SPECIFICATIONS, CALCULATIONS & SUPPORTING MATERIAL

FOR A GROUND ABSORPTION SEWAGE DISPOSAL SYSTEM USING

SEPTIC TANK, PUMP TANK AND AN

OFFSITE LOW-PRESSURE T&J PANEL DRAINFIELD

FOR A

4 BEDROOM RESIDENCE

13728 PAVILION ESTATES DRIVE

Mecklenburg County, North Carolina

February 17, 2022

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Ground Absorption Sewage Disposal System
13728 Pavilion Estates Drive
Mecklenburg County, NC

T & J Panel System

I. NARRATIVE:

TK Construction is proposing to construct a new 4-bedroom residence at 13728 Pavilion Estates Drive located in Mecklenburg County, North Carolina. The septic system is being designed for 480 gallons per day. The primary and repair drainfield will be located off site and identified by Paul Penninger, LSS. The recommended loading rate for the septic system has been determined to be 0.30 G/D/SF.

A low pressure prefabricated Permeable Block Panel System (PPBPS) is proposed for this residence due to limited available space and soil data. The panel system will function as additional pre-treatment of effluent before entering the soil. Nitrification lines (panels) are to be placed on 8' centers minimum as shown on the plan. The field will be dosed by a properly sized pump with float control. 100% repair is required for this site. These specifications address the Owner's responsibilities as well as installation instructions, components of the proposed system, and testing and operating procedures.

The septic system plan has been prepared using boundary and physical survey data by Phoenix Surveying to locate the proposed panels, tanks, house, and driveway and proposed well.

The area of the nitrification field shall be barricaded prior to any site disturbance to prevent the access of any vehicle or anyone not knowledgeable of septic system installation. Any disturbance within the area shall be performed by the system installer. ONLY!

II. LOCATION:

From Highway 73 in Huntersville, head south on Ramah Church Road. Turn left onto Hiawassee Road toward Metrolina Greenhouses. Turn right onto Huntersville-Concord Road. Turn right onto Pavilion Estates Drive. Turn left on Pavilion Estates Drive. Lot is on left side before Pavilion Loop Drive.

III. REFERENCE MATERIAL:

(1) DESIGN AND INSTALLATION (Manual)
OF LOW-PRESSURE PIPE WASTEWATER TREATMENT SYSTEMS
By: Craig Cogger; Bobby L. Carlisle; Dennis Osborne; Ed Holland
Published by: UNC Sea Grant College Pub. UNC-SC-82-03
May 1982.

(2) LAWS AND RULES FOR GROUND ABSORPTION SEWAGE DISPOSAL SYSTEMS.
SECTION .1956 OF THE N.C. Administrative Code: Title 10 Health
Services; Environmental Health; Subchapter 10a; Sanitation.
Published by N.C. Dept. of Human Resources; July 1, 1982.
Paragraph .1956 (a)(ii)(B).

(3) EPA 625/1-80-012 Design Manual
Onsite Wastewater Treatment and Disposal System Oct.,1980.
Chapter 7.

IV. CERTIFICATION:

The Contractor shall employ the Local Health Department to make timely observations and inspections of the project during construction. Upon completion of the project, the Contractor shall provide the Engineer an "as built" plan of the project. The Engineer shall certify that the project has been constructed in accordance with the plans and specifications. A copy of the "as-built" plan (data collected by PLS) and certification shall be provided to the County Health Department at time of startup.

V. COMPONENTS OF THE SYSTEM AND CONSTRUCTION SEQUENCE:

Refer to T & J Panel System's manufacturing and installment manual. Furnish and install all items required for a complete system in accordance with plans and specifications; for requirements of the County Dept. of Environmental Health (CDEH); the N. C. Dept. of Environmental Health (NCDEH); the N. C. Building Code, Plumbing Code and Electrical Code; and the National Electric Code. System must be professionally installed by a qualified, competent contractor.

COMPONENTS OF SYSTEM:

- 1,000-gallon two compartment septic tank with effluent filter
- 1,000-gallon pumping tank with access
- Submersible effluent pump, SIM TECH filter and float controls
- Pump Control and high-water alarm signals (audible and visible)
- 3-Inch Supply Pipe (Existing and Proposed)
- 1.25-Inch Gate Valves
- Shallow Placed T & J 16" high panels & distribution laterals

CONSTRUCTION SEQUENCE:

(1) Lay out T & J, 16" high, panel system network area with stakes and flagging to ten feet (minimum) beyond the limits of the network. As soon as the absorption area is designated, it shall be flagged, roped off and isolated from construction traffic. This barrier should be maintained until the system is accepted by the Owner. Refer to site plan for the size of absorption area. See site plan for lateral locations.

(2) Prior to beginning construction of the system, carefully locate, lay out and identify disposal site, manifolds and the lateral panel piping networks, using a tripod mounted engineer's leveling instrument to accurately establish each lateral along a level contour. Note: Lateral panel runs which conflict with cut-off-in-place stumps or trees shall "snake" by with a 12" minimum trench clearance and then continue along its projection run. (The 8' minimum trench separation must be maintained.)

(3) Excavate for and construct curtain drain (if shown on the plan.)

(4) Excavate lateral network trenches 24" wide by 30" deep (see detail). Remove loose soil from bottom of trench.

(5) Install sand in bottom of the lateral trench to the proper depth of approximately 30" below finish ground level.

(6) Follow the manufacturer's guidelines for installing the T & J Panel System.

(7) All joints in lateral and the manifold piping shall be watertight connections to ensure that the only source of the water seepage from the system is through the orifices as designed. See layout and details. Carefully install manifold and lateral network

according to the attached designed layout. A larger diameter protective sleeve with cap or approved box with lid shall be placed over the turned up lateral and positioned level with the ground surface (so as not to be damaged by mowing machine.)

(8) Carefully backfill manifold trenches to finish grade with clean (debris free earth (no stone).

(9) Contractor shall install a 6-inch soil cap over the entire drainfield at the direction of the consulting Soil Scientist. Soil cap shall extend 10 feet beyond limits of proposed drainfield and taper at a minimal slope to final grade of surrounding area

(9) Leave absorption area with a raked surface, free of any low areas, ready for grassing.

(10) The installation contractor shall stabilize the area of construction by planting and seeding with Kentucky 31 tall fescue and shall keep the planted area watered and mulched until such time that a hardy stand of grass is established. (See Seeding Specification.)

(11) SEPTIC TANK The septic tank shall consist of a 1,000-gallon capacity, reinforced, precast concrete tank with full baffle and shall have easy access to each chamber from ground level for checking and pumping. The first chamber of the septic tank shall consist of 2/3 to 3/4 of the volume of the total tank and the baffle shall contain a horizontal opening across the tank at about midway its height. The outlet of the tank shall have an effluent filter as specified herein. Locate the septic tank at such height as to provide approximately 8" of cover soil over top of the tank. The tank shall have a DEH approved access with lids over both tank chambers and extend to 6-inches above finish grade.

(12) SLOTTED-FILTER A Polylok Model PL 122 effluent filter, with 1/16" infiltration shall be installed in the outlet tee in the septic tank. The filter shall be manufactured by POLYLOK or approved equal, 3 Fairfield Blvd Wallingford, CT 06492 Toll Free 1-888-765-9565.

(11) PUMP TANK shall consist of a 1,000-gallon capacity, reinforced, precast concrete tank without baffle and shall have a concrete mounting pad (concrete blocks) for accommodating the pump. Access shall be provided for entry into the tank directly over the pump location and extending 6" above final grade or as called for on the plan. The tank shall have a DEH approved access with lids over both tank chambers and extend to 6-inches above finish grade.

(12) The tank shall be supplied by a manufacturer approved by DEH and bear the manufacturer's serial number. The tank shall be positioned to allow gravity flow of the effluent from the septic tank. Immediately downstream from the pump shall be an approved effluent filter system Sim-Tech 100 Series manufactured by Sim-Tech.

All tanks shall be tested for water tightness by an approved method such as 24-hour water tightness test with maximum allowable leakage not to exceed ½ inch per 24 hours. Testing shall begin after the water level in the tank has stabilized. Any leaking shall be corrected, and the tanks retested.

Once testing of the tank has been completed, the tank shall be backfilled in lifts with well compacted, debris free earth to a level, which directs surface water away from the tanks. Tank access holes shall be installed and grouted watertight and the earth raked smooth for grassing. Grade over the tank shall be sloped to prevent surface water from entering the tank through the access.

(13) PIPING All piping and fittings shall be Schedule 40 PVC except LPP piping in the panels shall be PR160 PVC. Glue for all PVC pipe joints shall be as recommended by the pipe manufacturer.

(14) PUMP The submerged pump shall be Goulds 3885 Series Model WE1512HH manufactured by Xylem or approved equal, 1.5 HP, 230V/1PH: capable of pumping 34.00 G/M at a 71.70 ft. head.

(15) PUMP CONTROL PANEL: The pump shall be powered by a simplex control panel with standard features including: a corrosion resistant enclosure, an aluminum back panel, silver cadmium contacts (IEC Contactor), an IEC motor starter, a 100VA control circuit transformer, a main circuit breaker, a 1 amp control circuit fuse, a 1 amp alarm circuit fuse, a Hand-Off-Auto switch, an alarm test switch, a pump run light, a seal leak light, terminal blocks for pump and float connections, a ground lug, an alarm light and an alarm buzzer. Panel shall be equal to Orenco S1IR2ROETMCT Engineer Approved Equal.

(16) EFFLUENT PUMP FILTER The effluent filter shall be connected directly to the pump outlet. The filter shall be equal to the GAG Sim Tech Filter, Boyne City, Michigan, 49712, telephone 1-888-999-3290. The contractor shall furnish the following with the filter: STF 100 Filter, an STF 102 Filter Screen, an STF 103 Wrench, an STF 104 Sock, an STF 101 Pressure Alarm Switch and an STF 107 Tank Alert. Filter can be obtained through Confederate Sales Associates, 8205 Brooknell Terrace, Charlotte, NC 28270, telephone 704/ 364-1372.

(17) PUMP ON-OFF FLOATS: In the extended position this float switch shall create an open circuit and prevent operation of the pumps. When the circuit is closed the float switch shall allow activation of the pump transferring wastewater to the downstream disposal field.

(18) HIGH WATER ALARM SWITCH: The high-level alarm float switch shall activate the audio/visual alarm when the circuit is closed.

(19) PUMP INSTALLATION: Details of pump installation are shown on the plan. The pump must be placed on two concrete blocks next to each other on the bottom of the tank. This prevents the pumping of any solid particles, which can clog the system. 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. (The PVC outlet pipe is too fragile to support the pump.)

The pump outlet pipe should be connected to the supply manifold with a threaded PVC union (or dresser coupling) to allow quick removal. A check valve shall also be installed in the supply line (within the pump chamber). If effluent will be pumped down hill, a 3/16" 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. This hole is especially important.

(23) ELECTRICAL CONNECTIONS: The pump and high-water alarm must be placed on separate electrical circuit breakers. (If the pump circuit fails, the alarm must still be able to operate.) Follow the manufacturers' recommendations for the proper fuses or circuit-breakers. All electrical connections must be made outside the pumping chamber. Power cords from the pumps and controls shall extend to a NEMA 4X approved outdoor control panel mounted outside of the pumping chamber. There are

to be no junction boxes inside the tank. Power and control conductors shall be conveyed through 2” conduit with Seal-off(s).

Wiring between the pumping chamber and the house should meet State and local code requirements. Conductors from the tank to the control panel shall be conveyed through 2-inch diameter conduit with duct seal or Seal Off.

Requirements for Leakage Testing-Pressure Force Mains

Required testing of pipelines and valves shall be done under the direct supervision of the Project Engineer. Field-testing shall not negate the requirements for material certifications as contained in the material specification section of this contract. Unless otherwise directed by the Engineer, all testing and disinfection will be completed prior to connection to any existing line.

Hydrostatic & Leakage Tests

On completion of the line or sections of the lines, connections and appearances, the line shall be filled and hydrostatically tested. The water for testing purposes can be taken from the nearest available water main under the supervision of the Engineer's Inspector or the contractor may install a well on site and ensure that all setbacks are observed in doing so and leakage will be measured by the Inspector. All leaks and any defective material shall be repaired or replaced to the satisfaction of the Engineer and the tests repeated until the requirements of this specification are met. Any special equipment, pumps, etc., required to make the test shall be furnished and operated by the Contractor as directed by the Inspector.

The Contractor shall use great care to be sure that all air is expelled from each section under test. If service connection or other openings are not available for the purposes of expelling air, the Contractor shall provide air release of enough size (as determined by the Engineer).

Specific procedures for testing main are as follows:

- The test pressure will be 100 PSI at the low point of the section under test.
- Allowable leakage will be determined by Table 6, AWWA C-600 (see below) or by the formula:
- 1 = 0.000106SD where.
- S = length of pipe under test
- D = pipe diameter.
- Pressure and leakage tests will be run concurrently and for duration of two hours except as modified below.
- The Contractor will pressurize the line and verify that it is within allowable leakage before the official test is started.
- The Inspector will begin the test and remain at the job for the first hour, making sure that the test pressure is maintained within 5 PSI. The Contractor is to maintain the pressure within 5 PSI for the duration of the test period. At the end of the first hour, with the line pumped to full test pressure, he will read the meter and record the first hour leakage. If the first hour leakage is within allowable, he will return at the end of the fourth hour and again read the meter. If the total leakage for the four-hour period does not exceed four times the first hour leakage, the test will be terminated. If the total leakage exceeds four times the first hour leakage, but is still within allowable, the test will be held an additional hour. If the fifth hour leakage does not exceed the average hourly leakage for the first four hours, the test will be terminated at the end of the fifth hour. Otherwise, the test will be held until the leakage is non-increasing and within allowable for two consecutive hours.

- If leakage exceeds allowable for the four-hour test, the test will be terminated and re-scheduled after the Contractor has verified that actual leakage is within the allowable leakage, but no earlier than the next working day.
- If the first hour leakage does not exceed 15% of the allowable, or if the allowable leakage rate does not exceed 0.4/gallons/hour, the test may be terminated at the end of two hours provided the second hour leakage does not exceed the first hour leakage. If the second hour leakage exceeds the first hour leakage, the test will be held for an additional period as described in Paragraph (e) above.
- The maximum length of pipe testing in one test shall be 5,000 feet or as close to 5,000 feet as possible depending on valve spacing.
- During the last stages of the test and without any reduction in pressure progressing from the end opposite the test pump, each mainline valve will be closed, and pressure released to determine if the valve is holding pressure (minimum 10 minutes per valve closing).

The Contractor shall be required to provide as many tests and/or certifications as the Engineer may deem necessary for materials, such as concrete, piping, valves, steel reinforcement, all fasteners and anchorage systems, etc. Testing for materials shall be made by a separate independent test laboratory employed by the Contractor and approved by the Engineer.

The Contractor shall coordinate and schedule site visits, installation, and startup assistance from the equipment manufacturers.

(24) A "HOMEOWNER'S WARNING SIGN" shall be located within the house to inform the owner of what action to take in case the "High Water Alarm" is activated. This sign shall contain the name, address, telephone number, and emergency telephone number of the person to contract immediately upon malfunction of the system.

(25) PROPER OPERATION CHECK: After all components have been installed and connected, the system should be checked for proper operation. With electrical power turned off, fill the pumping chamber with water from a garden hose (or allow effluent to accumulate) until the liquid rises to half of pump tank. 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 set pressure level on the control panel. The pump should turn off when the liquid reaches the pump off setting on the control panel. Be sure the pump is still completely submerged.

(26) PRESSURE HEAD ADJUSTMENT: 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:

(a) Glue a 4' length of pipe (preferably clear) to a threaded adapter that will screw onto the turn-up adapters. (Call this the "test tube".)

(b) Replace the turn-up cap with the "test tube".

(c) Turn the power on to allow liquid to rise in the "test tube".

(d) Adjust the ball valve at the head of each lateral until the effluent reaches the desired height in the "test tube". Remember to include the distance below the ground surface to the lateral line when measuring the height. The pressure head should be 3' for each line. This is the height above the lateral the liquid should be in the temporary "test tube". Continue to adjust valves until all "test tubes" have an equal amount of liquid.

(27) FINAL LANDSCAPING: After the T & J System is installed, the following should be checked to ensure that the system will not be overloaded with excess rainwater and run off:

(a) The distribution field is shaped to shed rainwater and is free of low area.
(b) Gutter and downspout drains are directed away from the system.

Any problems should be corrected before approving the system.
Finally, the entire area should be planted with grass according to specifications.

VI. OPERATION AND MAINTENANCE:

The system is classified as a Type IV(a). The Regulations require that the system to be managed by a certified operator. Operating, Maintenance and Inspection procedures shall be conducted by the Operator on a timely basis. Procedures shall include but not be limited to the following:

- Minimum inspection/maintenance frequency shall be conducted on a timely and routine basis.

- Septic system shall be pumped every 5 years or when solids accumulate to the volume of the tank.

- Effluent and pump filters shall be cleaned on routine basis as required.

- The PPBPS system should be observed by the regulatory agency one, three, six and nine months after initial installation, and every 3 years. An inspection report should be completed and filed each time the system is checked. This system does require a licensed operator. Minimum inspection frequency is twice a year and reporting required one time per year.

- All laterals shall be pressure back-washed annually with clean water.

- Pressure head for upper and lower laterals should be checked and adjusted one month after installation and every six months 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 ensure 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.

- Check septic tank and pump tank for evidence of damage or leakage. Check the quality of effluent including grease and sludge accumulation.

At every inspection by the ORC, clean and inspect effluent filter in the septic tank and the sock filter in the pump tank. When washing the filter, debris must be sprayed directly back into the septic and pump tank and not onto the lawn.

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

DESIGN SPECIFICATIONS - T & J PANEL SYSTEM

13728 Pavilion Estates Drive

Mecklenburg County, NC

Daily design waste flow:	480 G/D
Septic tank size:	1,000 gal. (2 compartment)
Septic tank filter:	Polylok Model PL-122
Pumping tank size:	1,000 gal.
Pressure Filter:	Sim-Tech Filter 100 Series
Control Panel:	Orenco S-Series Model S1IR2ROETMCT
Effluent loading rate:	0.30 G/D/SF (50% increase with PPBPS)
Total linear feet and diameter:	295 ft. of 1-1/4" dia. PVC of laterals and T & J 16" high panels (allow 4.33 ft per panel) (Does not inc. pipe from manifold to lateral)
Total length and diameter of supply manifold:	+/-1,575 LF 3" Dia. SCH 40 PVC
Number and length of laterals:	Blue (3): 14 Panels Pink (4): 16 Panels Orange (5): 7 Panels Red (6): 16 Panels Blue (7): 15 Panels **Total Panels = 68 panels**
Number of panels:	68
Hole size:	5/32"
Hole spacing:	1 hole per panel
Total number of holes:	68
Flow per hole at 3' head	0.50 G/M
Flow rate through the system:	34.0 G/M
Elevation head:	53.02’
Pressure head:	3.0'
Friction head:	15.68’
Total head:	71.70’
Pump requirements:	34.0 G/M at 71.70’ use Goulds 3885 Series WE1512HH 1.5 HP - 230 V - 1PH or approved equal
Dosing volume:	160 gal.
Depth of water pumped per dose:	7.85"
Pump run per dose:	4.71 min.
Check valve:	yes
Siphon break hole:	yes

SEEDING SPECIFICATIONS
SLOPES 3:1 or FLATTER

1. Apply agricultural lime at the rate of 90 lb/1000 sf.
2. Apply 10-10-10 commercial fertilizers at the rate of 20 lb/1000 sf.
3. Seed in accordance with the following schedule and application rate:

DATE	TYPE	PLANTING RATE
Aug 15 - Nov 1	Tall Fescue	200 lb/ac or 7 lb/1000 sf
Nov 1 - Mar 1*	Tall Fescue and	200 lb/ac or 7 lb/1000 sf
	Abruzzi Rye	25 lb/ac or 2 lb/1000 sf
Mar 1 - Apr 15	Tall Fescue	200 lb/ac or 7 lb/1000 sf
Apr 15 - Jul 30	Hulled Common or Bermuda	30 lb/ac or 1 lb/1000 sf
Jul 15 - Aug 15	Tall Fescue and	200 lb/ac or 7 lb/1000 sf
	Brown Millet or	35 lb/ac or f lb/1000 sf
	Sorghum-Sudan Hybrids	30 lb/ac or: lb/1000 sf

4. Mulch with straw applied at the rate of 75-100 lb/1000 sf.

* Heavily mulched during January - March period.

SLOPES GREATER THAN 3:1 TO 2:1

1. Apply agricultural lime at the rate of 90 lb/1000 sf.
2. Apply 10-10-10 commercial fertilizers at the rate of 20 lb/1000 sf.
3. Seed in accordance with the following schedule and application rate.

DATE	TYPE	PLANTING RATE
Mar 1 - Jun 1	Sericea Lespedeza (scarified) &	50 lb/ac or 11 lb/1000 sf
Mar - Apr	Add Tall Fescue or	150 lb/ac or 32 lb/1000 sf
Mar - Jun	Add Weeping Lovegrass	5 lb/ac or c lb/1000 sf
Jun - Sep 1**	Tall Fescue and	60 lb/ac or 12 lb/1000 sf
	Brown Top Millet	35 lb/ac or f lb/1000 sf
	Sorghum Sudan Hybrids	30 lb/ac or: lb/1000 sf
Sep - Mar 1	Sericea Lespedeza (Unhulled-unscarified)	70 lb/ac or 1: lb/1000 sf
	Tall Fescue	150 lb/ac or 32 lb/1000 sf
	Millet or Sudan	20 lb/ac or 2 lb/1000 sf

**Temporary - Reseed September 1 at recommended rates.

4. Mulch with 3" straw applied at the rate of 50-90 lb/1000 sf and anchor with asphalt emulsion tack coat applied at the rate of 3-5 gal/1000 sf or 200-300 gal/ac.

4 Bedroom LP Panel Block System
13728 Pavilion Estates Drive
Mecklenburg County, North Carolina

Original Date: February 17, 2022
Revised Date: February 17, 2022

Design Flow

Bedrooms	4	Bedrooms
Flow per Day per Bedroom	120	Gal./Day/Bedroom
Daily Design Flow (DDF)	480	Gal./Day

Use PPBPS Laterals for 50% Reduction in Drainfield Size

LTAR	0.30	G/D/SF	Per Ashley Rollans, LSS	
Sq. Ft. Trench Bottom	1,600	Sq. Ft.	DDF x LTAR	
	3			
Field Sizing	533	LF Conventional Lines		(SF Trench Bottom/3)
PPBPS Sizing	267	LF 50% Reduction System		(LF Conv. Line x 0.5)

Since Lot was Platted prior to 1982, 100% repair area not required

	LF out of 50' Buffer	No of Panels	Pipe to Panel	
NF	13.00	4.00		Repair
Orange (1)	38.00	9.00		Repair
Pink (2)	56.00	13.00		Repair
Blue (3)	63.00	14.00	77.00	
Pink (4)	64.00	16.00	66.00	
Orange (5)	32.00	7.00	55.00	
Red (6)	69.00	16.00	45.00	
Blue (7)	67.00	15.00	34.00	
Pink (8)	68.00	16.00		Repair
NF	32.00	8.00		Repair
Orange (9)	60.00	14.00		Repair
	295.00	**LF Total**		
	267.00	LF Repair Total		

Dose Volume

No. of Panels	68	Panels	(Per Panel Design Manual)
Panel Volume (Max)	3.60	Gal./Panel	(Per Panel Design Manual)
Flow Rate	160.00	Gal./Dose	2 Doses per Day
Volume per Panel	2.35	Gal./Panel	
	65.4%		
Pump Run Time	4.71	Minutes	Actual Volume to Panel/Dose
Operation Head	3.00	Feet	(Orifice Flow Rate x # of Panels)
Use 5/32" Diameter Hole			(Per Panel Design Manual)
Flow Rate per Panel	0.50	G/M	(Per Panel Design Manual)
Field Flow Rate	34.00	G/M	(No. of Panels x Orifice Flow Rate)
Force Main Static Head	53.02	Feet	

Calculations for 3.0" Force Main and 1.25" Supply Laterals				
	Friction Loss	Pipe Length	Q	Pipe I.D.
Pipe Run	(Feet)	(Feet)	(GPM)	(Inches)
Blue (3)	1.45	140.00	7.00	1.380
Pink (4)	1.72	130.00	8.00	1.380
Orange (5)	0.25	87.00	3.50	1.380
Red (6)	1.51	114.00	8.00	1.380
Blue (7)	1.19	101.00	7.50	1.380
3.0" Supply Force Main	6.19	1,575.00	34.00	3.068
Total Friction & Minor Loss	15.68	Feet		

Total Dynamic Head	71.70	Feet	(Static HD + Friction HD + Oper. HD)	
Pump Required	**34.00**	G/M at	**71.70**	TDH

Use Goulds 3885 Series Model WE1512HH
230 V /1.5 HP / 1 Phase
Contractor to Verify Power Requirements before Ordering Pump

Drawdown

Tank Volume per Inch	20.37	Gallons per Inch
Dose Volume	160.00	Gallons
Drawdown	7.85	Inches per Dose
Pump Rune Time	4.71	Minutes per Dose

4 Bedroom LP Panel Block System
13728 Pavilion Estates Drive
Mecklenburg County, North Carolina

Original Date: February 17, 2022
Revised Date: February 17, 2022

TANK ANTI-BUOYANCY CALCULATIONS

1,000 Gallon Septic Tank			*Based on shoaf Precast*	
Outer Length	9.00	Ft.	**STB-347**	
Inner Length	8.50	Ft.		
Outer Width	4.83	Ft.		
Inner Width	4.33	Ft.		
Outer Height	5.63	Ft.		
Inner Height	5.04	Ft.		
Wt of Water Displaced	15,268.50	Lbs.		Outer Length x Outer Width x Outer Length x 62.4 Lb/CF (Wt of Water)
Wt of Tank	4,306.50	Lbs.	Top & Bottom	Outer Length x Outer Width x 150 Lb/CF x 2 (Top & Bottom) x Slab Thickness
	1,827.60	Lbs.	Ends	Inner Width x Inner Height x 150 Lb/CF x 2 (Ends) x Wall Thickness
	3,214.06	Lbs.	Sides	Outer Height x Outer Length x 150 Lb/CF x 2 (Sides) x Wall Thickness
	1,045.62	Lbs.	Baffle	Inner Width x (Inner Height-3 Inches) x 150 Lb/CF x x Wall Thickness
	10,393.78	Lbs.	Total Tank Wt.	Sum Above four
Wt of Overburden	6,525.00	Lbs.	15" Cover	Outer Length x Outer Width x 120 Lb/CF (Saturated Soil Wt) x Soil Thickness
Total	16,918.78	Lbs.		Sum of Total Tank Wt. & Soil Overburden

Water	**15,268.50**	**<**	**16,918.78**	Tank

**Buoyancy Calculations Account for Fluid in Tank, Do Not Pump When Ground is Saturated or During Extremely Wet Conditions.*

1,000 Gallon Pump Tank			*Based on Shoaf Precast*	
Outer Length	8.00	Ft.	**PT-363**	
Inner Length	7.50	Ft.		
Outer Width	5.17	Ft.		
Inner Width	4.67	Ft.		
Outer Height	4.75	Ft.		
Inner Height	4.17	Ft.		
Wt of Water Displaced	12,251.20	Lbs.		Outer Length x Outer Width x Outer Length x 62.4 Lb/CF (Wt of Water)
Wt of Tank	4,092.00	Lbs.	Top & Bottom	Outer Length x Outer Width x 150 Lb/CF x 2 (Top & Bottom) x Slab Thickness
	1,614.58	Lbs.	Ends	Inner Width x Inner Height x 150 Lb/CF x 2 (Ends) x Wall Thickness
	2,343.75	Lbs.	Sides	Outer Height x Outer Length x 150 Lb/CF x 2 (Sides) x Wall Thickness
	8,050.33	Lbs.	Total Tank Wt.	Sum Above four
Wt of Overburden	6,200.00	Lbs.	15" Cover	Outer Length x Outer Width x 120 Lb/CF (Saturated Soil Wt) x Soil Thickness
Total	14,250.33	Lbs.		Sum of Total Tank Wt. & Soil Overburden

Water	**12,251.20**	**<**	**14,250.33**	Tank

**Buoyancy Calculations Account for Fluid in Tank, Do Not Pump When Ground is Saturated or During Extremely Wet Conditions.*

Penninger Soil Consulting, PLLC
Ph: 704-996-6330 Email: pgpenninger@gmail.com

February 15, 2022

TK Construction

Attention: Zack Kent

Submitted via email to: zkentclt@att.net

Reference: **Off-Site Septic System Drainfield Layout**
Lot 19 The Pavilion Subdivision
13728 Pavilion Estates Drive
MCHD File No. 6897B
Mecklenburg County, North Carolina
Project No. 22-112

Dear Mr. Kent:

Penninger Soil Consulting, PLLC has provided a proposed septic drainfield layout for a possible 4-bedroom Septic Improvement Permit/Construction Authorization to be issued by the Mecklenburg County Health Department (MCHD) for the referenced site. The septic drainfield layout was performed in general accordance with Penninger Soil Consulting Proposal 22-P109, dated February 7, 2022.

BACKGROUND

We understand the MCHD issued a 4-bedroom septic Improvement Permit for Lot 19 to Simonini Builders in 2007 for a LPP T&J Panel System. This permit has expired and is no longer valid. The 2007 MCHD permit utilized an off-site septic area for the system and repair area.

We understand you now own the lot and have submitted an application to the MCHD for a new septic permit. The MCHD now has a policy that requires the proposed system to be designed by a Professional Engineer. You have requested Penninger Soil Consulting, PLLC to assist you with flagging the proposed, new 4-bedroom septic drainfield on the off-site septic area and then a Professional Engineer will complete the system design and submit it to the MCHD. We understand you have discussed the system engineer design with David DeCaron with Piedmont Design Associates, PA.

SEPTIC DRAINFIELD LAYOUT

- Mr. Paul Penninger with Penninger Soil Consulting visited the site on February 14, 2022. Your surveyor had staked the boundary of the off-site septic area. Some of the wire pin flags from the 2007 MCHD permit were still visible on the off-site septic area. A laser level and wire pin flags were utilized to re-flag the proposed drainfield and repair area lines.
- The flagged septic lines were approximately sketched on the attached site plan.

- The system layout assumes the 4-bedroom system will be a T&J Panel System similar to that permitted in 2007.
- Mr. Jacob Presley with the MCHD indicated he had placed new hand auger borings on the off-site septic area and confirmed the soil was Provisionally Suitable at a 0.3 gpd/sqft LTAR. The primary T&J Panel system could utilize 4 lines at 68 ft long, as shown on the site plan.
- The site was wooded and any minor topographic irregularities should be smoothed prior to system installation.
- We understand the pipe from the building lot to the off-site septic area was installed by the developer. A subbed-up, 3-inch PVC pipe was observed on the off-site septic area that was assumed to be the end of the septic supply line. A locator wire was attached to the pipe.
- Based on the MCHD Engineering Policy, the proposed off-site septic system must be designed by a Professional Engineer. The engineer should provide the system design components and specifications to be approved and permitted by the MCHD.

Septic system suitability is affected by the soil present, the proposed house size and number of bedrooms, lot size and configuration, topography, required setbacks, etc. This report identifies the general location of the septic drainfield lines flagged on the off-site septic area but does not constitute or imply approval for permit as required by the local health department and/or state agencies. System layouts are done based on interpretations of the rules governing wastewater treatment and disposal systems and are not guarantees for site approval or future system performance.

CLOSING

Penninger Soil Consulting, PLLC appreciates the opportunity to provide these services to you. The proposed T&J Panel primary and repair lines have been flagged on the off-site septic area for Lot 19 The Pavilion Subdivision. If necessary, we can further review the system layout with you and the design engineer.

Sincerely,

Penninger Soil Consulting, PLLC

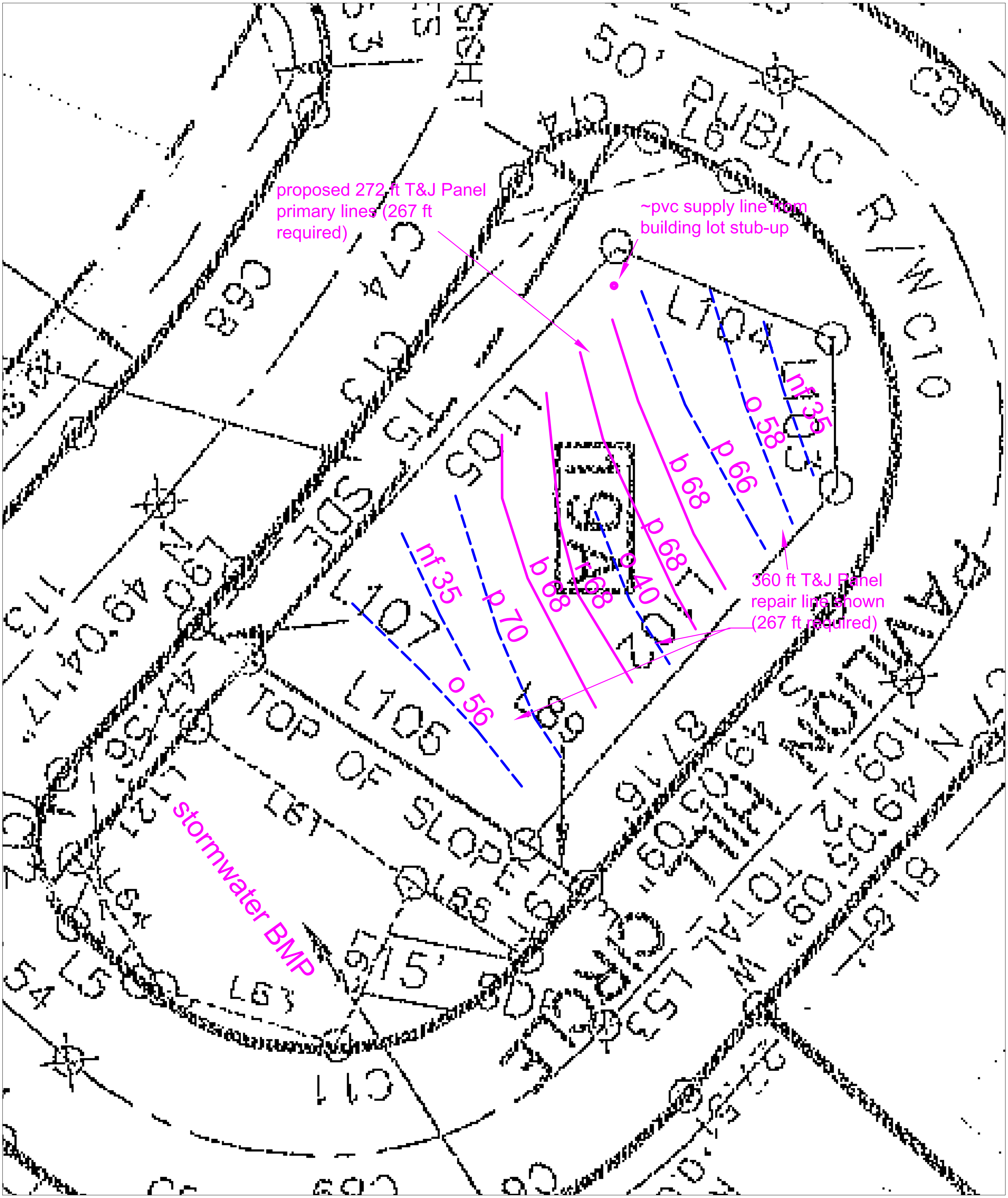


Paul G. Penninger, L.S.S.
Soil Scientist

Attachments: 1. Lot 19 Off-Site Septic Area System Layout Site Plan

2. 2007 MCHD Improvement Permit

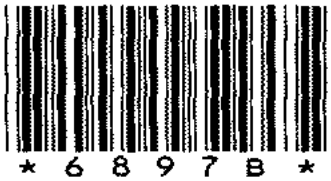
1. Lot 19 Off-Site Septic Area System Layout Site Plan



T.K. Construction - Lot 19 The Pavilion Subdivision - Off-Site Septic Drainfield Layout - 2.15.22

Base site plan from The Pavilion record plat. Off-site septic area staked by Phoenix Land Surveying. Proposed septic lines flagged by Penninger Soil Consulting, PLLC. Approx. line locations; refer to flags in field. PE design required for off-site septic system. Four bedroom LPP T&J Panel system permitted by MCHD on same off-site area in 2007, but the IP has expired. Soils approved at 0.3 gpd/sqft LTAR by MCHD in 2007 and 2022. New septic system Improvement Permit and Construction Authorization must be issued by MCHD to install septic system.

2. 2007 MCHD Improvement Permit



13728 PAVILION ESTATES DR

1/11/2008

duponbj

Groundwater and Wastewater Services File Imaging Project
May 2007
Barcode Font = IDAutomationHC39M

Groundwater & Wastewater Services
Septic Project File & Data Review Worksheet

GWS File #: 6897-B WASPS App #: 1724

Primary ES assigned to project: DJ

Secondary ES assigned to project:

Project Type: New System ☑ Alteration ☐ Repair ☐ Modified Plot Plan ☐

I. File Review:

Rule or Law	Permit Application			
.1937(d)	Is the Application complete	Yes ☑	No ☐	N/A ☐
.1937(d)	Is there a Site plan/Plat with application	Yes ☑	No ☐	N/A ☐
.1937(d)	Is the Facility shown?	Yes ☑	No ☐	N/A ☐
.1937(d)	Are appurtenances shown	Yes ☑	No ☐	N/A ☐
	Site Evaluation Information			
.1939 (a)(1)	Topography and Landscape Position Recorded?	Yes ☑	No ☐	N/A ☐
.1940 (a-g)	Slope % Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(2)	Texture Class Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(2)	Structure type Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(2)	Consistence Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(2)	Mineralogy Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(3)	Soil Wetness Condition Recorded?	Yes ☐	No ☐	N/A ☑
.1939 (a)(4)	Soil Depth to Rock or Parent Material Recorded When Encountered	Yes ☐	No ☐	N/A ☑
.1939 (a)(5)	Depth to Restrictive Horizons Recorded When Encountered?	Yes ☐	No ☐	N/A ☑
.1939 (a)(6)	Sufficient Available Space Recorded?	Yes ☑	No ☐	N/A ☐
.1937(m)	Are the Profile Locations Shown?	✓		
.1939(a)	Are the S/PS Profiles in system & in repair area?	Yes ☑	No ☐	N/A ☐
& .1945(b)	Number of auger borings made: 6 Were sufficient auger borings made?	Yes ☑	No ☐	N/A ☐
.1939(d), .1955, .1956, .1957	LTAR 3	Yes ☐	No ☐	N/A ☐
	Improvement Permit/Construction Authorization			
.1937(g) 130A-336(a)	Proposed System Type stated-Initial	Yes ☑	No ☐	N/A ☐
.1945(b)	Proposed System Type stated-Repair	Yes ☑	No ☐	N/A ☐
130A-336 (a)(3)	System location identifiable by setbacks - Initial	Yes ☐ ✓	No ☐	N/A ☐
.1937(g) .1945(b)	System components shown – Initial	Yes ☑	No ☐	N/A ☐
.1945(b)	Repair area shown	Yes ☑	No ☐	N/A ☐
.1937 (f)(g)	Does System design match facility, flow & WWcharacteristics?	Yes ☑	No ☐	N/A ☐
.1937 (f)(g)	Is System design consistent with soil/site conditions?	Yes ☑	No ☐	N/A ☐
.1937 (f)(g)	Is the System located in the approved area?	Yes ☑	No ☐	N/A ☐
130A-336(a)	Is the Design flow (gpd) indicated?	Yes ☑	No ☐	N/A ☐

130A-336(a)	Number of Bedrooms, employees, seats, etc. indicated?	Yes ☑	No ☐	N/A ☐
.1937(g)	Trench depth indicated?	Yes ☑	No ☐	N/A ☐
.1937(g)	Trench width indicated?	Yes ☑	No ☐	N/A ☐
.1937(g)	Trench length indicated?	Yes ☑	No ☐	N/A ☐
130A-336(a)(1)	Proposed/existing well shown?	Yes ☑	No ☐	N/A ☐
130A-336(a)(1)	Property line lengths shown?	Yes ☑	No ☐	N/A ☐
130A-336(a)	Facility/appurtenance setbacks shown from fixed points?	Yes ☑	No ☐	N/A ☐
	Operation Permit			
.1937(i)	System type as described in table V(a) of rule .1961	Yes ☐	No ☐	N/A ☐
.1937(i)	Conditions for system performance, operation, maintenance, monitoring and reporting.	Yes ☐	No ☐	N/A ☐

II. WASPS Review:

Construction authorization issued	Yes ☐	No ☐	N/A ☐
Installation approval issued	Yes ☐	No ☐	N/A ☐
Operation permit issued	Yes ☐	No ☐	N/A ☐
Other related documentation	Yes ☐	No ☐	N/A ☐

Items requiring correction/modification: _____

Comments:

_____

_____

_____

_____

_____

IA issued date: _____

OP issued date: _____

Review performed by: WR Date performed: 5.18.07

To: Jay Aidoo
From: Rick Jasinski

MECKLENBURG COUNTY

Land Use & Environmental Services Agency
Groundwater & Wastewater Services

Fax Coversheet

****NOTICE****

The information contained in this fax may be privileged and/or confidential and is intended only for the use of the person to who it is addressed. If the reader of this message is not the intended recipient (or such recipient's employee or agent), you are hereby notified not to read, distribute, or copy the materials attached hereto without the prior written consent of the sender. If you have received this fax in error, please notify the sender by telephone call and return the original to us by mail and you will be reimbursed for the required postage. Thank you.

To: RICK JASINSKI Fax #: 704-358-9978
Phone #: 704-201-8976

From: J. Aidoo Date: ~~07/11/07~~ 7/12/07

Number of pages transmitted: 5 (including coversheet)

Comments:
Please sign permit and fax signed copy back to our office

If you do not receive all pages of this fax please call (704) 336-5103.

☒ Original will not follow

☐ Original will follow via: ☐ U.S. Mail ☐ Hand Delivery ☐

700 North Tryon Street • Suite 211 • Charlotte, North Carolina 28202-2236
Office #: (704) 336-5103 • Fax #: (704) 336-6894

Mecklenburg County Groundwater & Wastewater Services
700 N Tryon St. Suite 211 Charlotte, NC 28202
Phone: (704) 336-5103 Fax: (704) 336-8894

NC DENR
Division of Environmental Health
On-Site Wastewater Section

IMPROVEMENT PERMIT for a RESIDENTIAL ON-SITE WASTEWATER TREATMENT & DISPOSAL SYSTEM

Permit #: 30001774 GWS File #: 6897B Tax Parcel #: 019-243-06

- This IMPROVEMENT PERMIT is subject to revocation if site plans or the intended use change. There is to be NO grading, filling, or disturbance of the soil in the area of the septic tank system or repair area.
- CONSTRUCTION AUTHORIZATION must be obtained prior to receiving a Building Permit. The Construction Authorization is NOT transferable. Do not clear, grade, fill or disturb soil prior to obtaining a Construction Authorization.
- Domestic-type wastewater only. No industrial process wastewater may be discharged into the system.

I. **This Improvement Permit Shall:** Expire in Five (5) Years **Expiration Date (If Applicable):** 5/18/2012

Type of Installation: Residential - New System Lot Number: 19

Structure Type: HOUSE Size (ft^2): 0 # Bedrooms: 4 # Occupants: 4

Building Foundation: Basement With Plumbing Water Supply: Private Well

II. **Initial System Type:** PPBPS (pressurized) **System Classification:** IVa

Initial System Specifications:

Design Flow (gpd): 480 LTAR (gpd/ft^2): 0.3 Septic Tank Size (gal): 1500 Pump Tank Size (gal): 1500

Trench Width (ft): 3 Trench Spacing (ft): 9 Absorption Area (ft^2): 801 Total Trench Length (ft): 267

Maximum Trench Depth (in): 30 Depth of Media (in): N/A Distribution Device: Manifold (LPP Distri

III. **Repair System Type:** PPBPS (pressurized) **System Classification:** IVa

Repair System Specifications:

Design Flow (gpd): 480 LTAR (gpd/ft^2): 0.3 Septic Tank Size (gal): 1500 Pump Tank Size (gal): 1500

Trench Width (ft): 3 Trench Spacing (ft): 9 Absorption Area (ft^2): 800 Total Trench Length (ft): 267

Maximum Trench Depth (in): 30 Depth of Media (in): N/A Distribution Device: Manifold (LPP Distri

IV. **Permit Condition(s)/Comments:**

(Please See the Following Page for Permit Conditions.)

The undersigned, an authorized agent of the MECKLENBURG COUNTY HEALTH DEPARTMENT, certifies that the Department is issuing an IMPROVEMENT PERMIT for the above referenced property. This permit is being issued in accordance with the *Laws and Rules For Sewage Treatment and Disposal Systems* and is subject to the following provisions:

- No work shall be conducted on the septic system until an INSTALLATION APPROVAL is granted by the Department.
- The septic system installer shall be a registered septic contractor with Mecklenburg County Health Department.
- The permitted system shall be installed in accordance with the included PLOT PLAN.
- This IMPROVEMENT PERMIT is transferable.

OENR Authorized Agent: Jeremy Michelone

Signature: Jeremy Michelone, RS

Date Issued: 5/18/2007

Owner/Legal Agent: Rick Jasinski
Print Name

Signature: Rick Jasinski

Mecklenburg County Groundwater & Wastewater Services
700 N. Tryon St, Suite 211 Charlotte, NC 28202
Phone: (704) 336-5103 Fax: (704) 336-8894

NC DENR
Division of Environmental Health
On-Site Wastewater Section

IMPROVEMENT PERMIT for a RESIDENTIAL ON-SITE WASTEWATER TREATMENT & DISPOSAL SYSTEM

Permit #: 30001774 GWS File #: 6897B

IV. Permit Conditions/Comments:

- Easement agreement forms shall be on file and the property shall be deeded and recorded prior to issuance of Construction Authorization.
- This type of septic system requires an inspection once every 3 years by our office. The system owner is responsible for any fees, as determined by the Mecklenburg County Board of Commissioners, associated with this inspection.
- This type of septic system requires a Certified Operator to maintain the system. A system maintenance contract with a Certified Operator must be on file prior to issuance of an Operation Permit

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- This IMPROVEMENT PERMIT is transferable.

DENR Authorized Agent: Jeremy Michelone

Signature: Jeremy Michelone R.S.

Date Issued: 5/18/2007

Owner/Legal Agent: Rick Jarzynski
Print Name

Signature: Rick Jarzynski

Mecklenburg County Groundwater & Wastewater Services
700 N. Tryon St, Suite 211 Charlotte, NC 28202
Phone: (704) 336-5103 Fax: (704) 336-6894

NC DENR
Division of Environmental Health
On-Site Wastewater Section

IMPROVEMENT PERMIT for a RESIDENTIAL ON-SITE WASTEWATER TREATMENT & DISPOSAL SYSTEM

Permit #: **30001774** GWS File #: **6897B** Tax Parcel #: **019-243-06**

- This IMPROVEMENT PERMIT is subject to revocation if site plans or the intended use change. There is to be **NO** grading, filling, or disturbance of the soil in the area of the septic tank system or repair area.
- CONSTRUCTION AUTHORIZATION must be obtained prior to receiving a Building Permit. The Construction Authorization is **NOT** transferable. Do not clear, grade, fill or disturb soil prior to obtaining a Construction Authorization.
- Domestic-type wastewater only. No industrial process wastewater may be discharged into the system.

I. This Improvement Permit Shall: Expire in Five (5) Years **Expiration Date (If Applicable):** 5/18/2012

Type of Installation: Residential - New System Lot Number: 19

Structure Type: HOUSE Size (ft^2): 0 # Bedrooms: 4 # Occupants: 4

Building Foundation: Basement With Plumbing Water Supply: Private Well

II. Initial System Type: PPBPS (pressurized) **System Classification:** IVa

Initial System Specifications:

Design Flow (gpd):	480	LTAR (gpd/ft^2):	0.3	Septic Tank Size (gal):	1500	Pump Tank Size (gal):	1500
Trench Width (ft):	3	Trench Spacing (ft):	9	Absorption Area (ft^2):	801	Total Trench Length (ft):	267
Maximum Trench Depth (in):	30	Depth of Media (in):	N/A	Distribution Device:	Manifold (LPP Distri		

III. Repair System Type: PPBPS (pressurized) **System Classification:** IVa

Repair System Specifications:

Design Flow (gpd):	480	LTAR (gpd/ft^2):	0.3	Septic Tank Size (gal):	1500	Pump Tank Size (gal):	1500
Trench Width (ft):	3	Trench Spacing (ft):	9	Absorption Area (ft^2):	800	Total Trench Length (ft):	267
Maximum Trench Depth (in):	30	Depth of Media (in):	N/A	Distribution Device:	Manifold (LPP Distri		

IV. Permit Conditions/Comments:

(Please See the Following Page for Permit Conditions.)

The undersigned, an authorized agent of the MECKLENBURG COUNTY HEALTH DEPARTMENT, certifies that the Department is issuing an IMPROVEMENT PERMIT for the above referenced property. This permit is being issued in accordance with the *Laws and Rules For Sewage Treatment, and Disposal Systems* and is subject to the following provisions:

- No work shall be conducted on the septic system until an INSTALLATION APPROVAL is granted by the Department.
- The septic system installer shall be a registered septic contractor with Mecklenburg County Health Department.
- The permitted system shall be installed in accordance with the included PLOT PLAN.
- This IMPROVEMENT PERMIT is transferable.

DENR Authorized Agent: Jeremy Michelone Owner/Legal Agent: _____
Print Name

Signature: Jeremy Michelone, R-S Signature: _____

Date Issued: 5/18/2007

Mecklenburg County Groundwater & Wastewater Services
700 N. Tryon St, Suite 211 Charlotte, NC 28202
Phone: (704) 336-5103 Fax: (704) 336-6894

NC DENR
Division of Environmental Health
On-Site Wastewater Section

IMPROVEMENT PERMIT for a RESIDENTIAL ON-SITE WASTEWATER TREATMENT & DISPOSAL SYSTEM

Permit #: **30001774** GWS File #: **6897B**

IV. Permit Conditions/Comments:

- Easement agreement forms shall be on file and the property shall be deeded and recorded prior to issuance of Construction Authorization.
- This type of septic system requires an inspection once every 3 years by our office. The system owner is responsible for any fees, as determined by the Mecklenburg County Board of Commissioners, associated with this inspection.
- This type of septic system requires a Certified Operator to maintain the system. A system maintenance contract with a Certified Operator must be on file prior to issuance of an Operation Permit.

The undersigned, an authorized agent of the MECKLENBURG COUNTY HEALTH DEPARTMENT, certifies that the Department is issuing an IMPROVEMENT PERMIT for the above referenced property. This permit is being issued in accordance with the *Laws and Rules For Sewage Treatment and Disposal Systems* and is subject to the following provisions:

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- The permitted system shall be installed in accordance with the included PLOT PLAN.
- This IMPROVEMENT PERMIT is transferable.

DENR Authorized Agent: Jeremy Michelone

Signature: Jeremy Michelone, R.S.

Date Issued: 5/18/2007

Owner/Legal Agent: _____
Print Name

Signature: _____

S&ME

GWS Septic System Design Review

May 4, 2007

GWS File #: 6897B	Approved	Disapproved
Design Review: TCT 5-16-07	☒	☐
Field Review: JM 4/5/07	☒	☐

*Projects are not considered "APPROVED" until both sections above are completed and indicate an APPROVED status.

Mr. Rick Jasinski
Simonini Builders
1910 South Boulevard, Suite 200
Charlotte, North Carolina 28203

Reference: **Request for a Septic Improvement Permit for Lot 19 at The Pavilion**
Mecklenburg County Health Department (MCHD) File #6897B

Dear Mr. Jasinski,

Attached is the request for the Improvement Permit for the above referenced lot. We are requesting an Improvement Permit for a ~~4 bedroom house~~. We are proposing a ~~EPP PPBPS system and a LPPPBPS repair~~. Mr. Bill Marlin, LSS with the MCHD has evaluated the soils (see attached MCHD soil sheets) and approved the proposed septic area at a 0.3 gpd/sqft LTAR. S&ME, Inc. has flagged the primary system and repair on the proposed septic area. The attached sketch and specifications are not an Improvement Permit and are intended only to assist the MCHD in permitting the referenced lot at The Pavilion.

This lot will utilize an ~~off-site septic~~ area for the septic system drainfield. Simonini will install the pipe from the lot to the septic area easement in the recorded septic supply line easement. The pipe will be ~~5 inch SCH 40 PVC~~ unless otherwise specified by both the MCHD and the Town of Huntersville in writing. Both the MCHD and Huntersville should sign off on the proposed pipe specifications and routing prior to installation. Both should also be advised of the installation schedule so they can inspect the installation as necessary.

A building permit cannot be issued until the MCHD issues an Authorization to Construct (ATC). The buyer will apply for the ATC. **No grading shall take place on the septic area prior to obtaining the ATC from the MCHD.**

The proposed system is a TYPE IV and will require a contract with a ~~Certified Operator~~ to supply maintenance services for the septic system. Please review the attached system sketch and design specifications for the Improvement Permit. If necessary, the MCHD may add comments to the site plan or specifications. Please call in you have and questions or comments.

Sincerely,

S&ME, Inc.

Paul G. Penninger, LSS
Licensed Soil Scientist

Rob Willcox, LSS
Natural Resources Department Manager

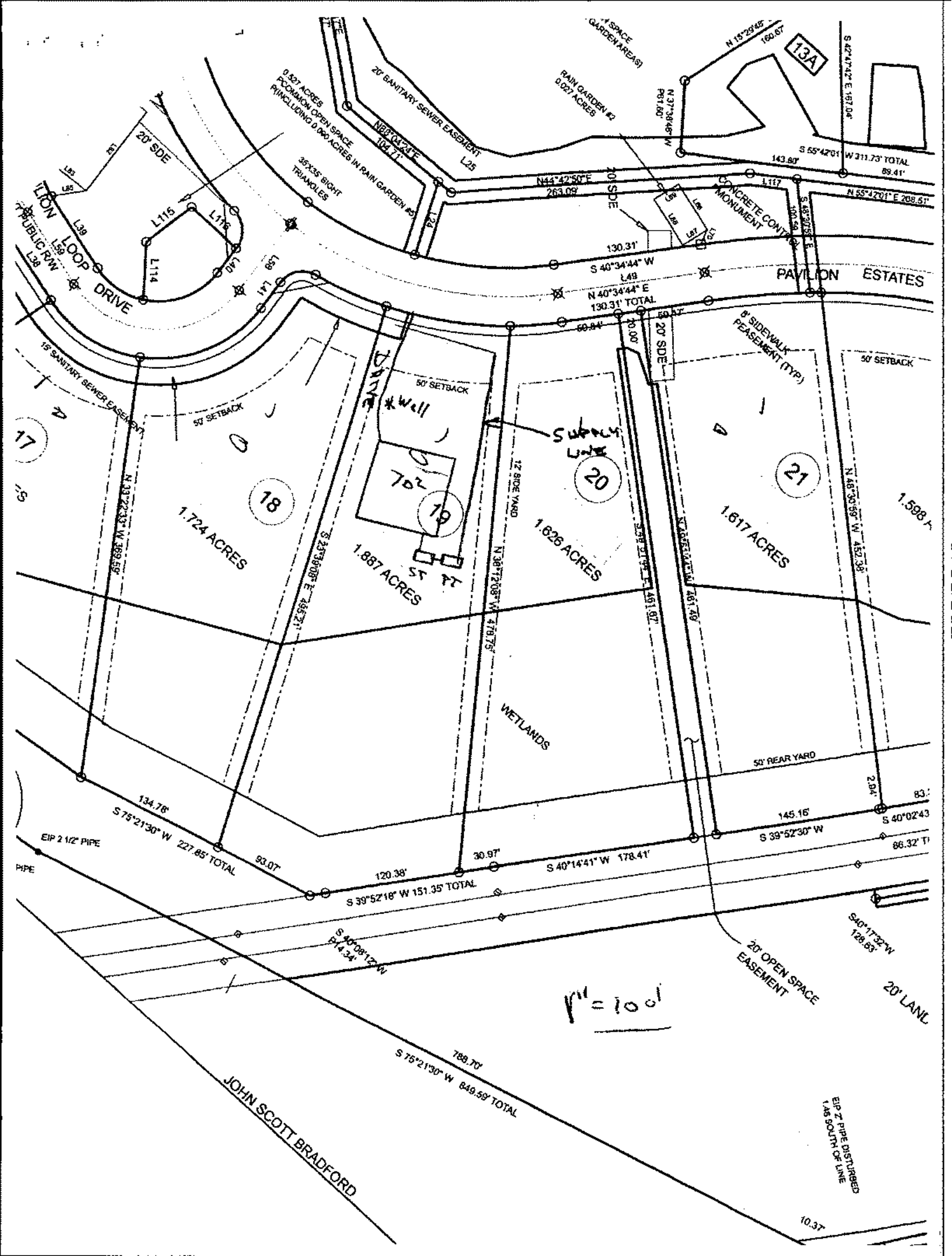
Attachments:
1. System Specifications
2. Site Plan
3. MCHD Soil Evaluation

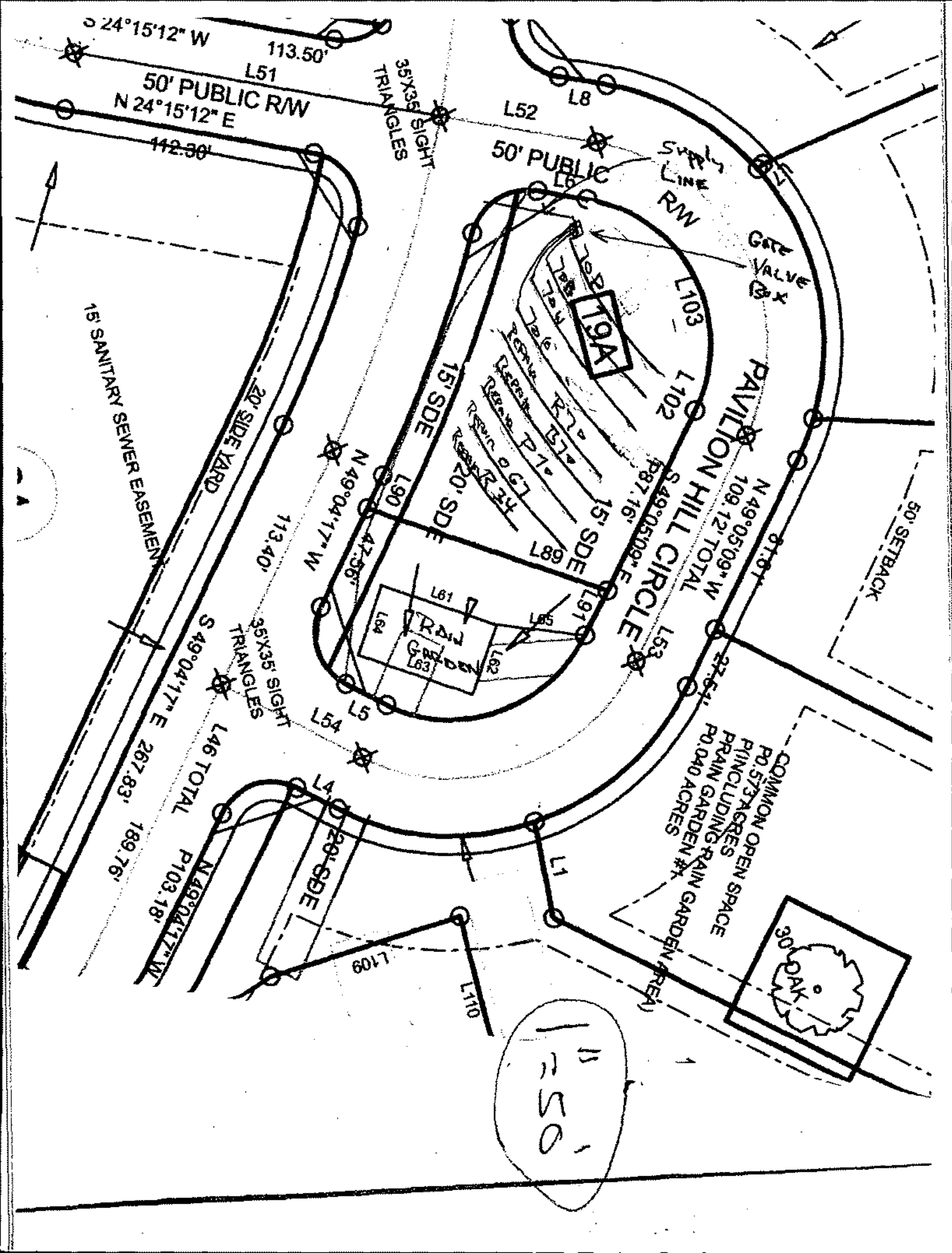
Copy: Mr. Jeremy Michelone, R.S.
MCHD

Design Specifications for Lot 19 at The Pavilion ✓ TCT
MCHD File # 6897B

Daily Design Flow:	480 gpd
Number Bedrooms:	4 bdr.
Basement or Crawlspace:	~~Basement~~
Septic Tank Size:	1500 gal
Pump Tank Size:	1500 gal
Primary System Loading Rate:	0.3 gpd/ft^2
Primary System:	LP PPBPS
Number and length of laterals:	4 @ 70 ft.
Total ft. of primary system:	~~270 ft.~~ 280 ℄.
Number of T&J Panels:	16 per 70 ft. line for a total of 64 panels
Flow Rate through system:	32 gpm – use 5/32 in. holes with 3 ft. head pressure
Pump Requirements:	to be calculated by installer when specific house and pump tank locations are available
Dosing Volume:	approx. 230 gal. – (3.6 gal per panel)*
Depth of effluent pumped per dose:	calculated to specific tank by measure or dealer engineering specifications (1 cubic ft. of water equals 7.48 gal.)
Check Valve:	yes
Siphon break hole:	yes
Repair System Loading Rate:	0.3 gpd/ft^2
Repair System:	LP PPBPS
Total ft. of repair	311 ft. (267 ft. required)

Notes: Before placement of cap block, one panel on each line, near the center of the field should be observed filling to male certain that it does not overflow the top chamber into the air chambers. If overflow occurs, reduce floats by 25 gallons and reset until no overflow is observed.


13A
20' SANITARY SEWER EASEMENT
RAIN GARDEN #2
0.027 ACRES
0.527 ACRES
PCOMMON OPEN SPACE
P(INCLUDING 0.060 ACRES IN RAIN GARDEN #2
35'X35' SIGHT TRIANGLES
N 15°29'45" E 160.67'
S 42°47'42" E 167.04'
S 55°42'01" W 311.73' TOTAL
89.41'
143.80'
N44°42'50"E
263.09'
20' SIDE
N 55°42'01" E 208.51'
CONCRETE CONTROL MONUMENT
S 40°34'44" W
130.31'
L49
N 40°34'44" E
130.31' TOTAL
PAVILION ESTATES
LOOP DRIVE
PUBLIC R/W
15' SANITARY SEWER EASEMENT
50' SETBACK
8' SIDEWALK PEASEMENT (TYP)
20' SIDE
50' REAR YARD
17
18
19
20
21
1.724 ACRES
1.887 ACRES
1.626 ACRES
1.617 ACRES
1.598 A
*Well
Subject Line
WETLANDS
N 33°22'37" W 369.59'
S 23°39'08" E 495.21'
N 38°12'08" W 478.79'
S 48°30'59" E 491.87'
N 48°30'59" W 452.38'
N 48°30'59" W 461.79'
134.76'
S 75°21'30" W 227.85' TOTAL
93.07'
120.38'
S 39°52'18" W 151.35' TOTAL
30.97'
S 40°14'41" W 178.41'
145.15'
S 39°52'30" W
S 40°02'43
EIP 2 1/2" PIPE
PIPE
S 40°08'13" W
814.34'
S40°17'32"W
128.63'
20' OPEN SPACE EASEMENT
20' LANE
1" = 100'
788.70'
S 75°21'30" W 849.59' TOTAL
JOHN SCOTT BRADFORD
EIP 2" PIPE DISTURBED 1.45 SOUTH OF LINE
10.37'


S 24°15'12" W
113.50'
L51
50' PUBLIC R/W
N 24°15'12" E
112.30'
35'X35' SIGHT TRIANGLES
L52
L8
50' PUBLIC
L6
SWR LINE
R/W
GATE VALVE BOX
L103
L102
19A
PAVILION HILL CIRCLE
15' SIDE
20' SIDE YARD
15' SANITARY SEWER EASEMENT
N 49°04'17" W
113.40'
L90
L89
L91
L61
L64
L65
L62
L63
L53
L54
L5
L4
L46 TOTAL
S 49°04'17" E
267.83'
189.76'
N 49°04'17" W
P103.18'
20' SIDE
L109
L110
50' SETBACK
COMMON OPEN SPACE
P0.573 ACRES
PINCLUDING RAIN GARDEN #4
P0.040 ACRES
30" OAK
L1
150'

Department of Environment, Health, and Natural Resources
Division of Environmental Health
On-site Wastewater Section

Sheet: 1 of 2
Property ID: 019-243-06
Lot #: 19
File #: 6897B
AppID: 1774

SOIL/SITE EVALUATION
for ON-SITE WASTEWATER SYSTEM

Owner: *The Pavilion of Huntersville*
Applicant: S & ME, Jacob Presley
Address: 1910 S. Blvd., Ste 200, Charlotte, N. C. 28203
Date Evaluated: 2/2/07
Proposed Facility: Residence
Design Flow (.1949): 600gpd
Property Size: 2.0a
Location of Site: Pavilion Estates Drive
Property Recorded:
Water Supply: [ ] Public [ ] Individual [x] Well [ ] Spring [ ] Other
Evaluation Method: [x] Auger Boring [ ] Pit [ ] Cut
Type of Wastewater: [x] Sewage [ ] Industrial Process [ ] Mixed

PROFILE #	.1940 Landscape Position/ Slope%	Horizon Depth (IN.)	SOIL MORPHOLOGY .1941 1941 Structure/ Texture	SOIL MORPHOLOGY .1941 1941 Consistence Mineralogy	b PROFILE FACTORS 1942 Soil Wetness/ Color	1943 Soil Depth (IN.)	1956 Sapro Class	1944 Restr Horiz	Profile Class & LTAR
1	LS, 8	0-3	GR/SCL	FR/SEXP/SS/SP	>48" TO SOIL WETNESS	48+	N/A	NONE	PS, IV .3GPD/FT^2
		3-48	SBK/C	FI/SEXP/S/P					
2	"	0-3	GR/SCL	FR/SEXP/SS/SP	"	"	"	"	"
		3-40	SBK/ABK/C	FI/SEXP/S/P					
		40-48	SBK/CL	FR/SEXP/SS/SP					
3	LS, 10	0-16	GR/SCL	"	>24" TO SOIL WETNESS	16	"	"	US
		16-24	M/SL	FR/SEXP/NS/NP					
4	LS, 8	0-3	GR/SCL	FR/SEXP/SS/SP	>48" TO SOIL WETNESS	48	"	"	PS, IV .3GPD/FT^2
		3-30	SBK/C	FI/SEXP/S/P					
		30-48	SBK/CL	FR/SEXP/SS/SP					
5	"	0-3	GR/SCL	"	>45" TO SOIL WETNESS	45	"	"	"
		3-29	SBK/C	FI/SEXP/S/P					
		29-45	SBK/CL	FR/SEXP/SS/SP					
6	"	0-3	GR/SCL	"	>48" TO SOIL WETNESS	48	"	"	"
		3-18	SBK/C	FI/SEXP/S/P					
		18-48	SBK/CL	FR/SEXP/SS/SP					
					SITE LTAR .3GPD/FT^2				

Description	Initial System	Repair System
Available Space (.1945)		
System Type(s)		
Site LTAR		

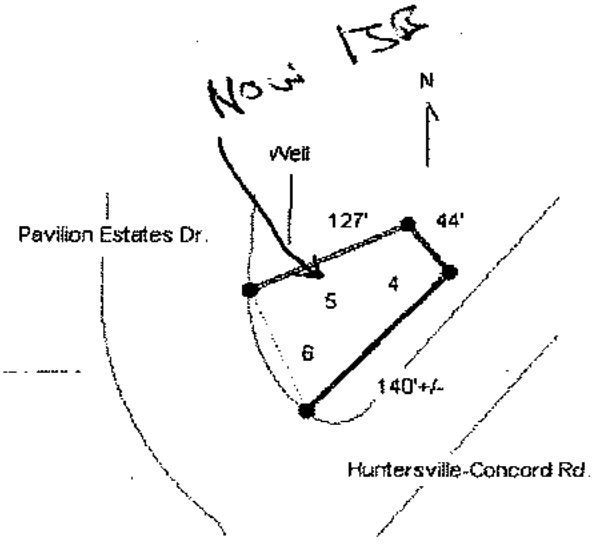
Other Factors (.1946):
Soil Evaluation By: W. R. Martin, LSS, 2/13/2007
Others Present:
Site Classification (.1948):
Site Evaluation By:
Others Present:

COMMENTS:

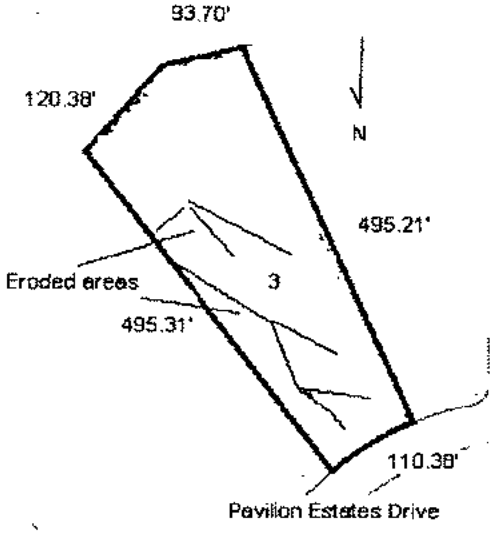
100% repair, drainfield locations in COS in area of lots 1-4,
and on right of subdivision entrance on Huntersville-Concord Rd.
Well that probably needs abandoning below DF area at H-C Rd.

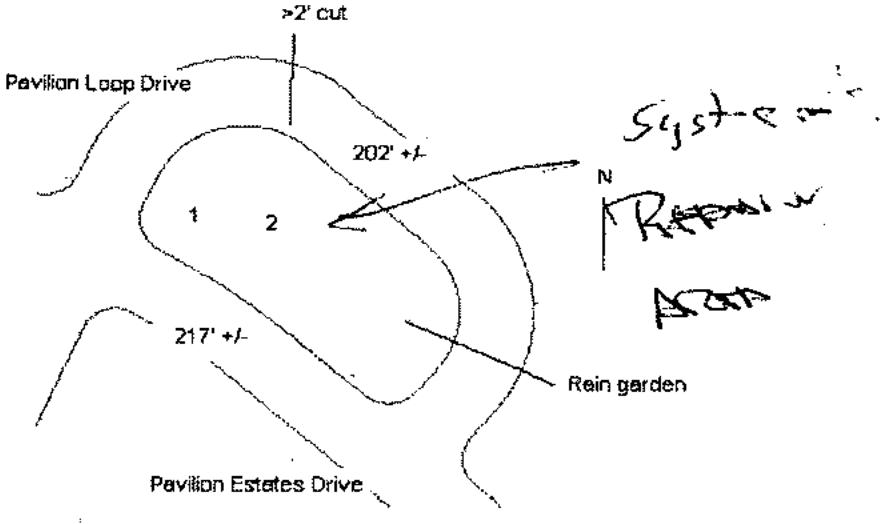
Landscape Position	Group	Texture	.1955 LTAR	Structure
R-Ridge	I	S-Sand	1.2 - 0.8	SG-Single Grain
SS-Shoulder Slope		LS-Loamy Sand		M-Massive
LS-Linear Slope				CR-Crumb
FS-Foot Slope	II	SL-Sandy Loam	0.8 - 0.6	GR-Granular
NS-Nose Slope		L-Loam		SBK-Subangular Blocky
HS-Head Slope				ABK-Angular Blocky
CC-Concave Slope	III	SI-Silt	0.6 - 0.3	PL-Platy
CV-Convex Slope		SICL-Silty Clay Loam		PR-Prismatic
T-Terrace				
FP-Flood Plain		CL-Clay Loam		
		SCL-Sandy Clay Loam		
	IV	SC-Sandy Clay	0.4 - 0.1	
		SIC-Silty Clay		
		C-Clay		

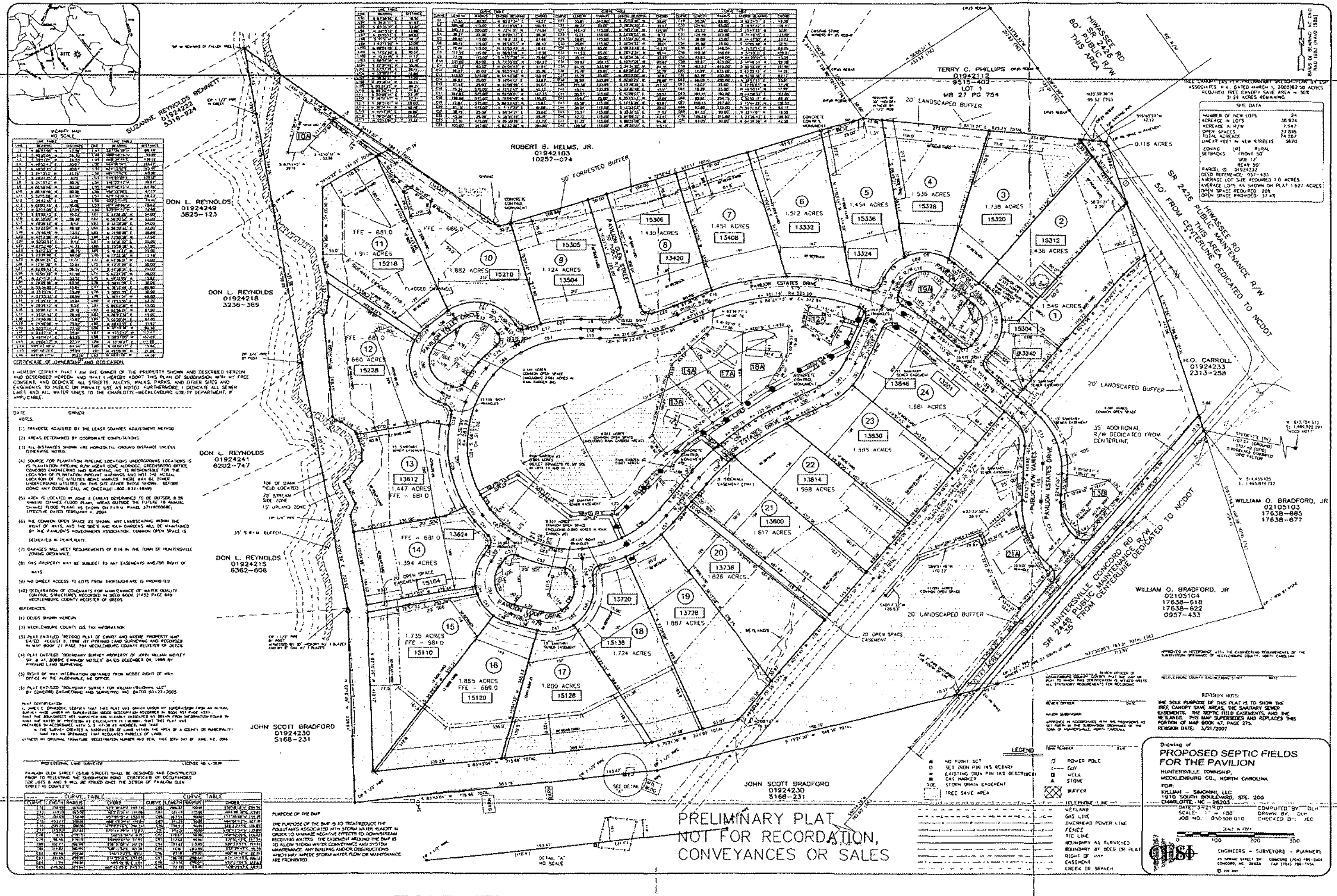
Consistence Moist	Consistence Wet	Mineralogy
VFR-Very Friable	NS-Non-Sticky	SEXP-Slightly Expansive
FR-Friable	SS-Slightly Sticky	EXP-Expansive
FI-Firm	S-Sticky	
VFI-Very Firm	VS-Very Sticky	
EFI-Extremely Firm	NP-Non-Plastic	
	SP-Slightly Plastic	
	P-Plastic	
	VP-Very Plastic	

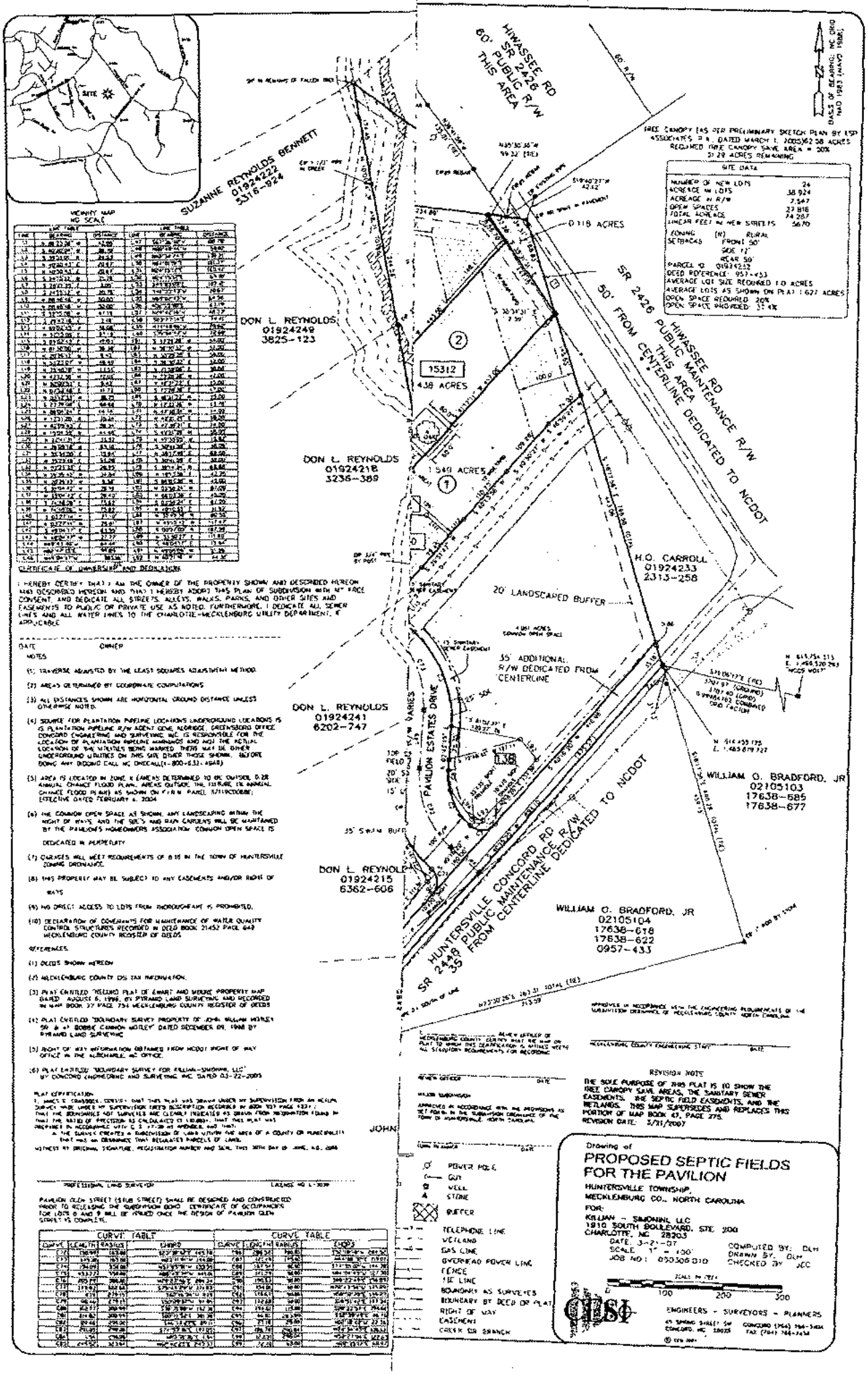


Sketch of Soil Evaluation Locations






VICINITY MAP
NO SCALE
SITE
SUZANNE REYNOLDS BENNETT
01924222
5316-824
ROBERT B. HELMS, JR.
01942103
10257-074
DON L. REYNOLDS
01924249
3825-123
DON L. REYNOLDS
01924218
3236-389
DON L. REYNOLDS
01924241
6202-747
DON L. REYNOLDS
01924215
6362-606
JOHN SCOTT BRADFORD
01924230
5168-231
TERRY C. PHILLIPS
01942112
9515-402
LOT 1
MB 27 PG 754
HWASSEE RD
60' PUBLIC R/W
THIS AREA
SR 2426
50' FROM CENTERLINE DEDICATED TO NCDOT
H.O. CARROLL
01924233
2313-258
WILLIAM O. BRADFORD, JR
02105103
17638-885
17638-677
WILLIAM O. BRADFORD, JR
02105104
17638-618
17638-622
0957-433
PAVILION GLEN STREET
PAVILION ESTATES DRIVE
PAVILION VALLEY CIRCLE
PAVILION KNOLL DRIVE
50' FORESTED BUFFER
20' LANDSCAPED BUFFER
20' OPEN SPACE EASEMENT
35' ADDITIONAL R/W DEDICATED FROM CENTERLINE
HUNTERSVILLE CONCORD RD R/W
SR 2449
PUBLIC MAINTENANCE R/W
35' FROM CENTERLINE DEDICATED TO NCDOT
SITE DATA
NUMBER OF NEW LOTS 24
ACREAGE IN LOTS 38.924
ACREAGE IN R/W 7.547
OPEN SPACES 27.836
TOTAL ACREAGE 74.057
LINEAR FEET IN NEW STREETS 5870
ZONING (E) RURAL
SETBACKS FRONT 50'
SIDE 12'
REAR 30'
PARCEL ID 01924232
DEED REFERENCE: 957-433
AVERAGE LOT SIZE REQUIRED 1.0 ACRES
AVERAGE LOTS AS SHOWN ON PLAT 1.627 ACRES
OPEN SPACE REQUIRED 20%
OPEN SPACE PROVIDED 37.4%
TREE CANOPY (AS PER PRELIMINARY SKETCH PLAN BY LDP ASSOCIATES P.A. DATED MARCH 1, 2005) 62.58 ACRES
REQUIRED FREE CANOPY SAVE AREA = 50%
31.29 ACRES REMAINING
REVISION NOTE:
THE SOLE PURPOSE OF THIS PLAT IS TO SHOW THE TREE CANOPY SAVE AREAS, THE SANITARY SEWER EASEMENTS, THE SEPTIC FIELD EASEMENTS, AND THE WETLANDS. THIS MAP SUPERSEDES AND REPLACES THIS PORTION OF MAP BOOK 47, PAGE 275.
REVISION DATE: 3/21/2007
LEGEND
NO POINT SET
SET IRON PIN (#5 REBAR)
EXISTING IRON PIN (AS DESCRIBED)
GAS MARKER
SDE STORM DRAIN EASEMENT
TREE SAVE AREA
POWER POLE
GUY
WELL
STONE
BUFFER
LOT LINE
WETLAND
GAS LINE
OVERHEAD POWER LINE
FENCE
TIC LINE
BOUNDARY AS SURVEYED
BOUNDARY BY DEED OR PLAT
RIGHT OF WAY
EASEMENT
CREEK OR BRANCH
PRELIMINARY PLAT
NOT FOR RECORDATION,
CONVEYANCES OR SALES
Drawing of
PROPOSED SEPTIC FIELDS
FOR THE PAVILION
HUNTERSVILLE TOWNSHIP,
MECKLENBURG CO., NORTH CAROLINA
FOR:
WILLIAM - SIMONINI, LLC
1910 SOUTH BOULEVARD, STE. 200
CHARLOTTE, NC - 28203
DATE: 3/22/2007
SCALE: 1" = 100'
JOB NO.: 050308.010
COMPUTED BY: DLH
DRAWN BY: DLH
CHECKED BY: JEC
CESI
ENGINEERS - SURVEYORS - PLANNERS
CERTIFICATE OF OWNERSHIP AND DEDICATION
I HEREBY CERTIFY THAT I AM THE OWNER OF THE PROPERTY SHOWN AND DESCRIBED HEREON AND DESCRIBED HEREON AND THAT I HEREBY ADOPT THIS PLAN OF SUBDIVISION WITH MY FREE CONSENT, AND DEDICATE ALL STREETS, ALLEYS, WALKS, PARKS, AND OTHER SITES AND EASEMENTS TO PUBLIC OR PRIVATE USE AS NOTED. FURTHERMORE I DEDICATE ALL SEWER LINES AND ALL WATER LINES TO THE CHARLOTTE-MECKLENBURG UTILITY DEPARTMENT, IF APPLICABLE.
DATE OWNER
NOTES:
(1) TRAVERSE ADJUSTED BY THE LEAST SQUARES ADJUSTMENT METHOD
(2) AREAS DETERMINED BY COORDINATE COMPUTATIONS
(3) ALL DISTANCES SHOWN ARE HORIZONTAL GROUND DISTANCE UNLESS OTHERWISE NOTED.
(4) SOURCE FOR PLANTATION PIPELINE LOCATIONS UNDERGROUND LOCATIONS IS (E) PLANTATION PIPELINE R/W AGENT CDNE ALDRIDGE, GREENSBORO OFFICE, CONCORD ENGINEERING AND SURVEYING, INC IS RESPONSIBLE FOR THE LOCATION OF PLANTATION PIPELINE MARKINGS AND NOT THE ACTUAL LOCATION OF THE UTILITIES BEING MARKED. THERE MAY BE OTHER UNDERGROUND UTILITIES ON THIS SITE OTHER THOSE SHOWN. BEFORE DOING ANY DIGGING CALL NC ONECALL (1-800-632-4949)
(5) AREA IS LOCATED IN ZONE X (AREAS DETERMINED TO BE OUTSIDE 0.2% ANNUAL CHANCE FLOOD PLAIN) AREAS OUTSIDE THE FUTURE (1) ANNUAL CHANCE FLOOD PLAIN) AS SHOWN ON F.I.R.M. PANEL 3719CO068E, EFFECTIVE DATED FEBRUARY 4, 2004
(6) THE COMMON OPEN SPACE AS SHOWN, ANY LANDSCAPING WITHIN THE RIGHT OF WAYS, AND THE SIDES AND REAR GARDENS WILL BE MAINTAINED BY THE PAVILION'S HOMEOWNERS ASSOCIATION. COMMON OPEN SPACE IS DEDICATED IN PERPETUITY.
(7) GARAGES WILL MEET REQUIREMENTS OF R-16 IN THE TOWN OF HUNTERSVILLE ZONING ORDINANCE.
(8) THIS PROPERTY MAY BE SUBJECT TO ANY EASEMENTS AND/OR RIGHT OF WAYS
(9) NO DIRECT ACCESS TO LOTS FROM THOROUGHFARE IS PROHIBITED
(10) DECLARATION OF COVENANTS FOR MAINTENANCE OF WATER QUALITY CONTROL STRUCTURES RECORDED IN DEED BOOK 21482 PAGE 649 MECKLENBURG COUNTY REGISTER OF DEEDS
REFERENCES:
(a) DEEDS SHOWN HEREON
(b) MECKLENBURG COUNTY GIS TAX INFORMATION
(c) PLAT ENTITLED "RECORD PLAT OF SMART AND MOORE PROPERTY MAP DATED AUGUST 8, 1996 BY HYPRARD LAND SURVEYING AND RECORDED IN MAP BOOK 47 PAGE 794 MECKLENBURG COUNTY REGISTER OF DEEDS
(d) PLAT ENTITLED "BOUNDARY SURVEY PROPERTY OF JOHN WILLIAM MOREY SR. & wf. BONNIE CANNON MOREY" DATED DECEMBER 09, 1998 BY HYPRARD LAND SURVEYING
(e) RIGHT OF WAY INFORMATION OBTAINED FROM NCDOT RIGHT OF WAY OFFICE IN THE ASHEVILLE, NC OFFICE.
(f) PLAT ENTITLED "BOUNDARY SURVEY FOR WILLIAM-SIMONINI, LLC" BY CONCORD ENGINEERING AND SURVEYING, INC DATED 03-22-2005
PLAT CERTIFICATION:
I, JAMES E. CRAWFORD, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK 957 PAGE 433); THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION FOUND IN BOOK AS REFERENCED; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000+; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED; AND THAT
THE SURVEY CREATED A SUBDIVISION OF LAND WITHIN THE AREA OF A COUNTY OR MUNICIPALITY THAT HAS NO ORDINANCE THAT REGULATES PARCELS OF LAND).
WITNESS MY ORIGINAL SIGNATURE REGISTRATION NUMBER AND SEAL THIS 30TH DAY OF JUNE, A.D. 2006
PROFESSIONAL LAND SURVEYOR LICENSE NO L-3939
PAVILION GLEN STREET (S.R.# STREET) SHALL BE DESIGNED AND CONSTRUCTED PRIOR TO RELEASING THE SUBDIVISION BOND / CERTIFICATE OF OCCUPANCIES FOR LOTS 8 AND 9 WILL BE ISSUED ONCE THE DESIGN OF PAVILION GLEN STREET IS COMPLETE.
PURPOSE OF THE BMP
THE PURPOSE OF THE BMP IS TO TREAT/REDUCE THE POLLUTANTS ASSOCIATED WITH STORM WATER RUNOFF IN ORDER TO MINIMIZE NEGATIVE EFFECTS TO DOWNSTREAM RECEIVING WATERS. THE EASEMENT AROUND THE BMP IS TO ALLOW STORM WATER CONVEYANCE AND SYSTEM MAINTENANCE. ANY BUILDING AND/OR OBSTRUCTIONS WHICH MAY IMPEDE STORM WATER FLOW OR MAINTENANCE ARE PROHIBITED.
DETAIL "A" NO SCALE
SEE DETAIL "A"
BMP



LINE	LINE TABLE BEARING	DISTANCE
L1	S 88°23'30" W	72.88
L2	S 86°46'07" W	88.78
L3	S 85°31'55" W	29.63
L4	N 87°08'37" E	69.67
L5	S 24°19'32" W	25.78
L6	S 28°01'29" E	8.00
L7	S 24°19'32" W	50.00
L8	N 28°01'29" W	50.00
L9	S 24°19'32" W	50.00
L10	N 28°01'29" W	50.00
L11	S 24°19'32" W	67.19
L12	N 87°08'37" E	8.00
L13	S 87°08'37" W	58.66
L14	S 24°19'32" W	51.18
L15	S 89°07'43" E	29.83
L16	S 87°30'30" W	98.36
L17	S 24°19'32" W	8.19
L18	S 24°19'32" W	48.49
L19	S 23°46'18" W	11.55
L20	S 23°46'18" W	50.00
L21	N 24°19'32" E	8.49
L22	N 87°08'37" E	41.72
L23	S 24°19'32" W	28.77
L24	S 87°29'58" E	68.68
L25	S 88°50'14" E	14.16
L26	S 12°31'20" E	19.66
L27	S 45°59'52" E	28.30
L28	S 45°59'52" E	44.96
L29	N 12°41'31" E	15.32
L30	S 89°08'18" W	83.16
L31	S 30°53'20" E	13.84
L32	N 30°53'20" W	51.26
L33	N 87°23'18" E	26.35
L34	N 29°35'45" E	32.84
L35	N 28°24'33" E	9.56
L36	N 87°08'37" E	28.79
L37	N 33°04'39" E	28.43
L38	S 24°19'32" W	13.62
L39	N 24°19'32" E	15.62
L40	S 87°23'18" W	21.10
L41	S 87°23'18" W	25.61
L42	S 87°08'37" W	41.35
L43	S 87°08'37" W	28.79
L44	N 87°23'18" E	22.27
L45	N 87°23'18" E	24.34
L46	S 87°08'37" W	69.65

LINE	LINE TABLE BEARING	DISTANCE
L47	S 87°08'37" W	69.78
L48	N 87°08'37" E	69.78
L49	S 87°08'37" W	69.78
L50	N 87°08'37" E	69.78
L51	S 87°08'37" W	69.78
L52	N 87°08'37" E	69.78
L53	S 87°08'37" W	69.78
L54	N 87°08'37" E	69.78
L55	S 87°08'37" W	69.78
L56	N 87°08'37" E	69.78
L57	S 87°08'37" W	69.78
L58	N 87°08'37" E	69.78
L59	S 87°08'37" W	69.78
L60	N 87°08'37" E	69.78
L61	S 87°08'37" W	69.78
L62	N 87°08'37" E	69.78

CERTIFICATE OF OWNERSHIP AND DEDICATION

I HEREBY CERTIFY THAT I AM THE OWNER OF THE PROPERTY SHOWN AND DESCRIBED HEREON AND DESCRIBED HEREON AND THAT I HEREBY ADOPT THIS PLAN OF SUBDIVISION WITH MY FREE CONSENT, AND DEDICATE ALL STREETS, ALLEYS, WALKS, PARKS, AND OTHER SITES AND EASEMENTS TO PUBLIC OR PRIVATE USE AS NOTED. FURTHERMORE, I DEDICATE ALL SEWER LINES AND ALL WATER LINES TO THE CHARLOTTE-MECKLENBURG UTILITY DEPARTMENT, IF APPLICABLE

DATE OWNER

NOTES

(1) TRAVERSE ADJUSTED BY THE LEAST SQUARES ADJUSTMENT METHOD.

(2) AREAS DETERMINED BY COORDINATE COMPUTATIONS

(3) ALL DISTANCES SHOWN ARE HORIZONTAL GROUND DISTANCE UNLESS OTHERWISE NOTED.

(4) SOURCE FOR PLANTATION PIPELINE LOCATIONS UNDERGROUND LOCATIONS IS IS PLANTATION PIPELINE R/W AGENT GENE NORRIDGE, GREENSBORO OFFICE. CONCORD ENGINEERING AND SURVEYING, INC. IS RESPONSIBLE FOR THE LOCATION OF PLANTATION PIPELINE MARKINGS AND NOT THE ACTUAL LOCATION OF THE UTILITIES BEING MARKED. THERE MAY BE OTHER UNDERGROUND UTILITIES ON THIS SITE OTHER THOSE SHOWN. BEFORE DOING ANY DIGGING CALL NC ONECALL(1-800-632-ASAP)

(5) AREA IS LOCATED IN ZONE X (AREAS DETERMINED TO BE OUTSIDE 0.2% ANNUAL CHANCE FLOOD PLAIN, AREAS OUTSIDE THE FUTURE (0.2% ANNUAL CHANCE FLOOD PLAIN) AS SHOWN ON F.I.R.M. PANEL 3719 J DATED: EFFECTIVE DATED FEBRUARY 6, 2004

(6) THE COMMON OPEN SPACE AS SHOWN, ANY LANDSCAPING WITHIN THE RIGHT OF WAYS, AND THE SCE'S AND RAIN GARDENS WILL BE MAINTAINED BY THE PAVILION'S HOMEOWNERS ASSOCIATION. COMMON OPEN SPACE IS DEDICATED IN PERPETUITY

(7) GARAGES WILL MEET REQUIREMENTS OF 8.16 IN THE TOWN OF HUNTERSVILLE ZONING ORDINANCE.

(8) THIS PROPERTY MAY BE SUBJECT TO ANY EASEMENTS AND/OR RIGHTS OF WAYS

(9) NO DIRECT ACCESS TO LOTS FROM THOROUGHFARE IS PROHIBITED.

(10) DECLARATION OF COVENANTS FOR MAINTENANCE OF WATER QUALITY CONTROL STRUCTURES RECORDED IN DEED BOOK 21452 PAGE 649 MECKLENBURG COUNTY REGISTER OF DEEDS

REFERENCES

(1) DEEDS SHOWN HEREON

(2) MECKLENBURG COUNTY GIS TAX INFORMATION.

(3) PLAT ENTITLED "RECORD PLAT OF EWART AND MEEKS PROPERTY MAP DATED AUGUST 6, 1998, BY SYKAND LAND SURVEYING AND RECORDED IN MAP BOOK 37 PAGE 734 MECKLENBURG COUNTY REGISTER OF DEEDS

(4) PLAT ENTITLED "BOUNDARY SURVEY PROPERTY OF JOHN WILLIAM MORLEY SR & AT BOBBIE CANNON MORLEY" DATED DECEMBER 09, 1998 BY SYKAND LAND SURVEYING

(5) RIGHT OF WAY INFORMATION OBTAINED FROM NCDOT RIGHT OF WAY OFFICE IN THE ALBEMARLE, NC OFFICE.

(6) PLAT ENTITLED "BOUNDARY SURVEY FOR KILLIAN-SIMONINI, LLC" BY CONCORD ENGINEERING AND SURVEYING, INC. DATED 03-22-2005

PLAT CERTIFICATION

I, JAMES E. CRAWFORD, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK 957 PAGE 433); THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION FOUND IN BOOK AS NOTED; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000+; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. AND THAT:

A. THE SURVEY CREATES A SUBDIVISION OF LAND WITHIN THE AREA OF A COUNTY OR MUNICIPALITY THAT HAS AN ORDINANCE THAT REGULATES PARCELS OF LAND.

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 30TH DAY OF JUNE, A.D. 2006

PROFESSIONAL LAND SURVEYOR LICENSE NO. L-3039

PAVILION GLEN STREET (STUB STREET) SHALL BE DESIGNED AND CONSTRUCTED PRIOR TO RELEASING THE SUBDIVISION BOND. CERTIFICATE OF OCCUPANCIES FOR LOTS 8 AND 9 WILL BE WITHELD ONCE THE DESIGN OF PAVILION GLEN STREET IS COMPLETE.

CURVE TABLE					CURVE TABLE				
CURVE	LENGTH	RADIUS	CHORD		CURVE	LENGTH	RADIUS	CHORD	
C1	134.99'	432.96'	S27°38'07"E	134.43'	C16	284.52'	780.00'	S35°18'04"E	282.90'
C2	154.09'	325.00'	S13°31'51"E	152.67'	C17	127.42'	175.00'	S44°38'39"E	124.62'
C3	154.09'	325.00'	S13°31'51"E	152.67'	C18	187.54'	80.00'	S31°35'09"W	144.78'
C4	153.27'	325.00'	N86°23'39"W	151.84'	C19	141.29'	80.00'	N84°04'43"W	121.30'
C5	199.99'	286.00'	N76°23'39"W	195.94'	C20	194.83'	80.00'	S88°22'49"E	154.89'
C6	117.81'	286.00'	S39°41'13"W	116.99'	C21	154.89'	80.00'	N00°23'39"W	131.83'
C7	87.18'	214.15'	S40°08'36"W	86.59'	C22	156.63'	90.00'	S58°08'39"E	134.99'
C8	98.46'	214.15'	S52°59'30"W	97.60'	C23	132.68'	90.00'	S09°52'39"E	121.24'
C9	82.17'	200.00'	S39°39'39"W	81.60'	C24	116.61'	125.00'	S89°22'39"E	99.64'
C10	114.82'	200.00'	S15°31'39"W	113.26'	C25	44.82'	125.00'	S32°08'39"E	44.58'
C11	29.46'	200.00'	S06°23'39"E	29.43'	C26	29.46'	20.00'	S42°36'21"E	27.16'
C12	213.95'	175.00'	S34°23'39"E	200.61'	C27	186.76'	250.00'	N68°54'39"E	182.53'
C13	213.95'	175.00'	S34°23'39"E	200.61'	C28	57.23'	250.00'	N89°21'39"E	57.11'
C14	29.46'	20.00'	S42°36'21"E	27.16'	C29	74.68'	250.00'	N75°13'39"E	74.40'
C15	186.76'	250.00'	N68°54'39"E	182.53'	C30	54.85'	250.00'	N59°05'39"E	54.75'

SEPTIC SYSTEM DESIGN REVIEW WORKSHEET

File: 6897B

Address: Pavilion Estates Dr.

PID #: 01924232 PO

Subdivision:

Lot #: 19

Comments:

1. Need updated application on file for 4 bedrooms.
2. Update soil report to reflect 4 bedroom evaluation.
3. Lot requires easement(s) for supply line and drain field (initial & repair).

Reviewed By: Trevor Thomason TCT

Date: May 16, 2007

Status: **X Approved** **Disapproved** **Pending**

Department of Environment, Health, and Natural Resources
Division of Environmental Health
On-site Wastewater Section

Sheet: 1 of 2
Property ID: 019-243-06
Lot #: 19
File #: 6897B
AppID: 1774

SOIL/SITE EVALUATION for ON-SITE WASTEWATER SYSTEM

Owner: The Pavilion of Huntersville
Applicant: S & ME, Jacob Presley
Address: 1910 S. Blvd., Ste 200, Charlotte, N. C. 28203
Date Evaluated: 2/2/07
Proposed Facility: Residence
Design Flow (.1949): 600gpd
Property Size: 2.0a
Location of Site: Pavilion Estates Drive
Property Recorded:
Water Supply: [ ] Public [ ] Individual [x] Well [ ] Spring [ ] Other
Evaluation Method: [x] Auger Boring [ ] Pit [ ] Cut
Type of Wastewater: [x] Sewage [ ] Industrial Process [ ] Mixed

PROFILE #	.1940 Landscape Position/ Slope%	Horizon Depth (IN.)	SOIL MORPHOLOGY .1941 .1941 Structure/ Texture	.1941 Consistence Mineralogy	b PROFILE FACTORS .1942 Soil Wetness/ Color	.1943 Soil Depth (IN.)	.1956 Sapro Class	.1944 Restr Horiz	Profile Class & LTAR
1	LS, 8	0-3	GR/SCL	FR/SEXP/SS/SP	>48" TO SOIL WETNESS	48+	N/A	NONE	PS, IV .3GPD/FT^2
		3-48	SBK/C	FI/SEXP/S/P					
2	"	0-3	GR/SCL	FR/SEXP/SS/SP	"	"	"	"	"
		3-40	SBK/ABK/C	FI/SEXP/S/P					
		40-48	SBK/CL	FR/SEXP/SS/SP					
3	LS, 10	0-16	GR/SCL	"	>24" TO SOIL WETNESS	16	"	"	US
		16-24	M/SL	FR/SEXP/NS/NP					
4	LS, 8	0-3	GR/SCL	FR/SEXP/SS/SP	>48" TO SOIL WETNESS	48	"	"	PS, IV .3GPD/FT^2
		3-30	SBK/C	FI/SEXP/S/P					
		30-48	SBK/CL	FR/SEXP/SS/SP					
5	"	0-3	GR/SCL	"	>45" TO SOIL WETNESS	45	"	"	"
		3-29	SBK/C	FI/SEXP/S/P					
		29-45	SBK/CL	FR/SEXP/SS/SP					
6	"	0-3	GR/SCL	"	>48" TO SOIL WETNESS	48	"	"	"
		3-18	SBK/C	FI/SEXP/S/P					
		18-48	SBK/CL	FR/SEXP/SS/SP					
					SITE LTAR .3GPD/FT^2				

Description	Initial System	Repair System
Available Space (.1945)		
System Type(s)		
Site LTAR		

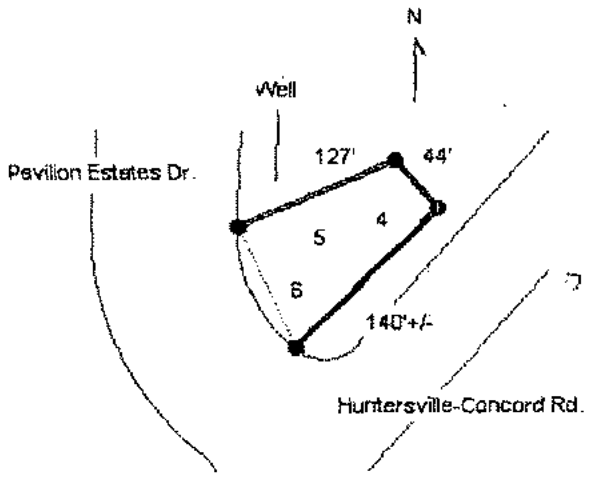
Other Factors (.1946):
Soil Evaluation By: W. R. Marlin, LSS, 2/13/2007 W. R. Marlin
Others Present:
Site Classification (.1948):
Site Evaluation By:
Others Present:

COMMENTS:

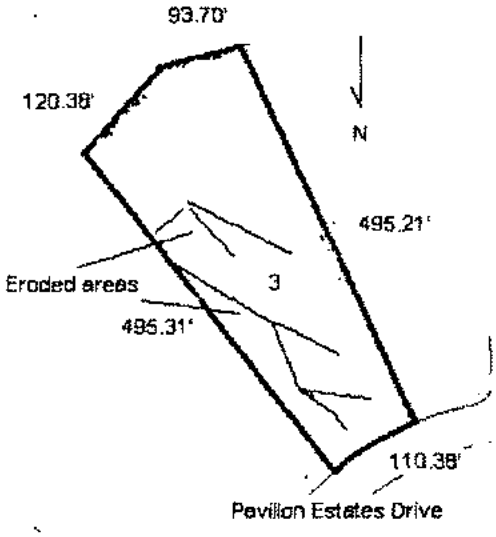
100% repair, drainfield locations in COS in area of lots 1-4, and on right of subdivision entrance on Huntersville-Concord Rd.
Well that probably needs abandoning below DF area at H-C Rd.

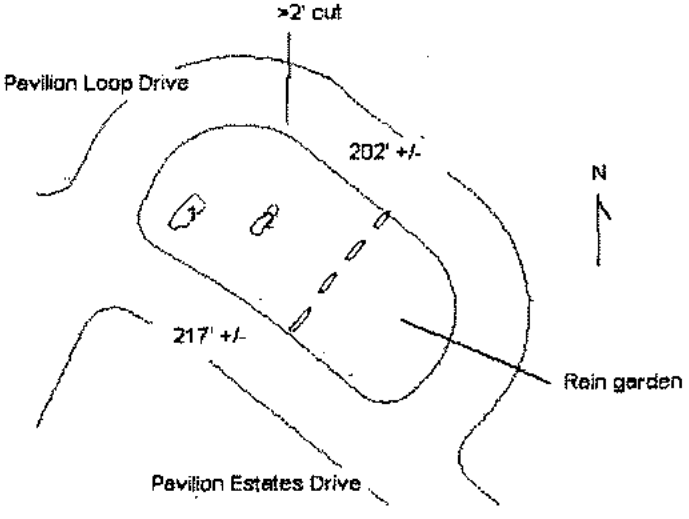
Landscape Position	Group	Texture	.1955 LTAR	Structure
R-Ridge	I	S-Sand	1.2 - 0.8	SG-Single Grain
SS-Shoulder Slope		LS-Loamy Sand		M-Massive
LS-Linear Slope				CR-Crumb
FS-Foot Slope	II	SL-Sandy Loam	0.8 - 0.6	GR-Granular
NS-Nose Slope		L-Loam		SBK-Subangular Blocky
HS-Head Slope				ABK-Angular Blocky
CC-Concave Slope	III	SI-Silt	0.6 - 0.3	PL-Platy
CV-Convex Slope		SICL-Silty Clay Loam		PR-Prismatic
T-Terrace		CL-Clay Loam		
FP-Flood Plain		SCL-Sandy Clay Loam		
	IV	SC-Sandy Clay	0.4 - 0.1	
		SIC-Silty Clay		
		C-Clay		

Consistence Moist	Consistance Wet	Mineralogy
VFR-Very Friable	NS-Non-Sticky	SEXP-Slightly Expansive
FR-Friable	SS-Slightly Sticky	EXP-Expansive
FI-Firm	S-Sticky	
VFI-Very Firm	VS-Very Sticky	
EFI-Extremely Firm	NP-Non-Plastic	
	SP-Slightly Plastic	
	P-Plastic	
	VP-Very Plastic	



Sketch of Soil Evaluation Locations





Department of Environment, Health, and Natural Resources
Division of Environmental Health
On-site Wastewater Section

Sheet: 1 of 2
Property ID: 019-243-06
Lot #: 19
File #: 6897B
AppID: 1774

SOIL/SITE EVALUATION
for ON-SITE WASTEWATER SYSTEM

Owner: The Pavilion of Huntersville
Applicant: S & ME, Jacob Presley
Address: 1910 S. Blvd., Ste 200, Charlotte, N. C. 28203
Date Evaluated: 2/2/07
Proposed Facility: Residence
Design Flow (.1949): 480 gpd
Property Size: 2.0a
Location of Site: Pavilion Estates Drive
Property Recorded:
Water Supply: [ ] Public [ ] Individual [x] Well [ ] Spring [ ] Other
Evaluation Method: [x] Auger Boring [ ] Pit [ ] Cut
Type of Wastewater: [x] Sewage [ ] Industrial Process [ ] Mixed

PROFILE #	.1940 Landscape Position/ Slope%	Horizon Depth (IN.)	SOIL MORPHOLOGY .1941 .1941 Structure/ Texture	.1941 Consistence Mineralogy	b PROFILE FACTORS .1942 Soil Wetness/ Color	.1943 Soil Depth (IN.)	.1956 Sapro Class	.1944 Restr Horiz	Profile Class & LTAR
1	LS, 8	0-3	GR/SCL	FR/SEXP/SS/SP	>48" TO SOIL WETNESS	48+	N/A	NONE	PS, IV
		3-48	SBK/C	FI/SEXP/S/P					.3GPD/FT^2
2	"	0-3	GR/SCL	FR/SEXP/SS/SP	"	"	"	"	"
		3-40	SBK/ABK/C	FI/SEXP/S/P					
		40-48	SBK/CL	FR/SEXP/SS/SP					
3	LS, 10	0-16	GR/SCL	"	>24" TO SOIL WETNESS	16	"	"	US
		16-24	M/SL	FR/SEXP/NS/NP					
4	LS, 8	0-3	GR/SCL	FR/SEXP/SS/SP	>48" TO SOIL WETNESS	48	"	"	PS, IV
		3-30	SBK/C	FI/SEXP/S/P					.3GPD/FT^2
		30-48	SBK/CL	FR/SEXP/SS/SP					
5	"	0-3	GR/SCL	"	>45" TO SOIL WETNESS	45	"	"	"
		3-29	SBK/C	FI/SEXP/S/P					
		29-45	SBK/CL	FR/SEXP/SS/SP					
6	"	0-3	GR/SCL	"	>48" TO SOIL WETNESS	48	"	"	"
		3-18	SBK/C	FI/SEXP/S/P					
		18-48	SBK/CL	FR/SEXP/SS/SP					
					SITE LTAR .3GPD/FT^2				

Description	Initial System	Repair System
Available Space (.1945)	PS	PS
System Type(s)	Iva	Iva
Site LTAR	0.3	0.3

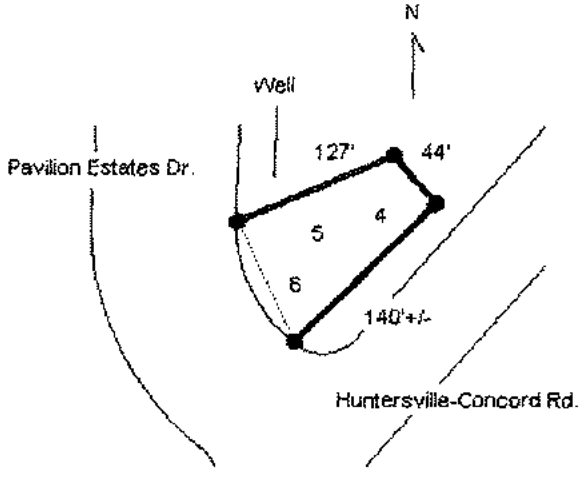
Other Factors (.1946):
Soil Evaluation By: W. R. Martin, LSS, 2/13/2007
Others Present:
Site Classification (.1948): PS
Site Evaluation By:
Others Present:

COMMENTS:

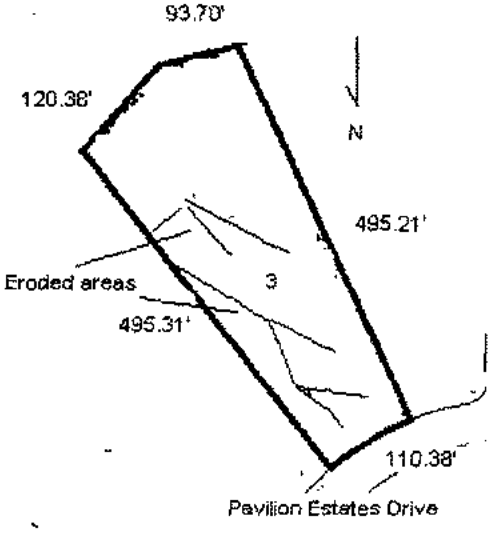
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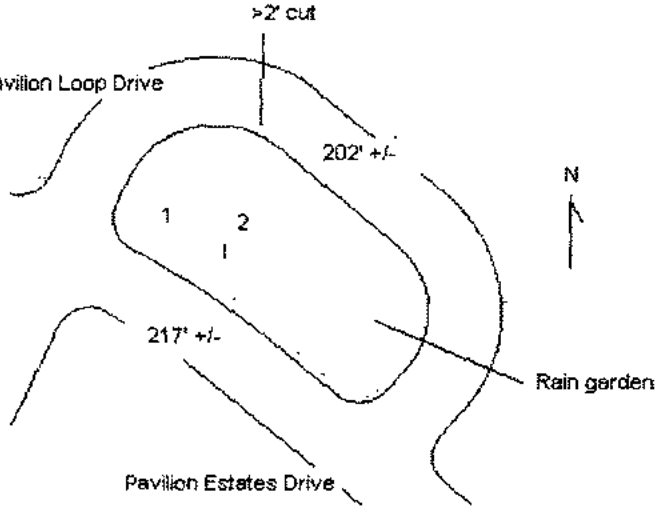
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CV-Convex Slope		SICL-Silty Clay Loam		PR-Prismatic
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VFI-Very Firm	VS-Very Sticky	
EFI-Extremely Firm	NP-Non-Plastic	
	SP-Slightly Plastic	
	P-Plastic	
	VP-Very Plastic	



Sketch of Soil Evaluation Locations





#1774

GWS – RES. APP 07/05

SEPTIC FEE: 200 CK
DATE: 1/30/07
CRT [ ]

PERMIT APPLICATION FOR A RESIDENTIAL SITE IMPROVEMENT PERMIT / CONSTRUCTION AUTHORIZATION FOR ON-SITE WASTEWATER SYSTEM NEW WELL INSTALLATION OR REPAIR OF EXISTING WELL MECKLENBURG COUNTY GROUNDWATER & WASTEWATER SERVICES

WELL FEE: _____
DATE: _____
CRT [ ]

FILE # 6897B

SEPTIC / TYPE APPLICATION: ☐ NONE ☑ NEW SYSTEM ☐ ALTERATION ☐ REPAIR ☐ MODIFY PLOT PLAN

WELL / TYPE APPLICATION: ☑ NONE ☐ NEW WELL ☐ MAJOR REPAIR ☐ ABANDONMENT

JOB LOCATION INFORMATION:

TAX/PARCEL #: 01924232P0
STREET ADDRESS: Pavilion Blvd Dr.
CITY: Huntersville NC
STATE: NC ZIP: 28078
SUBDIVISION OR MOBILE HOME PARK NAME:
LOT #: 19
TOWNSHIP:

☒ 0-MECKLENBURG ☐ 4-PINEVILLE
☐ 1-CHARLOTTE ☐ 5-MATTHEWS
☐ 2-DAVIDSON ☒ 6-HUNTERSVILLE
☐ 3-CORNELIUS ☐ 7-MINT HILL

BUILDING INFORMATION:

TYPE OF BUILDING:

☐ SINGLE MOBILE HOME (S) ☐ MODULAR HOME (M)
☐ DOUBLE WIDE (D) ☐ MULTIPLE FAMILY (U)
☑ HOUSE (H) ☐ OTHER

HEATED SQUARE FOOTAGE:
NUMBER OF BEDROOMS: 4
NUMBER OF OCCUPANTS:

FOUNDATION FOR RESIDENCE:

☐ CONCRETE SLAB ☑ BASEMENT WITH PLUMBING
☐ CRAWLSPACE ☐ BASEMENT WITH NO PLUMBING

IF PLANNING TO EXPAND/ALTER THE EXISTING SYSTEM INDICATE THE FOLLOWING CHANGES:

NUMBER OF BEDROOMS TO BE ADDED: NUMBER OF ADDITIONAL OCCUPANTS IN THE RESIDENCE:
WILL THERE BE A HOME BUSINESS IN THE RESIDENCE? ☐ YES ☐ NO TYPE:

WATER SUPPLY:

☐ MUNICIPAL (M) ☒ PUBLIC (C) ☒ PRIVATE WELL (P) ☐ SHARED WELL (S) ☐ OTHER 'SPRINGS' (O)

PROPOSED USE OF WELL: ☐ N/A ☐ IRRIGATION ☐ POTABLE ☐ GEOTHERMAL ☐ OTHER

ARE ANY OF THE FOLLOWING LOCATED ON THE PROPERTY? IF SO, PLEASE SHOW LOCATION ON SITE PLAN/PLAT.

BURIED CABLES, LANDFILLS, STUMPHOLES	☐ YES	☑ NO	WELLS, SPRINGS, OR WATER LINES	☐ YES	☐ NO
EXISTING WASTEWATER SYSTEMS	☐ YES	☑ NO	DESIGNATED WETLANDS	☐ YES	☐ NO
EASEMENTS OR RIGHT-OF-WAYS	☐ YES	☑ NO	GRADING/SOIL REMOVAL PERFORMED	☐ YES	☑ NO

PROPERTY OWNER:

NAME: The Pavilion of Huntersville
ADDRESS: 1910 S. Blvd. STE 200
CITY: Charlotte
STATE: NC ZIP: 28203
HOME PHONE: WORK PHONE: 704-358-9940
MOBILE PHONE: 704-201-8976 FAX: 704-358-9978

LEGAL AGENT FOR PROPERTY OWNER, IF APPLICABLE:

NAME: Jacob Presley, S&ME, Inc.
ADDRESS: 3718 Old Battleground Rd.
CITY: Greensboro
STATE: NC ZIP: 27410
HOME PHONE: WORK PHONE: 336-288-7180
MOBILE PHONE: 336-312-1123 FAX: 336-288-8780

WHAT DATE WAS THE PROPERTY ORIGINALLY DEEDED AND RECORDED?

WHAT IS THE ANTICIPATED CLOSING DATE FOR THIS PROPERTY?

*An Improvement Permit is subject to suspension or revocation if site plans or the intended use change or if information submitted in this application is falsified or changed. The undersigned, owner, or legal agent for the owner, of the property described above as the "Job Location" has read the foregoing application, acknowledges that the contents of same are true, and authorizes the Mecklenburg County Health Department to enter onto the property for the purpose of processing this request.

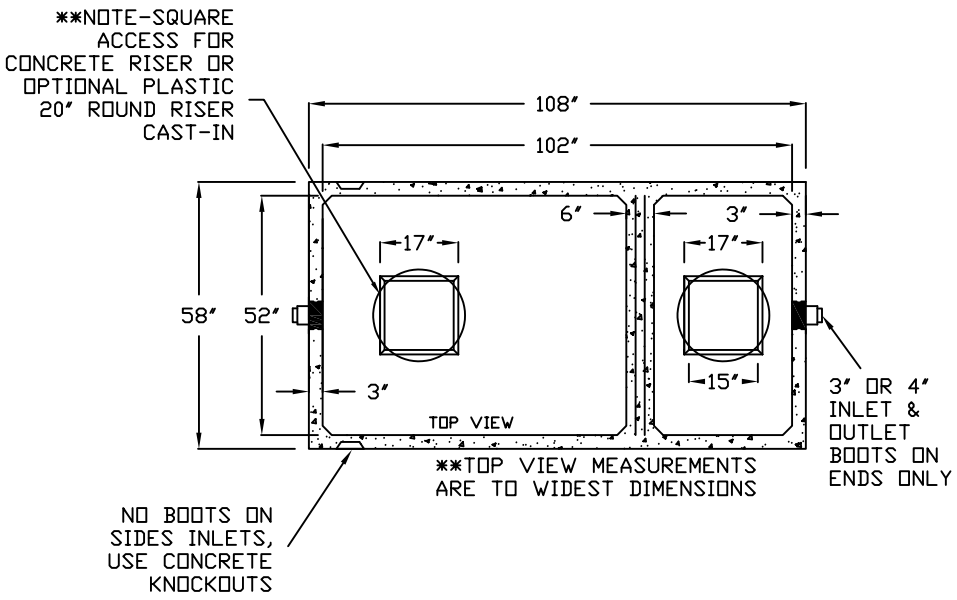
12-22-06
Owner's/Agent's Signature Date

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT & NATURAL RESOURCES DIVISION
OF ENVIRONMENTAL HEALTH ON-SITE
WASTEWATER SECTION

*A Well Permit is subject to suspension or revocation if site plans or the intended use change or if information submitted in this application is falsified or changed. The undersigned, owner, or legal agent for the owner, of the property described above as the "Job Location" has read the foregoing application, acknowledges that the contents of same are true, and authorizes the Mecklenburg County Health Department to enter onto the property for the purpose of processing this request.

Owner's/Agent's Signature Date

MECKLENBURG COUNTY HEALTH DEPARTMENT
GROUNDWATER & WASTEWATER SERVICES
700 N. TRYON ST., SUITE 211
CHARLOTTE, NC 28202 704-336-5103 / FAX: 704-336-6894

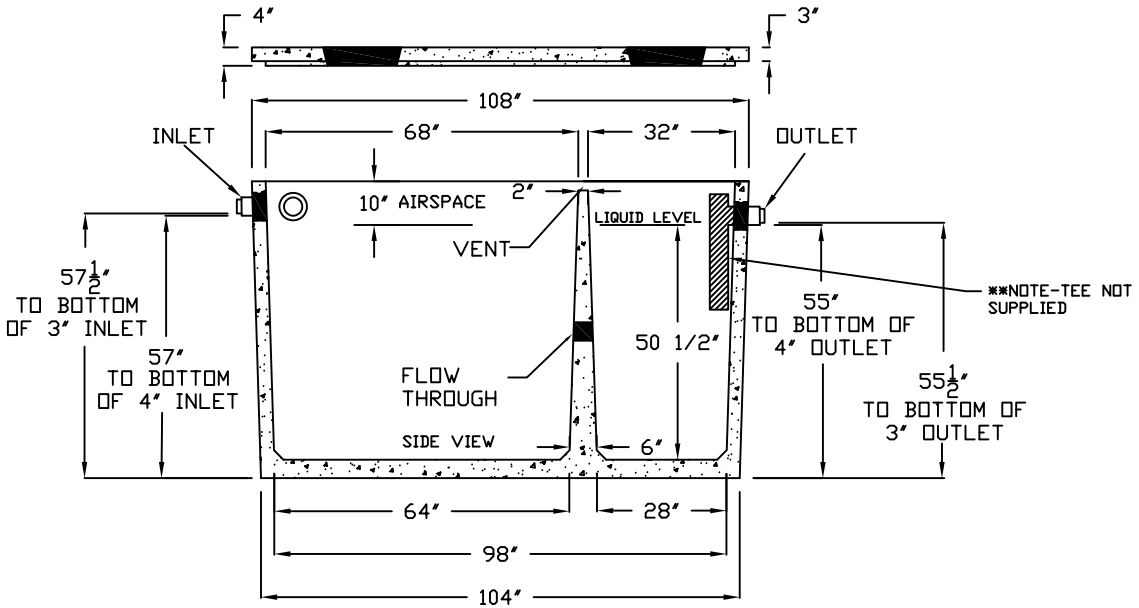


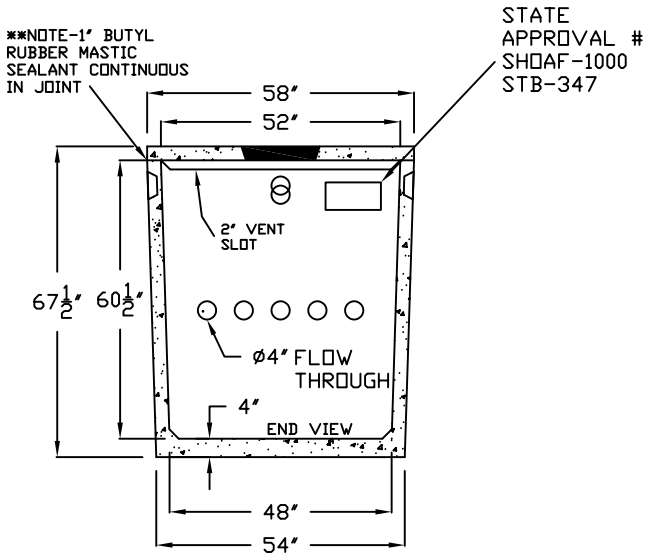
SHOAF PRECAST SEPTIC INC.
4130 WEST US HWY 64
LEXINGTON, NC 27295
PHONE (336) 787-5826
FAX (336) 787-2826

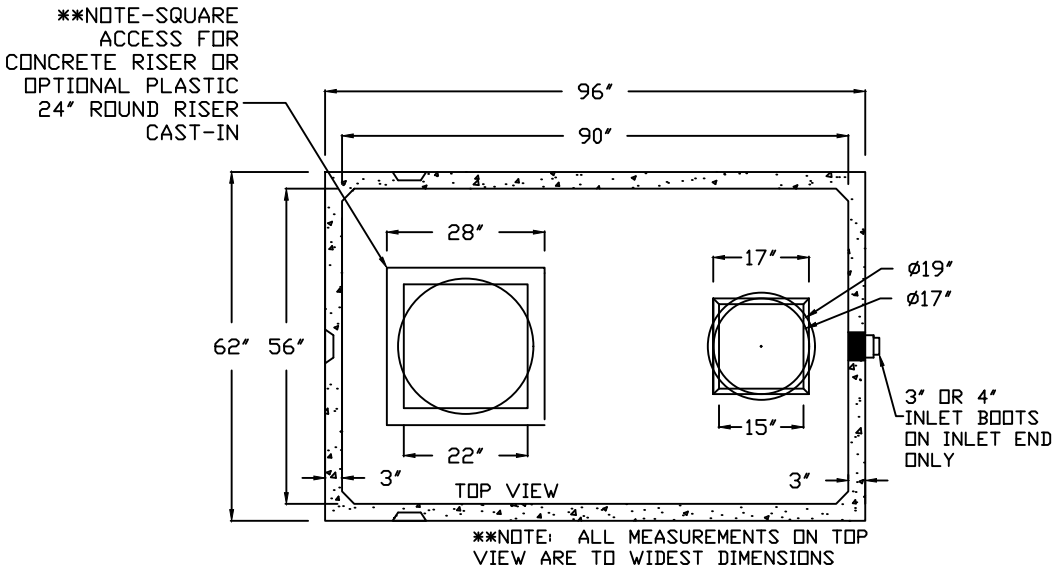
MODEL: TS 1000 STB
NON TRAFFIC
1000 Gallon Septic Tank

WWW.SHOAFPRECAST.COM
SHOAF-1,000 SEPTIC TANK
STB-347 NON TRAFFIC
LIQUID CAPACITY-1,000 GALLONS/AIRSPACE-10"
TANK HEIGHT-67 ½"
BOTTOM OF TANK TO CENTER OF INLET-59"
BOTTOM OF TANK TO CENTER OF OUTLET-57"
LENGTH TO WIDTH RATIO-2 TO 1
SIZE OF INLET & OUTLET-3" OR 4" PIPE
TYPE OF INLET & OUTLET-POLYLOCK OR EQUAL (MEETS ASTM C-923)
CONCRETE PSI-4000; TANK WEIGHT- 10,500 LBS.
REINFORCEMENT PER STATE CODE

SCALE - N.T.S.





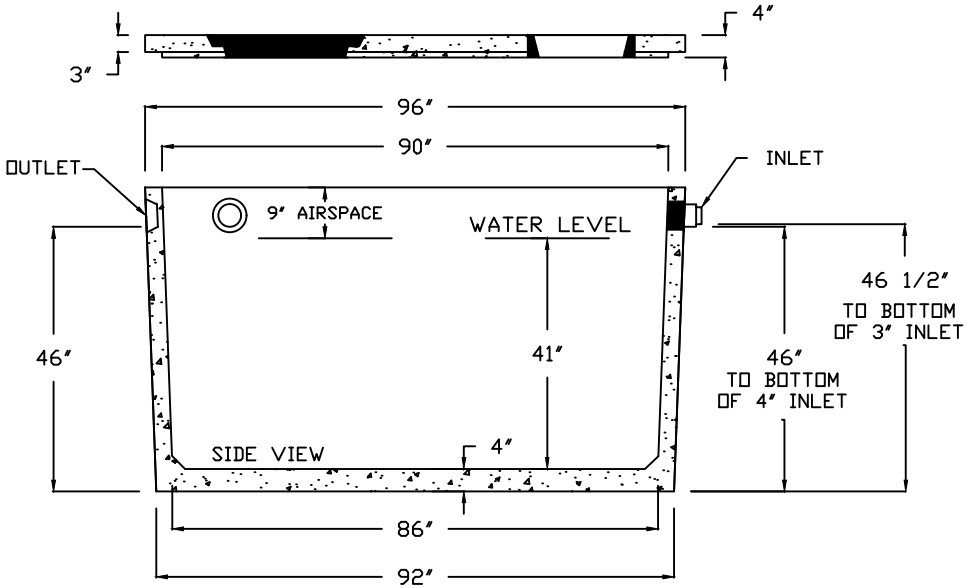


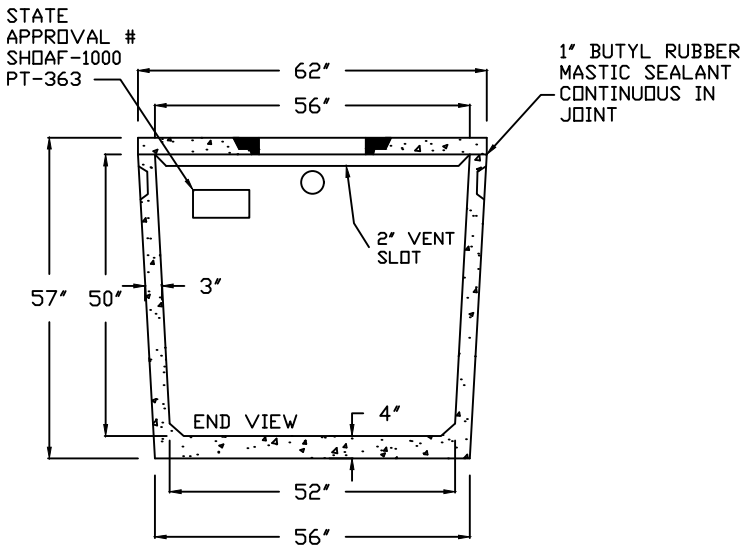
SHOAF PRECAST SEPTIC INC.
4130 WEST US HWY 64
LEXINGTON, NC 27295
PHONE (336) 787-5826
FAX (336) 787-2826

MODEL: TS 1000 PT
NON TRAFFIC
1000 Gallon Pump Tank

WWW.SHOAFPRECAST.COM
SHOAF-1000 NON TRAFFIC RATED
PT-363 NON TRAFFIC
LIQUID CAPACITY-1008 US GALLONS INCLUDING 9" AIRSPACE
GALLONS PER INCH-20.16 (AVGERAGE)
TANK HEIGHT-57"
BOTTOM OF TANK TO CENTER OF INLET-48"
BOTTOM OF TANK TO CENTER OF OUTLET-48"
LENGTH TO WIDTH RATIO-2 TO 1
SIZE OF INLET & OUTLET-3" OR 4" PIPE
TYPE OF INLET & OUTLET-POLYLOCK OR EQUAL (MEETS ASTM C-923)
CONCRETE PSI-4000; TANK WEIGHT-9,000 LBS.
REINFORCING PER STATE CODE

SCALE - N.T.S.





POLYLOK™ Inc.
Innovations in Precast, Drainage & Wastewater Products
Zabel® A Division of Polylok Inc.

PL-122 Effluent Filter

PL-122 Filter

The PL-122 was the original Polylok filter. It was the first filter on the market with an automatic shut-off ball installed with every filter. When the filter is removed for regular servicing, the ball will float up and prevent any solids from leaving the tank. Our patented design cannot be duplicated.

Features:

- Offers 122 linear feet of 1/16" filter slots, which significantly extends time between cleaning.
- Has a flow control ball that shuts off the flow of effluent when the filter is removed for cleaning.
- Has its own gas deflector ball which deflects solids away.
- Installs easily in new tanks, or retrofits in existing systems.
- Comes complete with its own housing. No gluing of tees or pipe, no extra parts to buy.
- Has a modular design, allowing for increased filtration.

PL-122 Installation:

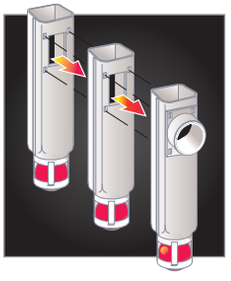
Ideal for residential waste flows up to 1,500 gallons per day (GPD). Easily installs in any new or existing 4" outlet tee.

1. Locate the outlet of the septic tank.
2. Remove the tank cover and pump tank if necessary.
3. Glue the filter housing to the outlet pipe, or use a Polylok Extend & Lok if not enough pipe exists.
4. Insert the PL-122 filter into tee.
5. Replace and secure the septic tank cover.

PL-122 Maintenance:

The PL-122 Effluent Filter will operate efficiently for several years under normal conditions before requiring cleaning. It is recommended that the filter be cleaned every time the tank is pumped, or at least every three years.

1. Do not use plumbing when filter is removed.
2. Pull PL-122 cartridge out of the tee.
3. Hose off filter over the septic tank. Make sure all solids fall back into septic tank.
4. Insert filter back into tee/housing.



Polylok offers the only filter on the market where you can get more GPD by simply snapping our filters together!

1 Filter = 1500 GPD
2 Filters = 3000 GPD
3 Filters = 4500 GPD

Patent Numbers
6,015,488 & 5,871,640



1/16" Filtration Slots

1,500 GPD

NSF



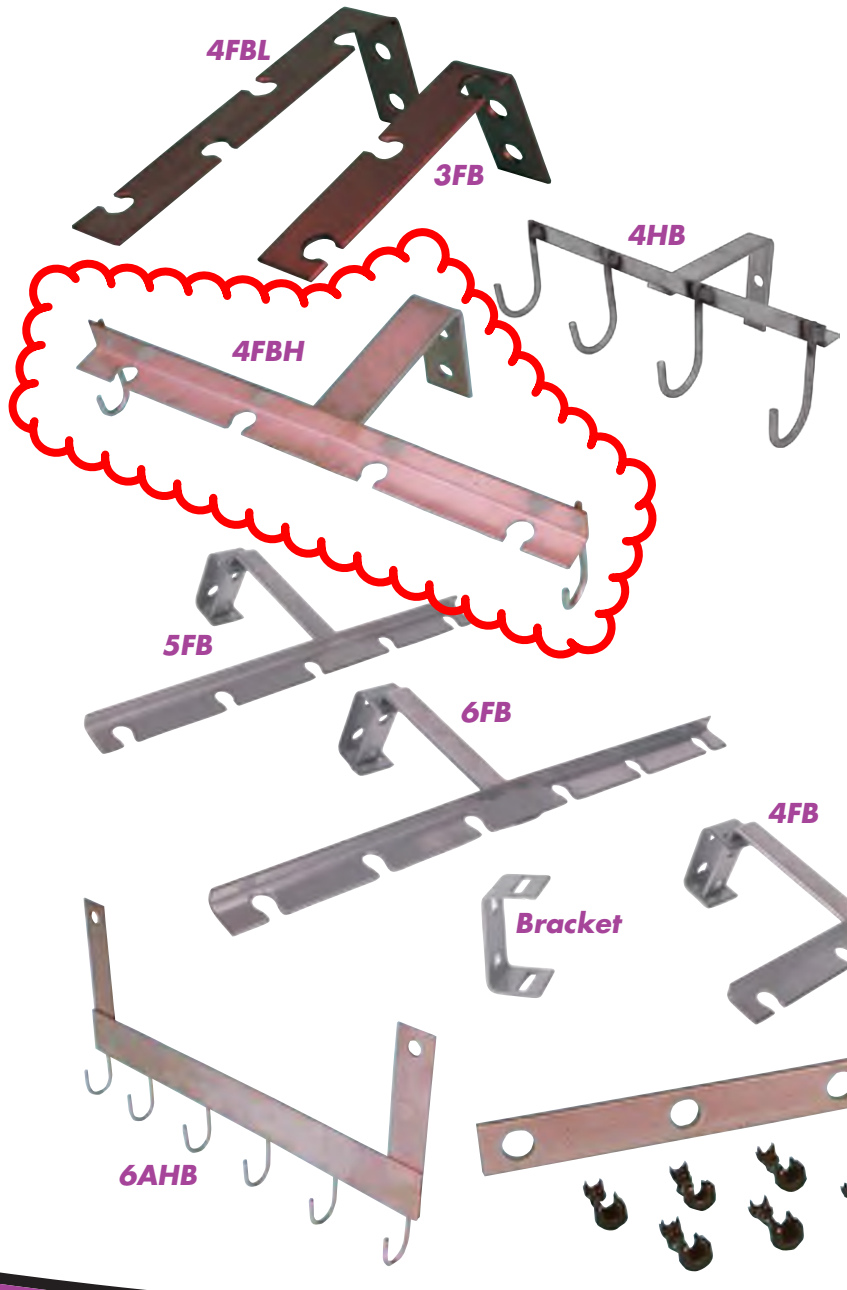
Filter Ready Adapter
Connects to Septic Tank Wall



Outdoor SmartFilter® Alarm
Polylok, Zabel & Best filters accept the SmartFilter® switch and alarm.

Stainless Steel Float Brackets

Brackets are designed to keep multiple float switches organized within the basin. All brackets are made of Type 304 stainless steel and come with black cord snubbers to securely attach float cables. As an option, liquid tight cord grips are also available for the same purpose. Brackets are available in different shapes and sizes to accommodate up to six floats. Additional hook type style brackets are also available. Additionally, the T-shaped bracket styles are supplied with a mounting piece so that the bracket itself may be easily removed from the basin with the floats still attached.



Stainless Steel Float Brackets

	List Price
L-Type Brackets	
3FB	$ 42.00
4FBL	48.00
T-Type Brackets	
4FB	55.00
5FB	61.00
6FB	65.00
T-Type Brackets w/Side Hooks	
4FBH	61.00
5FBH	66.00
4HB	55.00
H-Type Brackets	
6HFB	82.00
U-Type Bracket	
6AHB	66.00

Optional Cord Grips

Note: To add cord grips to your float bracket order, simply specify G1 after the part number. You will receive the number of cord grips that fit each respective float bracket.

G1- Cord Grip
List $4.00



CONERY™ MFG INC

Chain, Cable and Accessories

TYPE 316 STAINLESS STEEL CHAIN KITS

Part Number	Description	List Price
SS316 - 10-2	3/16″ Stainless steel chain kit - 10′ of chain & 2-1/4″ shackles	$121.00
SS140 - 10-2	1/4″ Stainless steel chain kit - 10′ of chain & 2-5/16″ shackles	177.00
SS516 - 10-2	5/16″ Stainless steel chain kit - 10′ of chain & 2-3/8″ shackles	207.00
SS380 - 10-2	3/8″ Stainless steel chain kit - 10′ of chain & 2-1/2″ shackles	312.00
SS120 - 10-2	1/2″ Stainless steel chain kit - 10′ of chain & 2-5/8″ shackles	446.00
SSC14 - 10-2	1/4″ Stainless steel cable kit - 10′ of cable & 2-1/4″ shackles	93.00

*Add additional chain footage or shackles per the individual list prices noted above
Change the (10) number to actual chain footage Change the (2) number to actual number of shackles



TYPE 316 STAINLESS STEEL CHAIN

Grade 30 Proof Coil Size	Drum Qty (ft)	SWL (lbs)	Wgt/ft (lbs)	List Price (per ft)
1/8″	1,000	375	0.25	$ 6.25
3/16″	1,000 or 500	800	0.45	8.50
1/4″	400 or 200	1,400	0.78	13.00
5/16″	275	1,800	0.97	16.00
3/8″	200	2,800	1.67	23.00
1/2″	100	4,500	2.25	36.00
5/8″	100	6,800	3.75	52.00



TYPE 316 STAINLESS STEEL SHACKLES

Size	Fits to Size Chain	SWL (lbs)	Wgt/ea (lbs)	List Price (each)
1/4″	3/16″	667	0.09	$ 10.50
5/16″	1/4″ and under	1,000	0.15	13.75
3/8″	5/16″ and under	1,500	0.31	15.50
1/2″	3/8″ and under	3,000	0.73	25.50
5/8″	1/2″ and under	4,000	1.26	36.50
3/4″	5/8″ and under	8,000	2.10	62.00



TYPE 316 STAINLESS STEEL QUICK LINK

Size	SWL (lbs)	Wgt/ea (lbs)	List Price (each)
1/4″	880	0.08	$8.50
5/16″	1,700	0.18	10.50
3/8″	2,200	0.31	21.00
1/2″	3,300	0.51	29.75

TYPE 304 STAINLESS STEEL CABLE

Size	Spool Qty	SWL (lbs)	Wgt/ft (lbs)	List Price (per ft)
1/4″	1,000	1,600	0.11	$ 2.60
5/16″	1,000	2,250	0.17	$ 4.00



CHAIN & CABLE ACCESSORIES

Description	SWL (lbs)	Wgt/ea (lbs)	List Price (each)
Alloy steel grab link	6,400	1.92	$80.00
5/16″ - 316 Stainless steel eye bolt	780	0.05	20.75
3/8″ - 316 Stainless steel eye bolt	1320	0.07	28.00
1/4″ Stainless steel thimble (use w/cable)	N/A	0.03	2.60
5/16″ Stainless steel thimble (use w/cable)	N/A	0.04	4.00
1/4″ Stainless steel wire clamp	N/A	0.05	10.00
1/4″ Copper sleeve (use w/cable)	N/A	0.08	6.00
5/16″ Copper sleeve (use w/cable)	N/A	0.09	10.00



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Control Duty Mechanical Narrow Angle Switch

Normally open control duty float switch

Single pole - single throw

10 AMP @ 120 VAC narrow angle mechanical switch		**10′**	**15′**	**20′**	**25′**	**30′**	**40′**	**50′**
2900 - B3-S1	Mechanical (Mch) bulb	$32.00	$34.00	$38.00	$42.00	$46.00	$54.00	$62.00
2900 - B3-S1-C1	Mch bulb w/cord weight	$37.00	$39.00	$43.00	$47.00	$51.00	$59.00	$67.00
2900 - B3-S1-C3	Mch bulb w/clamp - stainless band	$36.00	$38.00	$42.00	$46.00	$50.00	$58.00	$66.00
2900 - B3-S1-C4	Mch bulb w/releasable tie strap	$35.00	$37.00	$41.00	$45.00	$49.00	$57.00	$65.00

Normally closed control duty float switch

Single pole - single throw

10 AMP @ 120 VAC narrow angle mechanical switch		**10′**	**15′**	**20′**	**25′**	**30′**	**40′**	**50′**
2901 - B3-S1	Mechanical (Mch) bulb	$32.00	$34.00	$38.00	$42.00	$46.00	$54.00	$62.00
2901 - B3-S1-C1	Mch bulb w/cord weight	$37.00	$39.00	$43.00	$47.00	$51.00	$59.00	$67.00
2901 - B3-S1-C3	Mch bulb w/clamp - stainless band	$36.00	$38.00	$42.00	$46.00	$50.00	$58.00	$66.00
2901 - B3-S1-C4	Mch bulb w/releasable tie strap	$35.00	$37.00	$41.00	$45.00	$49.00	$57.00	$65.00

Normally open/closed control duty float switch

Single pole - double throw (SPDT)

10 AMP @ 120 VAC narrow angle mechanical switch		**10′**	**15′**	**20′**	**25′**	**30′**	**40′**	**50′**
2902 - B3-S2	Mechanical (Mch) bulb	$45.00	$47.00	$53.50	$60.00	$66.50	$79.50	$92.50
2902 - B3-S2-C1	Mch bulb w/cord weight	$50.00	$52.00	$58.50	$65.00	$71.50	$84.50	$97.50
2902 - B3-S2-C3	Mch bulb w/clamp - stainless band	$49.00	$51.00	$57.50	$64.00	$70.50	$83.50	$96.50
2902 - B3-S2-C4	Mch bulb w/releasable tie strap	$48.00	$50.00	$56.50	$63.00	$69.50	$82.50	$95.50

Additional float switch options packaging options

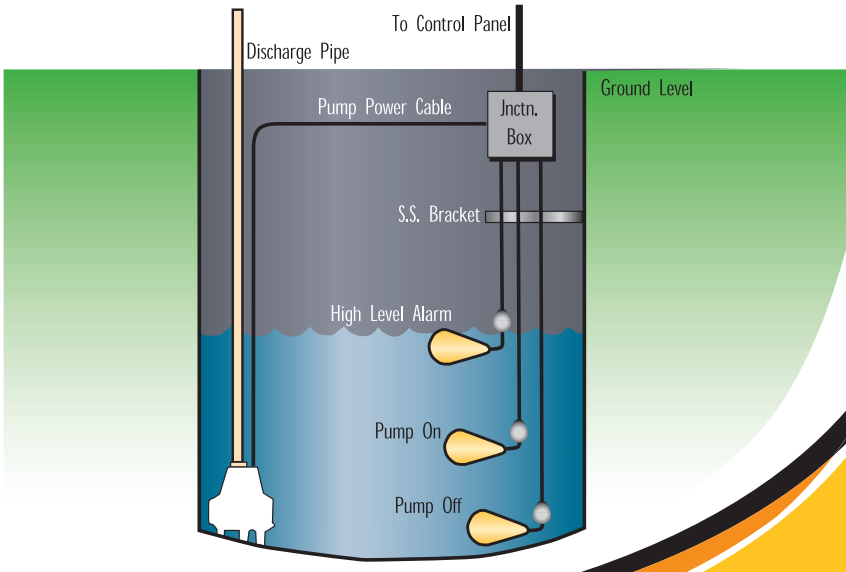
Bulk boxed - standard
K1 Individually boxed ADD $1.25 to list price per float switch
K2 Individually bagged ADD $1.00 to list price float switch

Cable length options

S1 Additional cable lengths ADD $4.00 to list price per float switch per 5′
S2 Additional cable lengths ADD $6.50 to list price per float switch per 5′

2900 MULTI FLOAT SYSTEM

A typical simplex pump installation showing a pump on and off float with a high water alarm float. (A duplex station would have four floats). All pump cords are connected in the Junction Box , with wiring going to the control panel at another location. The #2900 float switches will control all types of pumps.



TECHNICAL BROCHURE
B3885



FEATURES

Impeller: Cast iron, semi-open, non-clog with pump-out vanes for mechanical seal protection. Balanced for smooth operation. Silicon bronze impeller available as an option.

Casing: Cast iron volute type for maximum efficiency. 2" NPT discharge.

Mechanical Seal: Silicon Carbide vs. Silicon Carbide sealing faces. Stainless steel metal parts, BUNA-N elastomers.

Shaft: Corrosion-resistant, stainless steel. Threaded design. Locknut on all models to guard against component damage on accidental reverse rotation.

Fasteners: 300 series stainless steel.

Capable of running dry without damage to components.

Designed for continuous operation when fully submerged.

EXTENDED WARRANTY AVAILABLE FOR RESIDENTIAL APPLICATIONS.

WE Series

Model 3885

SUBMERSIBLE EFFLUENT PUMPS

GOULDS WATER TECHNOLOGY
a xylem brand

APPLICATIONS

Specifically designed for the following uses:

- Homes, Farms, Trailer Courts, Motels, Schools, Hospitals, Industry, Effluent Systems

SPECIFICATIONS

Pump

- Solids handling capabilities: ¾" maximum.
- Discharge size: 2" NPT.
- Capacities: up to 140 GPM.
- Total heads: up to 128 feet TDH.
- Temperature: 104°F (40°C) continuous, 140°F (60°C) intermittent.
- See order numbers on reverse side for specific HP, voltage, phase and RPM's available.

MOTORS

- Fully submerged in high-grade turbine oil for lubrication and efficient heat transfer.
- Class B insulation on ⅓ – 1½ HP models.
- Class F insulation on 2 HP models.

Single phase (60 Hz):

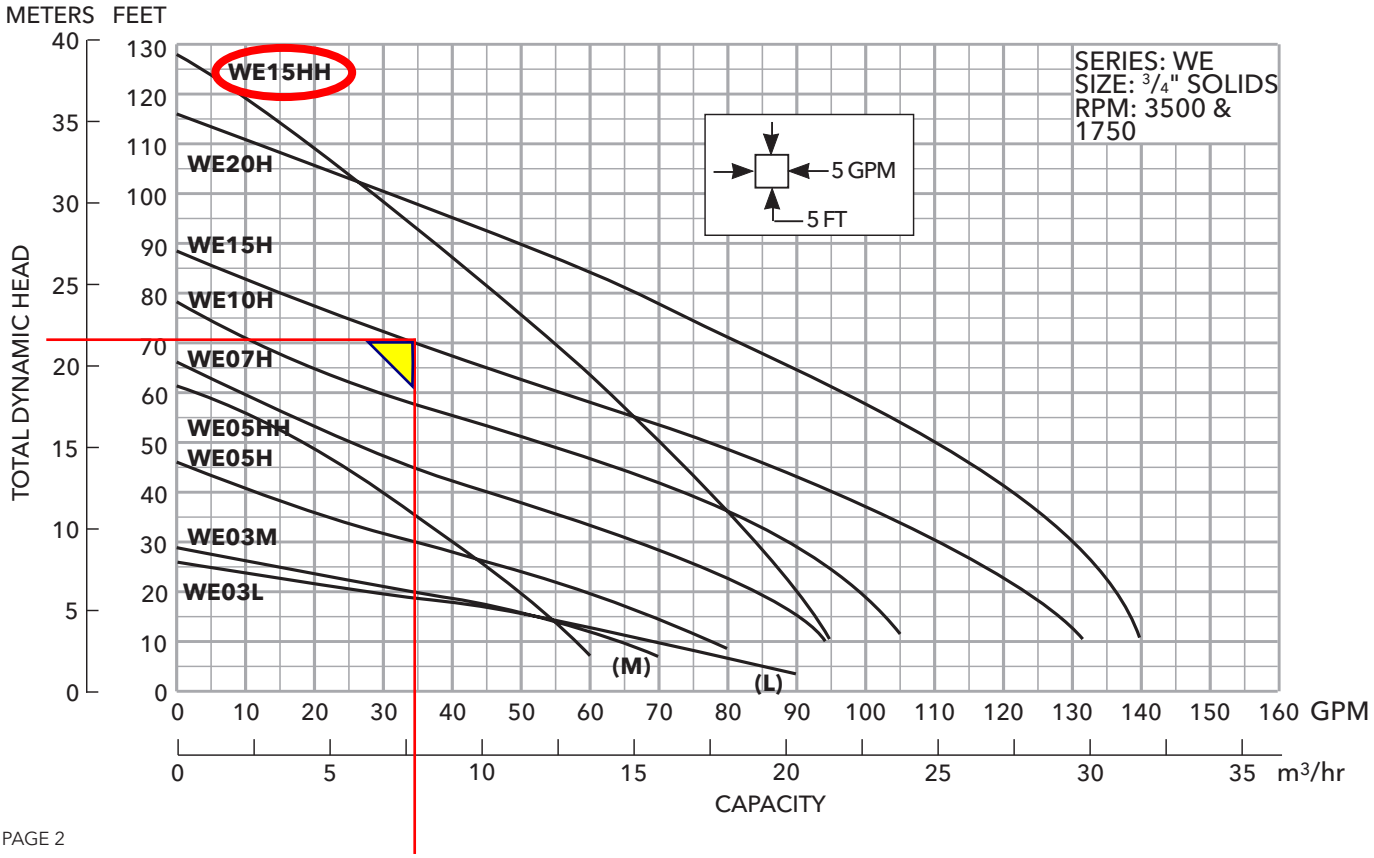
- Capacitor start motors for maximum starting torque.
- Built-in overload with automatic reset.
- SJTOW or STOW severe duty oil and water resistant power cords.
- ⅓ – 1 HP models have NEMA three prong grounding plugs.
- 1½ HP and larger units have bare lead cord ends.

Three phase (60 Hz):

- Class 10 overload protection must be provided in separately ordered starter unit.
- STOW power cords all have bare lead cord ends.
- Designed for Continuous Operation: Pump ratings are within the motor manufacturer's recommended working limits, can be operated continuously without damage when fully submerged.
- Bearings: Upper and lower heavy duty ball bearing construction.
- Power Cable: Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. Standard cord is 20'. Optional lengths are available.
- O-ring: Assures positive sealing against contaminants and oil leakage.

AGENCY LISTINGS

Tested to UL 778 and CSA 22.2 108 Standards
By Canadian Standards Association File #LR38549



MODELS

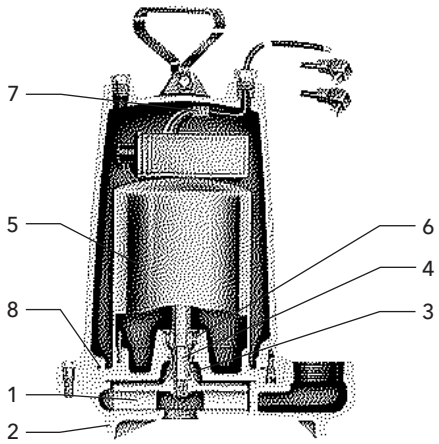
Order Number	HP	Phase	Volts	RPM	Impeller Diameter (in.)	Maximum Amps	Locked Rotor Amps	KVA Code	Full Load Efficiency %	Resistance		Power Cable Size	Weight (lbs.)
										Start	Line-Line		
WE0311L	0.33	1	115	1750	5.38	10.7	30.0	M	54	11.9	1.7	16/3	56
WE0318L			208			6.8	19.5	K	51	9.1	4.2		
WE0312L			230			4.9	14.1	L	53	14.5	8.0		
WE0311M			115			10.7	30.0	M	54	11.9	1.7		
WE0318M			208			6.8	19.5	K	51	9.1	4.2		
WE0312M			230			4.9	14.1	L	53	14.5	8.0		
WE0511H	0.5	1	115	3450	3.56	14.5	46.0	M	54	7.5	1.0	14/3	60
WE0518H			208			8.1	31.0	K	68	9.7	2.4	16/3	60
WE0512H			230			7.3	34.5	M	53	9.6	4.0		
WE0538H		3	200			4.9	22.6	R	68	NA	3.8	14/4	60
WE0532H			230			3.3	18.8	R	70	NA	5.8		
WE0534H			460			1.7	9.4	R	70	NA	23.2		
WE0537H			575			1.4	7.5	R	62	NA	35.3		
WE0511HH		1	115		3.88	14.5	46.0	M	54	7.5	1.0	14/3	60
WE0518HH			208			8.1	31.0	K	68	9.7	2.4	16/3	60
WE0512HH			230			7.3	34.5	M	53	9.6	4.0		
WE0538HH		3	200			4.9	22.6	R	68	NA	3.8	14/4	60
WE0532HH			230			3.6	18.8	R	70	NA	5.8		
WE0534HH			460			1.8	9.4	R	70	NA	23.2		
WE0537HH			575			1.5	7.5	R	62	NA	35.3		
WE0718H	0.75	1	208		4.06	11.0	31.0	K	68	9.7	2.4	14/3	70
WE0712H			230			10.0	27.5	J	65	12.2	2.7		
WE0738H		3	200			6.2	20.6	L	64	NA	5.7	14/4	70
WE0732H			230			5.4	15.7	K	68	NA	8.6		
WE0734H			460			2.7	7.9	K	68	NA	34.2		
WE0737H			575			2.2	9.9	L	78	NA	26.5		
WE1018H	1	1	208		4.44	14.0	59.0	K	68	9.3	1.1	14/3	70
WE1012H			230			12.5	36.2	J	69	10.3	2.1		
WE1038H		3	200			8.1	37.6	M	77	NA	2.7	14/4	70
WE1032H			230			7.0	24.1	L	79	NA	4.1		
WE1034H			460			3.5	12.1	L	79	NA	16.2		
WE1037H			575			2.8	9.9	L	78	NA	26.5		
WE1518H	1.5	1	208		4.56	17.5	59.0	K	68	9.3	1.1	14/3	80
WE1512H			230			15.7	50.0	H	68	11.3	1.6		
WE1538H		3	200			10.6	40.6	K	79	NA	1.9	14/4	80
WE1532H			230			9.2	31.7	K	78	NA	2.9		
WE1534H			460			4.6	15.9	K	78	NA	11.4		
WE1537H			575			3.7	13.1	K	75	NA	16.9		
WE1518HH		1	208		5.50	17.5	59.0	K	68	9.3	1.1	14/3	80
WE1512HH			230			15.7	50.0	H	68	11.3	1.6		
WE1538HH		3	200			10.6	40.6	K	79	NA	1.9	14/4	80
WE1532HH			230			9.2	31.7	K	78	NA	2.9		
WE1534HH			460			4.6	15.9	K	78	NA	11.4		
WE1537HH			575			3.7	13.1	K	75	NA	16.9		
WE2012H	2	1	230		5.38	18.0	49.6	F	78	3.2	1.2	14/3	83
WE2038H		3	200			12.0	42.4	K	78	NA	1.7	14/4	83
WE2032H			230			11.6	42.4	K	78	NA	1.7		
WE2034H			460			5.8	21.2	K	78	NA	6.6		
WE2037H			575			4.7	16.3	L	78	NA	10.5		

PERFORMANCE RATINGS (gallons per minute)

Order No.		WE-03L	WE-03M	WE-05H	WE-07H	WE-10H	WE-15H	WE-05HH	WE-15HH	WE-20H
Total Head Feet of Water	HP	⅓	⅓	½	¾	1	1½	½	1½	2
	RPM	1750	1750	3500	3500	3500	3500	3500	3500	3500
	5	86	–	–	–	–	–	–	–	–
	10	70	63	78	94	–	–	58	95	–
	15	52	52	70	90	103	128	53	93	138
	20	27	35	60	83	98	123	49	90	136
	25	5	15	48	76	94	117	45	87	133
	30	–	–	35	67	88	110	40	83	130
	35	–	–	22	57	82	103	35	80	126
	40	–	–	–	45	74	95	30	77	121
	45	–	–	–	35	64	86	25	74	116
	50	–	–	–	25	53	77	–	70	110
	55	–	–	–	–	40	67	–	66	103
	60	–	–	–	–	30	56	–	63	96
	65	–	–	–	–	20	45	–	58	89
	70	–	–	–	–	–	35	–	55	81
	75	–	–	–	–	–	25	–	51	74
	80	–	–	–	–	–	–	–	47	66
	90	–	–	–	–	–	–	–	37	49
	100	–	–	–	–	–	–	–	28	30

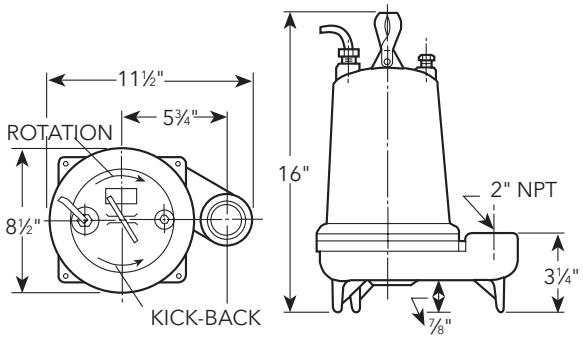
COMPONENTS

Item No.	Description
1	Impeller
2	Casing
3	Mechanical Seal
4	Motor Shaft
5	Motor
6	Ball Bearings
7	Power Cable
8	Casing O-Ring



DIMENSIONS

(All dimensions are in inches. Do not use for construction purposes.)



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Sim/Tech Filter
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Boyne City, MI 49712
Office: 231-582-1020

Website: www.gag-simtech.com
Email: sales@gag-simtech.com
Fax: 231-582-7324
Toll Free: 888-999-3290

Sim/Tech Filter's Last Line of Defense

The 100 Series Pressure Filter



Vortex Action

The Sim/Tech pressure filter, with its unique design and mounting location, allows the filtering screen to be scrubbed during pump operation, providing maximum maintenance intervals with unmatched performance capabilities.

The filter screen is a type 316L stainless steel with .062" (1/16") diameter holes. Optional socks are available for finer filtration. The screen is 3 inches in diameter and 18 inches long, with 41% open area. This large open area (69.52 square inches) allows the filter to operate at up to 83.8 gallons per minute at 1 psi. With features like these even a 95% plugged screen will keep your pressurized system well protected and working properly.

This performance product assures quality effluent with lower TSS levels, keeping your pressurized systems functioning at 100% efficiency.

Engineers and designers can specify the Sim/Tech pressure filter to safeguard and assure systems will function as designed now and in the future.

The Sim/Tech pressure filter is perfect for both residential and commercial applications.

For more info and to see videos, visit www.simtechfilter.com



High flow-rate manifold.



Multiple filters can be assembled into a manifold to accommodate high flow-rate or high strength effluent systems.

At the max flow-rate of 83.8 gpm, headloss for a clean filter is .21 psi or 1/2 foot and headloss for a 95% plugged filter is .85 psi or 2 feet.



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For the protection and performance of wastewater systems by
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PRESSURE FILTER INSTALLATION & SERVICE INSTRUCTIONS

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Boyne City, MI 49712

Toll Free 888-999-3290
Fax 231-582-7324

Office 231-582-1020
Email sales@gag-simtech.com *Web* www.gag-simtech.com

INSTALLATION:

When installing an STF-100, screw filter into discharge port of any pump that has a 2" National Pipe Thread. Pumps with a smaller discharge port may be adapted to fit. When installing an STF-100A2 a tailpiece and male adapter will need to be added to the inlet end of the filter (end opposite of the cap) to the desired height and a 2" union will need to be added to the outlet end (the end closest to the cap & on the side of the filter). Always install the filters in a position where they can be easily serviced. **Always use caution when starting threads to avoid cross threading**. Plumb force main into the 2" sch 80 PVC union. **We recommend that the union remain together during gluing to insure that glue or cleaner does not ruin O-ring or sealing surface**. For best performance, if a check valve is installed it should only be after the outlet of the filter.

SERVICE:

Service of filter screen is dependent on usage as every system is unique. For most residential systems we recommend inspecting the filter within the first year to determine the necessary service intervals for the filter. In high volume systems we recommend inspection within the first 6 months to determine necessary service intervals for the filter. Once the service interval is determined it should be consistent unless something changes in the system. Always inspect the filter screen for any damage or corrosion and replace if necessary. If our STF-101 service alarm switch has been installed and adjusted properly it will alarm when the filter requires service. It should be serviced no less than when periodic pumping of the septic tank and pump chamber is performed. Servicing will be more frequent if using any one of our optional filter socks (600 micron, 150-190 micron, and 100 micron). Check your local health department for septic system servicing recommendations.

If the screen becomes clogged before the periodic pumping requirements, a high level alarm or light will indicate the need for service. If system is equipped with a "pump on light" that stays on longer than normal, this also may indicate a need to service filter.

To service filter screen, unscrew the 4" cap. Pull filter screen from canister and wash out thoroughly in appropriate location with proper protection. In some cases an additional filter screen allows quicker service allowing the dirty filter to be washed later at the shop. *Note that in cold conditions the filter cap may be difficult to remove. Keep the filter in a warm area or pour warm water over the cap before removing. Once the filter is installed in the tank it maintains a stable temperature and removing the cap will not be a problem.*

If the system is equipped with our Service Alarm Switch, the filter screen does not need service until the Service Alarm Switch activates a light or audio alarm. We still recommend that the filter be inspected once a year for damage or corrosion.

NOTE: The total dynamic head loss of the system must be increased by 0.5 feet of head to overcome friction loss through the filter.

SERVICE ALARM SWITCH

The alarm switch is available in three pressure ranges, low head, medium head, and high head. Installation is simple, on SIM/TECH FILTER systems, remove ¼" plug from base of filter chamber and connect tube fitting. Next, run the tube up into the tank riser and connect to service alarm switch. The alarm switch is fastened to the side of the riser via the nylon strap provided. Run alarm wire to alarm box. The service alarm switch can be wired with its own alarm or with the high water alarm.

Pressure adjustment is made by removing the end plug, and inserting the 7/32 allen. Clockwise increases pressure. One turn equals approximately 3 PSI. The low head alarm switch comes factory preset at 8 PSI and is completely field adjustable within it's range (3 to 24 PSI). *We recommend the use of a ball valve when using an alarm switch. Once you have installed the filter and alarm switch, the ball valve can be closed off to simulate a plugged filter so that you can make sure the alarm switch is working correctly.*

****TRY OUR LID/SCREEN REMOVAL WRENCH. Our wrench holds filter lid firmly and hooks screen for easy removal and installation. Made of PVC plastic.

WARRANTY

All products are warranted against defects in material and workmanship for a period of two years from the date of purchase. In no event shall GAG SIM/TECH FILTER, INC. be liable for any consequential damages or any labor, material, freight or expenses required to replace, correct or reinstall the product. GAG SIM/TECH FILTER, INC.'s liability is limited to repair or replacement of the part. All warranties are void if the product has been improperly modified, applied or installed, subjected to misuse or abuse. Except as stated herein, there are no warranties expressed or implied, including the warranty of merchantability or warranty of fitness for a specific purpose. EFFECTIVE September 13, 2005



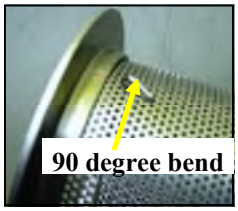
Toll Free: 888-999-3290



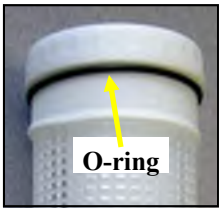
STF-104/600 micron Poly-Knit Filter Sock

Installation Instructions





Stainless Steel Screen



Plastic Screen

Before Sock Installation:
If you have a stainless steel filter screen with a wire handle installed in it, straighten out the 90 degree bend in the wire on one side and pull it out from the other side.
If you have a plastic filter screen remove the o-rings from each end.

Step 1 Insert sock into the filter screen so that equal lengths stick out of both ends.



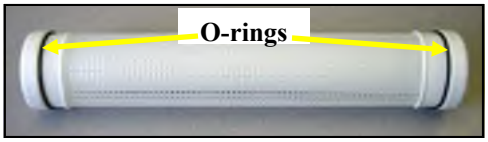
Tips:
Fold the sock in half (the long way) before inserting into the screen.

Step 2 Wrap the sock around the top and bottom of filter screen.



Stainless Steel Screen

Tips:
The sock material should be pulled tight, although there will still be some wrinkling even when it is tight.



Plastic Screen with O-rings

If your pressure filter has a plastic filter screen, stretch the o-rings over the sock and screen.

Step 4 Look through end of filter screen and confirm that sock is not twisted.



Twisted Sock



Corrected Sock

Tips:
If the sock is twisted, grab the sock over one of the ends of the screen and twist until the sock is straight.

Step 5 Dispose of the old filter sock in accordance with state and local regulations.

Important Notes:

- Socks filter out much finer solids than the filter screen and will most likely require more frequent service depending upon the application.
- If choosing to reuse the sock, make sure that there is no visible damage to the sock.

Toll Free: 888-999-3290 • Fax: 231-582-7324 • E-mail: sales@gag-simtech.com • www.simtechfilter.com

Orenco® SYSTEMS

Technical Data Sheet

S-Series Simplex Control Panels

Applications

Orenco® S-Series Simplex Control Panels control single pumps in effluent sewer (STEP) systems, onsite septic systems, and for pump control into conventional gravity sewer systems.



Orenco S-Series Simplex Control Panel (S1ETMCT shown)

General

Orenco® S-Series Simplex Control Panels are electromechanical panels for controlling single pumps. Standard features include an Automatic/Off/Manual (Auto/Off/Man) toggle switch, controls circuit breaker, pump circuit breaker, automatic motor control operation, and an audible/visible high water level alarm with auto reset. Specifications for standard and optional features are listed on page 2.

All S-Series control panels have a 120 VAC controls circuit breaker. S1 panels have a 120 VAC pump circuit breaker, while S2 panels have a 240 VAC pump circuit breaker.

All S-Series panels can be used with both mechanical and mercury float switches.

Listed per UL-508 and cUL-508; CE-listed versions of S-Series panels are available.

Standard Models

S1, S2

Materials of Construction

Component	Material
Enclosure	UV-resistant fiberglass, Type 4X (IP 66)
Hinge	Stainless steel
Latch	Stainless steel

Specifications

Feature	Specifications
Height, in. (mm)	11.5 (292)
Width, in. (mm)	9.3 (236)
Depth, in. (mm)	5.4 (137)
S1 panel ratings*	120 VAC, 1 hp (0.75 kW), 16 A, 1-phase, 60 Hz
S2 panel ratings*	240 VAC, 3 hp (2.24 kW) 16 A, 1-phase, 60 Hz

** Pump motors used with these panels require internal overload protection.*

Product Code Diagram

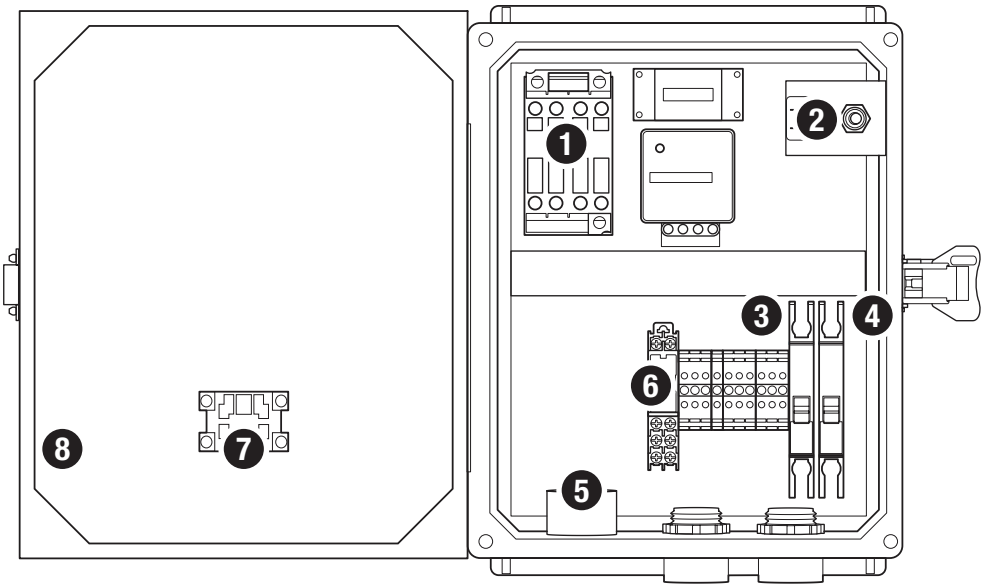
S | 1 | IR2 | ROETMCT

Standard options (list in order):
- PT = programmable timer
- RO = redundant off relay
- DS = disconnect switch
- ETM = elapsed time meter
- CT = event counter
- HT = heater
- PRL = pump run light
- PL = power light
- SA = surge arrestor

Intrinsically safe relays:
- Blank = standard, no IR relays
- IR1 = up to 2 float switches
- IR2 = up to 4 float switches

Pump voltage:
- 1 = 120 VAC
- 2 = 120 VAC or 240 VAC

S Series simplex control panel



Orenco S-Series Simplex Control Panel (S1ETMCT shown)

Standard Features

Feature	Specifications*
1. Motor-start contactor	120 VAC: 17 FLA, 1 hp (0.75 kW), 2.5 million cycles at FLA 240 VAC: 17 FLA, 3 hp (2.24 kW), 2.5 million cycles at FLA
4. Auto/Off/Man toggle switch	Single-pole, double-throw HOA switch
2. Controls circuit breaker	10 A, OFF/ON switch, single pole, DIN rail mounting with thermal magnetic tripping characteristics
3. Pump circuit breaker tripping characteristics	20 A, OFF/ON switch, single pole (120 VAC) or double pole (240 VAC), DIN rail mounting with thermal magnetic
5. Audible alarm	95 dB at 24 in. (610 mm), warble-tone sound; gasketed, UL Type 4X (IP66)
6. Audible alarm silence relay	Automatic reset, DIN rail mount
7. Visible alarm	7⁄8-in. (22-mm) diameter red lens, "Push-to-silence," UL Type 4X (IP66), 1 W LED light
8. Enclosure	UV-resistant fiberglass and stainless steel, UL Type 4X (IP66)

Optional Features

Feature	Specifications*	Product code adder
Intrinsically safe control relays	Listed per UL 698A, for Class 1 Div. 1, groups A, B, C, D hazardous locations (Requires larger enclosure)	IR
Programmable timer	Repeat cycle from 0.05 seconds to 30 hours; separate variable controls for OFF & ON time periods	PT
Redundant off relay	DIN rail mount; provides a secondary off; sounds alarm upon low level condition	RO
Elapsed time meter	7-digit, non-resettable; limit of 99,999 hours; accurate to 0.01 hours	ETM
Event counter	6-digit, non-resettable	CT
Heater	anti-condensation heater; self-adjusting: radiates additional wattage as temperature drops	HT
Pump run light	7⁄8-in. (22-mm) diameter green lens; UL Type 4X (IP66), 1 W LED light	PRL
Power light	7⁄8-in. (22-mm) diameter green lens; UL Type 4X (IP66), 1 W LED light	PL
Surge arrestor	Status light on unit; protects incoming power supply from electrical surges	SA
Test Switch	Momentary switch for alarm testing	TS

** All voltages are 120 VAC unless otherwise noted.*

Orenco Systems® Inc. , 814 Airway Ave., Sutherlin, OR 97479 USA • 800-348-9843 • 541-459-4449 • www.orenco.com

Design, Installation and Maintenance

of the

T & J Panel
Wastewater Treatment System



Environmental Health Specialists
Septic Tank Installers

Updated 2020

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Resources – pg. 12- pg. 18 (Installation/Design Resources & Illustrations)

Introduction

Although this manual is sectioned for specific user groups, we at T&J Panel suggest you familiarize yourself with the complete manual. Please visit our website at www.TJPanel.com for more resources regarding design, installation and maintenance of T&J Panel Systems. All of the resources provided in this manual are available online to print. The most current and up-to-date version of this manual is posted on our website at www.TJPanel.com and supersedes all printed editions. For further discussion of this manual, please reach out to our office at 704-924-8600.

Company Information

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Brad@tjpanel.com

Feel free to contact us with any questions regarding ordering, installation, design, maintenance or any other matter regarding the T&J Panel System.

Installer Training

While T&J Panels does not require a product specific installer certification, it is our goal to train installers to correctly install a panel block system. If it is your first time installing, inspecting, or designing a system, please do not hesitate to reach out to us, or to ask us to include the installer training for your job. Installation training will send a company representative to your jobsite to discuss the panel block system and how to properly install them. T&J Panels recommends an installation training for each orientation of the panel block system (both horizontal and vertical). Contact our offices to schedule your install training at 704-924-8600.

ENVIRONMENTAL HEALTH SPECIALISTS

System Design

The primary reason for permitting the panel block system is because of insufficient space for a conventional system. Panel block systems are included in the North Carolina Sewage Regulations [10NCAC 10A.1956 (3) (a) (ii)] [15ANCAC 18E .0905] as a modified conventional system. The panel block system should be considered when: a quality effluent may be needed, space is limited, usable soil is limited, or there are indications that at some future time space may be needed for other development. When there is a trend for added development such as additions to homes, pools or other special landscaping development, a T&J Panel System may prevent insufficient space later. As the Environmental Health Specialist who is designing a system, you can foresee such a trend of continued development, the panel block system may be an option the property owner would like to utilize.

As noted in the regulations, a PPBPS (Prefabricated, Permeable, Block Panel System) is permitted where soils are suitable, provisionally suitable, or reclassified provisionally suitable; however, only one half of the area needed for a conventional system is required. This is one reason the panel block system can help you utilize the best soils available on the lot. The minimum soil depth required for horizontally installed Panel Systems is 26-inches, whereas the minimum soil depth required for vertically installed Panel Systems is 34-inches (minimum depths require 6" of suitable soil cover). The system can be gravity fed, pumped to a pressure manifold and gravity fed into the lines, or pumped to low-pressure panel lines. Most of the concepts for a panel block system layout are the same as for a conventional system; the biggest difference being the aerial area needed and the quality of effluent being introduced into the ground.

T&J panels can be installed as either gravity, pump to gravity, pump to pressure manifold, or lowpressure pipe distribution system. When designing a pressure system, the principles of low-pressure distribution are as described in the LPP manual. There is further discussion on pressure systems on page 11 of this manual.

Conversion

A three-bedroom house with a 0.4 gpd application rate. (The first three steps are the same as for the conventional system.)

1) 120 gallons per bedroom X 3 bedrooms = 360 gallons per day design flow rate.

2) 360 gallons' flow rate / 0.4 application rate = 900 sq. ft. of conventional trench bottom.

3) 900 sq. ft. / 3 ft. wide trench = 300 linear feet of conventional system.

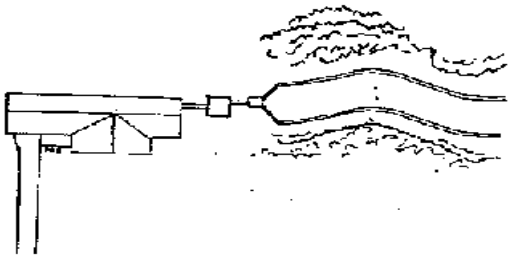
This conventional layout requires 2700 sq. ft. of area on the lot with another equal area of repair space for a total of 5400 sq. ft. of suitable usable area. To calculate the size of the T&J Panel system, the above calculations must be made with an additional fourth step as described in [10NCAC 10A .1956 (3) (a) (ii) (B)] for a PPBPS, (T&J Panel System).

4) 300 linear feet of conventional system X 0.5 for a horizontally or vertically installed 16inch panel block system = 150 linear feet of T&J Panel System.

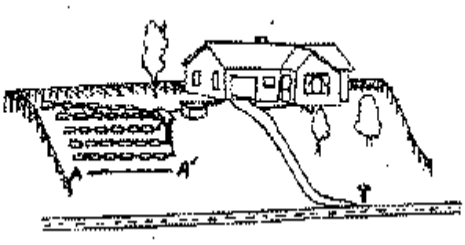
A panel block system requires only a 1200 sq. ft. area on the lot for the system with an equal area for repair, a total of 2400 sq. ft. With the panel block system, the installation and repair can go into the same area as the initial area required for a conventional gravel trench system.

Window Effect

To prevent hydraulic overload in the soil, aerial space should always be a consideration for any system. However, it is especially notable with panel block systems, as with any system, that reduces the size of the aerial area drain field. The following is a simplistic example of this concept:



MOST DESIRABLE

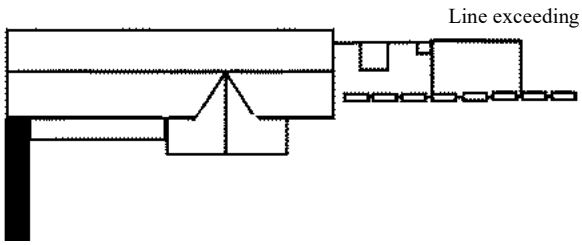


LESS DESIRABLE

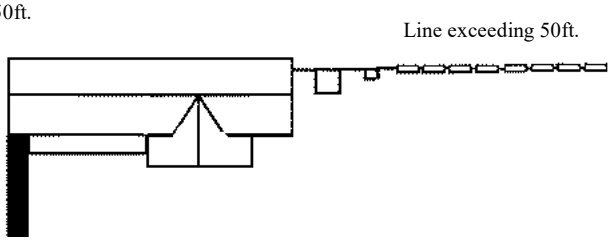
While both systems have the same linear footage of trench, the second diagram is a less desirable design. The effluent must pass through the area A-A' which can cause a strain on that area and even a failure because of hydraulic overloading.

Distribution

In the incorrect example below, the aerial space is good and the chance of hydraulic overloading is greatly reduced. However, downline distribution in a long single trench fed from only one end, will not give optimum treatment. In the correct example we see that the trench has been fed from multiple points. Because the panel lines are put in as level as possible (never exceeding ¼ inch of drain line fall in 10 feet of run), they feed both ways equally. T&J Panel recommends that no gravity line exceed 50 feet unless it is fed from multiple points. T&J Panel recommends that line lengths between 50 and 70 feet utilize a pressure manifold to gravity, and that lines exceeding 70 feet utilize low-pressure distribution. (These are best practice, but not required)



(Correct)



(Incorrect)

Any questions regarding the optimal distribution method for your system design, please contact our office.

Calculating Panels per Trench

To calculate the number of panels needed for a 150-foot line, multiply 150' X 12" = 1800", then divide by 52" which is 46 inches for the panel and 6 inches for the space between the panels in the trench. 1800" / 52" = 34.6 panels; therefore, you would call for 35 panels. If there is to be more than one trench, the sizing of the lines should be as equal as possible with as close to the same number of panels in each trench as is practical. A material order chart is available on page 15 of this manual.

Backfill

Backfill sand shall be a clean, screened, medium-grade sand that is naturally-occurring. Acceptable sands are sands that are suitable for the production of ready-mix concrete and clean of organic debris and stone. Sands dredged from rivers and creeks can be used, if gradation is sufficient to be blended into ready-mix concrete production. Product description includes, but is not limited to: Concrete Sand, NC-2S Sand, ASTM C-33 Sand, FA-10 Sand and Grade "A" Sand. Product suitability is important and T&J Panel, Inc. will help answer any questions.

S.A.P. Sand Alternative Product: is the geotextile fabric inside each panel for quality control and downline and horizontal distribution. (this takes the place of medium blasting sand)

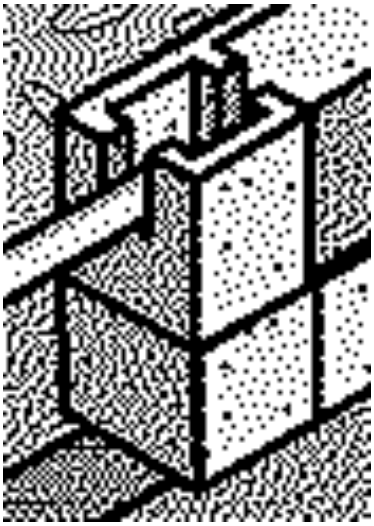
Foam Sealant / Tar Seals

The drawings below illustrate the outer and inner seal. Note that while the outer seal is a complete seal, the inner seal is only up to the top of the connecting pipe. This is to allow for over flow of the effluent into the sand at peak use. These seals can be inspected by lifting the caps at the ends of the panels while inspecting the system installation. GE Foam Sealer is an approved alternative to tar for these seals. Care should be used not to glue the caps down with the use of GE Foam Sealer. When using GE Foam Sealer, special care should be used n the inner seals of the panel not to over fill or under fill this seal. The **inner** seal, if sealed off completely, will restrict the overflow reservoir.

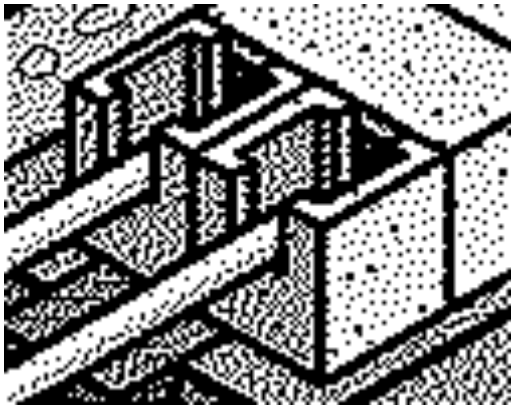
Vertical Installation

Inner Seal

Outer Seal



Horizontal Installation

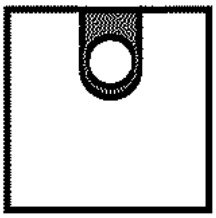


Inner Seal

Inner Seals

Outer Seals

Outer Seal



Trench Preparation

Trench grade should be established so that backfill cover will be four to six inches over the tops of the panels. (Note, on severe slopes, system depth should be adjusted to protect against breakout of effluent.) In soils containing clay, the trench side walls should be raked to bring slicked over areas back as near to original structure as possible. A light dusting of lime on the sidewalls will help restore the soils back to their original structure.
(At grade installation systems are required to bring in 6" of topsoil suited for vegetative growth)

Final Inspection

The following list of key points are things that an inspector should look for when issuing a completion permit:

1) Were panels installed horizontally or vertically, according to the permit?

2) Is the depth of the panels within guidelines?

3) Are drain lines level or less than ¼ inch fall in ten feet?

4) Have seals been properly constructed?

5) Was the proper sand used in the trench backfill?
Is the sand clean? (i.e. free of debris, large organics, leaves, etc.)
Has the sand been screened? (to a medium-grade, not too fine, free of large rocks)
Is the sand naturally-occurring? (i.e. from a river, creek, sand pit, etc., not manufactured)

6) If in soils where clay is present, were the sidewalls raked and limed?

For Pumped Systems

7) Have pump size, head pressure and dose cycle been properly sized and set?
Set dose cycle for 3.6 gallons per panel with pressure distribution
Set dose cycle at 3.6 gallons per vertical panel and 7.2 gallons per horizontal panel when pumping to pressure manifold and gravity feeding.

8) Record field data on operations permit.

INSTALLER

The Panel Block System

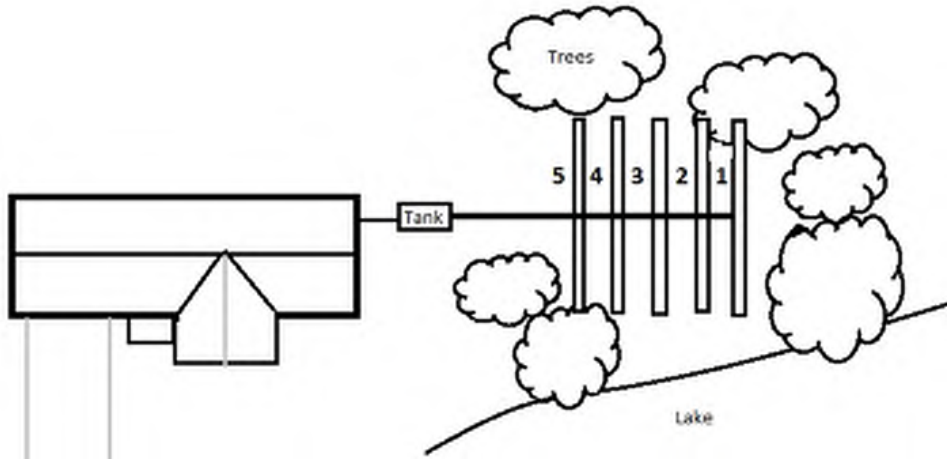
Generally, on level open land, a panel block system can be installed in about the same amount of time as a conventional system; however, traditionally, panel block systems have been installed where space and topography have restricted the use of a conventional system. For this reason, panel block system installations require more time. Many installers enjoy the change of working with panels, not handling gravel, and the satisfaction of knowing a better quality, long-lasting system has been installed.

Ordering Materials

T&J Panel partners with suppliers to ensure panel block systems are available statewide. Please be sure to let your supplier know what installation method you are utilizing, as this will affect the amount of materials needed for the system. For information on the distributor located closest to you, call **704-924-8600** or email **info@tjpanel.com**.

Installation Tips

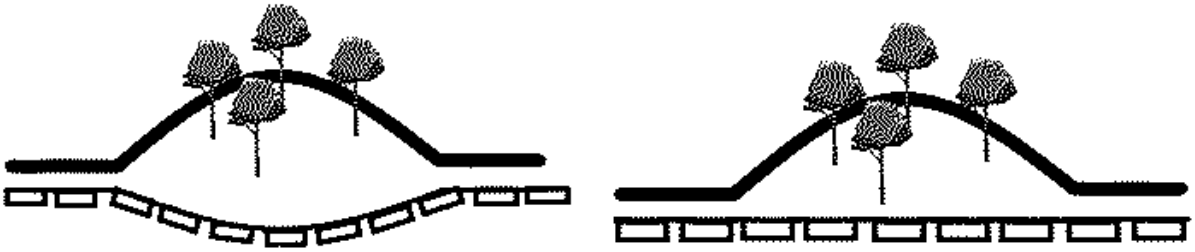
Installation for multiple line systems should begin in the most confining area and be worked to the more open areas.



Above is an example of a multiple line installation. As you can see, the installation should begin with the line marked 1 and proceed to 2, 3 then 4. This procedure will greatly ease material handling and backfilling. (Note, sections of the drain lines should be left uncovered to allow for inspection of lines when area is confined and return access to lines is limited.)

Most Panel Systems are currently used due to space considerations and caution should be taken to preserve suitable soil structure and site conditions.

Below are two examples of drain lines on sloping lots. The second drawing shows the drain line going through a slope making the center of the line deeper in the ground, resulting in an undesirable situation. The first drawing shows the drain line going around the slope (on contour) keeping the trench depth and cover uniform for the entire length of the line. On slopes, care should be given to avoid cutting away valuable topsoil in an effort to make straight lines. The panel line should be installed on grade with the contour of the natural slope. Panel lines can be curved to almost any degree.



CORRECT INCORRECT

Digging the Trench for Vertical Installation

Start by shooting the grade and marking the contour. For a 16-inch, vertically installed panel, add 28 inches to the shallowest or lowest grade (22 inches for at grade installations with area soil cap) that the trench must cross to obtain the trench bottom grade. Dig the trench at the elevation derived, checking the grade frequently. The trench should be a minimum of 2 feet wide. With the trench open, all sidewalls should be raked to bring smeared areas back to their original structure before a light dusting of lime is applied. Place a 6-inch layer of appropriate backfill sand (clean, screened, naturally-occurring sand) in the trench and level to grade. Place a 1x4 or 1x6 board (does not have to be treated) flat on the top of the 6-inch layer of sand. Once more, check the grade of the trench by shooting the top of the board. Once the grade boards have been set, the panels may be set into the trench by hand or by using the backhoe. Each panel weighs about 140 pounds and placement by hand goes quickly. The panels should be placed about 6 inches apart in the trench to obtain equal spacingGE Foam Sealer or tar seal rope should be placed in the bottom of the U outs to form seals around the pipe as shown in earlier drawings. Once the GE Foam Sealer or tar seal rope is in place, a 24-inch section of 2inch PVC pipe (for gravity distribution, see page 11 for pressure distribution instructions) is cut to span from the middle top chamber of the first panel to the middle top chamber of the next panel. Any tar seal rope that is used should be of tar or butyl that is soft and pliable to obtain a watertight seal. Now that the connection and sealing is complete, a cap block is placed on each end of the panel, covering all openings (these will be delivered with the panels). The cap block may well serve as an inspection port at some future date. The trench is ready to be backfilled to the top of the panel with the same backfill sand used in the trench bottom. With the sand to the top of the panel, trenches should be left for the sanitarian to inspect. Soil cover should be added after the final inspection. (At grade installation systems are required to bring in 6” of topsoil suited for vegetative growth)

Materials Chart for Vertical Installation

Materials needed:

- One can of GE Foam Sealer per five panels
  or
- Three feet of half inch tar seal rope per panel

- Two feet of 2-inch SCH40 pipe per panel (for gravity distribution), or same linear feet as line layout of pressure system of 1 ¼ inch or 1 ½ inch pipe. Add pipe for tie in of lines to tank and house.

- Same linear feet of 1x4 or 1x6 as line length

- Bag of powder lime when in clay soil

Vertical Installation

Panel and Backfill Sand totals for a Vertical Installation trench.
(Add 50% more for a 3-foot-wide trench with vertical installation)

50 LF – 12 panels 8¼ tons sand	130 LF – 30 panels 21½ tons sand
60 LF – 14 panels 10 tons sand	140 LF – 32 panels 23 tons sand
70 LF – 16 panels 11½ tons sand	150 LF – 35 panels 25 tons sand
80 LF – 18 panels 13¼ tons sand	160 LF – 37 panels 26½ tons sand
90 LF – 21 panels 15 tons sand	170 LF – 39 panels 28 tons sand
100 LF – 23 panels 16½ tons sand	180 LF – 42 panels 30 tons sand
110 LF – 25 panels 18¼ tons sand	190 LF – 44 panels 31½ tons sand
120 LF – 28 panels 20 tons sand	200 LF – 46 panels 33 tons sand

Shallow Soils Solution

***** Please Let Your Distributor Know If You Plan To Use Horizontal Installation***** (This will change the amount of materials needed to complete your job)

Digging the Trench for Horizontal Installation

Start by shooting the grade and marking the contour. For a 16-inch panel, horizontal installation, add 20 inches to the shallowest or lowest grade (14 inches for at-grade installations with area soil cap) that the trench must cross to obtain the trench bottom grade. Dig the trench at the elevation derived, checking the grade frequently. The trench should be a minimum of 3-foot-wide (9 feet on center). With the trench open, all sidewalls should be raked to bring smeared areas back to their original structure before a light dusting of lime is applied. Place a 6-inch layer of appropriate backfill sand (clean, screened, naturally-occurring sand) in the trench and level to grade, then place a 1x6 inch board flat on the top of the 6-inch layer of sand. Once more check the grade of the trench by shooting the top of the board. Once the grade boards have been set, the panels may be set into the trench by hand or by using the backhoe. Each panel weighs about 140 pounds and placement by hand goes quickly. The panels should be placed about 6 inches apart in the trench to obtain equal spacing. At the beginning of each line, install an Entry T (for gravity distribution) to divide the gravity flow, as close to the beginning of the first panel as possible. GE Foam Sealer or tar seal rope should be placed in the bottom of the U outs to form seals around the pipe as shown in earlier drawings. Once the GE Foam Sealer or tar seal rope is in place, a 24-inch section of 1 ½ inch PVC pipe (for gravity distribution, see page 11 for pressure distribution instructions) is cut to span from the inside of the two chambers to the inside of the two chambers in the following panel. Any tar seal rope that is used, should be of tar or butyl that is soft and pliable to obtain a watertight seal. Once the connection and sealing are complete, a cap block (delivered with all panels) is placed on each end of the panel covering all openings. The cap block may well serve as an inspection port at some future date. The trench is then ready to be backfilled to the top of the panel with the same backfill sand used in the trench bottom. With the sand to the top of the panel, trenches should be left for the sanitarian to inspect. Soil cover should be added after the final inspection. (At grade installation systems are required to bring in 6” of topsoil; suited for vegetative growth)

Most Panel Systems are currently used due to space considerations and caution should be taken to preserve suitable soil structure and site conditions.

***** Please Let Your Distributor Know If You Plan To Use Horizontal Installation*****
(This can change the materials needed to complete your job)

Materials Chart for Horizontal Installation

Materials needed: - Five feet of half inch tar seal rope per panel
or
- Two cans of GE Foam Sealer per five panels

- Two pieces of two feet long 1 ½ inch SCH40 pipe per panel (for gravity distribution), or two times the linear feet of line layout of pressure system of 1 ¼ inch or 1 ½ inch pipe. Add pipe for tie in of lines to tank and house.

- Same linear feet of 1x6 as line length

- Bag of powder lime when in clay soil

Horizontal Installation

Panel and Backfill Sand totals for a Horizontal Installation trench.

50 LF – 12 panels 8¼ tons sand	130 LF – 30 panels 21½ tons sand
60 LF – 14 panels 10 tons sand	140 LF – 32 panels 23 tons sand
70 LF – 16 panels 11½ tons sand	150 LF – 35 panels 25 tons sand
80 LF – 18 panels 13¼ tons sand	160 LF – 37 panels 26½ tons sand
90 LF – 21 panels 15 tons sand	170 LF – 39 panels 28 tons sand
100 LF – 23 panels 16½ tons sand	180 LF – 42 panels 30 tons sand
110 LF – 25 panels 18¼ tons sand	190 LF – 44 panels 31½ tons sand
120 LF – 28 panels 20 tons sand	200 LF – 46 panels 33 tons sand

Pump to Pressure Manifold Gravity Feed

When pumping to gravity feed, the vertical panel should be dosed at 3.6 gal per panel and the horizontal panel should be dosed between 5 gal to 7.2 gal per panel. The outer and inner seal on the first panel in each line should be a full seal. The maximum flow per tap on a vertical panel should be 12.5 gpm and 17.7 gpm on horizontal panels.

Low-Pressure Distribution

The LP Panel uses technology similar to that of Low Pressure Pipe (LPP) Systems. The tables and distribution design described in the LPP manual, in most regards, is applicable to the pressure Panel System. The system should be used with two to four feet of head. In many respects, a LP Panel is similar to an LPP with the holes discharging into the panels. In *both* horizontally and vertically installed pressure dosed panel systems, valves should be banked in a valve box and turn-ups should be neatly capped, covered and labeled for future service. Pump tanks should be constructed as shown in the drawing on page 14 to allow for service and repairs.

Vertical Panels with Pressure Distribution

The dosing cycle for the vertical Panel System is designed to pump enough effluent to fill the top chambers of all the panels in the system. The top chamber of a 16-inch panel holds 3.6 gallons, before promoting downline distribution to the next panel. When the system has 34 panels and all holes are the same size, you would multiply 34 X 3.6 to get 122 gallons per dose cycle. The holes are drilled in the distribution pipe, one hole per panel. These holes are drilled, alternating between the 10 o'clock and 2 o'clock positions on the pipe in each panel. Special care should be taken to ensure that only one hole is drilled per panel. These holes are alternating between 10 o'clock and 2 o'clock every panel to prevent hydraulic overload of one side of the trench. These pipes are then placed so that the effluent is pumped into the top chamber of the panel. If the hole sizing changes in the system, the pump cycle is set by the hole that is discharging the fastest.

Horizontal Panels with Pressure Distribution

The dosing cycle for the horizontal Panel System is designed to pump enough effluent to fill an inner chamber in all the panels in the system. Each chamber of a 16-inch panel holds 3.6 gallons. When the system has 34 panels and all holes are the same size, you would multiply 34 X 3.6 to get 122 gallons per dose cycle. The holes are drilled in the distribution pipe, one hole per panel. These holes are drilled, alternating between the 10 o'clock and 2 o'clock positions on the pipe in each panel, while also alternating between the left and right chambers within the panel. Special care should be taken to ensure that only one hole is drilled per panel. These holes are alternating between 10 o'clock and 2 o'clock every panel, as well as alternating between the left and right chambers to prevent hydraulic overload of one side of the trench. These pipes are then placed so that the effluent is pumped into the inner chambers of the panel. If the hole sizing changes in the system, the pump cycle is set by the hole that is discharging the fastest.

Please feel free to contact a member of T&J Panel with any design, installation or maintenance questions related to an LP Panel or Pressure Manifold system

Flow Chart of Various Orifices and Pressure Heads

Head	Orifice Size												
Pressure	3/32"	1/8"		**5/32"**	**3/16"**	7/32"	1/4"	9/32"			5/16"	11/32"	3/8"
ft.	.094"	.125"		**.156"**	**.188"**	.219"	.250"	.281"			.313"	.344"	.375"
2.0	.15	.26		**.41**	**.59**	.80	1.04	1.32			1.63	1.97	2.34
2.1	.15	.27		**.42**	**.60**	.82	1.07	1.35			1.67	2.02	2.40
2.2	.15				**.61**								2.46
		.27	**.43**										
2.3	.16	.28		**.44**	**.63**			1.38	1.71	2.07			2.51
								1.41	1.75	2.11			
2.4	.16				**.64**								2.57
		.29	**.46**										
2.5	.16	.29		**.46**	**.66**			1.44	1.78	2.16			2.62
								1.47	1.82	2.20			
2.6	.17				**.67**								2.67
		.30	**.46**										
2.7	.17	.30		**.47**	**.68**			1.5	1.86	2.25			2.72
								1.53	1.89	2.29			
2.8	.17				**.69**								2.77
		.31	**.48**										
2.9	.18	.31		**.49**	**.71**			1.56	1.93	2.33			2.82
								1.59	1.96	2.37			
3.0	.18				**.72**								2.87
		.32	**.50**										
3.1	.18	.32		**.51**	**.73**			1.62	1.99	2.41			2.92
								1.64	2.03	2.45			
3.2	.19				**.74**	1.01							2.97
		.33	**.51**										
3.3	.19	.33		**.52**	**.75**	1.02		1.67	2.06	2.49			3.01
								1.69	2.09	2.53			
3.4	.19				**.76**	1.04							3.06
		.34	**.53**										
3.5	.19	.34		**.54**	**.78**	1.06		1.72	2.12	2.57			3.10
								1.74	2.15	2.61			
3.6	.20				**.79**	1.07							3.15
		.35	**.55**										
3.7	.20	.35		**.55**	**.80**	1.09		1.77	2.18	2.64			3.19
								1.79	2.21	2.68			
3.8	.20				**.81**	1.10							3.23
		.36	**.56**										
3.9	.20	.36		**.57**	**.82**	1.11		1.82	2.24	2.72			3.27
								1.84	2.27	2.75			
4.0	.21	.37		**.58**	**.83**	1.13	1.47	1.87			2.30	2.79	3.32

PRESSURE MANIFOLD TAP FLOW

GPM

Here you will find a pressure head table to help in flow design of your LP Panel system. These numbers are a guide to help you in selecting the right flow for your system. We have found that in most systems the 5/32" and 3/16" hole at 2 to 4 feet of head pressure works the best in giving a pump cycle of more than 5 minutes and keeps the same maximum top chamber flow load as sited on the previous page.

Head	SCH 40		Tap Diameter	SCH 80	
Pressure	**1/2"**	**3/4"**		**1/2"**	**3/4"**
ft.	**0.622**	**0.824**		**0.546**	**0.742**
2.0	7.11	12.50		5.48	10.10
2.1	7.29	12.80		5.62	10.40
2.2	7.46	13.10		5.75	10.60
2.3	7.63	13.40		5.88	10.90
2.4	7.79	13.70		6.00	11.10
2.5	7.95	14.00		6.13	11.30

2.6	8.11	14.20		6.25	11.50
2.7	8.26	14.50		6.37	11.80
2.8	8.62	14.80	**Gallons**	6.48	12.00
2.9	8.36	15.00	**per minute**	6.60	12.20
3.0	8.71	15.30		6.71	12.40
3.1	8.86	15.50		6.82	12.60
3.2	9.00	15.80		6.93	12.80
3.3	9.14	16.00		7.04	13.00
3.4	9.27	16.30		7.15	13.20
3.5	9.41	16.50		7.25	13.40
3.6	9.54	16.70		7.35	13.60
3.7	9.67	17.00		7.45	13.80
3.8	9.80	17.20		7.55	14.00
3.9	9.93	17.40		7.65	14.10
4.0	10.10	17.70		7.75	14.30

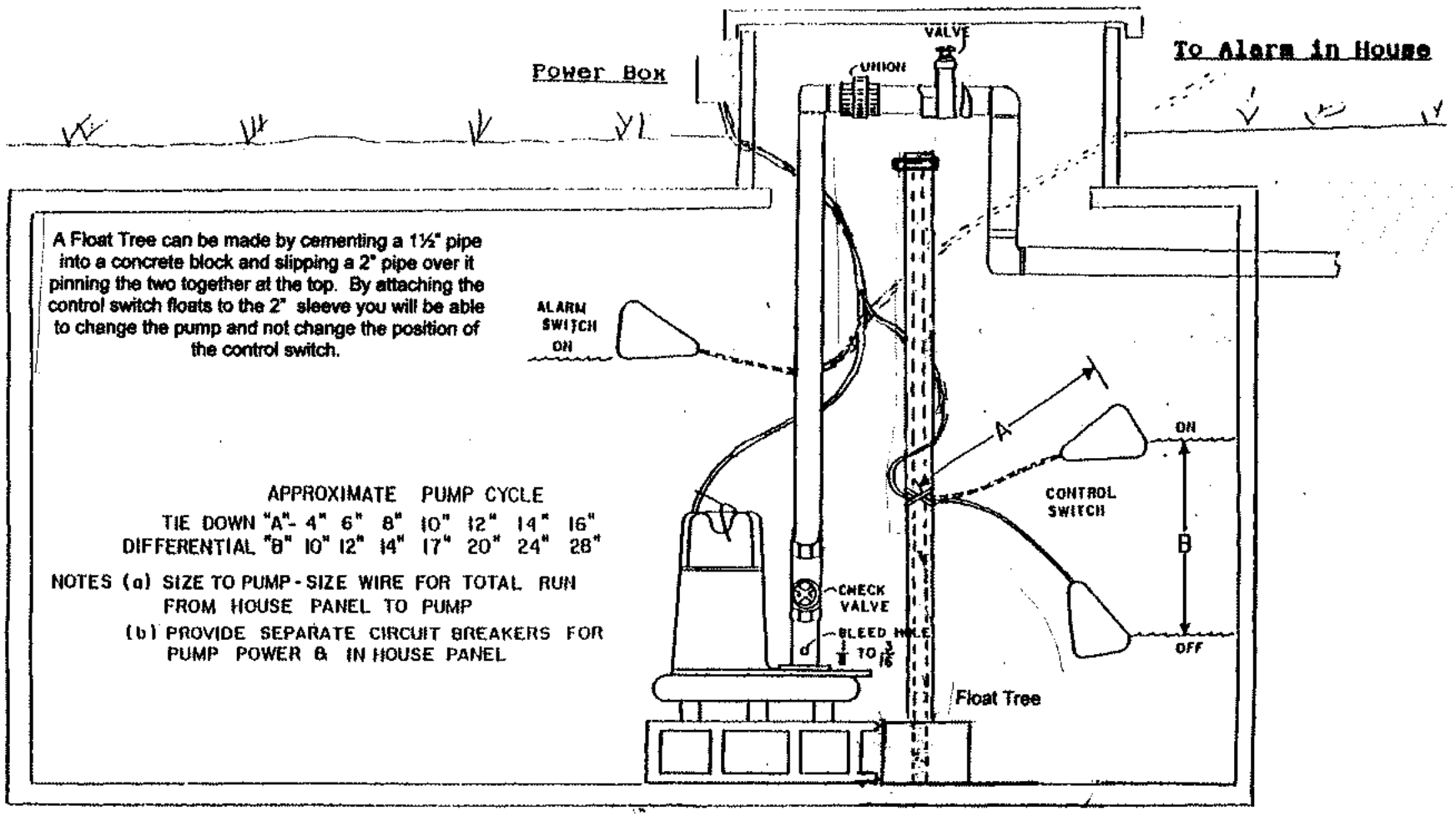
This chart will assist you in determining the proper tap sizes when you have to pump to a pressure manifold in a gravity system.

Pump Sizing

Below is a chart to aid in head selection due to friction loss in PVC pipe. In calculating friction, be sure to add 20% for loss in fittings. In the chart below, friction loss is per 100 feet of pipe. The head created by friction loss is added to the elevation head of lift from the bottom of the pump tank to the top of the highest turn-up.

Flow GPM	**Pipe Diameter**					
	1"	1 1/4"	1 1/2"	2"	3"	4"
		Friction Loss (100ft)				
1	.07					
2	.28	.07				
3	.60	.16	.07			
4	1.01	.25	.12			
5	1.52	.39	.18			
6	2.14	.55	.25	.07		
7	2.89	.76	.36	.10		
8	3.63	.97	.46	.14		
9	4.57	1.21	.58	.17		
10	5.5	1.46	.70	.21		
11		1.77	.84	.25		
12		2.09	1.01	.30	.07	

13		2.42	1.17	.35	.08	
14		2.74	1.33	.39	.09	
15		3.06	1.45	.44	.10	
16		3.49	1.65	.50	.11	
17		3.93	1.86	.56	.12	
18		4.37	2.07	.62	.16	
19		4.81	2.28	.68	.23	
20		5.23	2.46	.74	.30	
25			3.75	1.10	.39	
30			5.22	1.54	.48	
35				2.05	.58	.07
40				2.62	.81	.09
45				3.27	1.08	.12
50				3.98	1.38	.16
60					1.73	.21
70					2.09	.28
80						.37
90						.46
100						.55


Power Box
VALVE
UNION
To Alarm in House
A Float Tree can be made by cementing a 1½" pipe into a concrete block and slipping a 2" pipe over it pinning the two together at the top. By attaching the control switch floats to the 2" sleeve you will be able to change the pump and not change the position of the control switch.
ALARM SWITCH ON
ON
CONTROL SWITCH
OFF
A
B
CHECK VALVE
BLEED HOLE
Float Tree
APPROXIMATE PUMP CYCLE
TIE DOWN "A" 4" 6" 8" 10" 12" 14" 16"
DIFFERENTIAL "B" 10" 12" 14" 17" 20" 24" 28"
NOTES (a) SIZE TO PUMP - SIZE WIRE FOR TOTAL RUN FROM HOUSE PANEL TO PUMP
(b) PROVIDE SEPARATE CIRCUIT BREAKERS FOR PUMP POWER & IN HOUSE PANEL

T&J Panels Jobsite Worksheet

Homeowner/Job Name: _____ County: _____

Address: _____

System Description (Distribution type, total lines, line lengths, etc.):

_____

_____

MATERIALS CHECKLIST:

_____ 2" Pipe

_____ Vertical T&J Panels (Caps included)

_____ Horizontal T&J Panels (Caps included)

_____ GE Foam Sealer (amount varies based on installation method)

_____ Medium Sand Blasting Sand (amount varies based on installation method)

AVAILABLE FOR PURCHASE FROM T&J PANEL.

_____ Powdered Lime

_____ Entry T (per line, Horizontal Installation ONLY)

_____ 1 ½" Pipe

_____ 1 ¼" Pipe

_____ Fittings for Pipe

_____ Backfill Sand (Clean, Screened, Naturally-Occurring, Concrete Sand, or ASTM-C33, NC-2S, FA-10 and Grade "A" Sands)

Be sure to use the correct backfill sand material. Contact our offices for backfill sand sources or with any questions regarding backfill sand material.

_____ 1x6 Board (Does not need to be treated)

ADDITIONAL PRODUCTS THAT MAY BE NEEDED FOR COMPLETITION:

_____ Septic Tank _____ Gallon

_____ Pump Tank _____ Gallon

_____ 4" Pipe

_____ Distribution Box

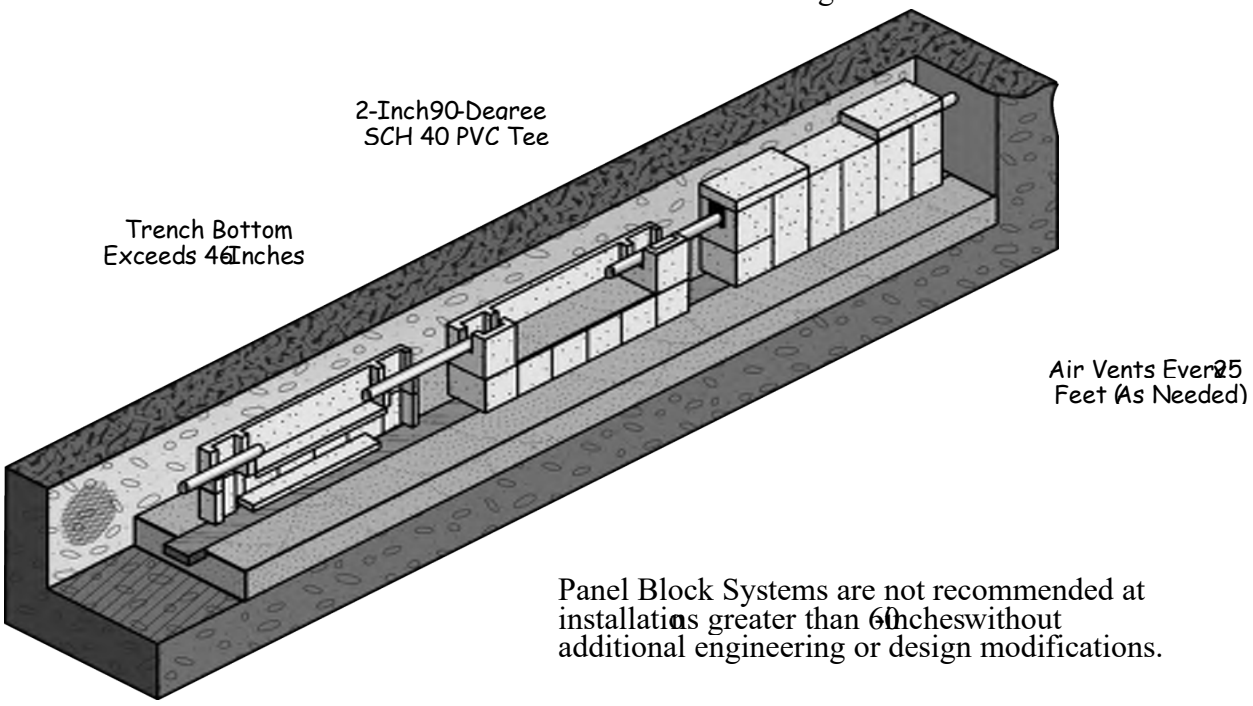
_____ Manifold _____ Taps _____ Size

_____ Install Training

_____ Tar Seal Rope (5ft. per panel)

Deep Installation of Panel Block Systems

Utilize these specifications for ventilation when Trench Bottom *exceeds* 46-inches for vertical installation. In certain situations, there are more desirable soil conditions deeper in the soil profile. On these sites, Panel Systems can still be utilized, with proper ventilation to the system. Air vents are used with Panel Systems to allow the chambers within the Panel to receive the air needed for treatment. Air vents should be installed as designed.

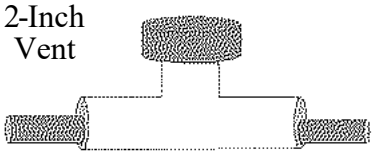


Panel Block Systems are not recommended at installations greater than 60 inches without additional engineering or design modifications.

<u>Gravity Flow Installation</u>: Cut the 24-inch long, 2-inch PVC pipe in half, then reconnect with a 2-inch 90-Degree SCH 40 Tee. Extend the 2-inch Tee up to ground surface to allow ventilation. Recommend utilizing vent caps, studor vents, or turndowns if needed, install as designed.

<u>LP Panel Installation (Low Pressure Pipe)</u>: Insert your $1^{1/4}$-inch or 1 ½-inch into a 2inch PVC "sleeve" that spans from one chamber of a panel to the next. Connect a 2-inch 90Degree SCH 40 Tee to this "sleeve" halfway between one panel and the next. Extend the 2-inch Tee up to ground surface to allow ventilation. Recommend utilizing vent caps, studor vents, or turndowns if needed, install as designed.

$1^{1/4}$-Inch or 1 ½ Inch PVC	2-Inch PVC



T & J Panel Wastewater Treatment System

269 Marble Road
Statesville, NC 28625

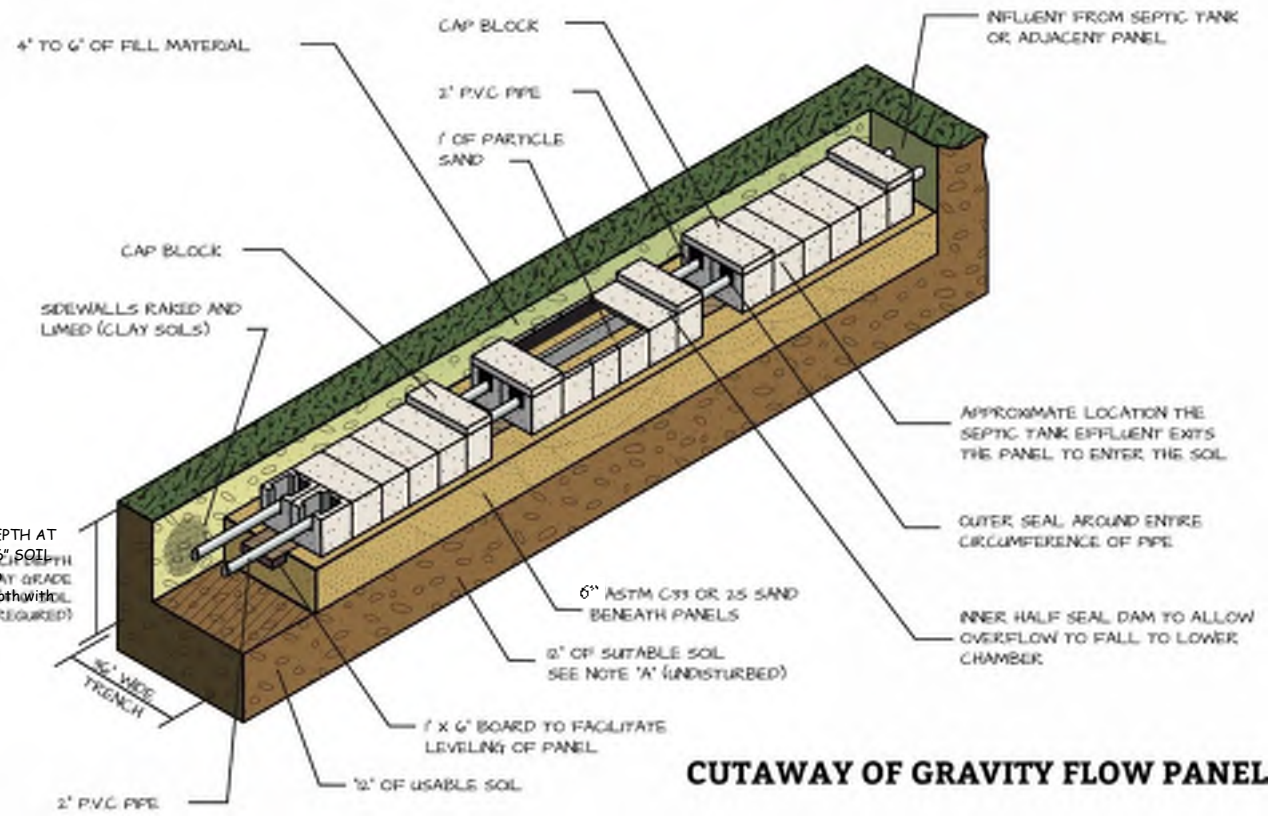
Office: **704-924-8600**
Fax: **704-924-8681**

Website**: www.tjpanel.com**
Email: **info@tjpanel.com**

Limited Warranty:

The structural integrity of each T&J Panel, when installed in accordance with manufacturer's instructions, is warranted against defective materials and workmanship for one year from date of manufacture. Should a defect appear within the warranty period, purchaser must inform T&J Panel System of the defect before the warranty expires. T&J Panel System will supply a replacement unit. T&J Panel System's liability specifically excludes the cost of removal and/or installation of the panels. There are no other warranties with respect to the units, including no warranties of merchantability or of fitness for a particular purpose. The warranty does not extend to incidental, consequential, special or indirect damages. The company shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other loss or expense incurred by buyer. Specifically excluded from warranty coverage are: Damage to the panels due to ordinary wear and tear; alteration, accident, misuse, abuse or neglect of the panels; the panels being subjected to stresses greater than those prescribed in the installation instructions; the placement by buyer of improper materials into buyer's system; or any other event, not caused by the company. Furthermore, in no event shall the company be responsible for any loss or damage to the buyer, the panels or any third party resulting from its installation or shipment. Buyer shall be solely responsible for ensuring that installation of the system is completed in accordance with all applicable laws, codes, rules and regulations. Any alteration of this warranty must be noted as "Warranty" in writing by the company.

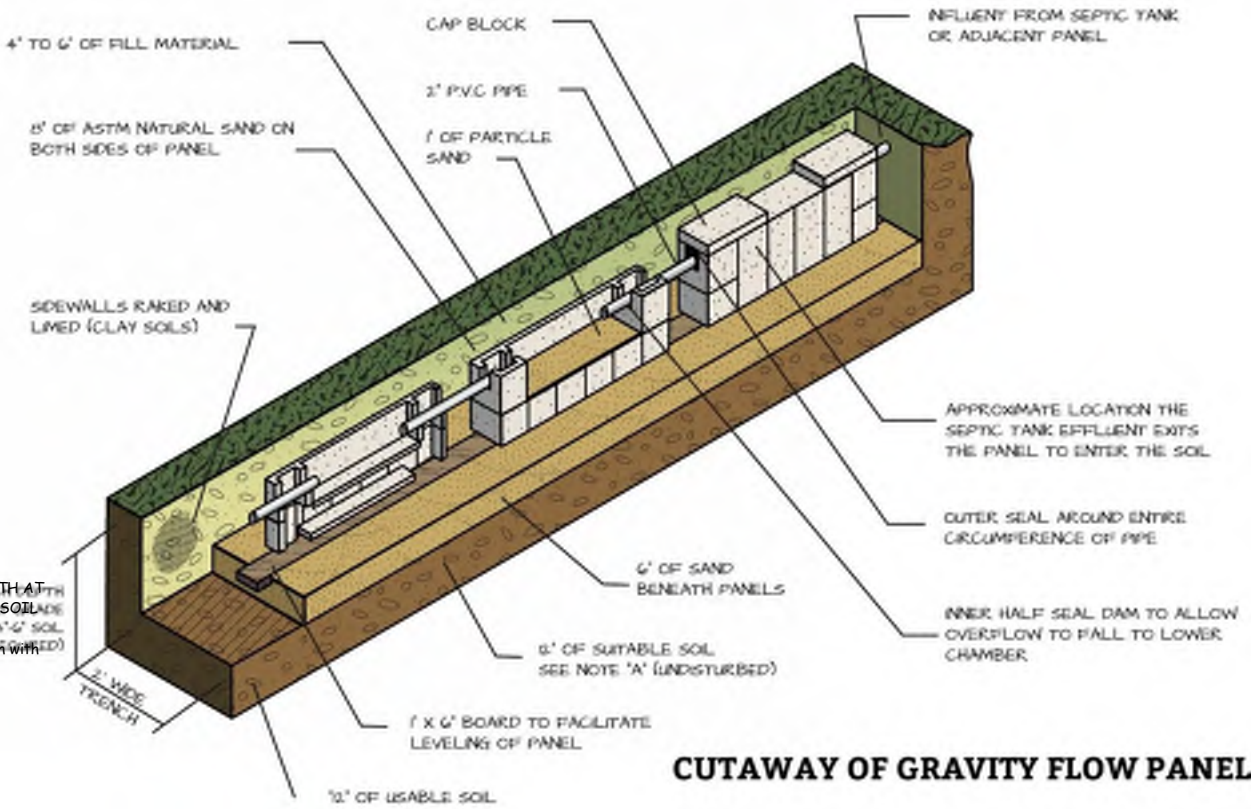
Isometric Drawing of a Segment of T & J Panel Horizontal Installation



14" TRENCH DEPTH AT GRADE WITH 6" SOIL CAP REQUIRED (20" Trench Depth with no area fill)

CUTAWAY OF GRAVITY FLOW PANEL

Isometric Drawing of a Segment of T & J Panel Vertical Installation



22" TRENCH DEPTH AT GRADE WITH 6" SOIL CAP REQUIRED (28" Trench Depth with no area fill)

CUTAWAY OF GRAVITY FLOW PANEL

When Your Problem In On-site Is:



Topography and Vegetation

Special Landscaping Needs

Future Site Needs



Limited Suitable Area

Then consider a better quality effluent with T & J Panel





Utility Swing & Spring Check Valves



Sample Engineering Specification

All thermoplastic check valves Shall be Utility Swing Check or Utility Spring Check type constructed form PVC Type I, ASTM D 1784 Cell Classification 12454. All valves shall be maintenance free seal unit construction with EPDM seat and weighted disc. All Spring Check Valves shall have stainless steel spring assisted operation. All valves shall have external flow arrow direction designation. All valves shall be certified by NSF International for use in potable water service. All valves shall be pressure rated to 150 psi for water @ 73°F in full flow (open) position and to 75 psi @ 73°F back pressure (closed), as manufactured by Spears® Manufacturing Company.

Features - PVC White & PVC Clear

Spears® Utility Swing Check and spring assisted Utility Spring Check Valves offer a compact, high performance check valve for Landscape & Irrigation, Pool & Spa, Aquaculture, OEM and many general purpose applications. These maintenance free sealed units feature long-life EPDM elastomer seats with weighted disc for full-flow with minimal restriction and positive shutoff. Spring assisted "Spring Check" model incorporates a positive-pressure spring to assist in valve closing without slamming. Produced from PVC White or PVC Clear material with Socket, Threaded or SR Threaded end connectors. Available in IPS Sizes 1/2" through 8" for Swing Check Valves and 1/2" through 4" for Spring Check Valves.

- Chemical & Corrosion Resistant PVC White or High Visibility PVC Clear Construction
- No Metal Parts on Swing Check - Stainless Steel Spring on Spring Check
- Maintenance Free Sealed Unit in a Compact Space Saving Design
- Engineered for Maximum Flow, Quick Response & Positive Shutoff
- Long-Life, High Grade EPDM Seat with Weighted Disc
- Spring Assisted Spring Check Model Option for Positive Closing
- Sizes 1/2" – 8" Pressure Rated to 150 psi @ 73°F Full-Flow (open) and 75 psi @ 73°F Back Pressure (closed)
- Suitable for either Horizontal or Vertical Up-flow Installations and Vacuum Service
- NSF® Certified for Potable Water Use
- Silicone-Free Assembly

Quick-View Utility Swing Check Valve Selection Chart

Valve Size	Seat Material	PVC Material[1]			Pressure Rating
		Socket	Threaded	SR Threaded	
1/2	EPDM	S1520-05	S1520-05F	S1520-05FSR	150 psi @ 73°F Full Flow (Open) 75 psi Back Pressure (Closed)
3/4	EPDM	S1520-07	S1520-07F	S1520-07FSR	
1	EPDM	S1520-10	S1520-10F	S1520-10FSR	
1-1/4	EPDM	S1520-12	S1520-12F	S1520-12FSR	
1-1/2	EPDM	S1520-15	S1520-15F	S1520-15FSR	
2	EPDM	S1520-20	S1520-20F	S1520-20FSR	
2-1/2	EPDM	S1520-25	S1520-25F	S1520-25FSR	
3	EPDM	S1520-30	S1520-30F	S1520-30FSR	
4	EPDM	S1520-40	S1520-40F	S1520-40FSR	
6	EPDM	S1520-60	S1520-60F	S1520-60FSR	
8	EPDM	S1520-80	N/A	N/A	

1: For PVC Clear Swing Check, replace dash (-) separator with the letter "C" in the part number (e.g. S1520**C**05), (e.g. S1520**C**05F) or (e.g. S1520**C**05FSR)

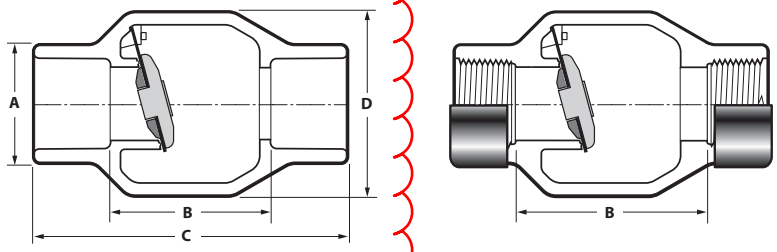
Quick-View Utility Spring Check Valve Selection Chart

Valve Size	Seat Material	PVC Material[1]			Pressure Rating
		Socket	Threaded	SR Threaded	
1/2	EPDM	S1580-05	S1580-05F	S1580-05FSR	150 psi @ 73°F Full Flow (Open) 75 psi Back Pressure (Closed)
3/4	EPDM	S1580-07	S1580-07F	S1580-07FSR	
1	EPDM	S1580-10	S1580-10F	S1580-10FSR	
1-1/4	EPDM	S1580-12	S1580-12F	S1580-12FSR	
1-1/2	EPDM	S1580-15	S1580-15F	S1580-15FSR	
2	EPDM	S1580-20	S1580-20F	S1580-20FSR	
2-1/2	EPDM	S1580-25	S1580-25F	S1580-25FSR	
3	EPDM	S1580-30	S1580-30F	S1580-30FSR	
4	EPDM	S1580-40	S1580-40F	S1580-40FSR	

1: For PVC Clear Spring Check, replace dash (-) separator with the letter "C" in the part number (e.g. S1580**C**05), (e.g. S1580**C**05F) or (e.g. S1580**C**05FSR)

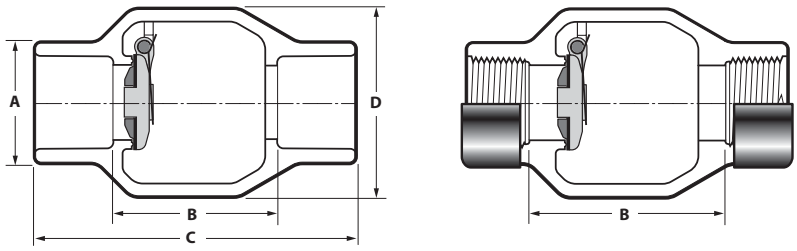
Utility Swing & Spring Check Valves

Utility Swing Check Valve



Utility Spring Check Valve

FLOW



Dimensions

Nominal Size	Dimension Reference (inches, ± 1/16)					
	A	B		C	D	
		Socket	Threaded/SR Threaded		Swing	Spring
1/2	1-3/8	2-19/32	2-5/8	4-3/32	2-1/8	2-5/8
3/4	1-3/8	2-5/32	2-1/16	4-1/16	2-1/8	2-5/8
1	1-11/16	2-5/16	2-15/16	4-9/16	2-5/8	2-5/8
1-1/4	2-1/16	2-15/16	3-5/8	5-1/2	3-3/8	3-3/8
1-1/2	2-7/16	3	3-11/16	5-5/8	3-3/8	3-3/8
2	3	3-5/8	4-3/8	6-3/8	4-1/4	4-1/4
2-1/2	3-9/16	4-3/8	5-1/4	7-7/8	5-1/8	5-1/8
3	4-5/16	4-11/16	5-5/8	8-7/16	5-3/4	5-3/4
4	5-1/4	6	7-1/16	10-1/16	6-3/8	6-3/8
6	7-11/16	8-1/2	11-5/16	14-9/16	9-1/4	N/A
8	9-7/16	11-3/16	N/A	19-1/4	11-15/16	N/A

General Installation Information: Utility Swing check valves are designed for horizontal installations, but may be installed in up-flow only vertical position. Check valves **MUST** be installed with the valves **FLOW** arrow pointing in the direction of the flow. Do not install valve upside down. Flow velocity should not exceed 5ft./sec. Minimum opening pressure less than 0.5 psi.

Temperature Pressure Rating

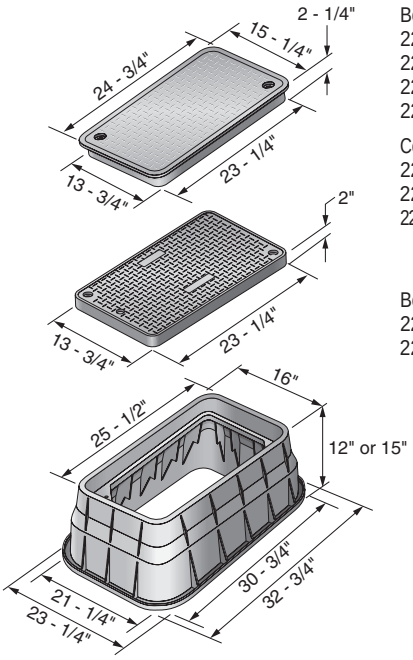
System Operating Temperature °F (°C)			100 (38)	110 (43)	120 (49)	130 (54)	140 (60)	150 (66)	160 (71)	170 (77)	180 (82)	190 (88)	200 (93)	210 (99)
Valve Pressure Rating psi (MPa)	1/2" - 8"	PVC	150 (1.03)	135 (.93)	110 (.76)	75 (.52)	50 (.34)	-0- (-0-)	-0- (-0-)	-0- (-0-)	-0- (-0-)	-0- (-0-)	-0- (-0-)	-0- (-0-)
			150 (1.03)	140 (.97)	130 (.90)	120 (.83)	-110- (.76)	-100- (.70)	-90- (.62)	-80- (.55)	-70- (.48)	-60- (.41)	-50- (.34)	-0- (-0-)

NDS PRO SERIES VALVE BOXES

COMMERCIAL GRADE

NDS Pro Series 13" X 24" Rectangular Valve Boxes

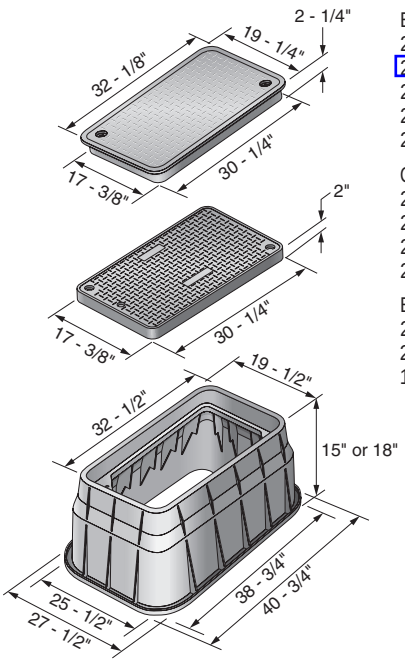
Specifications: The NDS PRO SERIES 13"x24" valve boxes and covers are injection molded of structural foam polyethylene material with a melt index between 10-12. Coloring and UV stabilizers are added, along with processing lubricants when needed.
The 13"x24" body shall be tapered and have a minimum wall thickness of .270". The body shall have a double wall at the top cover seat area with a minimum thickness of .270". The cover seat area shall have 18 structural support ribs on the underside of the seat, each with a minimum thickness of .250". The bottom of the body shall have a 1.000" flange. The 13"x24" cover shall have an average thickness of .320". The valve box shall have a 3/8" 304 SS nut for the bolt-down as a standard feature.



Part Number	Description - Marking	Color (Box / Cover)	Pallet Qty	Weight Ea	Product Class
Box & Cover					
221BCB	13"x24"x12" Box, Overlapping Bolt-Down Cover - ICV	Green/Green	12	24.00	20PR
222BCB	13"x24"x15" Box, Overlapping Bolt-Down Cover - ICV	Green/Green	12	26.00	20PR
221BCDB	13"x24"x12" Box, Drop-in Bolt-Down Cover - ICV	Green/Green	12	24.00	20PR
222BCDB	13"x24"x15" Box, Drop-in Bolt-Down Cover - ICV	Green/Green	12	26.00	20PR
Cover Only					
222C	13"x24" Overlapping Cover - ICV	Green	125	7.00	20PR
222CD	13"x24" Drop-in Cover - ICV	Green	125	7.00	20PR
222CD ELEC-L-Bolt	13"x24" Drop-in Cover - Electric**	Gray	125	7.00	20NM
	**Note – Installer responsible for ensuring product meets local building/electrical code requirements. Insulate bolt with 1/2" x 2 3/4" heat shrink tube and/or a ground rod clamp (such as Thomas & Betts Part Number 63) to reduce the chance of electrical shock				
Box Only					
221B	13"x24"x12" Box	Green	16	17.00	20PR
222B	13"x24"x15" Box	Green	12	19.00	20PR

NDS Pro Series 17" X 30" Rectangular Valve Boxes

Specifications: The NDS PRO SERIES 17"x30" valve boxes and covers are injection molded of structural foam polyethylene material with a melt index between 10-12. Coloring and UV stabilizers are added, along with processing lubricants when needed.
The 17"x30" body shall be tapered and have a minimum wall thickness of .320". The body shall have a double wall at the top cover seat area with a minimum thickness of .320". The cover seat area shall have 20 structural support ribs on the underside of the seat, each with a minimum thickness of .250". The bottom of the body shall have a 1.000" flange. The 17"x30" cover shall have an average thickness of .350". The valve box shall have a 3/8" 304 SS nut for the bolt-down as a standard feature.

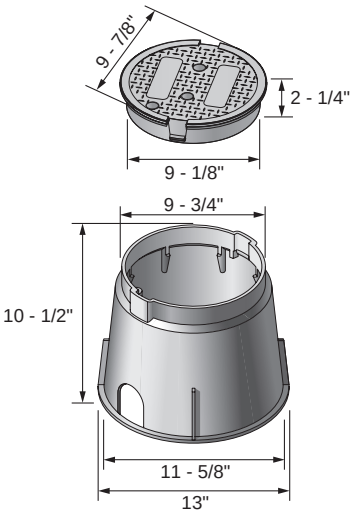


Part Number	Description - Marking	Color (Box / Cover)	Pallet Qty	Weight Ea	Product Class
Box & Cover					
224BCB	17"x30"x15" Box, Overlapping Bolt-Down Cover - ICV	Green/Green	12	28.00	20PR
226BCB	17"x30"x18" Box, Overlapping Bolt-Down Cover - ICV	Green/Green	10	37.00	20PR
224BCDB	17"x30"x15" Box, Drop-in Bolt-Down Cover - ICV	Green/Green	12	28.00	20PR
226BCDB	17"x30"x18" Box, Drop-in Bolt-Down Cover - ICV	Green/Green	10	37.00	20PR
226PBCRB	17"x30"x18" Box, Overlapping Cover - Reclaimed Water	Purple/Purple	10	37.00	20PR
Cover Only					
223C	17"x30" Overlapping Cover - ICV	Green	75	11.00	20PR
223CD	17"x30" Drop-in Cover - ICV	Green	75	11.00	20PR
223CR	17"x30" Overlapping Cover - Reclaimed Water	Purple	75	11.00	20PR
223CD ELEC	17"x30" Drop-in Cover - Electric	Gray	75	11.00	20PR
Box Only					
224B	17"x30"x15" Box	Green	12	20.00	20PR
226B	17"x30"x18" Box	Green	12	20.00	20PR
126PB	17"x30"x18" Box	Purple	10	23.00	20ND

Note: All dimensions are nominal. All weights are for shipping purposes only. Availability is subject to change.

NDS Pro Series 10“ Round Valve Boxes

Specifications: The NDS PRO SERIES 10" round valve boxes and covers are injection molded of structural foam polyethylene material with a melt index between 10-12. Coloring and UV stabilizers are added, along with processing lubricants when needed.
The 10" round body shall be tapered and have a minimum wall thickness of .250". The cover seat area shall have 8 structural support ribs on the underside of the seat, each with a minimum thickness of .250". The bottom of the body shall have a .500" flange. The 10" round cover shall have an average thickness of .300". The valve box shall have a 3/8" 304 SS nut for the bolt-down as a standard feature.



Part Number	Description - Marking	Color (Box / Cover)	Pallet Qty	Weight Ea	Product Class
Box & Cover					
212BC	10" Round Box, Round Overlapping Cover - ICV	Green/Green	120	4.50	20PR
212BCB	10" Round Box, Round Overlapping Bolt-Down Cover - ICV	Green/Green	120	4.60	20PR
211BCBLK	10" Round Box, Round Overlapping Cover - ICV	Black/Black	120	4.50	20PR
211PBCR	10" Round Box, Round Overlapping Cover - Reclaimed Water	Purple/Purple	120	4.50	20PR
212BCW	10" Round Box, Round Overlapping Cover - Water	Green/Green	120	4.50	20PR
212BCBW	10" Round Box, Round Overlapping Bolt-Down Cover - Water	Green/Green	120	4.60	20PR
212BCS	10" Round Box, Round Overlapping Cover - Sewer	Green/Green	120	4.50	20PR
212BCBS	10" Round Box, Round Overlapping Bolt-Down Cover - Sewer	Green/Green	120	4.60	20PR
212BC ELEC	10" Round Box, Round Overlapping Cover - Electrical	Gray/Gray	120	4.50	20PR
212BCB ELEC	10" Round Box, Round Overlapping Bolt-Down Cover - Electrical	Gray/Gray	120	4.60	20PR
Cover Only					
211C	10" Round Overlapping Cover - ICV	Green	200	1.50	20PR
211CR	10" Round Overlapping Cover - Reclaimed Water	Purple	200	1.50	20PR
211CRG	10" Round Overlapping Cover - Reclaimed Water	Green	200	1.50	20PR
211C BLK	10" Round Overlapping Cover - ICV	Black	200	1.50	20PR
211CW	10" Round Overlapping Cover - Water	Black	200	1.50	20PR
211CS	10" Round Overlapping Cover - Sewer	Green	200	1.50	20PR
211C ELEC	10" Round Overlapping Cover - Electrical	Gray	200	1.50	20PR
Box Only					
212B	10" Round Box	Green	120	3.00	20PR
212PB	10" Round Box	Purple	120	3.00	20PR
212B BLK	10" Round Box	Black	120	3.00	20PR
212B GRAY	10" Round Box	Gray	120	3.00	20PR
113BB	2-1/2" x 3/8" SS Bolt	Steel	(Bag of 10)	0.10	20NM