pump applications. Select Normally Open contacts for pump down (emptying) OR Normally Closed for pump up (filling).

All switches are supplied with piggyback plugs. If you plan to cut off the plugs for hand wiring, 120V switches can be used only with 120VAC and 230V switches only with 230VAC circuits.

CONTACTS	CORD	STOCK #	EACH
	120 VAC		
NO	20 FT.	29282	$89.57
NO	30 FT.	29283	95.30
NC	30 FT.	29284	95.30
	230 VAC		
NO	20 FT.	29285	$92.24
NO	30 FT.	29286	97.97
NC	30 FT.	29287	97.97



Flygt ENM Float Switches - 3 wire

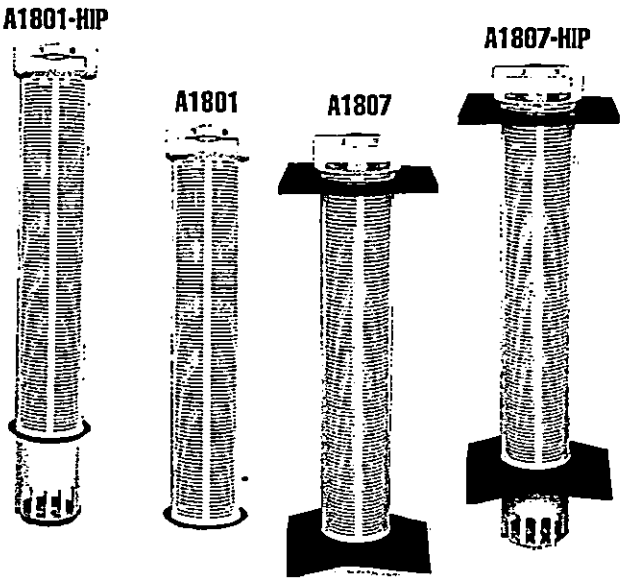
- No mercury

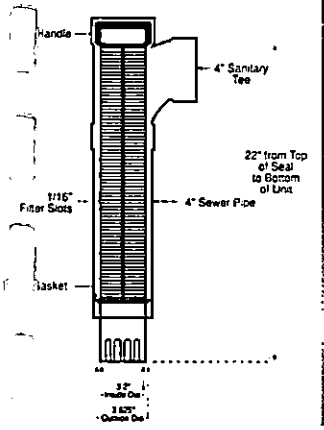
Our Genuine Flygt float switch has an internal weight and is housed in a smooth, chemical resistant, polypropylene casing. A unique boot with a locked compression fitting provides a secure yet flexible means of attaching the cable to the float. Both the Flygt and generic can be wired NC or NO. Not rated for potable water.

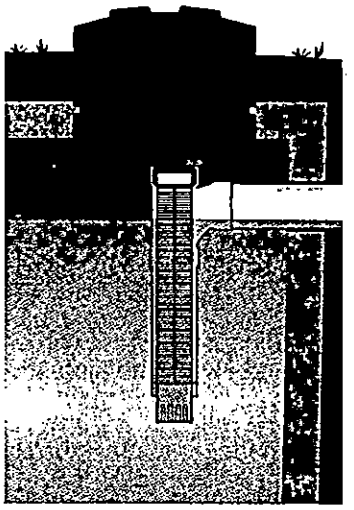
20' FLYGT	60515	$139.86	
40' FLYGT	60520	150.19	
60' FLYGT	60525	152.25	
GENERIC 20' SPDT*	47713	45.49	3+ 43.10
GENERIC 40' SPDT*	47717	62.22	3+ 58.96
GENERIC 60' SPDT*	47719	78.96	3+ 74.82

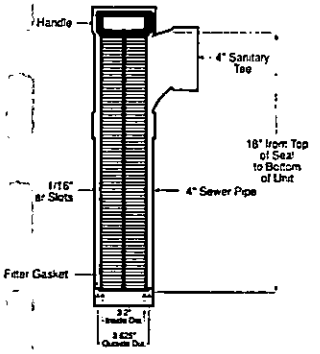
**External weight. Generics contain mercury.*

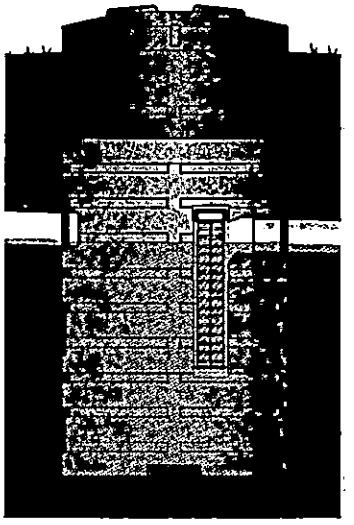
A1800s

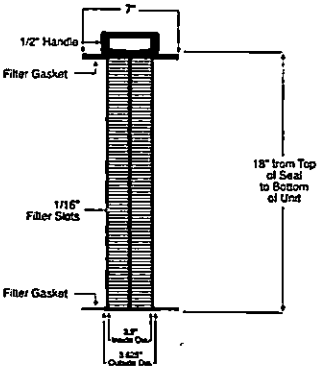


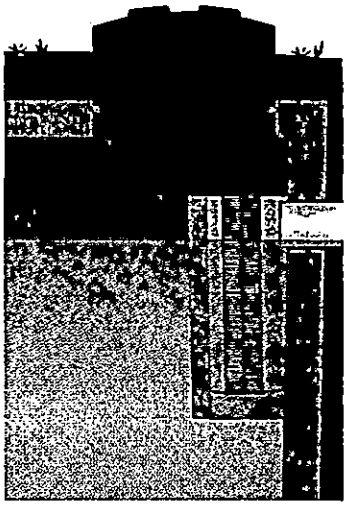












Zabel™ Recommendation: Any configuration of Risers used **should not** exceed 48" in height.

The product(s) shown are covered by one or more of the following patents:
U.S. 5,382,357, 5,482,621, 5,683,577, 5,580,453, 5,582,716, 5,591,331, 4,710,295, 5,593,584,
U.S. Des. 386,241,349067, 4605501,5098568, Des. 309007, Canadian: 2,135,937 New Zealand: 264824,
Other Patents Pending

Zabel™ A1800 Series Residential Wastewater Effluent Filter Product Specification

1. Product Name: Zabel™ The A1800 Residential Wastewater Filters, U.S. Patent Nos.: 5,382,357; 5,482,621; Canadian Patent No: 2,135,937; Other patents pending.
2. Model Numbers: A1800; A1800-HIP, A1800-HIP-SF, A1801, A1801-HIP, A1801-HIP-SF, A1807, A1807-HIP
3. Application: Single family homes no more than four bedrooms. **Zabel's™ New Residential High Performance Filter** is designed to provide extra protection for homes with garbage disposals and still sloughs the solids back into the tank.
4. Performance Specification
   4.1. All A1800 Models: Maximum daily flow - 800 gpd.
   4.2. Multiple Filters may be installed in manifolds to handle larger flows.
   4.3. TSS: Average reduction in TSS within 6 months of installation - 40 percent in typical residential wastewater.
5. Materials: All materials are non-corrosive PVC
6. New System Installation: Center the top of the 4-inch Filter Case under an outlet access opening at least 8 inches in diameter. Securely fasten the bell coupling of the case by a PVC solvent weld connection to the 4-inch PVC pipe extending through the outlet wall of the tank. The pipe extending through the end wall may be any schedule four-inch pipe. Location of the PVC outlet pipe in the tank end wall shall conform to local code. The PVC outlet pipe should extend at least 18 inches beyond the outside face of the tank wall. For septic tanks with cast in place concrete baffles use the A1807 model. Insert bottom of filter through thick gasket and slide to top of filter cartridge. Install filter cartridge with top gasket **only** into tank baffle, to ensure gasket lies flat without hanging over the edge of baffle. **Do not trim** gasket unless it overhangs edge of baffle. Remove filter cartridge and install thin gasket into the groove at the bottom of the cartridge. Reinsert the cartridge into the concrete baffle to complete installation. A riser to grade over the Outlet Access Opening is recommended.
7. Existing System Installation: The filter cartridge, Model A1801 may be installed in any existing 4" outlet Tee and pipe. The filter may be installed in an existing tank if an adequate outlet access opening already exists and the filter can be installed without damaging the existing tank. If a 4-inch PVC outlet pipe does not extend into the tank, the filter can be installed utilizing a plumbing flange. For septic tanks with cast in place concrete baffles use the A1807 model. Insert bottom of filter through thick gasket and slide to top of filter cartridge. Install filter cartridge with top gasket **only** into tank baffle, to ensure gasket lies flat without hanging over the edge of baffle. **Do not trim** gasket unless it overhangs edge of baffle. Remove filter cartridge and install thin gasket into the groove at the bottom of the cartridge. Reinsert the cartridge into the concrete baffle to complete installation. If the existing tank cannot be used, the filter can be installed in existing systems using a Zabel Container Assembly Model CA100 or Zeus™ Basin System.
8. Service: A professional onsite service company should perform all onsite system service.
9. Service Method: Grasp the filter handle and pull the filter cartridge upward. A Zabel™ 36" T-Handle is available if required to reach filters more than 12 inches below grade. Tap the cartridge on the inside of the inspection port or hose off the cartridge into the tank if needed and reinsert into the case. Installation of an effluent filter may increase the frequency of service if the homeowner discharges materials that are harmful to the system
10. Service Frequency: The filter should be cleaned when the septic tank is normally inspected and pumped as required by local regulation. The A1800's are designed to slough most normal solids off the inside of the vertical walls and back into the tank when the effluent flow is in a resting state. Installation of an effluent filter may increase the frequency of service if the homeowner discharges materials that are harmful to the system
11. Warranty: The A1800's are warranted to be free from defects in material and workmanship for the life of the original purchaser. Zabel's™ liability is limited to repair or replacement of the part and in no event shall Zabel™ be liable for any consequential damages of any kind.
12. Dimensions:

	Diameter	Cartridge Height	Filtration	Total Filter Surface	Lineal Feet of Weir
A1800	4"	18"	1/16"	158.4 in²	61
A1800-HIP	4"	22"	1/2"-1/16"	*158.4 in²	*61
A1807	4"	18"	1/16"	158.4 in²	61

*Calculations are for the 1/16" area only.

Plan Denied - Shallow soil depths
Repair drawn up in fill area
System layout is not on grade

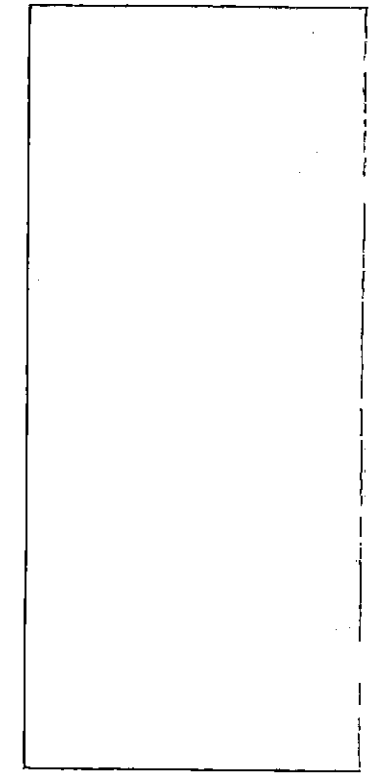
Larry Thompson, L.S.

GCI

GEO-ENVIRONMENTAL
CONSULTANTS, INC.

A Common Sense Approach To A Cleaner Environment

11704 Reames Road, Charlotte, NC 28269-7637 • 704-596-8788 • FAX: 704-596-8770



RESIDENTIAL CONVENTIONAL SYSTEM
FOR
SUBSURFACE WASTEWATER DISPOSAL
LOT #35 - COBBLER DRIVE
MINT HILL, NORTH CAROLINA

Prepared for
Mr. Stephen Bayzik
12422 Bentcreek Lane
Matthews, North Carolina 28105

Prepared by
Geo-environmental Consultants, Inc.
11704 Reames Road
Charlotte, North Carolina 28269

GCI Project No. 99088

May 1999

GEO-ENVIRONMENTAL
CONSULTANTS, INC.

May 12, 1999

Mr. Andrew Walker
Environmental Health Division
700 North Tryon Street, Suite 211
Charlotte, North Carolina 28202

RE: Residential Conventional System
Lot 35 - Cobbler Drive
Mint Hill, North Carolina
GCI Project No. 99088

Dear Mr. Walker:

On behalf of Mr. Stephen Bayzik, Geo-Environmental Consultants, Inc. (GCI) is pleased to present the attached application and design package for the above project. If you have any questions concerning this submittal, please contact us at 596-8788.

Sincerely,

GEO-ENVIRONMENTAL CONSULTANTS, INC.

Keith A. Anthony, P.E.
Principal Engineer

NORTH CAROLINA PROFESSIONAL SEAL 11260 ENGINEER KEITH A. ANTHONY 5/12/99

Tracy B. Lanier
Project Manager

Attachment

cc: Mr. Stephen Bayzik

W:\REPORTS\1999\99088\LOT35.REP

11704 Reames Road, Charlotte, NC 28269-7637 • 704-596-8788 • FAX: 704-596-8770

BACKGROUND

The property is planned for single family 5-bedroom residence.

Mecklenburg County Soil Scientist, Mr. William Marlin, performed a site investigation on February 25, 1999. He classified the site as provisionally suitable in some areas with a LTAR of 0.25 gpd/ft^2 and 0.275 gpd/ft^2. See attached Soil/Site Evaluation report.

The residence will be served by a private well which will be located at least 100 feet away from the disposal system.

The location of the nitrification field is on a relatively flat portion of the site. The nitrification field along with the designated repair area is shown on the attached figure. The repair area was sized for Low Pressure Pipe (LPP) system.

APPLICATION INFORMATION

1) Application for Improvement Permit has been submitted to Mecklenburg County Health Department (MCHD) by the property owner, Mr. Stephen Bayzik.
2) Property is shown on attached portion of development survey. The MCHD file number is 2859B.
3) Owner: Mr. Stephen Bayzik
12422 Bentcreek Lane
Matthews, NC 28105
(704) 841-1395 (Home)

Engineer: Mr. Keith A. Anthony, P.E.
Geo-Environmental Consultants, Inc.
11704 Reames Road
Charlotte, NC 29269
(704) 596-8788 (Office)
(704) 596-8770 (Fax)

4) Project described herein is a new project.
5) Water supply for residence will be provided by a private well.
6) Facility to be served by the proposed system is a 5-bedroom single family residence.
7) Wastewater system components are described herein.
8) With most systems, MCHD requires that the house and nitrification lines be located and marked prior to their final approval.

LOCATION

The property is located in the cul-de-sac of Cobbler Drive located off Old Camden Road in Mint Hill, North Carolina.

REFERENCES

1) Laws and Rules for Sewage Treatment and Disposal Systems, 15A NCAC 18A, Section .1900, Department of Environment Health and Natural Resources, August 1, 1998
2) On-Site Wastewater Management Guidance Manual by: North Carolina Department of Environment and Natural Resources, Division of Environmental Health, On-Site Wastewater Section, March 1996.

SITE PREPARATION

1) One of the most important concerns for an on-site system is to protect the site from soil disturbance by heavy equipment.
2) As soon as the absorption area has been designed, it should be flagged, roped off and "quarantined" from construction traffic. No site preparation or on-site construction work should occur if the soil is wet.
3) After the location is staked out and the soil is dry enough the site should be cleared of brush and small trees. If larger trees are removed, they should be cut off rather than uprooted in order to avoid creating depressions and damaging the soil-pore network.
4) Provisions must be made for intercepting or diverting surface water away from the absorption area.
5) After the area has been cleared and shaped, the location of the conveyance pipe and distributor box should be accurately staked out according to design specifications. Each disposal trench should be laid out along a level contour using a transit.

SPECIFICATIONS AND INSTALLATION FOR SPECIFIC SYSTEM COMPONENTS

Septic Tank

1) The septic tank receives wastewater directly from the house.
2) A septic tank shall be watertight, structurally sound, and not subject to excessive corrosion or decay.
3) The 1500 gallon septic tank must be of two-compartment design for maximum solids retention. The inlet compartment of a two-compartment tank shall hold between two-thirds and three-fourths of the total tank capacity.
4) Effluent from the two-compartment septic tank flows by gravity through a three-inch solid PVC pipe to the distribution box.
5) The septic tank must be provided with aboveground concrete or masonry manhole risers to provide easy access for clean-out and filter service.

6) When prefabricated concrete tanks or tanks of other material are used, they shall be constructed in accordance with the plans which have been approved by the State and shall comply with all requirements of Section .1953 of 15A NCAC 18A.

7) On the outlet tee of the septic tank a filter should be installed. This filter should be equivalent to a Zabel Model A1800. An access port over the filter should be installed. See attached product sheet from Zabel Environmental Technology.

Conveyance Piping

1) Conveyance pipes must be solid, non-perforated, Schedule 40 pipe at least 3 inches in diameter. The pipe can be made of PVC, PE or ABS and the joints must be made using the correct solvent and fittings for the type of pipe.

2) The pipes should be installed in trenches with bottoms of undisturbed or compacted soil so that the soil will not settle and break the pipes.

3) All conveyance piping should have a constant slope of 1/8 inch per foot to allow the sewage to flow by gravity to the distribution box. The slope of the pipe can be determined by measuring the height of the pipe at the septic tank outlet and at the distribution box.

4) The conveyance pipes must be installed to meet all required setback distances.

5) All the joints in the conveyance pipe and its connections to the septic tank and the distribution box should be watertight.

Distribution Box

1) Be certain that the distribution box is installed at the proper location and as marked on the plans. Check that the location meets all setback distances.

2) The box must be installed so that at least 2 feet of undisturbed earth separates the distribution box from the septic tank and the disposal trenches. This separation by undisturbed earth helps reduce leaking of sewage into unsuitable areas outside the treatment and disposal field.

3) Install distribution box on a base of level, undisturbed earth or a level concrete pad to prevent the soil from settling. If the soil settles, the device can tilt so that the effluent is not evenly distributed, possibly leaking from the device. A good test is to stand on the box and try to rock it - it should not rock or tilt.

4) Check the connections of the conveyance pipes to the distribution box to make sure there are no leaks.

5) Inspect distribution box to be sure that it is watertight and strong enough so it won't collapse in the soil.

6) One way to check for a leaking distribution box is to check the water level early in the inspection and then at the end of the inspection. If the water level has dropped below the outlet, there is a leak in the box.

7) Be sure that the distribution box inlet is higher than the outlet so the effluent will flow out to the treatment and disposal trenches. Often, distribution boxes are installed backwards, so it is important to check orientation.

8) Make certain the distribution box outlets are at least 6 inches below the septic tank outlet so the full trench depth can be used without directing effluent up into the septic tank.

9) A riser installed over the distribution box allows easy access and adjustment of flow after the system is installed.

10) Adjustments to ensure even flows to all trenches should be made during installation of distribution box. All outlets from a distribution box must be at the same level so that the same amount of effluent flows out of each outlet. A number of devices are available to make rapid adjustments to the outlets of distribution boxes so that all outlets have the same flow. These flow-adjusting devices work well and can speed installation.

11) Distribution boxes can be made of concrete or polyethylene plastic, either material works well if installed properly.

Disposal Trenches

1) The trenches must be installed on the contour so that the entire trench is at the same level. If the trench is level, all parts of the trench will accept effluent, instead of only the low parts in an uneven trench.

2) Trench bottoms should be level, within plus or minus 1/4 inch per 10 feet.

3) The width, spacing and depth of the trenches should be as shown on Figures 2 and 3.

4) Pipes used in trenches should be located in the center of the trench and covered with crushed rock. The pipe should be 4-inch diameter and meet ASTM F405 Standard Specification for Corrugated Polyethylene (PE) Tubing with three ½ inch to 3/4 inch holes around the pipe spaced every 4 inches along the pipe length. The holes should be toward the bottom of the trench. See Figure 3.

5) The crushed stone or gravel in the trenches should be hard and resist crumbling when wet with the effluent. Only washed stone must be used so that the fines have been removed. Fines can plug the soil or fill in the spaces between the crushed stone.

6) There should be 6 inches of crushed stone under the pipe, and the crushed stone should surround the pipe on all sides, with 2 inches covering the pipe. Acceptable sizes are ASTM Numbers 3,4,5,57, and 6.

7) To avoid grinding the stone together and making more fines, crushed stone must not be driven over with equipment. The stone is not to be mixed with the soil at the bottom of the stockpile. Placing a piece of plywood or sheet plastic under the stockpile can reduce the amount of soil that mixes in with the stone.

8) Use geotextile fabric over the trench at the gravel-backfill interface to prevent soil intrusion.

FINAL LANDSCAPING

1) After the system is installed, the following should be checked to ensure that the system will not be overloaded with excess rainwater and runoff:
   - The distribution field is shaped to shed rainwater and is free of low areas
   - Grassy swales or ditches for diverting surface water are properly installed
   - Gutter and downspout drains are directed away from the system.

2) Finally, the entire area should be planted with grass in order to prevent erosion. The soil should be properly tilled, limed (if necessary) and fertilized before planting. After applying an appropriate grass seed, the area should be heavily mulched with straw or other suitable material.

QUALITY ASSURANCE REQUIREMENTS

The Conventional system must be installed by a qualified, contractor that is on the Mecklenburg County list of competent contractors. GCI also recommends that the construction and installation of the Conventional system be spot checked by an independent design engineer recognized by Mecklenburg County to have experience in the design of Conventional systems. Critical stages of the installation which should be checked are:

1. System layout
2. Septic tank installation prior to backfilling
3. Trench excavation and pipe placement.
4. Final landscaping.

If quality assurance is not provided by GCI, then the homeowner and/or installation contractor assumes liability for proper system operation.

The system design is based on a maximum waste flow of 600 gallons per day. Homeowners should pay particular attention to the section titled Homeowner Suggestions for ways to minimize the burden on the system.

MAINTENANCE

1) Any person owning or controlling the property upon which a ground absorption sewage treatment and disposal system is installed shall be responsible for the following items regarding the maintenance of the system:
   - Ground absorption sewage treatment and disposal systems shall be maintained at all times to prevent seepage or discharge of sewage or effluent to the surface of the ground or to surface waters.
   - Ground absorption sewage treatment and disposal systems shall be checked and the contents of the septic tank removed periodically to ensure proper operation of the system.

OPERATION AND MAINTENANCE PROCEDURE

The system is classified as Type II. The Management Entity responsible for operation and maintenance of this type system is the Owner.

Operating, Maintenance and Inspection procedures shall include but not be limited to the following:

- Septic system shall be pumped every 4 years or when solids accumulate to 1/3 the volume of the tank.
- On a two- to five-year basis, clean and inspect the septic tank filter. When washing the filter, debris must be sprayed directly back into the septic tank and not onto the lawn.
- The property should be inspected to insure all surface water is deflected away from the fields and tank. Any ponding of surface water should be corrected.
- Grasses shall be mowed and maintained and any erosion shall be corrected promptly.
- The nitrification field area shall be checked for leakages, blowouts or malfunction, indications of damp or mushy areas compared to surrounding area or evidence of noticeable odor of sewage. Repairs shall be made immediately.
- Check septic tank and distribution box for evidence of damage or leakage. Check the quality of effluent including grease and sludge accumulation.

HOME OWNER SUGGESTIONS

Most conventional systems do not require much effort to operate and maintain. Even though the effort is small, the system must be maintained properly so that it operates reliably and at a minimum

cost. Following are suggestions for the home owner to minimize the burden on a conventional system.

1) Garbage disposals should not be used in on-site systems. The ground garbage adds large amounts of solids to a septic tank, causing sludge to build up very quickly.
2) Grease, cooking oils and coffee grounds should never be put into a septic tank.
3) Items such as disposable diapers, cigarettes, facial tissues and other solid or paper wastes should not be flushed into the on-site system.
4) Used motor oil and other such oily liquids should not be put into a septic tank.
5) Using less water can reduce the amount of water flowing to the treatment and disposal field.
6) Water-saving fixtures and devices can be installed on sinks, toilets and showers to reduce the rate at which the water flows from the fixture.
7) Dishwashers and washing machines should only be run with full loads.
8) Leaky faucets and toilets can add large volumes of water to the daily flow of water into the on-site system. Repair the leaks to save water and give the treatment and disposal field a rest.
9) Roof drains, basement sump pumps, foundation drains, and other such drains should not empty into the on-site system. These drains should be directed to another part of the lot away from the treatment and disposal field.

APPENDIX

DESIGN SPECIFICATIONS
Conventional System
Cobbler Drive - Lot #35

Daily waste flow	600 gal
Septic tank size	1500 gal
Effluent loading rate	0.275 gal/ft^2/day
Absorption area	2182 ft^2
Total length of laterals	728 ft
Lateral diameter	4 in dia. corrugated PE tubing
Lateral configuration	8 x 95 ft lines
Supply line diameter	3 in dia. Sch 40 PVC

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GEO-ENVIRONMENTAL CONSULTANTS, INC.

BY TBL DATE 4-29-99

CHKD. BY SRA DATE 5-12-99

CLIENT	STEVE RAVZIK	SHEET	1 OF 1
PROJECT	LOT 35	PROJECT NO.	99088
SUBJECT	SEPTIC SYSTEM (CONVENTIONAL)		

SIZE OF ABSORPTION AREA

- 5 BEDROOMS 5 X 120 gpd = 600 gpd
- LOADING RATE (FROM WILLIAM MARLIN 2-25-99) = 0.275 gpd/ft²

600/0.275 gpd/ft² = 2182 ft²

- TOTAL LENGTH OF DISTRIBUTION LINES (ASSUME 3' WIDE TRENCH)

2182 ft²/3 = 728'

USE 8 LINES, 95' LONG (EACH), 9' SPACING

- SIZE SEPTIC TANK

2 X 600 = 1200 gal

USE 1500 gal SEPTIC TANK

REPAIR AREA

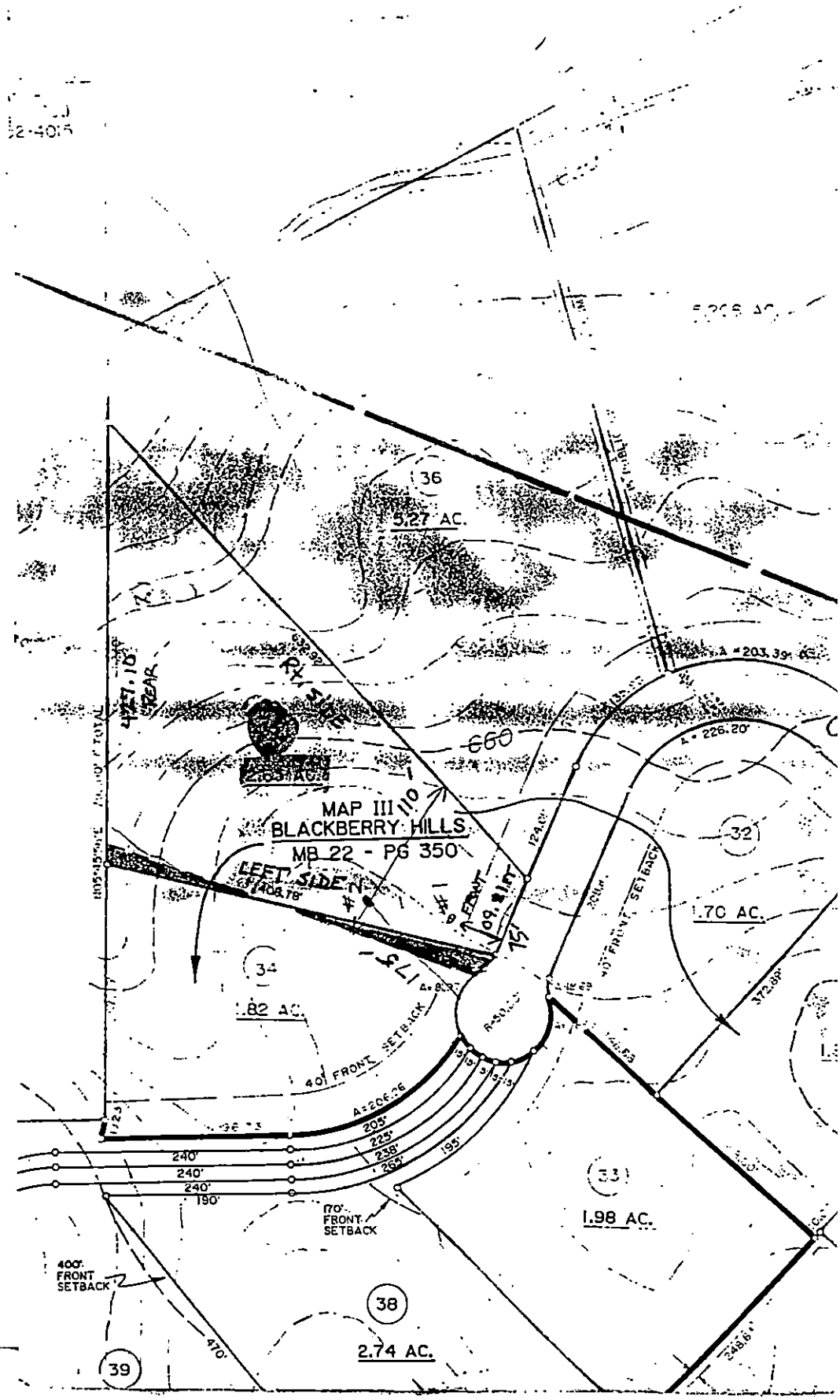
LOW PRESSURE PIPE (LPP) SYSTEM

600 / 0.25 (½) = 4800

4800 / 5' = 960'

USE 9 LINES, 110' EACH, 5' SPACING

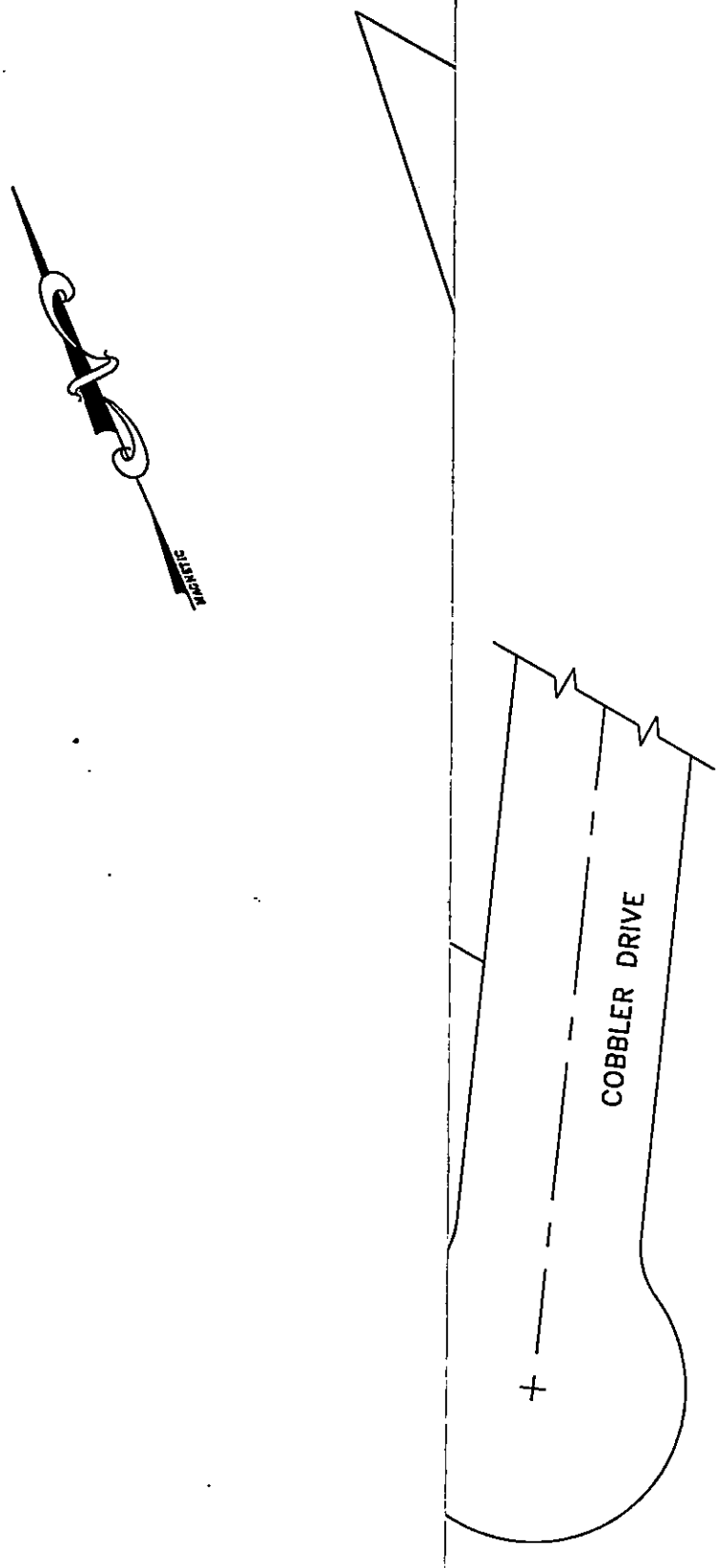
REPAIR AREA 40' X 110'



LOT #35
COBBLER DRIVE

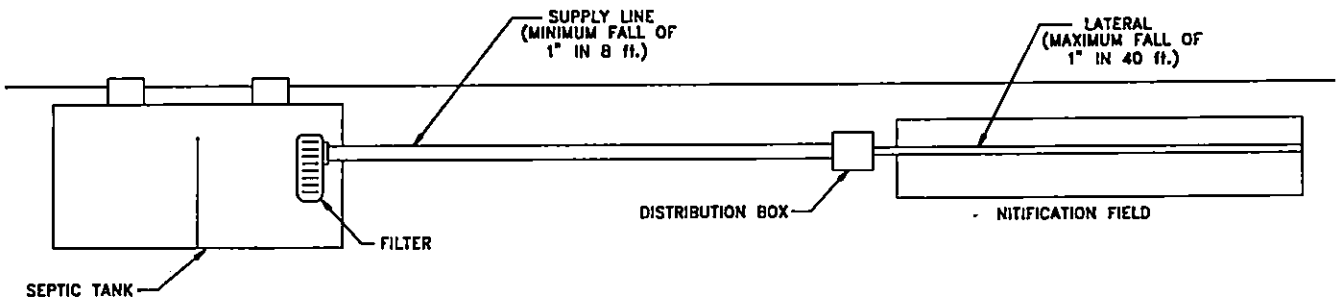
REF. FROM STEPHEN BAYZIK

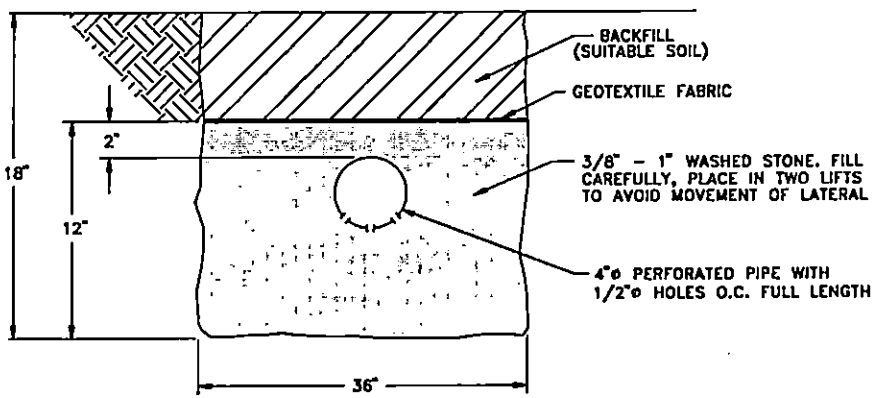
FIGURE 1



99088	COBBLER DRIVE
/29/99	LOT #35
K.A.A.	MINT HILL, NORTH CAROLINA
T.B.L.	
J.S.C.	CONVENTIONAL SYSTEM — FIGURE 2
60'	

99088





GCI
GEO-ENVIRONMENTAL
CONSULTANTS, INC.
GEOTECHNICAL/ENVIRONMENTAL ENGINEERS & SCIENTISTS
11704 REAMES ROAD, CHARLOTTE, NC 28269-7637
PHONE (704)596-8788 FAX (704)596-8770

PROJECT #:	99088
DATE:	5/5/99
PROJECT MGR:	K.A.A.
DESIGN BY:	T.B.L.
DRAWN BY:	M.E.G.
SCALE:	NOT TO SCALE

COBBLER DRIVE
LOT #35
MINT HILL, NORTH CAROLINA

CONVENTIONAL SYSTEM

FIGURE 3

MECKLENBURG COUNTY HEALTH DEPARTMENT JRCES

Sheet: 1 of 2

Property ID: 139-113-24

Lot #: 35

File #: 2659B

#2

LARRY THOMPSON, R.S.
Environmental Health Specialist

Telephone: (704) 336-5568
FAX: (704) 336-6894

700 North Tryon Street
Suite 211
Charlotte, NC 28202

VALUATION EWATER SYSTEM

APPLICANT: [illegible] Mullinax

DATE EVALUATED: 2-25-99

PROPOSED FACILITY: residence PROPOSED DESIGN FLOW (.1949) 600gpd PROPERTY SIZE: 2.+

LOCATION OF SITE: 16509 Cobbler Dr. PROPERTY RECORDED:

WATER SUPPLY: ~~Private~~ ☐Public ☐~~Well~~ ☐Spring ☐Other

EVALUATION METHOD: ~~Augur~~ Boring ☐Pit ☐Cut

TYPE OF WASTEWATER: ~~Sewage~~ ☐Industrial Process ☐Mixed

P	.1940 Landscape Position/ Slope % (Slopes 6-15%)	Horizon Depth (IN.)	SOIL MORPHOLOGY (.1941) .1941 STRUCTURE/ TEXTURE	.1941 CONSISTENCE MINERALOGY	OTHER PROFILE FACTORS .1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	PROFILE CLASS &LTAR
	R 1	0-7"	gr/sc/	Fr/SEXP/SS/SP	>26" TO soil wetness	26"	N/A	None	US
		7-24"	SAB/C	Fi-vFi/Mixed/US/VP					
		24-26"	M/C	Fi-vFi/Mixed/US/VP					
	LS 2	0-5"	gr/sl/	Fr/SEXP/SS/SP	>42" TO soil wetness	42"	N/A	None	PS IU .2539(F)
		5-42"	SBK/C	Fi/SEXP/SP					
	LS 3	0-3"	gr/sc/	Fr/SEXP/SS/SP	>36" TO soil wetness	36"	N/A	None	US
		3-28"	SBK/C	Fi/SEXP/SP					
		28-36"	M/C	Fi-vFi/Mixed/VS/VP					
4	LS 4	0-2"	gr/sl/	Fr/SEXP/SS/SP	>35" TO soil wetness	35"	N/A	None	US
		2-18"	SBK/C	Fi/SEXP/SP					
		18-35"	SBK/C	Fi-vFi/Mixed/VS/VP					
	LS 6	0-3"	gr/sc/	Fr/SEXP/SS/SP	>27" TO soil wetness	27"	N/A	None	US
		3-27"	ABK/C	vFi/Mixed/VS/VP					
	LS	0-4"	gr/sl/	Fr/SEXP/SS/SP	>32" TO soil wetness	32"	N/A	None	US IU .25%(F)
		4-32"	SBK/C	Fi/SEXP/SP					

DESCRIPTION	INITIAL SYSTEM	REPAIR SYSTEM
Available Space (.1945)	US	US
System Type(s)		

OTHER FACTORS (.1946):

SITE CLASSIFICATION (.1948): Unsuitable

EVALUATED BY: W.R. Mullis 2-2-99

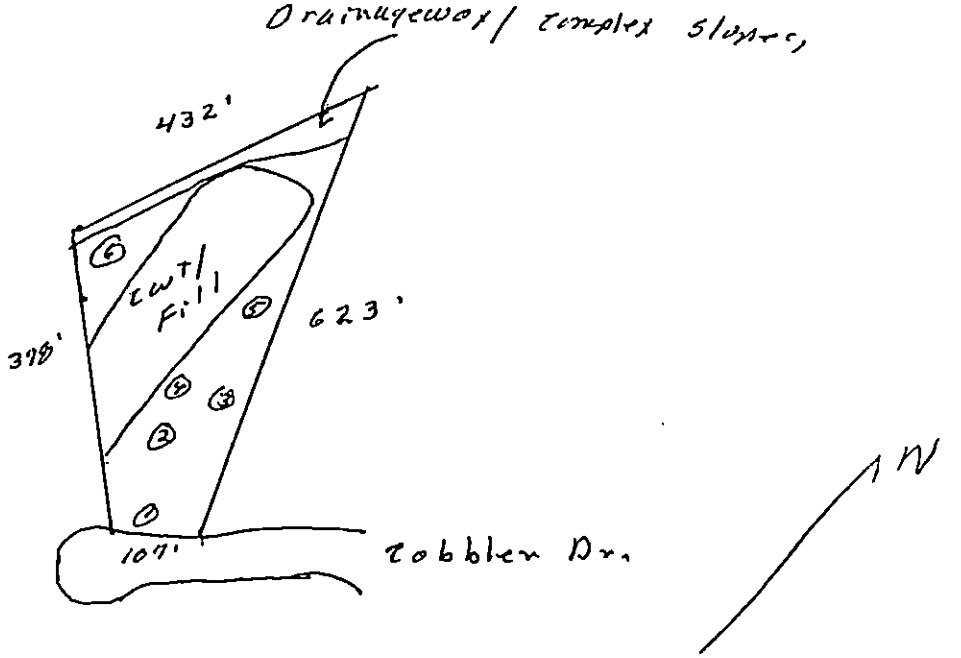
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100% Repair

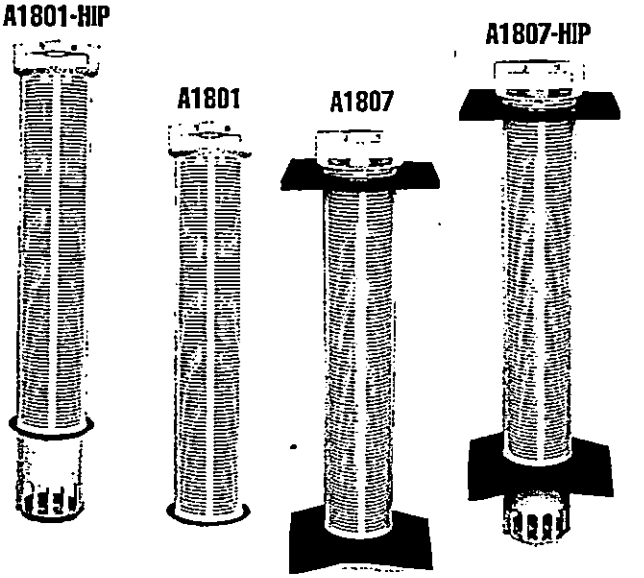
NDSCAPE POSITION	GROUP	TEXTURE	.1955 LTAR
R-RIDGE	I	S-SAND	1.2-0.8
S-SHOULDER SLOPE		LS-LOAMY SAND	
.INEAR SLOPE			
FOOT SLOPE	II	SL-SANDY LOAM	0.8-0.6
N-NOSE SLOPE		L-LOAM	
HEAD SLOPE			
C-CONCLAVE SLOPE	III	SI-SILT	0.6-0.3
CV-CONVEX SLOPE		SICL-SILTY CLAY LOAM	
TERRACE		CL-CLAY LOAM	
-FLOOD PLAIN		SCL-SANDY CLAY LOAM	
	IV	SC-SANDY CLAY	0.4-0.1
		SIC-SILTY CLAY	
		O-ORGANIC	

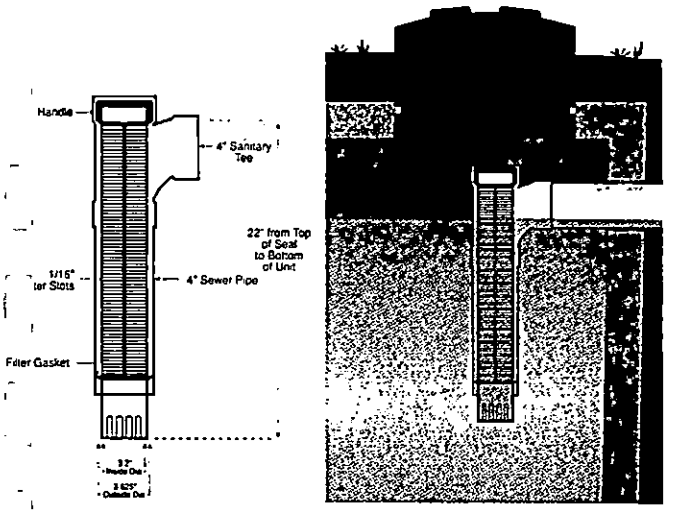
CONSISTENCE MOIST	CONSISTENCE WET
VFR-VERY FRIABLE	NS-NON-STICKY
FR-FRIABLE	SS-SLIGHTLYSTICKY
FI-FIRM	S-STICKY
VFI-VERY FIRM	VS-VERY STICKY
EFI-EXTREMELY FIRM	NP-NON-PLASTIC
	SP-SLIGHTLYSTICKY
	P-PLASTIC
	VP-VERY PLASTIC

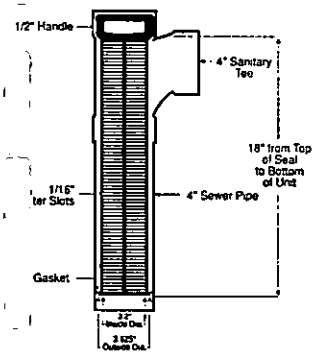
STRUCTURE	MINERALOGY
SG-SINGLE GRAIN	SLIGHTLY EXPANSIVE
-MASSIVE	
R-CRUMB	EXPANSIVE
GR-GRANULAR	
BK-SUBANGULAR BLOCKY	
BK-ANGULAR BLOCKY	
PL-PLATY	
PR-PRISMATIC	

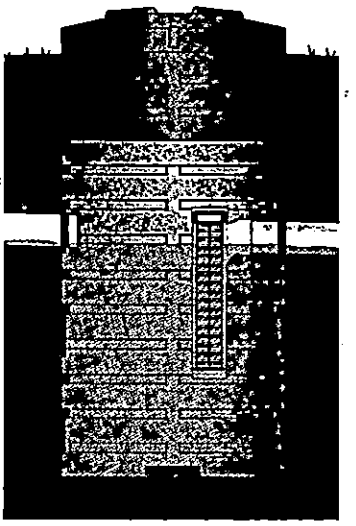


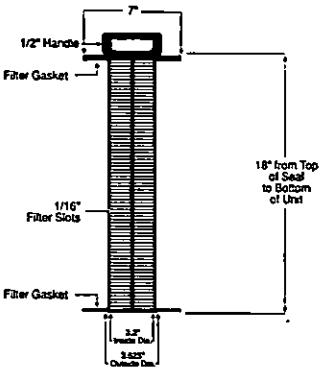
A1800s

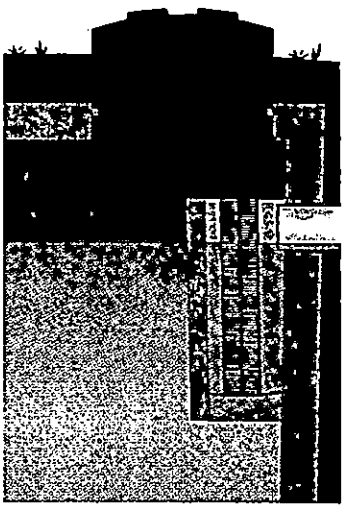












Zabel™ Recommendation: Any configuration of Risers used **should not** exceed 48" in height.

The product(s) shown are covered by one or more of the following patents:
U.S. 5,382,357, 5,482,621, 5,683,577, 5,580,453, 5,582,716, 5,591,331, 4,710,295, 5,593,584,
U.S. Des. 386,241,349067, 4605501,5098568, Des. 309007, Canadian: 2,135,937 New Zealand: 264824,
Other Patents Pending

Zabel™ A1800 Series Residential Wastewater Effluent Filter Product Specification

1. Product Name: Zabel™ The A1800 Residential Wastewater Filters, U.S. Patent Nos.: 5,382,357; 5,482,621; Canadian Patent No: 2,135,937; Other patents pending.
2. Model Numbers: A1800; A1800-HIP, A1800-HIP-SF, A1801, A1801-HIP, A1801-HIP-SF, A1807, A1807-HIP
3. Application: Single family homes no more than four bedrooms. **Zabel's™ New Residential High Performance Filter** is designed to provide extra protection for homes with garbage disposals and still sloughs the solids back into the tank.
4. Performance Specification
   - 4.1. All A1800 Models: Maximum daily flow - 800 gpd.
   - 4.2. Multiple Filters may be installed in manifolds to handle larger flows.
   - 4.3. TSS: Average reduction in TSS within 6 months of installation - 40 percent in typical residential wastewater.
5. Materials: All materials are non-corrosive PVC
6. New System Installation: Center the top of the 4-inch Filter Case under an outlet access opening at least 8 inches in diameter. Securely fasten the bell coupling of the case by a PVC solvent weld connection to the 4-inch PVC pipe extending through the outlet wall of the tank. The pipe extending through the end wall may be any schedule four-inch pipe. Location of the PVC outlet pipe in the tank end wall shall conform to local code. The PVC outlet pipe should extend at least 18 inches beyond the outside face of the tank wall. For septic tanks with cast in place concrete baffles use the A1807 model. Insert bottom of filter through thick gasket and slide to top of filter cartridge. Install filter cartridge with top gasket **only** into tank baffle, to ensure gasket lies flat without hanging over the edge of baffle. **Do not trim** gasket unless it overhangs edge of baffle. Remove filter cartridge and install thin gasket into the groove at the bottom of the cartridge. Reinsert the cartridge into the concrete baffle to complete installation. A riser to grade over the Outlet Access Opening is recommended.
7. Existing System Installation: The filter cartridge, Model A1801 may be installed in any existing 4" outlet Tee and pipe. The filter may be installed in an existing tank if an adequate outlet access opening already exists and the filter can be installed without damaging the existing tank. If a 4-inch PVC outlet pipe does not extend into the tank, the filter can be installed utilizing a plumbing flange. For septic tanks with cast in place concrete baffles use the A1807 model. Insert bottom of filter through thick gasket and slide to top of filter cartridge. Install filter cartridge with top gasket **only** into tank baffle, to ensure gasket lies flat without hanging over the edge of baffle. **Do not trim** gasket unless it overhangs edge of baffle. Remove filter cartridge and install thin gasket into the groove at the bottom of the cartridge. Reinsert the cartridge into the concrete baffle to complete installation. If the existing tank cannot be used, the filter can be installed in existing systems using a Zabel Container Assembly Model CA100 or Zeus™ Basin System.
8. Service: A professional onsite service company should perform all onsite system service.
9. Service Method: Grasp the filter handle and pull the filter cartridge upward. A Zabel™ 36" T-Handle is available if required to reach filters more than 12 inches below grade. Tap the cartridge on the inside of the inspection port or hose off the cartridge into the tank if needed and reinsert into the case. Installation of an effluent filter may increase the frequency of service if the homeowner discharges materials that are harmful to the system
10. Service Frequency: The filter should be cleaned when the septic tank is normally inspected and pumped as required by local regulation. The A1800's are designed to slough most normal solids off the inside of the vertical walls and back into the tank when the effluent flow is in a resting state. Installation of an effluent filter may increase the frequency of service if the homeowner discharges materials that are harmful to the system
11. Warranty: The A1800's are warranted to be free from defects in material and workmanship for the life of the original purchaser. Zabel's™ liability is limited to repair or replacement of the part and in no event shall Zabel™ be liable for any consequential damages of any kind.
12. Dimensions:

	Diameter	Cartridge Height	Filtration	Total Filter Surface	Lineal Feet of Weir
A1800	4"	18"	1/16"	158.4 in²	61
A1800-HIP	4"	22"	1/2"-1/16"	*158.4 in²	*61
A1807	4"	18"	1/16"	158.4 in²	61

*Calculations are for the 1/16" area only.