

Chatham County Public Health Department
Environmental Health Division
80 East Street, P.O. Box 130 Pittsboro, NC 27312
(919) 542-8208 FAX (919) 542-8288

File Name _____
911 Address _____
Parcel Number _____

SEWAGE DISPOSAL CONSTRUCTION AUTHORIZATION

EXPIRATION DATE 7-16-13

New

Repair

Expansion

Owner

Lee Moore Oil Co.

Directions To Property

15501 North next to Orange Co. Line on Right

- This permit authorizes its permit holder to install the sewage disposal system within five years of the issue date on the Improvement Permit.
- **This permit is non-transferable.**
- The installer must be registered with the Chatham County Environmental Health Division.
- This authorization is required prior to the issuance of a building permit.
- Before an Operations Permit is issued, all required inspections and conditions of the permit must be completed and verified by this department and payment of applicable fees must be received.

Instructions and Conditions

- Design capacity: Number of bedrooms _____ or GPD 990.
- Plans, if required were approved by _____.
- Approximate contour in system area is shown on site plan. The installer must flag the system prior to installation to ensure proper grade.
- Approximate system component locations shown on site plan, contractor must verify component locations prior to installation to assure proper fall from house to septic tank and from septic tank to approved system area.
- Approved site plan attached.
- Site plan per Improvement Permit approved.
- System Type* IIIb. System types III (b), IV, V and VI require the payment of annual onsite wastewater monitoring fees to the Chatham County Public Health Department. *Payment of the first annual fee is required prior to issuance of the Operation Permit.*

Follow design specifications by SEC dated 7-1-08
Contractor to meet on site prior to installing

The Operation Permit is required to be recorded at the Chatham County Register of Deeds Office prior to Environmental Health notifying Chatham County Building Inspections Department of Septic System Approval.

This Construction Authorization is subject to revocation if the site plan, plat or the intended use changes. This Construction Authorization is subject to compliance with the provisions of the Laws and Rules for Sewage Treatment and Disposal conditions on this permit.

Permit issued by Thomas J. Boyce R.S.
Environmental Health Specialist

Date 7-21-08

* I understand that the system type specified is different from the type specified on the application and accept the specifications of this permit.

Signature _____
Owner/Legal Representative

Date _____

CHATHAM COUNTY HEALTH DEPARTMENT ENVIRONMENTAL HEALTH DIVISION

80 East Street ▪ P. O. Box 130 ▪ Pittsboro, NC 27312-0130
Phone (919) 542-8208 ▪ Fax (919) 542-8288

OFFICE USE ONLY

TPN _____
Permit No. _____
Date _____
EHS _____
System Type _____

Improvement Permit for Wastewater Systems ARTICLE II-CHAPTER 130A OF THE NC GENERAL STATUTES

NEW REPAIR EXPANSION REVISED

An Improvement Permit is issued to Lee Moore Oil Co. for
a 40 acre site located HWY 15-501 next to Orange Co. Line
in Chatham County. It is specifically issued for the following facility:

Facility: Residential () Non-Residential ()
No. Bedrooms _____ No. Residents/Employees Retail Space 7000 sq ft
Type Wastewater: Residential () Commercial ()
Initial System Type: I () II () III () IV () V () VI ()

Description _____
Type System: Shallow Conventional () LPP ()
Other Pressure Main/Col to Accepted 25% Reduction
Design Flow 970 EPGD Application Rate .25 GPD/ft²
Size Tank(s) w/Risers and Effluent Filter ST 1659 min Gal PT 1659 min Gal
Nitrification Line (Length/Width/Max Depth) 1010' x 3' x 18"

(On contour in approved septic area; sch. 40 PVC required over step-downs)

Repair System Type: I () II () III () IV () V () VI ()
Description Drip Irrigation with TSS II pretreatment

Special Conditions _____

A plat with site plan showing specific location of the facility, the site for the proposed wastewater system, existing buildings, property lines, water supplies, surface waters, the conditions for any site modifications; and any other information required by the department must be attached to be valid.

Septic tank riser 6" above grade required over outlet access port as a visible marker for the septic tank. Solid PVC with elbows must be used to construct conveyance over dams or stepdowns.

This permit is valid [] without expiration [] for five years but is subject to revocation if the site is altered, soil disturbed, set-backs violated, or the plans of intended use are changed. The Improvement Permit shall not be affected by change in ownership.

THIS IS NOT AUTHORIZATION TO INSTALL. An authorization for Wastewater Construction must be obtained from this department before installation.

Issued by Thomas J. Bacon R.S.
Environmental Health Specialist

N.C. Registration Number 1353

Date 7-16-10

911 Address

Lee Moore Oil Co.

Name



Soil & Environmental Consultants, PA

11010 Raven Ridge Road • Raleigh, North Carolina 27614 • Phone: (919) 846-5900 • Fax: (919) 846-9467
www.SandEC.com

JUL 02 2008

July 1, 2008

Attached is a proposed design for a Pressure Manifold Septic System
for retail space located on HWY 15-501, Chatham County, NC

<u>Contents:</u>	<u>Page</u>
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S&EC PROJECT #10956.S1
DESIGN – S. Menser
PROJECT MGR – R. Pontello

INFORMATION FOR THE INSTALLER

The permit should be read very carefully prior to bidding. The following are details that must be considered by the installer prior to and during installation:

- Tanks shall be approved by NCDENR, and certification supplied by the manufacturer.
- Tanks shall be water tested prior to installation.
- The installer shall be responsible to the owner for placement of the tanks and to ensure that final grades are returned to the original grade, with exception of added structural features.
- The supply trench shall be compacted to eliminate cavities left during initial fill placement without damage or displacement of pipe or fittings.
- Installation of the system shall be during dry conditions in order to protect the soil structure.
- All fittings shall be pressure rated fittings.
- All joints shall be cleaned with PVC pipe cleaner and a heavy-bodied PVC pipe glue applied to weld all joints.
- Where required by Chatham County Environmental Services, post installation inspections by the designer must be scheduled 5 week days in advance.
- Trenches shall be carefully excavated so the bottom is within 2" from the highest to the lowest points of elevation within the trench. If the bottom elevation needs adjusting after it has been trenched, it will be done by removing high points rather than filling low points. It is extremely important to insure that trenches are not over excavated during initial trenching. All fine grading within the trench will be done by hand with a shovel. No loose material will be left in the trench.
- All pipe openings in the tanks shall be properly grouted with waterproof grout. This also applies to the joints around the riser.
- All tanks shall be properly back filled and compacted to prevent settlement.
- Earth dams, constructed of relatively impervious material, shall be installed at the beginning and end of each lateral.
- No heavy equipment shall be used on the field during or after installation. The use of a small loader (i.e. Bobcat) or a trencher (i.e. Ditch Witch 2300/2310) may be used for installation.
- Elevations at pinflag locations should be checked by the installer prior to beginning trench excavation.
- Pump tank riser shall be 6" above grade, control panel shall be 12" above grade.
- System uses EZ-FLOW drain line.
- Repair uses EZ-FLOW drain line.

**County Line Retail Space
Project No. 10956.S1
PRESSURE MANIFOLD SYSTEM
FOR WASTEWATER TREATMENT**

Owner: Lee Moore Capital Company
Attn: Kirk J. Bradley
Address: P.O. Drawer 9
Sanford, NC 27331
Phone: 919-895-6000
County: Chatham
Location: County Line Retail Space

Source of Wastewater Flow: ~~Drug~~ ^{RETAIL ~7000} Store (~~10000~~ sq ft)
Estimated Daily Wastewater Production: 990 gpd
System Flow: 98.38 gpm

Design Specifications

Number of Drain Lines: 9
Drainfield Size: 1010 ft
Loading Rate: 0.25 gpd/sq ft
Distribution Method: EZ-Flow
Gravel Size (if applicable): NA
Trench Depth: 24 in
Trench Width: 36 in
Septic Tank: 2065 gal (1659 gal minimum)
Pump Tank: 1763 gal (1659 gal minimum)
Grease Trap Size: NA -
Estimated Supply Line Length: 610 ft
Supply Line Diameter: 3 in. SCH 40 PVC
Supply Line Volume: 234.24 gal
Supply Manifold: 6 in. SCH 80 PVC
Supply Manifold Length: 6.0 ft (minimum)
Supply Manifold Volume: NA
Threaded Union: In Tank
Gate Valves: 1 in Tank
1 at Pressure Manifold
Check Valves: In Tank
Anti-Siphon Hole: In Tank
Solenoid Valve: NA
Air Release/Vacuum Break Valve: NA

Recommended Float Controls: SJE Sensor Float Control Switches as Required for Control Panel or County Approved Equivalent
Recommended Control Panel: SJE-Rhombus Model 112 (NEMA 4x) Control Panel or County Approved Control Panel.
Recommended Pump: Zoeller Model 189 or County Approved Equivalent
TDH Capacity: 41.52 ft
Flow Capacity: 98.38 gpm

Additional Comments: Soil suitability was performed by the
Chatham County Health Department.

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**County Line Retail Space
Project No. 10956.S1
DESIGN CALCULATIONS**

Supply line length	610	ft
3.0 in. SCH 40 PVC	0.384	gal/ft
Supply line Volume	234.24	gal

Total drain field length	1010	ft
4" pipe	0.65079	gal/ft
Total drain field volume	657.30	gal
Percent of dose volume	75%	
Dose Volume	493.0	gal

Dose volume	492.97	gal
Pump tank	28.9	gal/in
Pump tank Drawdown	17.1	in

Pump Tank Elevation	545.0	ft
Pump Elev. Difference	5.4	ft
Pump Elevation	539.6	ft
Manifold Elevation	562.0	ft
	22.4	ft
Elevation Head	22.4	ft

System flow	98.38	gal/minute
Friction Factor*	2.34	f/100ft
Supply Line Length	610	ft
Friction Adjustment for Fittings	732	ft
Friction Head	17.1	ft

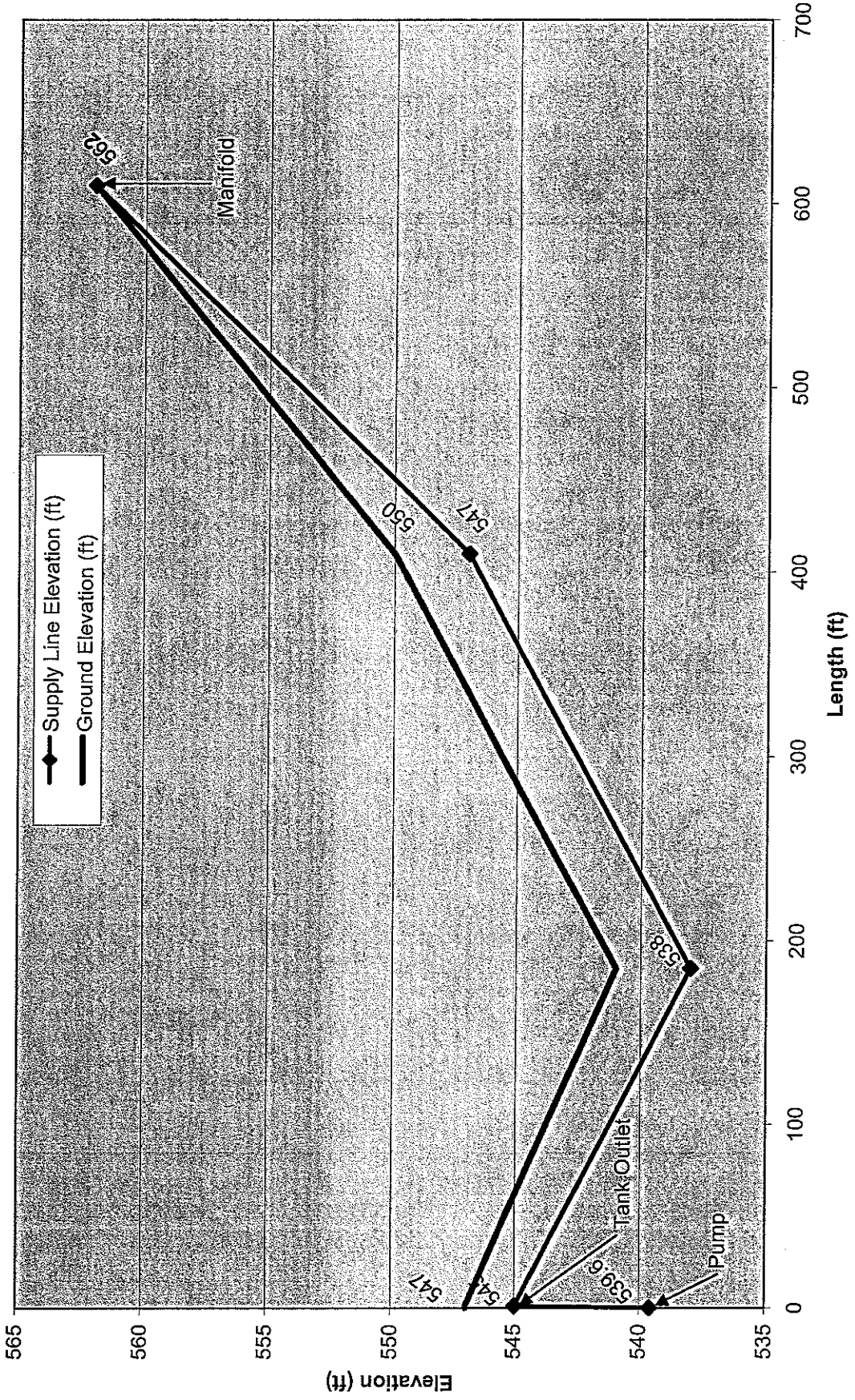
Pressure Head	2.0	ft
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(TDH) Total Dynamic Head	41.5	ft
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Daily flow	990	gal/day
LTAR	0.25	sqft/day
Trench width	3	ft
Required drain field length (gravel)	1320	ft
Required drain field length (ezflow)	990	ft

* Computed by Hazen Williams Formula, assuming C=140

Supply Line Profile County Line Retail Space



County Line Retail Space

Project No. 10956.S1

Retail Space (990 GPD)

July 1, 2008

<u>LINE #</u>	<u>FLAG COLOR</u>	<u>BS (ft)</u>	<u>HI (ft)</u>	<u>FS (ft)</u>	<u>ELEVATION (ft)</u>	<u>FLAGGED LINE LENGTH (ft)</u>	<u>DESIGN LINE LENGTH (ft)</u>
TBM		4.0			559.00		
INSTR. 1			563.00				
1	ORANGE			2.00	561.00	60	60
2	RED			2.40	560.60	100	100
3	PINK			2.90	560.10	120	120
4	BLUE			3.20	559.80	135	135
5	YELLOW			4.00	559.00	180	180
6	PINK			4.70	558.30	160	160
7	BLUE			5.90	557.10	135	135
8	ORANGE			6.50	556.50	122	120
Total						1012	1010

	<u>LINE LENGTH (ft)</u>	<u>LTAR GPD/FT²</u>	<u>SYSTEM TYPE</u>	<u>SOIL LTAR GPD/FT²</u>	<u>INNOVATIVE SYSTEM</u>	<u>DISTRIBUTION</u>
System	1010	0.25	INNOV.	0.25	EZ-Flow	PRESSURE MANIFOLD
Repair	3688	0.20	Drip	0.20	Drip Irrigation	Subsurface Drip Irrigation

- Notes:**
- ** TBM on Ground at PL Stake
 - **TBM is assumed to be 100'.
 - **All measures in feet.
 - **Nitrification lines are demonstrated on contour via colored pin flags.
 - **BS, FS indicate rod readings.

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**County Line Retail Space
Project No. 10956.S1
SYSTEM TAP CHART**

Line #	Color	Field Elev. (ft)	Length (ft)	Hole Size (in)	Flow/Tap (gpm)	gpd	Trench Area (sq ft)	Line LTAR (gpd/sq ft)
1	ORANGE	561.00	60	1/2" SCH. 80	5.48	55.15	180	0.306
2	RED	560.60	100	3/4" SCH. 80	10.1	101.64	300	0.339
3	PINK	560.10	120	3/4" SCH. 40	12.5	125.79	360	0.349
4	BLUE	559.80	135	3/4" SCH. 40	12.5	125.79	405	0.311
5	YELLOW	559.00	180	3/4" SCH. 40	16.4	165.03	540	0.306
6	PINK	558.30	160	3/4" SCH. 40	16.4	165.03	480	0.344
7	BLUE	557.10	135	3/4" SCH. 40	12.5	125.79	405	0.311
8	ORANGE	556.50	120	3/4" SCH. 40	12.5	125.79	360	0.349

Total Length (ft) = 1010 gal/min = 98.38

Design Flow 990 gpd
Total Pump Run 10.06 min
Soil LTAR 0.25 gpd/sq ft
(LTAR +5%) 0.2625 gpd/sq ft
LTAR with INNOV. 0.333333333 gpd/sq ft
LTAR with INNOV. + 5% 0.35 gpd/sq ft

100% Dose Volume 657.27 gal
Percent Dose Volume 75%
Dose Volume 492.95 gal

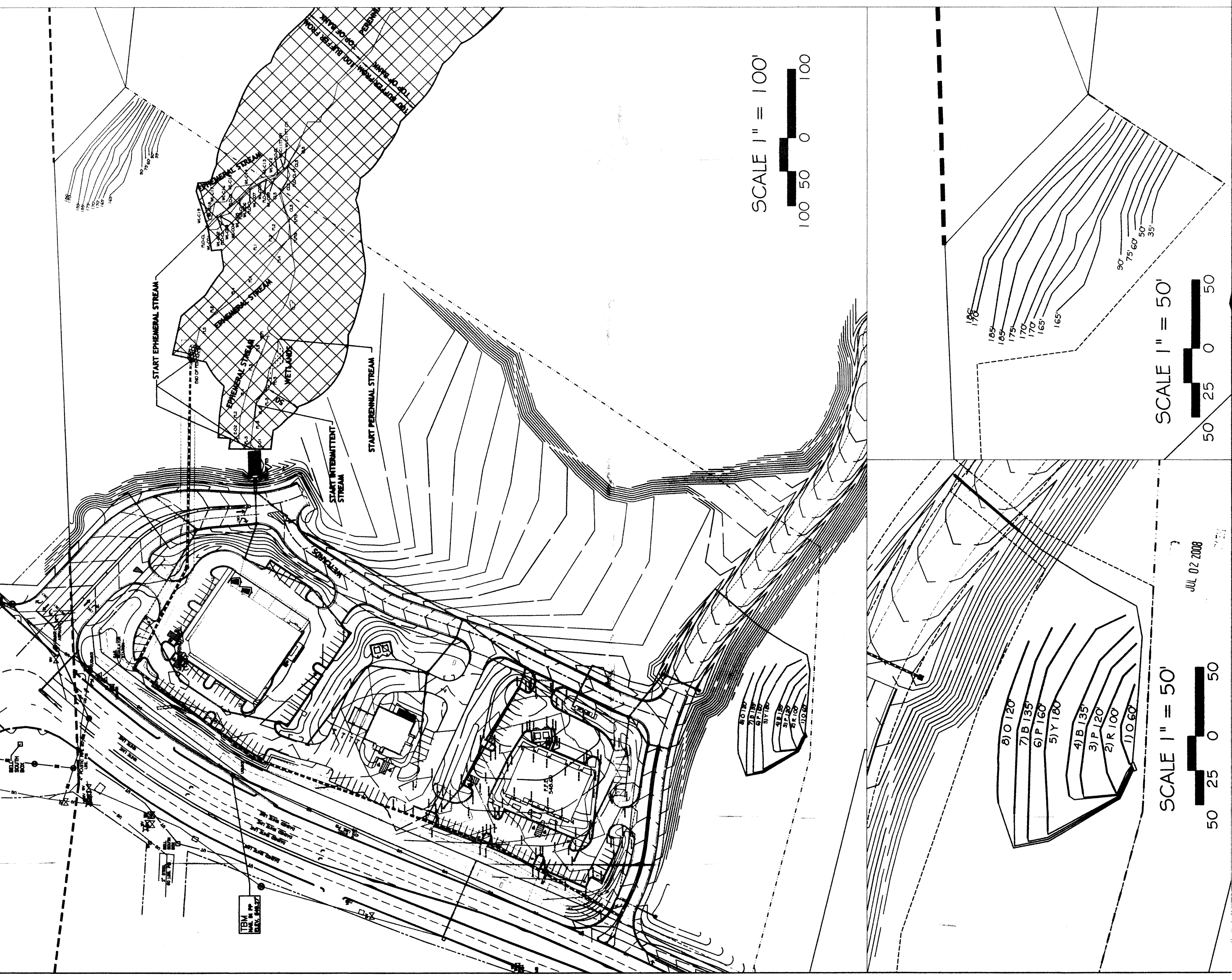
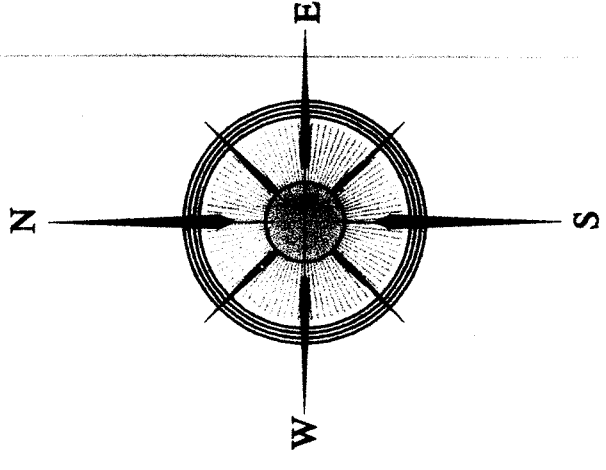
Pump Run Time 5.01 min

6



LEGEND

---	REPAIR LINE
—	SYSTEM LINE
—	REINFORCED PIPE SLEEVE
□	SEPTIC TANK
□	PUMP TANK



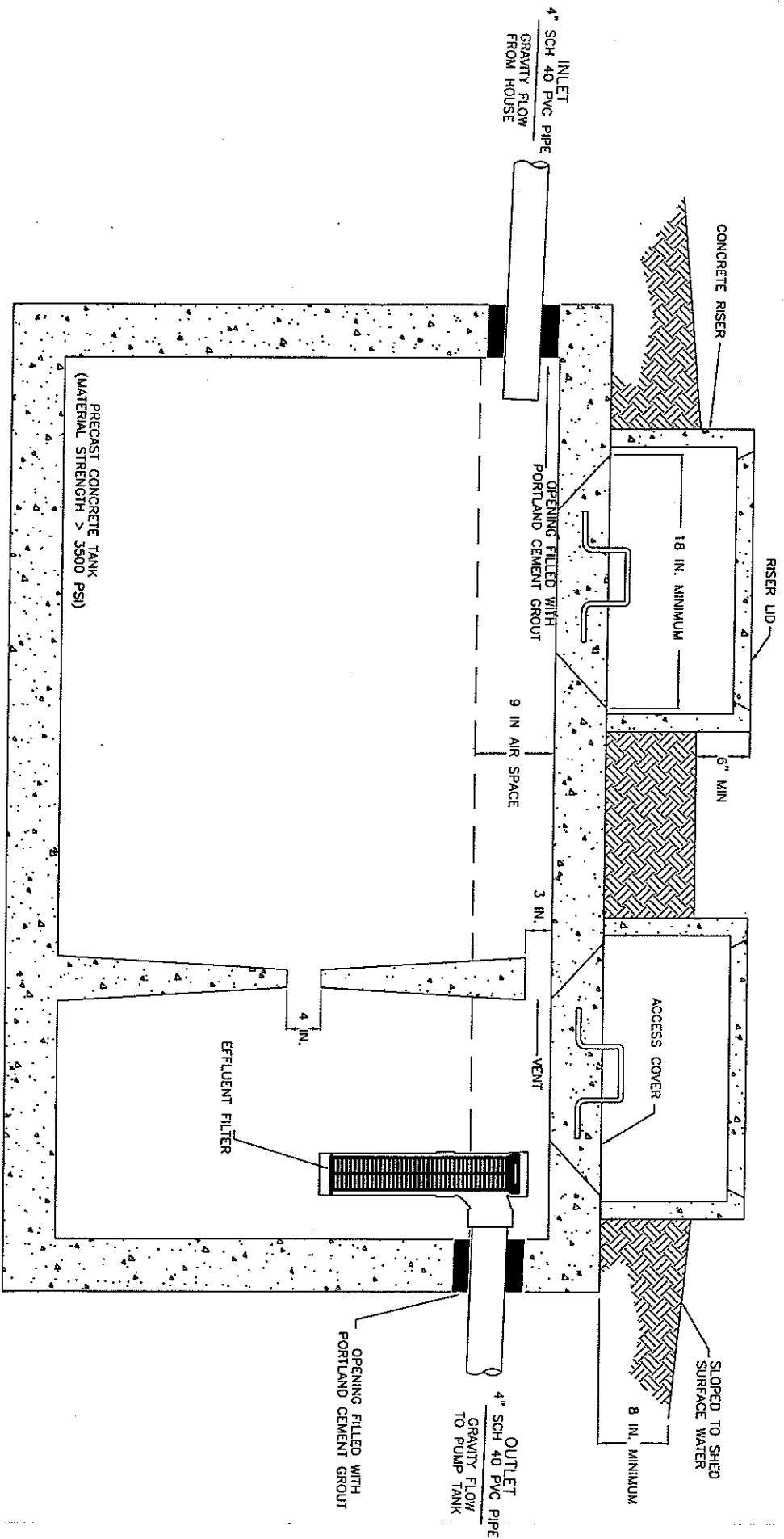
SCALE 1" = 100'

SCALE 1" = 50'

SCALE 1" = 50'

JUL 02 2008

NOTES:
 1) SITE DATA TO INCLUDE PROPERTY BOUNDARIES, STRUCTURE LOCATION, UTILITIES, AND EXISTING TOPOGRAPHY. ALL DATA TO BE PROVIDED BY THE CLIENT AND THE OWNER TO THE CONSULTANT.
 2) ALL SEPTIC SYSTEM COMPONENTS TO INCLUDE TANKS, PUMPS, MANHOLES, AND SYSTEM AND REPAIR LINES SHALL BE LOCATED BY THE CONSULTANT AND ENVIRONMENTAL CONSULTANT. ALL LOCATIONS, ELEVATIONS, AND OTHER VERTICAL OR HORIZONTAL DATA TO BE PROVIDED BY THE CLIENT.
 3) PROPERTY AND EASEMENT BOUNDARIES SHOWN ON THIS SITE SKETCH ARE APPROXIMATE AND ARE NOT INTENDED FOR LOCATION PROPERTY OR EASEMENT PROPERTY OF A SUBSEQUENT OWNER. THIS IS NOT A WARRANTY.



BLACKWELDER 2065 GALLON SEPTIC TANK (1659 GAL MIN.)

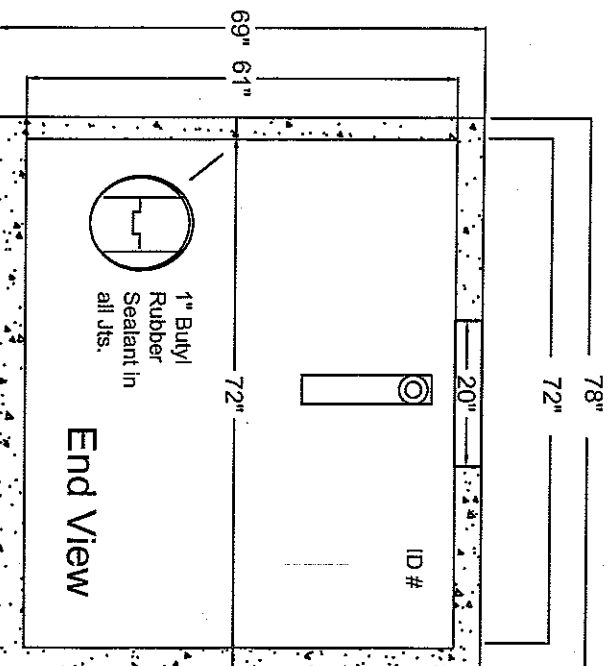
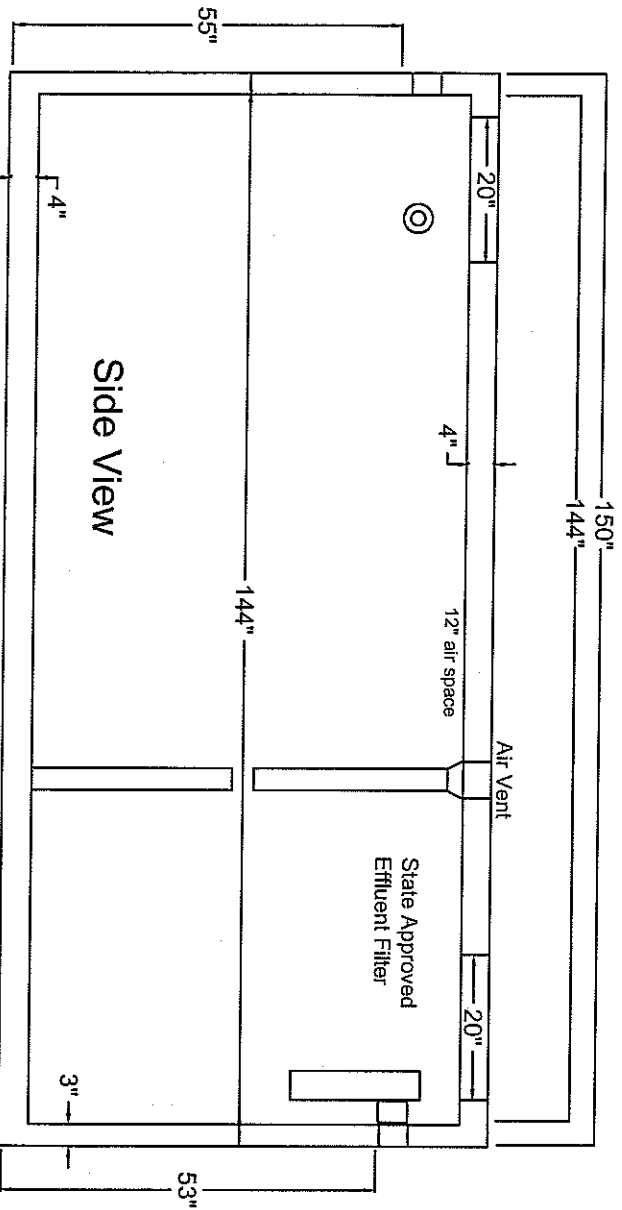
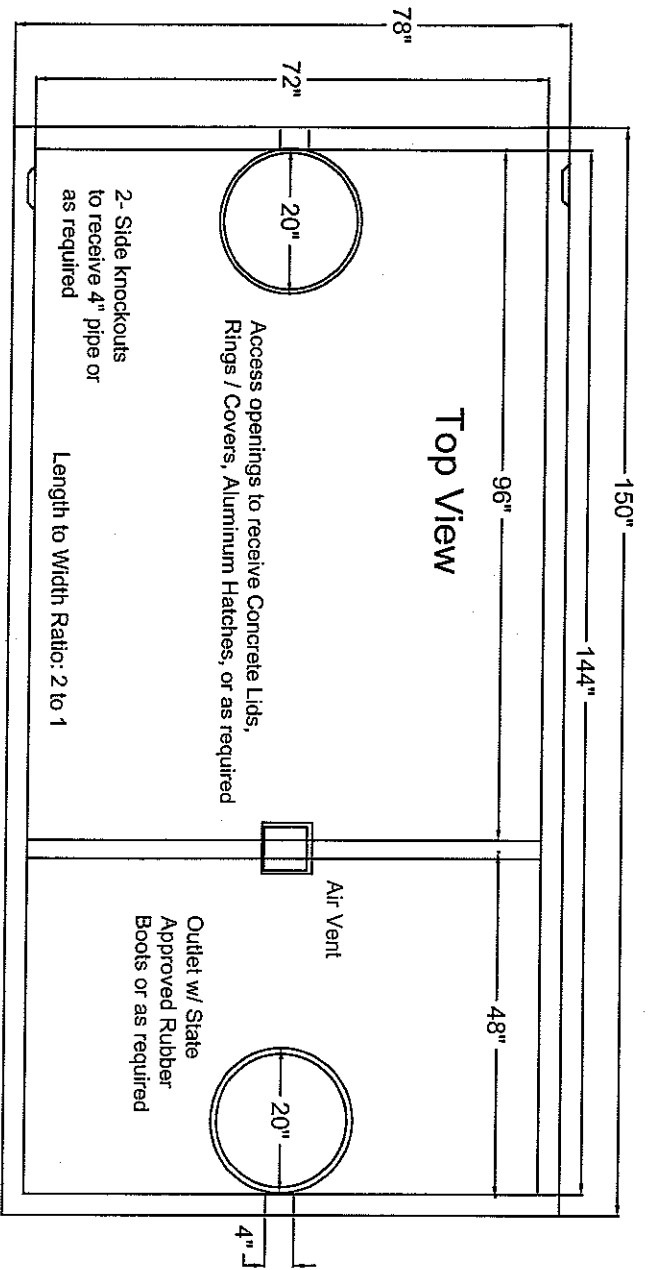
COUNTY LINE - RETAIL SPACE

SEPTIC TANK DIAGRAM

JOB NO. 10956.S1	PROJECT NAME:
PROJECT MGR. RP	
SCALE N15	SHEET TITLE:

SHEET 8 of 18

S&EBC
Soil & Environmental Consultants, PA
 11010 Xaxon Ridge Road • Raleigh, North Carolina 27614 • Phone: (919) 846-5900 • Fax: (919) 846-9467
 www.SandEC.com



STB - 278 - Mid Seam

Approval Date: 8-14-97

Liquid Capacity 2065 Gallons

Non Traffic Rated

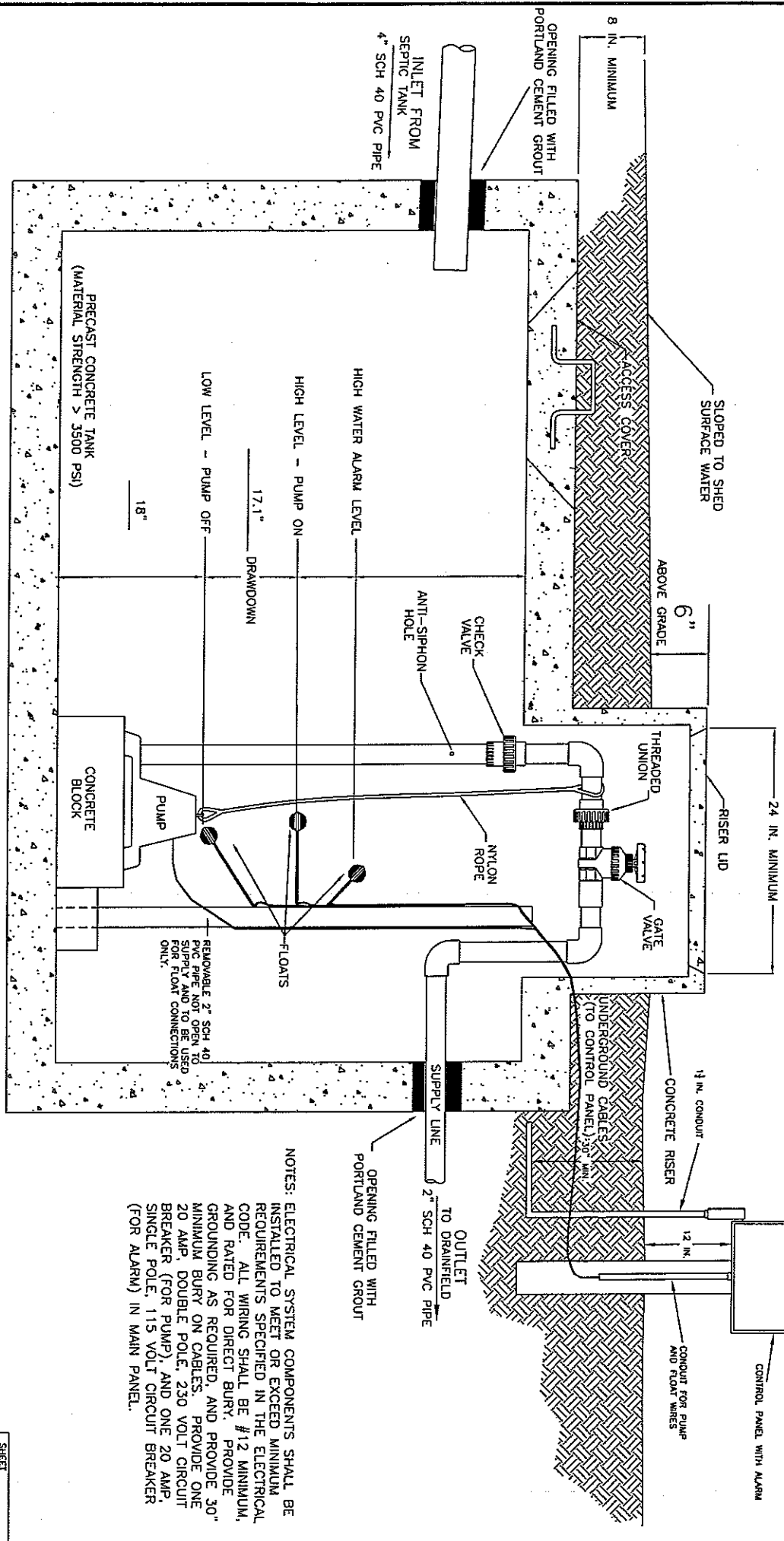
Reinforcement Schedule: # 3 Grade 60 Rebar
 4500 PSI Concrete w/ State Approved Structural Fiber
 4 Yds. **Est. Weight: 16,000 lbs.**

Manufactured By:

Blackwelder Tank Service, Inc.

121 Stanton Hill Rd.
 Carthage NC 28327
 Phone 919-718-5181
 Fax 919-775-2229
blackweldertank.com

1763 GALLON BLACKWELDER OR EQUIVALENT PUMP TANK
 DRAWDOWN SPECIFIED 28.9 GALLONS PER INCH (1659 GAL MIN.)



NOTES: ELECTRICAL SYSTEM COMPONENTS SHALL BE INSTALLED TO MEET OR EXCEED MINIMUM REQUIREMENTS SPECIFIED IN THE ELECTRICAL CODE. ALL WIRING SHALL BE #12 MINIMUM, AND RATED FOR DIRECT BURY. PROVIDE GROUNDING AS REQUIRED, AND PROVIDE 30" MINIMUM BURY ON CABLES. PROVIDE ONE 20 AMP, DOUBLE POLE, 230 VOLT CIRCUIT BREAKER (FOR PUMP), AND ONE 20 AMP, SINGLE POLE, 115 VOLT CIRCUIT BREAKER (FOR ALARM) IN MAIN PANEL.

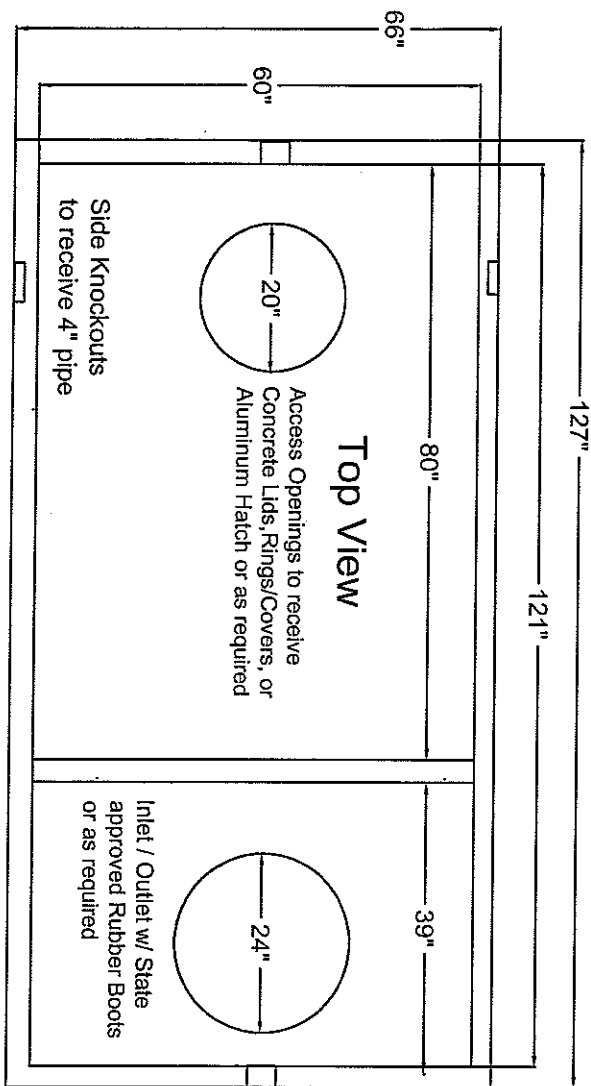
COUNTY LINE - RETAIL SPACE

PUMP TANK DIAGRAM

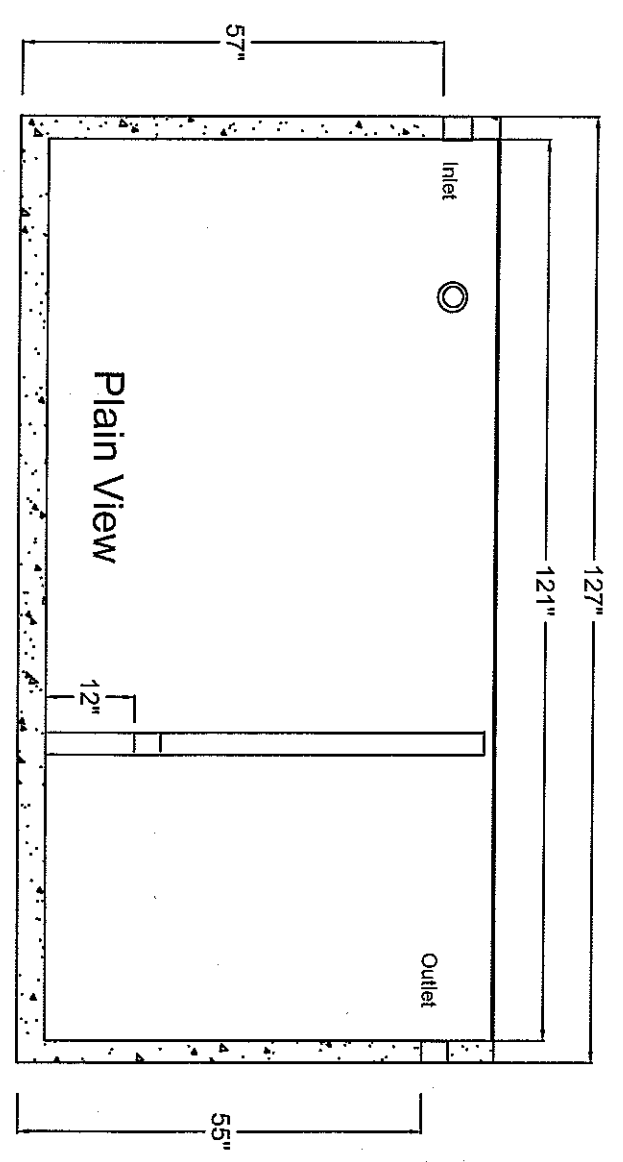
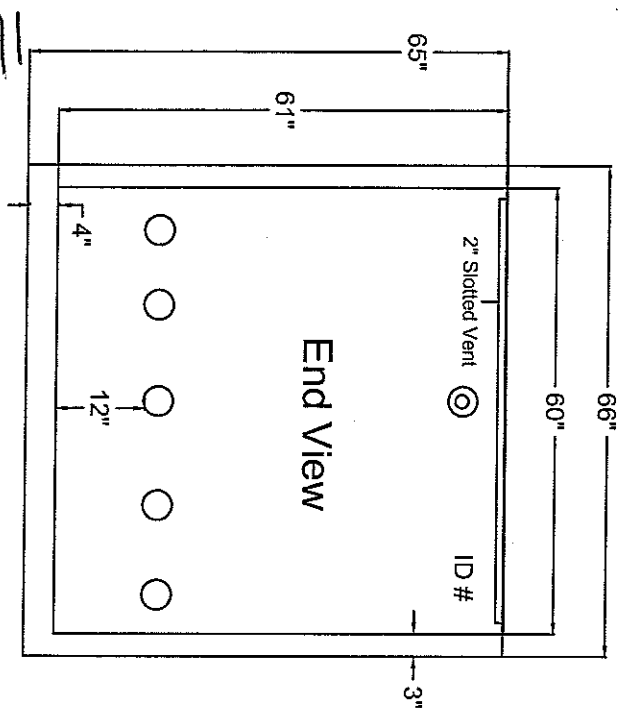
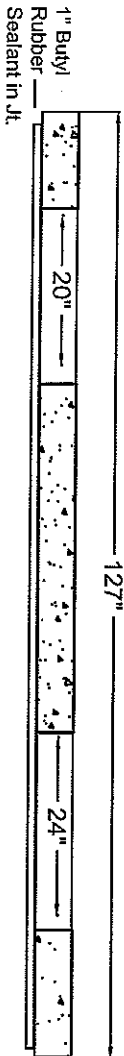
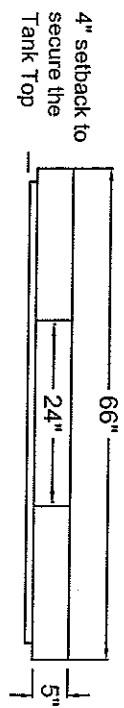
JOB NO.	10856.51
PROJECT MGR.	RP
SCALE	NIS

PROJECT NAME:	COUNTY LINE - RETAIL SPACE
SHEET TITLE:	PUMP TANK DIAGRAM

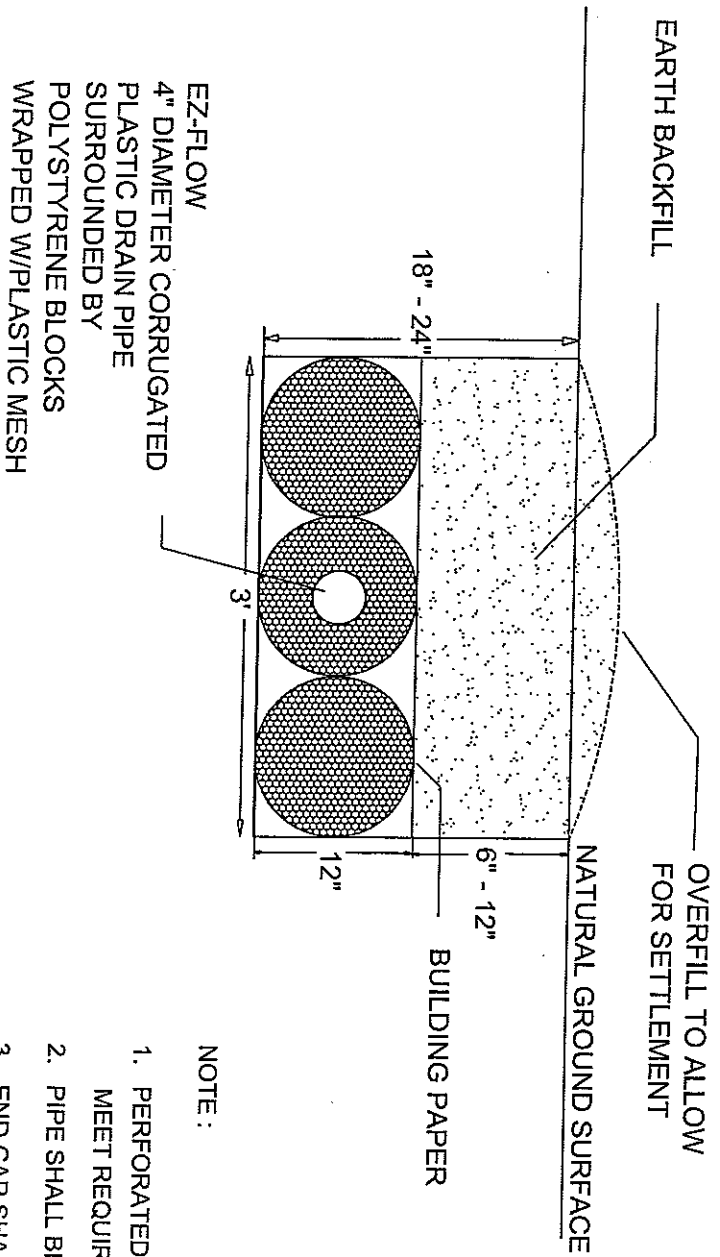
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 www.SandEC.com



PT - 373
 Date: 03-02-00
 Non Traffic Rated
 Liquid Capacity **1,763 Gallons**
 Reinforcing Schedule: # 3 Grade 60 Rebar
 4500 PSI Concrete w/ State Approved Structural Fiber
 3.25 yds. Est. Weight 13,000 lbs 28.9 gals. per in.
 Manufactured By:
Blackwelder Tank Service, Inc.
 121 Stanton Hill Rd.
 Carthage NC 28327
 Phone 919-718-5181
 Fax 919-775-2229
blackwelder tank .com



NITRIFICATION TRENCH DETAIL FOR EZ-FLOW



EZ-FLOW
 4" DIAMETER CORRUGATED
 PLASTIC DRAIN PIPE
 SURROUNDED BY
 POLYSTYRENE BLOCKS
 WRAPPED W/PLASTIC MESH

- NOTE :
1. PERFORATED CORRUGATED PLASTIC PIPE SHALL MEET REQUIREMENTS OF ASTM D 2729.
 2. PIPE SHALL BE LEVEL.
 3. END CAP SHALL BE PROVIDED AT END OF ALL CORRUGATED PLASTIC PIPE LINES.
 4. TRENCH BOTTOM SHALL BE LEVEL.
 4. SEE INFORMATION FOR INSTALLER.

JOB NO.	10988 S1
PROJECT MGR.	RP
SCALE	NTS

PROJECT NAME:	COUNTY LINE - RETAIL SPACE
SHEET TITLE:	TRENCH DETAIL

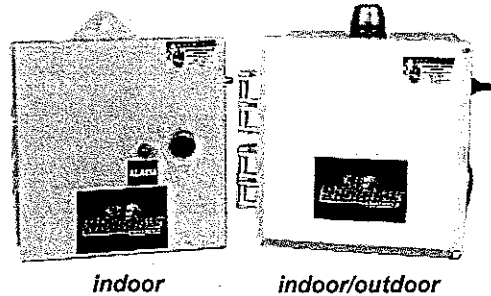


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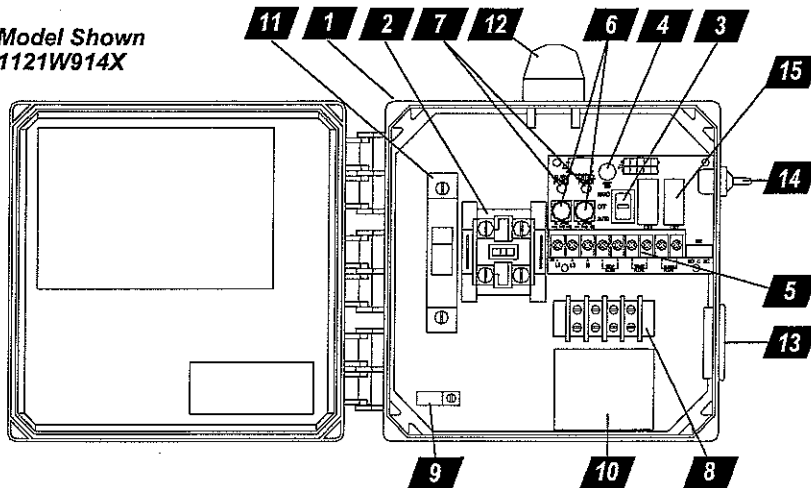
MODEL 112 Control Panel

Single phase, simplex motor contactor control.

The Model 112 control panel provides a reliable means of controlling one 120, 208, or 240 VAC single-phase pump in pump chambers, sump pump basins, irrigation systems and lift stations. Two control switches activate a magnetic motor contactor to turn the pump on and off. If an alarm condition occurs, an additional alarm switch activates the audio/visual alarm system.



Model Shown
1121W914X



1. **Enclosure** measures 8 x 8 x 4 inches (20.32 X 20.32 X 10.16 cm). Choice of NEMA 1 (steel for indoor use), or NEMA 4X (ultraviolet stabilized thermoplastic with removable flanges for outdoor or indoor use).
* Options selected may increase enclosure size and change component layout.
2. **Magnetic Motor Contactor** controls pump by switching hot electrical lines.
3. **HOA Switch** for manual pump control (mounted on circuit board).
4. **Green Pump Run Indicator Light** (mounted on circuit board).
5. **Float Switch Terminal Block** (mounted on circuit board).
6. **Alarm and Control Fuses** (mounted on circuit board).
7. **Alarm and Control Power Indicators** (mounted on circuit board).
8. **Pump Input Power and Pump Connection Terminal Block**
9. **Ground Lug**
10. **Terminal Block Installation Label**
11. **Circuit Breaker** (optional) provides pump disconnect and branch circuit protection.

STANDARD ALARM PACKAGE (other options available)

12. **Red Alarm Beacon** provides 360° visual check of alarm condition.
Note: NEMA 1 style utilizes a door mounted indicator in lieu of a beacon.
13. **Alarm Horn** provides audio warning of alarm condition (83 to 85 decibel rating).
Note: NEMA 1 style utilizes an internally mounted buzzer (83 to 85 decibel) in lieu of horn.
14. **Exterior Horn Test/Normal/Silence Switch** allows alarm horn to be silenced and testing of horn and light to ensure proper operation of alarm system.
15. **Horn Silence Relay** automatically resets alarm after alarm condition has been resolved (mounted on circuit board).

FEATURES

- Entire control system (panel and switches) is UL Listed to meet and/or exceed industry safety standards
- Dual safety certification for the United States and Canada
- Standard package includes three 20' Sensor Float® control switches
- Complete with step-by-step installation instructions
- Three-year limited warranty



SJE rhombus
SJ ELECTRO SYSTEMS, INC.

PO Box 1708, Detroit Lakes, MN 56502
1-888-DIAL-SJE • 1-218-847-1317
1-218-847-4617 Fax
email: sje@sjerhombus.com
www.sjerhombus.com

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112 1 W 9 0 4 H 2A, 8A, 8C, 15A

MODEL 112

- ALARM PACKAGE**
- 0 = select options or no alarm package
 - 1 = alarm package (includes test/normal/silence switch, fuse, red light, horn & float)
- ENCLOSURE RATING**
- I = Indoor, NEMA 1 (metal)
 - W = Weatherproof, NEMA 4X (engineered thermoplastic)
- STARTING DEVICE**
- 1 = magnetic motor contactor 120/208/240V
 - 9 = magnetic motor contactor 120V only
- PUMP FULL LOAD AMPS**
- 0 = 0-7 FLA
 - 1 = 8-15 FLA
 - 2 = 16-20 FLA
 - 3 = 21-30 FLA
- PUMP DISCONNECTS**
- 0 = no pump disconnect
 - 1 = pull-out with safety deadfront in a 10"x8" enclosure
 - 4 = circuit breaker
- FLOAT SWITCH APPLICATION**
- H or L = pump down or pump up
 - X = no floats

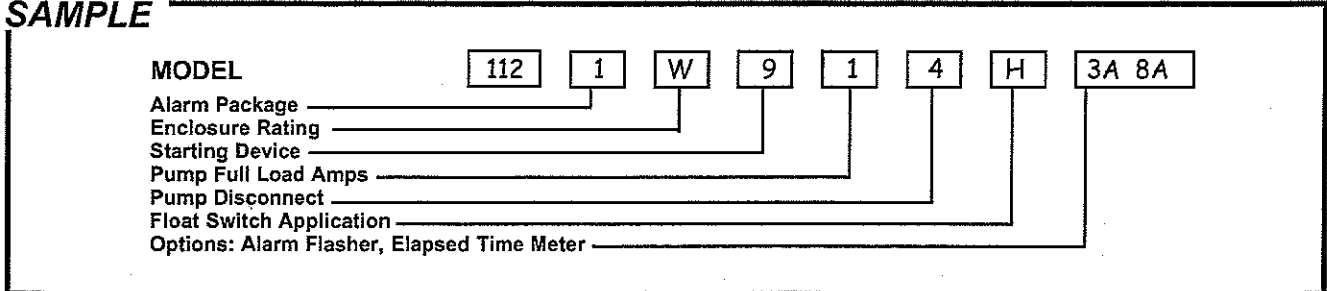
OPTIONS *Listed below*

★ Options selected may increase enclosure size and change component layout.

If additional features are required, call the factory for a quote on either a Pro-Line or Engineered Custom control panel system.

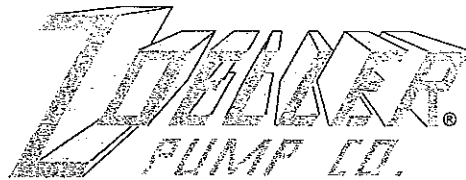
- | CODE DESCRIPTION | CODE DESCRIPTION |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> 1A Red beacon only / no audio
<i>must select 1E if floats included</i> | <input type="checkbox"/> 11C NEMA 1 alarm panel <i>must select option 6A</i> |
| <input type="checkbox"/> 1C Horn only / no visual
<i>must select 1E if floats included</i> | <input type="checkbox"/> 11D NEMA 4X alarm panel <i>must select option 6A</i> |
| <input type="checkbox"/> 1E Alarm float | <input checked="" type="checkbox"/> 15A Control / alarm circuit breaker
<i>Does not include the circuit board as in standard.</i> |
| <input checked="" type="checkbox"/> 3A Alarm flasher | <input type="checkbox"/> 16A 10' cord in lieu of 20' |
| <input type="checkbox"/> ★ 4A Low level cutout
<i>select option 4D if floats included</i> | <input type="checkbox"/> 16B 15' cord in lieu of 20' |
| <input type="checkbox"/> ★ 4B Red low-level indicator & alarm
<i>must select 4A also</i> | <input type="checkbox"/> 16C 30' cord in lieu of 20' |
| <input type="checkbox"/> 4D Low-level float | <input type="checkbox"/> 16D 40' cord in lieu of 20' |
| <input type="checkbox"/> 6A Auxiliary alarm contact, form C type | <input type="checkbox"/> 17A SJE SignalMaster® / mounting strap ● |
| <input checked="" type="checkbox"/> ★ 8A Elapsed time meter | <input type="checkbox"/> 17B SJE SignalMaster® / externally weighted ● |
| <input checked="" type="checkbox"/> ★ 8C Event (cycle) counter | <input type="checkbox"/> 17C Sensor Float® / internally weighted ▲ |
| <input type="checkbox"/> 10E Lockable latch - NEMA 4X | <input type="checkbox"/> 17D Sensor Float® / externally weighted ▲ |
| <input type="checkbox"/> 10E Lockable latch - NEMA 1 | <input type="checkbox"/> 17E Sensor Float® Mini / pipe clamp ▲ |
| <input type="checkbox"/> ★ 10F Lightning arrester | <input type="checkbox"/> 17F Sensor Float® Mini / externally weighted ▲ |
| <input type="checkbox"/> ★ 10K Anti-condensation heater | <input type="checkbox"/> 19X Door mounted pump run indicator |
| | <input type="checkbox"/> 21A Pumpmaster® in lieu of on/off switches ● |
| | <input type="checkbox"/> 21B PumpMaster® Plus in lieu of on/off switches ● |
| | <input type="checkbox"/> 21C Super Single® in lieu of on/off switches ▲ |
| | <input type="checkbox"/> 21D Double Float™ in lieu of on/off switches ▲ |
- Mechanically-activated ▲ Mercury-activated

SAMPLE



15

"QUALITY PUMPS SINCE 1939"



SECTION: 2.20.060
FM0659
0504
Supersedes
1103

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
SHIP TO: 3649 Cane Run Road • Louisville, KY 40211-1961
(502) 778-2731 • 1 (800) 928-PUMP • FAX (502) 774-3624

visit our web site:
www.zoeller.com

COMPARE THESE FEATURES

- Non-clogging vortex impeller design bronze class 88-8-0-4 (180 Series).
- Enclosed impeller design (191 Series).
- Float operated, submersible (NEMA 6) 2-pole mechanical switch.
- Durable cast construction. Cast iron switch case, base, motor and pump housing. No sheet metal parts to rust or corrode.
- Stainless steel screws, bolts, float rod, handle, guard, arm and seal assembly.
- 20 ft. UL Listed 3-wire neoprene cord and plug. Extra cord lengths available in 25-35-50 foot length only.
- Motor - 60 Hz, 3450 RPM, oil-filled, hermetically sealed, automatic reset, thermal overload protected (1 PH only).
- Maximum temperature for effluent or dewatering 130°F. 54°C, WD189 120°F (49°C).
- Variable level control systems available.
- Square Ring & Gasket - Neoprene.
- Shaft Seal - Stainless steel carbon & ceramic rotary.
- Upper sleeve bearing and lower ball bearing running in bath of oil.
- All 180/4180 series pass 3/4-inch spherical solids. Model 191 pump passes 1/2-inch spherical solids.
- On point 14 3/4" • Off point 5" (automatic units).
- Major width 12 3/4" • Height 18 9/16". (Single seal pumps)
- 1 1/2" NPT discharge with 2" or 3" flange available. (Model 191 is not available with 3" flange)
- Corrosion resistant powder coated epoxy finish.

MODELS 4185-4186-4188-4189


DOUBLE SEAL PUMPS (Nonauto only)

- Protects motor from seal leaks.
- Improved bearing lubrication.
- Helps eliminate seal and bearing damage from dry runs.
- Major width 12 3/4". Height 20 7/16".


Note: The sizing of effluent systems normally requires variable level float(s) controls and properly sized basins to achieve required pumping cycles or dosing timers with nonautomatic pumps.

AUTOMATIC UNITS NOT RECOMMENDED FOR USE IN EFFLUENT SYSTEMS



185 - 186 - 188 - 189 Single Seal Series
4185 - 4186 - 4188 - 4189 Double Seal Series
191 Single Seal Drip Pump
 (For Pump Prefix Identification see News & Views 0052)

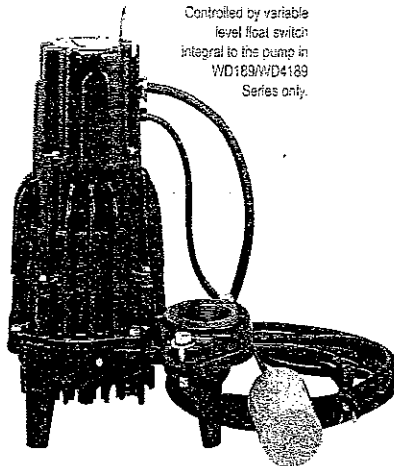


Tested to UL Standard UL778 & Certified to CSA Standard C22.2 No. 108




HIGH HEAD
"FLOW-MATE"
 FOR SEPTIC TANK • LOW PRESSURE PIPE (LPP)
 AND ENHANCED FLOW STEP SYSTEMS
EFFLUENT
 OR DEWATERING PUMP • SUBMERSIBLE
 1 1/2" NPT DISCHARGE STANDARD • 2" or 3" FLANGE AVAILABLE

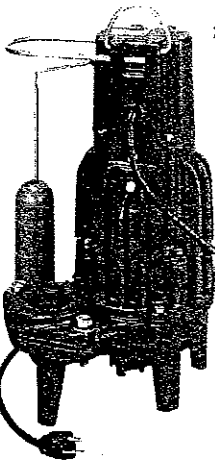





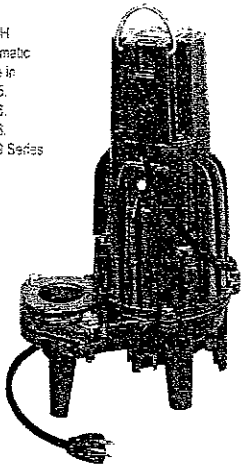
230V Automatic
Controlled by variable level float switch integral to the pump in WD189/WD4189 Series only.




Double Seal Pump



230V 1PH Automatic Available in 185, 186, 188, 189 Series



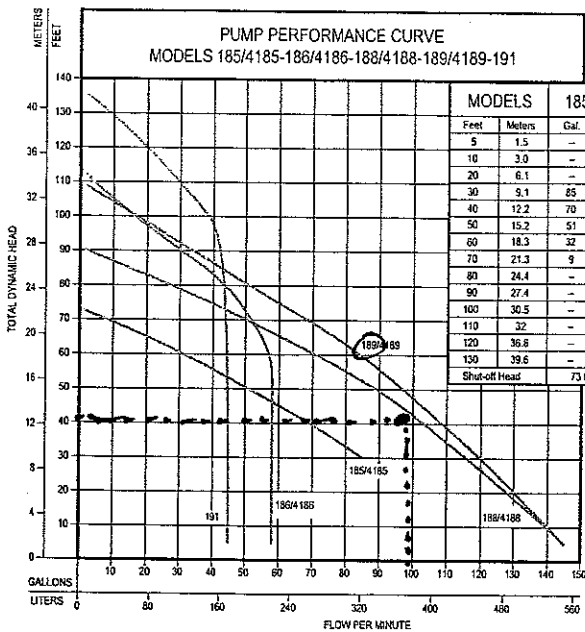
230V 1PH Nonautomatic Available in 185/4185, 186/4186, 188/4188, 189/4189 Series



POWDER COATED TOUGH™

*NOTE: No UL Listing for 200/208 1 Phase Pumps, Model 186 & 191, or Double Seal Series. See Back Page for UL & CSA Listings

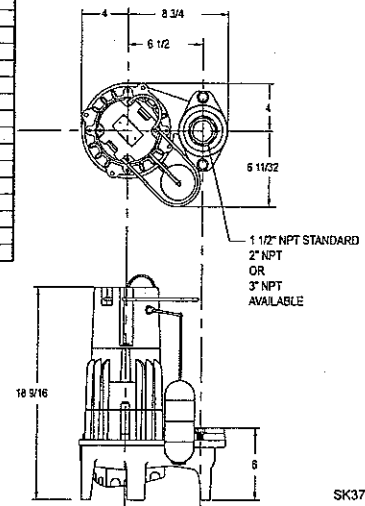
Nonautomatic Model for variable level systems



009903

WARNING: Model 185 should not be subjected to heads less than 30 feet TDH.

Single Seal 80 Series
Automatic Design
Weight 82-89 lbs.



SK374

185 MODELS / 4185 MODELS		Standard all models - 20 ft. cord - 1 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts - Ph	Mode	Amps	Simplex	Duplex	CSA	UL	
D185	—	230	1 Auto	9.8	1	—	Y	Y	
E185	E4185	230	1 Non	9.8	2 or 3	4	Y ⁽²⁾	Y	
* H185	—	200-208	1 Auto	11.5	1	—	N	N	
* I185	* I4185	200-208	1 Non	11.5	2 or 3	4	N	N	
* F185	* F4185	230	3 Non	7.4	3 & 5	4 & 5	Y	Y	
* J185	* J4185	200-208	3 Non	7.5	3 & 5	4 & 5	Y	Y	
* G185	* G4185	460	3 Non	3.7	3 & 5	4 & 5	Y	Y	
* BA185	—	575	3 Non	3.3	3 & 5	4 & 5	Y	N	

186 MODELS / 4186 MODELS		Standard all models - 20 ft. cord - 1 1/2 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts - Ph	Mode	Amps	Simplex	Duplex	CSA	UL	
D186	—	230	1 Auto	13.7	1	—	N	N	
E186	E4186	230	1 Non	13.7	2 or 3	4	N	N	
* F186	* F4186	230	3 Non	9.2	3 & 5	4 & 5	N	N	
* G186	* G4186	460	3 Non	4.6	3 & 5	4 & 5	N	N	

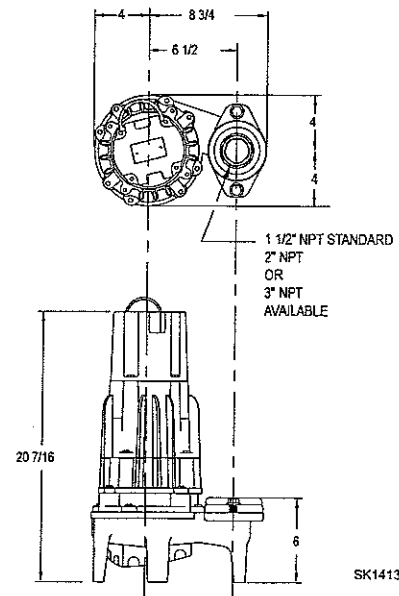
188 MODELS / 4188 MODELS		Standard all models - 20 ft. cord - 1 1/2 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts - Ph	Mode	Amps	Simplex	Duplex	CSA	UL	
D188	—	230	1 Auto	14.0	1	—	N	Y ⁽¹⁾	
E188	E4188	230	1 Non	14.0	2 or 3	4	Y ⁽²⁾	Y ⁽¹⁾	
* H188	—	200-208	1 Auto	16.8	1	—	N	N	
* I188	* I4188	200-208	1 Non	16.8	2 or 3	4	N	N	
* F188	* F4188	230	3 Non	8.9	3 & 5	4 & 5	Y	Y	
* J188	* J4188	200-208	3 Non	10.3	3 & 5	4 & 5	Y	Y	
* G188	* G4188	460	3 Non	4.6	3 & 5	4 & 5	Y	Y	
* BA188	—	575	3 Non	3.5	3 & 5	4 & 5	Y	N	

189 MODELS / 4189 MODELS		Standard all models - 20 ft. cord - 2 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts - Ph	Mode	Amps	Simplex	Duplex	CSA	UL	
⁽³⁾ D189	—	230	1 Auto	17.1	1	—	N	Y ⁽¹⁾	
⁽²⁾ E189	⁽²⁾ E4189	230	1 Non	17.1	2 or 3	4	Y ⁽²⁾	Y ⁽¹⁾	
* H189	—	200-208	1 Auto	20.5	1	—	N	N	
* I189	* I4189	200-208	1 Non	20.5	2 or 3	4	N	N	
* F189	* F4189	230	3 Non	11.2	3 & 5	4 & 5	Y	Y	
* J189	* J4189	200-208	3 Non	13.2	3 & 5	4 & 5	Y	Y	
* G189	* G4189	460	3 Non	6.0	3 & 5	4 & 5	Y	Y	
* BA189	—	575	3 Non	5.8	3 & 5	4 & 5	Y	N	
⁽³⁾ WD189	* WD4189	230	1 Auto	17.1	1	4	N	N	

191 MODEL		Standard all models - 20 ft. cord - 2 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts - Ph	Mode	Amps	Simplex	Duplex	CSA	UL	
E191	—	230	1 Non	14.5	2 or 3	4	N	N	

* No Molded Plug
(1) UL Listed unit available with 20 Amp Plug.
(2) CSA Approval without plug cap.
(3) 20 Amp Outlet, PIN 10-0060 must be used.

Double Seal 4180 Series / Weight 89-94 lbs.



SK1413

SELECTION GUIDE

1. Integral float operated mechanical switch, no external control required.
2. For automatic use single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. See FM1228 for correct model of simplex control panel.
4. See FM0712 for correct model of duplex control panel.
5. Variable level control switch 10-0225 used as a control activator, specify simplex (3) float or duplex (4) float system.

CAUTION

All installation of controls, protection devices and wiring should be done by a qualified licensed electrician. All electrical and safety codes should be followed including the most recent National Electric Code (NEC) and the Occupational Safety and Health Act (OSHA).

For information on additional Zoeller products refer to catalog on Piggyback Variable Level Float Switches, FM0477; Electrical Alternator, FM0486; Mechanical Alternator, FM0495; Sump/Sewage Basins, FM0487; Simplex Pump Control, FM1596; Alarm Systems, FM0732; and Disconnect/Rail Systems, FM0787.

RESERVE POWERED DESIGN

For unusual conditions a reserve safety factor is engineered into the design of every Zoeller pump.

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County Line Retail Space
Project No. 10956.S1

Retail Space (990 GPD)

July 1, 2008

<u>LINE #</u>	<u>FLAG</u> <u>COLOR</u>	<u>BS (ft)</u>	<u>HI (ft)</u>	<u>FS (ft)</u>	<u>ELEVATION (ft)</u>	<u>FLAGGED</u> <u>LINE LENGTH (ft)</u>	<u>DESIGN</u> <u>LINE LENGTH (ft)</u>
TBM		3.6			531.50		
INSTR. 1			535.10				
1	BLUE			3.60	531.50	186	186
2	-			3.75	531.35	0	178
3	ORANGE			3.90	531.20	170	170
4	-			4.25	530.85	0	178
5	RED			4.60	530.50	186	186
6	-			4.75	530.35	0	186
7	YELLOW			4.90	530.20	185	185
8	-			5.05	530.05	0	181
9	RED			5.20	529.90	177	177
10	-			5.35	529.75	0	176
11	BLUE			5.50	529.60	175	175
12	-			5.70	529.40	0	175
13	YELLOW			5.90	529.20	175	175
14	-			6.05	529.05	0	173
15	ORANGE			6.20	528.90	170	170
16	-			6.35	528.75	0	168
17	PINK			6.50	528.60	165	165
18	-			6.70	528.40	0	128
19	RED			6.90	528.20	90	90
20	-			7.05	528.05	0	83
21	ORANGE			7.20	527.90	75	75
22	-			7.45	527.65	0	68
23	BLUE			7.70	527.40	60	60
24	-			7.90	527.20	0	55
25	YELLOW			8.10	527.00	50	50
26	-			8.30	526.80	0	43
27	PINK			8.50	526.60	35	35
Total						1899	3688

	<u>LINE</u> <u>LENGTH (ft)</u>	<u>LTAR</u> <u>GPD/FT²</u>	<u>SYSTEM</u> <u>TYPE</u>	<u>SOIL</u> <u>LTAR</u> <u>GPD/FT²</u>	<u>INNOVATIVE</u> <u>SYSTEM</u>	<u>DISTRIBUTION</u> <u>PRESSURE</u> <u>MANIFOLD</u>
System	1010	0.25	INNOV.	0.25	EZ-Flow	
Repair	3688	0.20	Drip	0.20	Drip Irrigation	Subsurface Drip Irrigation

- Notes:**
- **TBM is assumed to be 531.5'.
 - **All measures in feet.
 - **Nitrification lines are demonstrated on contour via colored pin flags.
 - **BS, FS indicate rod readings.