HAL ~~~VEN & ASSOCIATES, I~~~.
SOIL & ENVIRONMENTAL SCIENTISTS
P. O. Box 400, 266 Old Coats Road
Lillington, NC 27546
Phone (910) 893-8743 / Fax (910) 893-3594
E-mail: halowen@intrstar.net

15 October, 2001

Mr. Bryan McSwain
Harnett County Environmental Health
P.O. Box 9
Lillington, NC 27546

Reference: Lot 9, Wynn Ridge
Septic System Design Revision

Dear Mr. McSwain,

A septic system design revision was prepared for the above referenced lot in October 2001. The site is located on Carriage Drive off the East side of Old Stage Rd. (S.R. 1006), Grove Township, Harnett County, North Carolina. The purpose of the investigation was to determine the ability of this lot to support a subsurface sewage waste disposal system and 100 % repair area for a typical three-bedroom home. Public water supplies will be utilized for this lot. A foundation drain will not be possible with the present location of the home. A pressure manifold to innovative drainlines is the proposed design for the initial septic system and a low-pressure pipe distribution system is proposed for the repair system.

Attached are the septic system layouts and supporting information for this lot. I trust that this report provides all the information that you require at this time. If you have any questions or need additional information, please contact me at your convenience.

Sincerely,

Laura J. Fortner

Laura J. Fortner
Soil Scientist in Training II

10-15-2001

Lot 9, Wynn Ridge

On-Site Wastewater Design Specifications

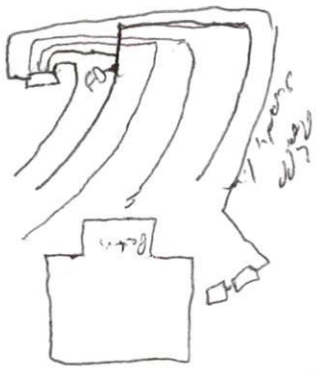
Prepared By: LJF
Hal Owen & Associates, Inc.
Soil & Environmental Scientists
P.O. Box 400, 266 Old Coats Rd.
Lillington, NC 27546-0400
Phone: (910) 893-8743

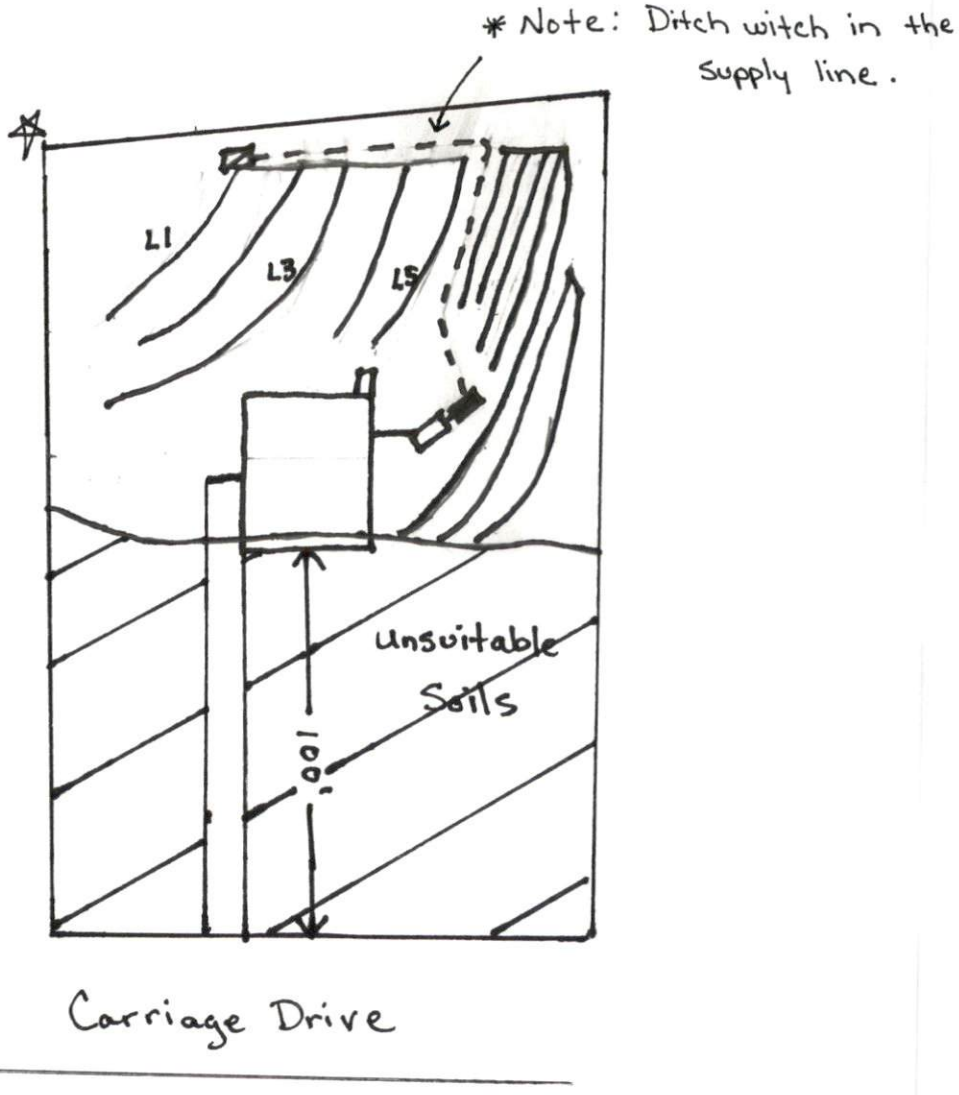
House Footprint:35' x 40'
Bedrooms:3

Initial System:pump pressure-manifold to innovative
L1-L5 (unequal length lines)
on contour at:18 inches
LTAR:0.4 gpd/sqft
Repair System:low-pressure pipe (L6-L12)
on contour at: 18 inches
LTAR:0.15 gpd/sqft

LEGEND

EIP	Septic Tank
Step-down	Pump Tank
Proposed Well	D-Box
Existing Well	Pressure Manifold





50.00 feet
1:600

**The unsuitable soils have been transferred from a hand-drawn map and are approximate.

PRESSURE MANIFOLD SIGN

Hal Owen Associates, Inc.
Soil Environmental Scientists
PO Box 400, Lillington, NC 27546
Phone (910) 893-8743 Fax 893-3594

Applicant: Mr. Dess Langdon Phone #: 880-0823

Mailing Address: 130 Pope Lake Road, Angier, NC 27501

PIN: _____ D# : 17999 S/D: Wynn Ridge Lot#: 9

Site Address: Carriage Rd. (last lot on left) off of S.R. 1006 Old Stage Rd.

BDR: 3 Daily Flow: 360 Square Ft: 900.00 Linear Feet: 300

LTAR: 0.3 gpd/sqft LTAR w/ innov: 0.4 gpd/sqft

Septic Tank (gal): 1000 Pump Tank (gal): 1000

Length of Trenches (ft): see tap chart Trench Depth (in): 18 Stone Depth (in): 12

Manifold Length (in): 42 Elevation: 97.89 Diameter: 4" sch 80 pvc

Taps 4 Tap Configuration: 6" spacing, 1 side(s) of manifold

Supply Line Length (ft): 140 Diameter: 2" sch 40 pvc

Pump Tank Elevation: 90.5 Pump Elevation (ft): 85.5

Simplex Control Panel, **SJE Rhombus 112** or equal, with elapsed time meter and cycle counter is required. Floats to be determined by type of pump tank used. A septic filter, **Polylok PL-122** or equal is required. Possible pumps include:

Hydromatic: SPD 50H Zoeller: M137 Goulds: _____ Meyers: _____

Friction Head (ft): 4.60 (supply line length + 70' for fittngs in pump tank)

Elevation Head (ft): 12.39 Design Head (ft): 2 Total Head (ft): 18.99

Dose Volume (gal): 146.93 with Pipe Volume at % 75

Pump to Deliver: 33.56 gpm @ 18.99 ft head

Dose PRT(min): 4.38 Daily PRT(min): 10.73

Drawdown: 146.93 gallons divided by 21 gal/ inch = 7.00 inches

Tap Chart

Line	Color	Relative Elevation	Drainline Length(ft)	Tap Size/ Schedule	flow (gpm) per tap	gpd	Trench Area	LTAR gpd/sqft
1	W	96.89	50	1/2" sch 80	5.48	58.78	150	0.392
2	R	95.81	55	FD 3/4" sch 40	6.25	67.04	165	0.406
3	B	94.68	90	3/4" sch 80	10.10	108.34	270	0.401
4	R	93.74	50	1/2" sch 80	5.48	58.78	150	0.392
5	B	92.81	55	FD 3/4" sch 40	6.25	67.04	165	0.406

Total Drainline: 300 Total Flow: 33.56 Sq. Foot: 900.00

LTAR + 5%= 0.42

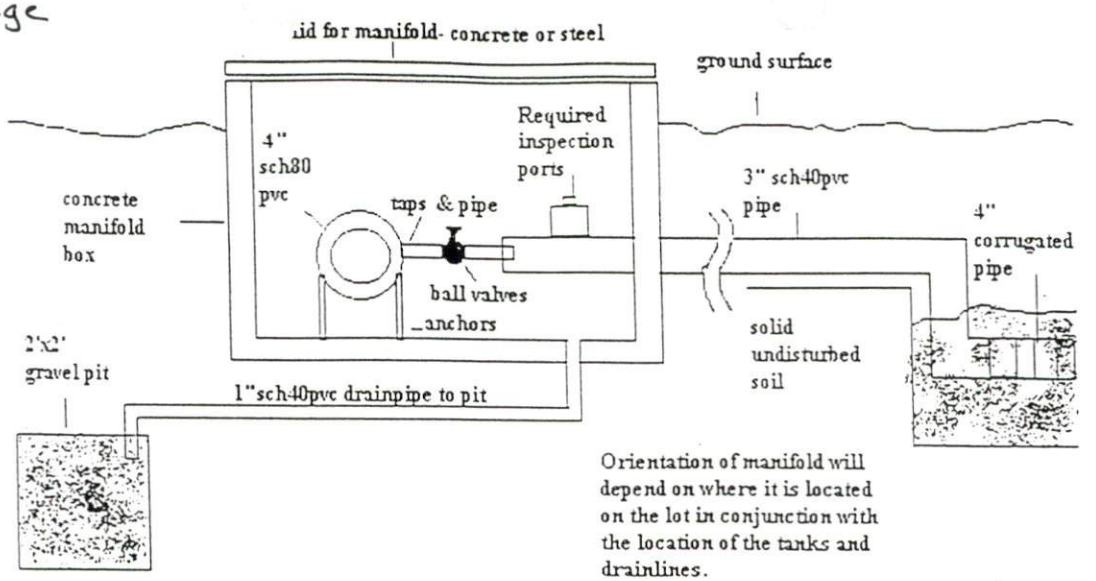
Lot 9, Wynn Ridge

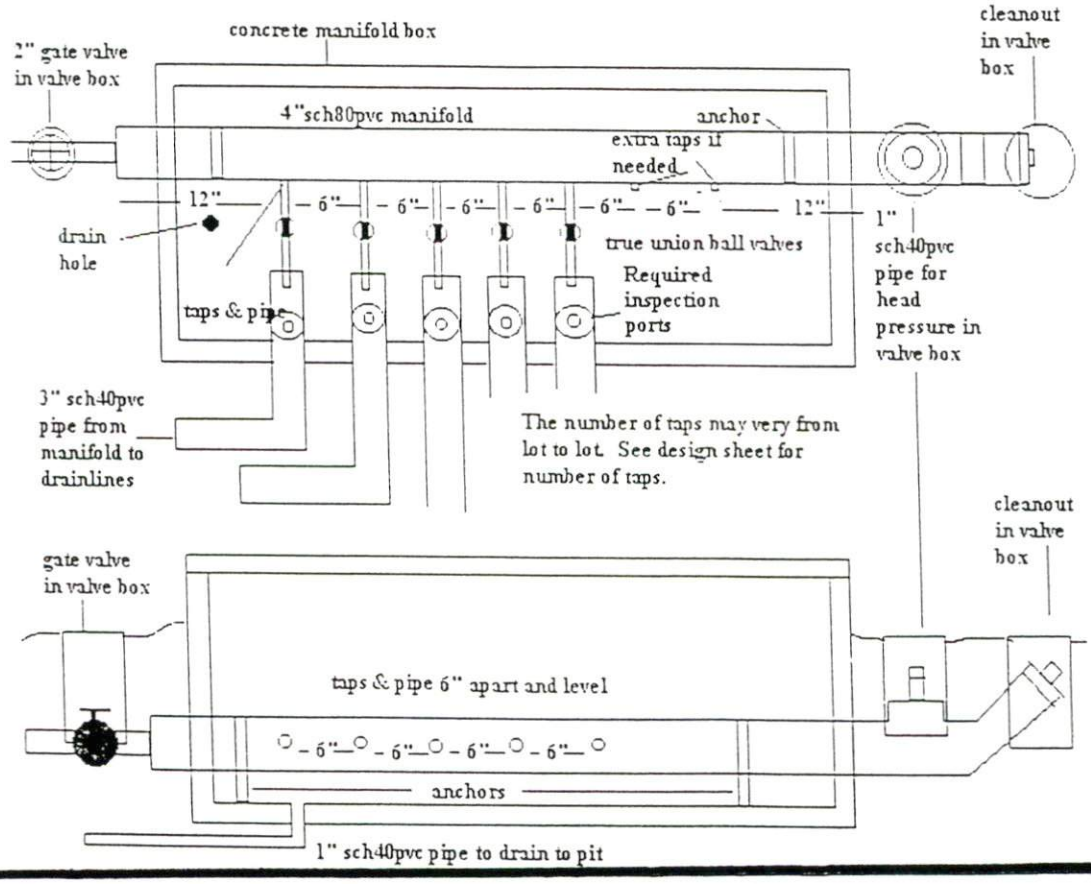
Lines 1-6 flagged at site on 10-ft centers.
Lines 6-12 flagged at site on 5-ft centers.

Initial/ Repair	Line #	Color	Drainline Length(ft)	Measured Field Line Length (ft)	Relative Elevation (ft)
Initial	1	W	50	52	96.89
Initial	2	R	55	71	95.81
Initial	3	B	90	92	94.68
Initial	4	R	50	62	93.74
Initial	5	B	55	56	92.81
Repair	6	R	42	62	91.7
Repair	7	W	40	63	91.3
Repair	8	B	55	55	90.72
Repair	9	Y	60	60	90.15
Repair	10	R	113	113	89.55
Repair	11	W	93	93	89.04
Repair	12	Y	77	77	88.41
Pump Tank:					90.5
		Total:	**780**	**856**	**EIP=0**

Pressure Manifold Requirements

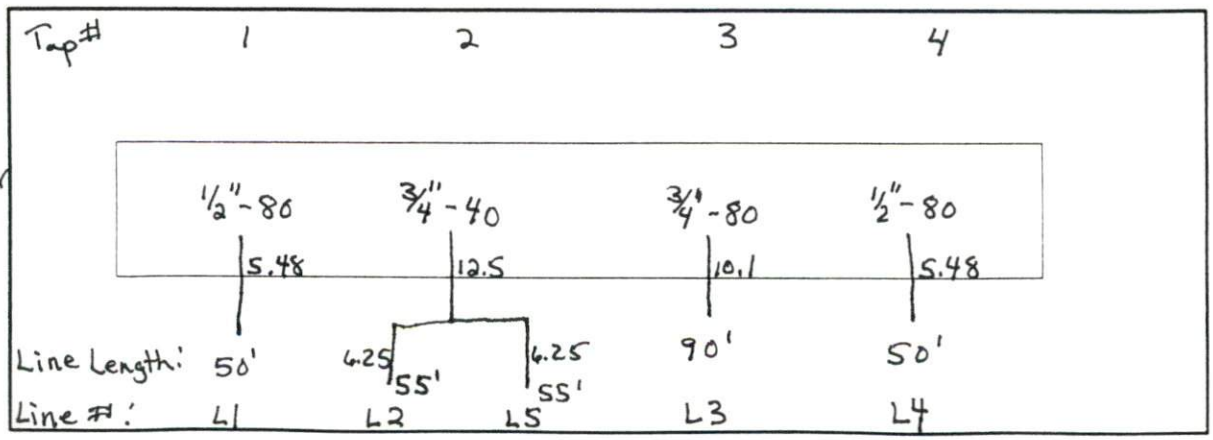
Lot 9, Wynn Ridge



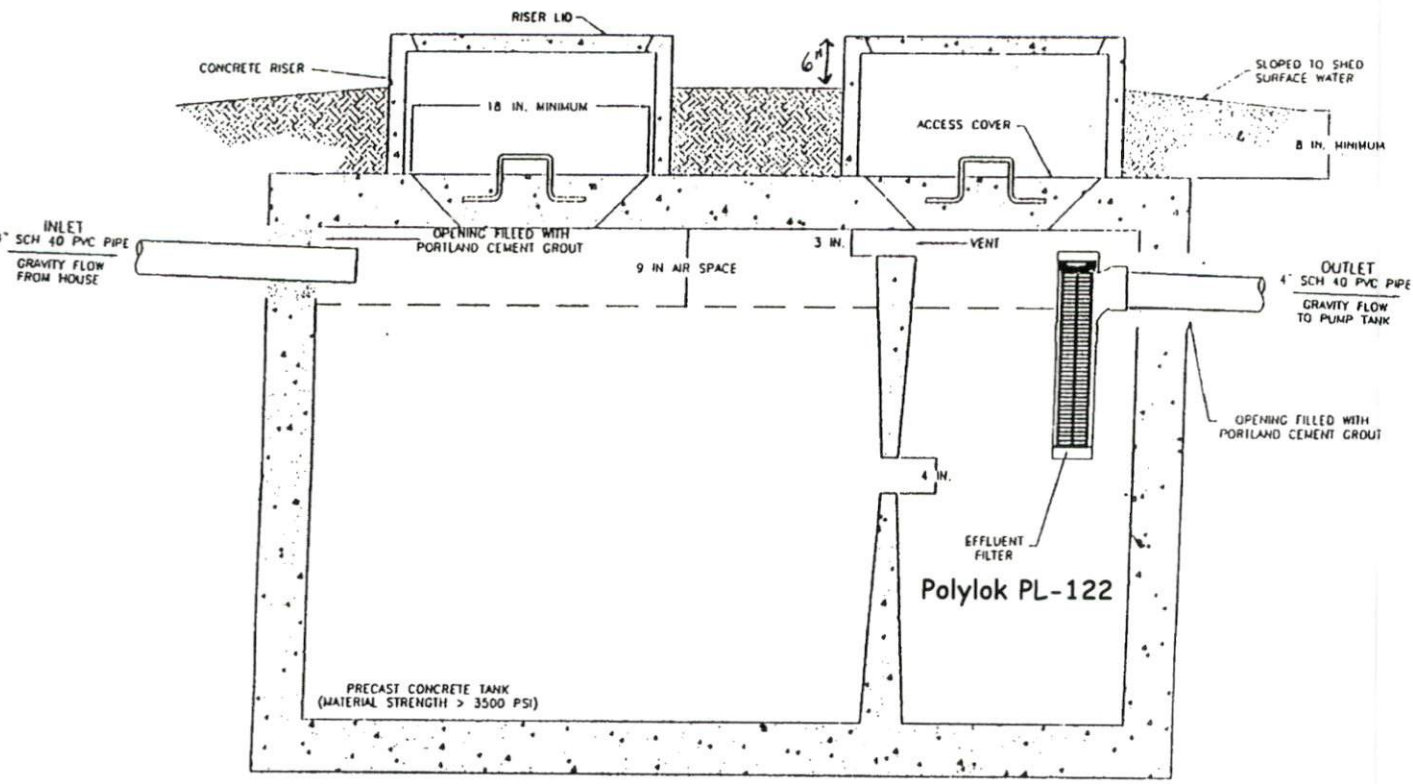


Pressure Manifold 4" Schedule 80 Initial System

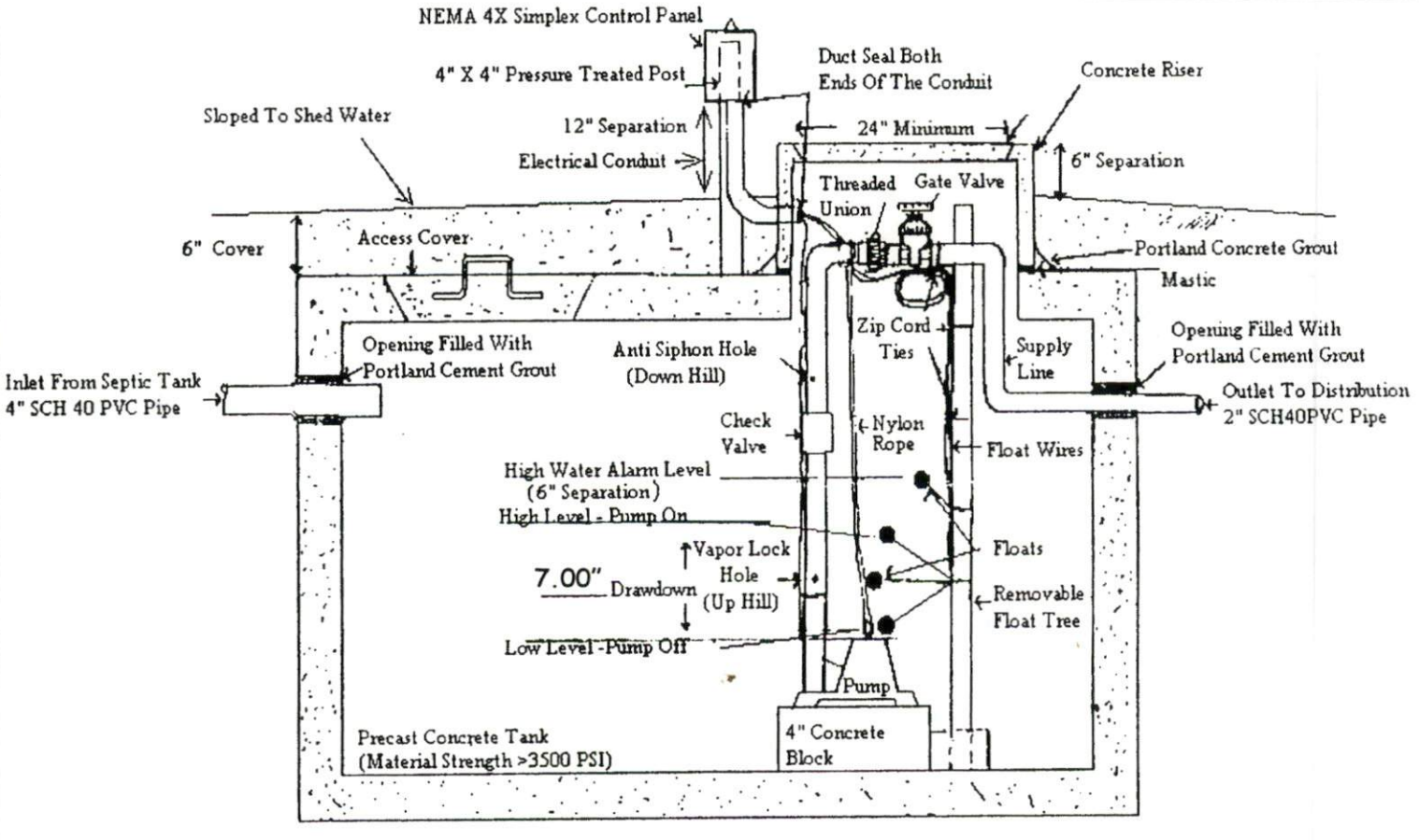
Tap 2 has a Flow divider



Lot 9, Wynn Ridge Subdivisio..

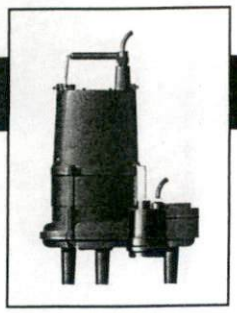


1000 GALLON SEPTIC TANK



1000 GALLON PUMP TANK

Lot 9, Wynn Ridge



ENGINEERING DETAILS - SPD50H/100H

Pump Characteristics

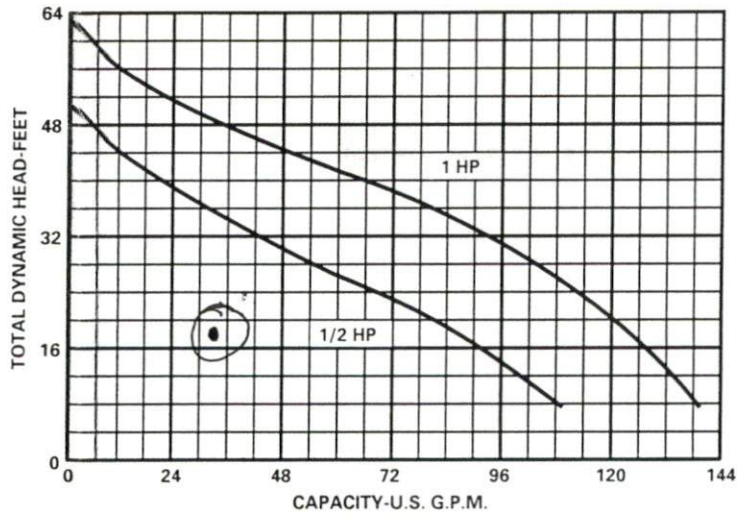
Pump/Motor Unit	Submersible				
Manual Model (50)	MH1	MH2	MH6	MH4	MH5
Automatic Models	AH1	AH2	–	–	–
Horsepower	1/2				
Full Load Amps	15.0	7.5	4.0	1.8	1.5
Motor Type	Capacitor Start		Three-Phase		
R.P.M.	3450				
Phase Ø	1		3		
Voltage	115	230	200	460	575
Manual Model (100)	MH2	MH6	MH3	MH4	MH5
Automatic Models	AH2	–	–	–	–
Horsepower	1				
Full Load Amps	9.5	4.5	4.0	2.5	1.5
Motor Type	Cap.	Three-Phase			
R.P.M.	3450				
Phase Ø	1	3			
Voltage	230	200	230	460	575
Hertz	60				
Operation	Intermittent				
Temperature	140 °F Ambient				
NEMA Design	B				
Insulation	Class B				
Discharge Size	2" NPT (3" opt.)				
Solids Handling	3/4"				
Unit Weight	73 lbs.				

Power Cord: SPD50H 14/3, SJTW-A, 1o, 115V = 10' std. (20' opt.)–14/4, STW-A, 1o, 115V = 10' std. (20' opt.)–16/3, STW-A, 1o, 230V = 20' std.–16/4, STW-A, 1o, 230V = 20' std. SPD100H 16/3, STW-A, 1o, 230V = 20' std.–16/4, STW-A, 1o, 230V = 20' std.–18/5, STW-A, 3o, 200V, 230V, 460V or 575V = 20' std.

Materials of Construction

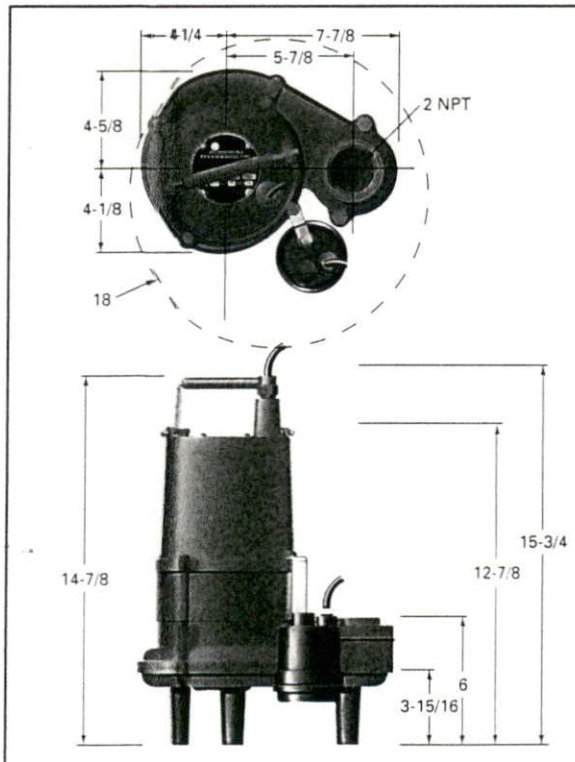
Handle	Steel
Lubricating Oil	Dielectric Oil
Motor Housing	Cast Iron
Seal Housing	Cast Iron
Pump Casing	Cast Iron
Shaft	Stainless Steel
Mechanical Shaft Seal	Seal Faces: Carbon/Ceramic Seal Body: Brass Spring: Stainless Steel Bellows: Buna-N
Impeller	Cast Iron
Upper Bearing	Single Row Ball Bearing
Lower Bearing	Single Row Ball Bearing
Base	Cast Iron
Fasteners	Stainless Steel

Performance Data



Total Head (feet)		10	20	30	40	50	60
GPM	1/2 HP	105	77	50	23	0	–
	1 HP	137	120	96	67	31	0

Dimensional Data



1. All dimensions in inches
2. Component dimensions may vary ± 1/8 inch
3. Not for construction purposes unless certified
4. dimensions and weights are approximate
5. We reserve the right to make revisions to our products and their specifications without notice

NOTE: Model SPD100AH2 utilizes wide-angle piggyback float switch for automatic operation.

AURORA/HYDROMATIC Pumps, Inc.
1840 Baney Road, Ashland, Ohio 44805
(419) 289-3042

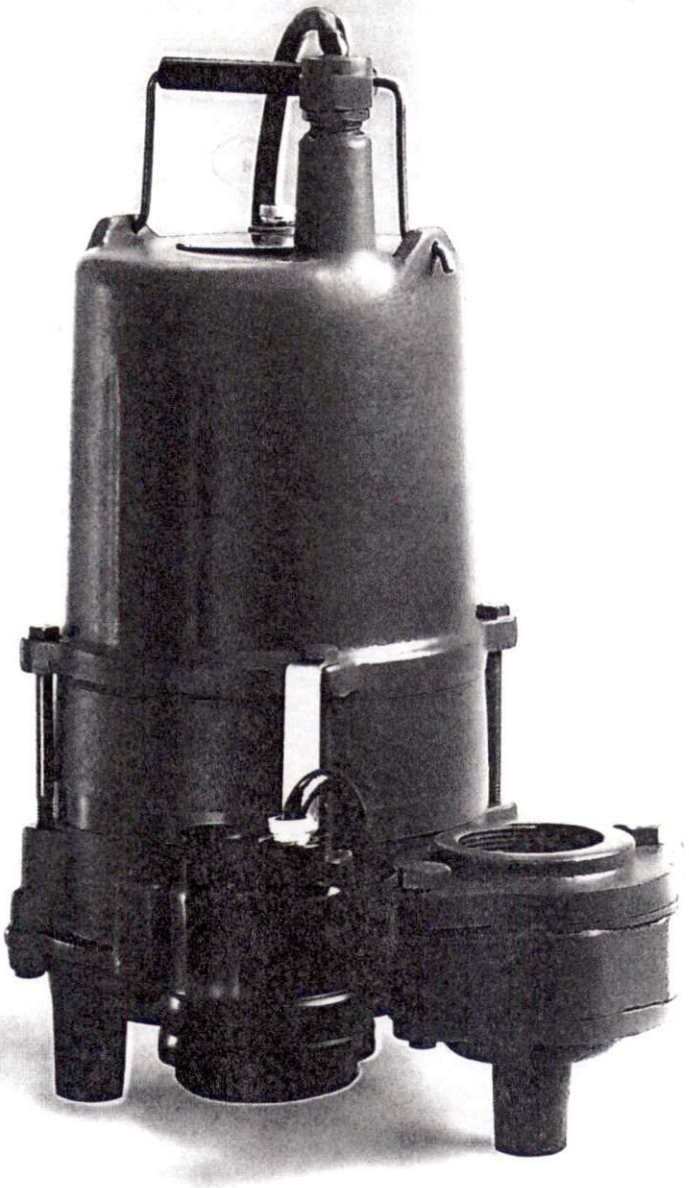
25M 1-90-KCC PRINTED IN USA

Lot 9, Wynn Rid[redacted]

HYDROMATIC SPD50H/100H

Submersible Effluent Pump

- Septic Tank Effluent
- High-Capacity Sump
- High-Head Dewatering



AURORA PUMP
A UNIT OF GENERAL SIGNAL

Lot 9, Wynn Ridge

"Quality Pumps Since 1939"

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

ZOELLER PUMP CO.

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:
http://www.zoeller.com

COMPARE THESE FEATURES

- Castings - Model 137, All cast iron. ASTM class 25, 25000# tensile strength. Model 139, all bronze.
- Oil-filled, hermetically sealed.
- Automatic reset thermal overload protection on single phase.
- Non-Clogging vortex impeller design.
- Corrosion resistant powder coated epoxy finish.
- Float operated 2 pole mechanical switch. (Automatic units only)
- Durable cast construction. Cast switch case, motor and pump housing, base and impeller. No sheet metal parts to rust or corrode.
- Stainless steel screws, bolts, handle, guard, and arm and seal assembly.
- Oil lubricated bearing.
- UL-listed 3-wire neoprene cord and plug.
  10 ft. standard for automatic.
  15 ft. standard for nonautomatic.
- Carbon and ceramic shaft seal.
- Maximum temperature for effluent or dewatering—130°F. - 54°C. (ED 140° F. - 60° C.)
- 60 cycles, 1725 RPM.
- Passes 5/8 inch solids (sphere).
- No screens to clog.
- 1½" NPT Discharge. (1½" x 2" PVC adapter fitting included with BN and BE models.)
- On point—10" Off point—2¾".

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

AVAILABLE SYSTEMS:
SIMPLEX AND DUPLEX SYSTEMS
PACKAGED SYSTEMS
VARIABLE LEVEL CONTROL SYSTEMS
DESIGNED FOR HEAVY DUTY EFFLUENT APPLICATION

ZOELLER PUMP CO.

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

Manufacturers of . . .

"Quality Pumps Since 1939"

137 Cast Iron Series
139 Bronze Series

Quality Made in America by U.S. Craftsmen

(For Pump Prefix Identification see News & Views 0052)

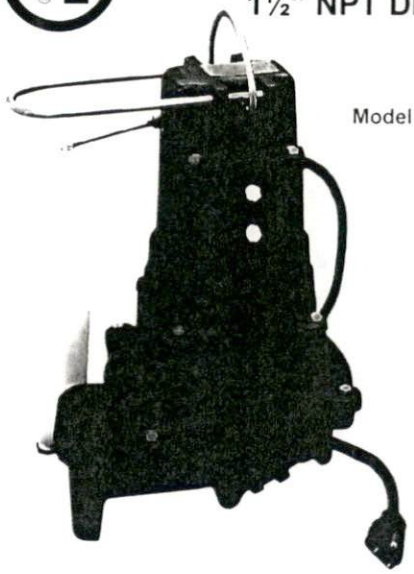
"FLOW-MATE"

FOR SEPTIC TANK - LOW PRESSURE PIPE (LPP)
AND ENHANCED FLOW STEP SYSTEMS

EFFLUENT

OR DEWATERING PUMPS
SUBMERSIBLE
1½" NPT DISCHARGE

SSPMA MEMBER
SUMP AND SEWAGE PUMP MFRS. ASSN.
SSPMA Specification Number
137 Series SC2225
139 Series SB1115



Model 137

Vortex Type Impeller

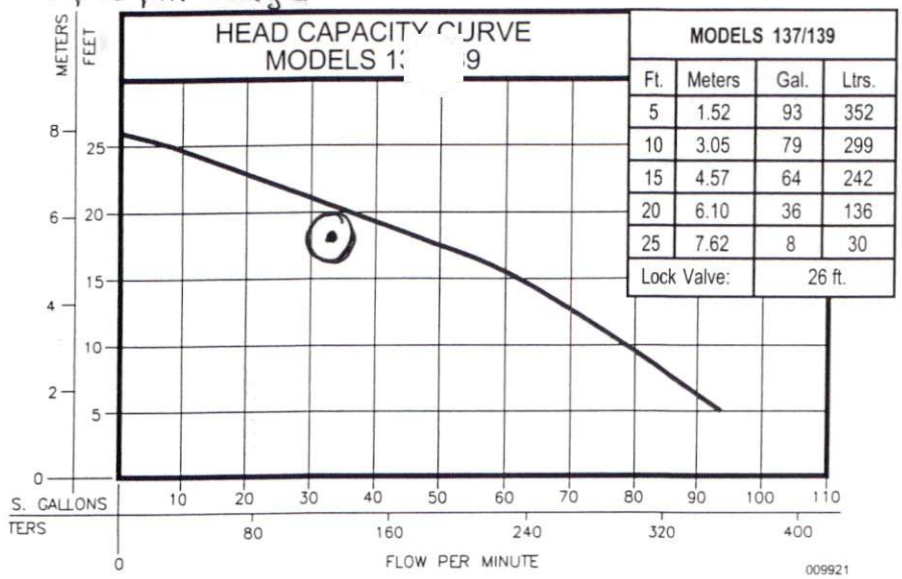
Model BN137

POWDER COATED TOUGH™

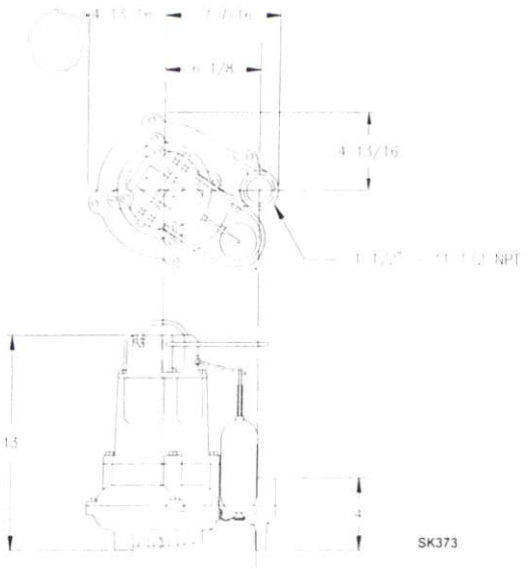
MODELS AVAILABLE
- Automatic
- Nonautomatic
- ½ H.P., 1 Ph., 115V, 200-208V or 230V
- ½ H.P., 3 Ph., 200-208V, 230V, or 460V

* NOTE: See back page for U.L. & CSA Listings.

Lot 9, Wynn Ridge



MODELS 137/139			
Ft.	Meters	Gal.	Ltrs.
5	1.52	93	352
10	3.05	79	299
15	4.57	64	242
20	6.10	36	136
25	7.62	8	30
Lock Valve:		26 ft.	



CONSULT FACTORY FOR SPECIAL APPLICATIONS

- Three phase pumps are available in 200/208V, 230V or 460V.
- Electrical alternators, for duplex systems, are available and supplied with an alarm.
- Mechanical alternators, for duplex systems, are available with or without alarm switches.
- Simplex Panels are available for 3 phase pumps.
- Control alarm systems are available for 1 phase pumps.
- Variable level control switches are available for controlling single and three phase systems.
- Double piggyback variable level float switches are available for variable level long cycle controls.
- Over 130°F. (54°C.) special quotation required.
- Refer to FM0806 for 200° F. applications.

137 Series - 47 lbs. 139 Series - 51 lbs.

Single Seal	Control Selection						Listings	
Model	Volts-Ph		Mode	Amps	Simplex	Duplex	CSA	UL
M137/139	115	1	Auto	10.7	1 or 1 & 8	-----	Y	Y
N137/139	115	1	Non	10.7	2 or 2 & 7	3 or 5 & 6	Y	Y
** BN137	115	1	Auto	10.7	**	-----	Y	Y
D137/139	230	1	Auto	5.8	1 or 1 & 8	-----	Y	Y
E137/139	230	1	Non	5.8	2 or 2 & 7	3 or 5 & 6	Y	Y
* H137/139	200-208	1	Auto	6.2	1 & 8	-----	Y	N
* I137/139	200-208	1	Non	6.2	2 & 7	3 or 5 & 6	Y	N
* J137/139	200-208	3	Non	2.6	4	3&4 or 5&6	Y	Y
* F137/139	230	3	Non	2.6	4	3&4 or 5&6	Y	Y
* G137	460	3	Non	1.4	4	3&4 or 5&6	N	N
* G139	460	3	Non	1.4	4	3&4 or 5&6	N	N

* No molded plug **Single piggyback switch included.

Pumps must be operated in upright position.

Three phase units require a control switch to operate an external magnetic contactor.

For information on additional Zoeller products refer to catalog on Piggyback Variable Level Float Switches, FM0477; Electrical Alternator, FM0486; Mechanical Alternator, FM0495; Alarm Package, FM0732; and Sump/Sewage Basins, FM0487.

SELECTION GUIDE

1. Integral float operated 2-pole mechanical switch, no external control required.
2. Single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. Mechanical alternator M-Pak 10-0072 or 10-0075. Refer to FM0495
4. Simplex three phase control panel. Refer to FM1228.
5. See FM0712 for correct model of Electrical Alternator.
6. Variable level control switch 10-0225 used as a control activator, specify duplex (3) or (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).

RESERVE POWERED DESIGN

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

http://www.zoeller.com

ZOELLER PUMP CO.

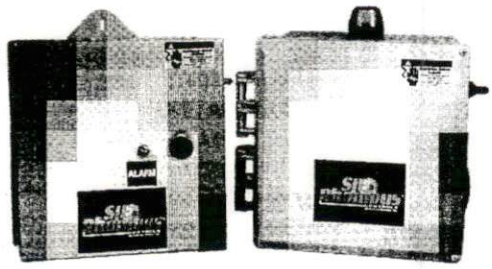
MAIL TO: P.O. BOX 16347
Louisville, KY 40256-0347
SHIP TO: 3649 Cane Run Road
Louisville, KY 40211-1961
(502) 778-2731 • 1 (800) 928-PUMP
FAX (502) 774-3624

Manufacturers of
"Quality Pumps Since 1939"

MODEL 112 Control Panel

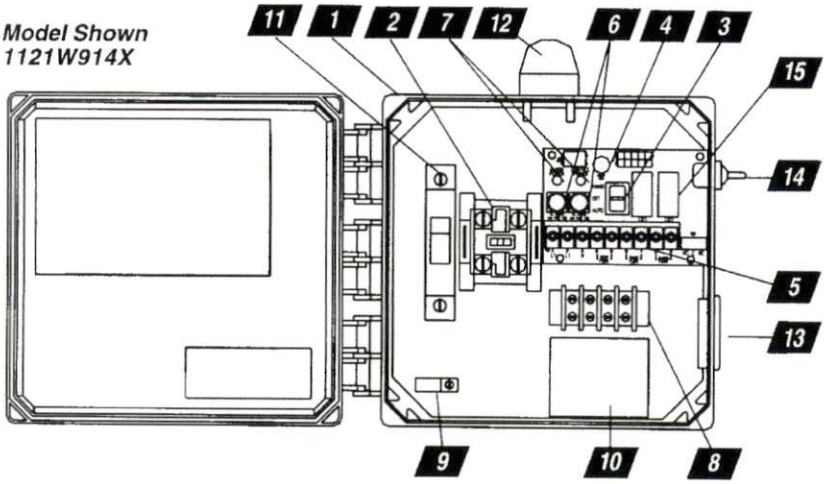
Single phase, simplex motor contactor control.

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.



indoor *indoor/outdoor*

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

c UL us LISTED

SJE-Rhombus CONTROLS
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

112	1	W	1	1/2	4	H	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
1A	Red beacon only / no audio *must select 1E if floats included*
1C	Horn only / no visual *must select 1E if floats included*
1E	Alarm float
3A	Alarm flasher
★ 4A	Low level cutout *select option 4D if floats included*
★ 4B	Red low-level indicator & alarm *must select 4A also*
4D	Low-level float
6A	Auxiliary alarm contact, form C type
★ 8A	Elapsed time meter
★ 8C	Event (cycle) counter
10E	Lockable latch - NEMA 4X
10E	Lockable latch - NEMA 1
★10F	Lightning arrester
★10K	Anti-condensation heater

CODE	DESCRIPTION
11C	NEMA 1 alarm panel *must select option 6A*
11D	NEMA 4X alarm panel *must select option 6A*
15A	Control / alarm circuit breaker *Does not include the circuit board as in standard.*
16A	10' cord in lieu of 20'
16B	15' cord in lieu of 20'
16C	30' cord in lieu of 20'
16D	40' cord in lieu of 20'
17A	SJE SignalMaster® / mounting strap ●
17B	SJE SignalMaster® / externally weighted ●
17C	Sensor Float® / internally weighted ▲
17D	Sensor Float® / externally weighted ▲
17E	Sensor Float® Mini / pipe clamp ▲
17F	Sensor Float® Mini / externally weighted ▲
19X	Door mounted pump run indicator
21A	Pumpmaster® in lieu of on/off switches ●
21B	PumpMaster® Plus in lieu of on/off switches ●
21C	Super Single® in lieu of on/off switches ▲
21D	Double Float™ in lieu of on/off switches ▲

● Mechanically-activated ▲ Mercury-activated

SAMPLE

MODEL	112	1	W	9	1	4	H	3A 8A

- Alarm Package
- Enclosure Rating
- Starting Device
- Pump Full Load Amps
- Pump Disconnect
- Float Switch Application
- Options: Alarm Flasher, Elapsed Time Meter

Lot 9, Wynn Ridge
Repair System

Low Pressure Pipe Distribution Flow Sheet

Subfields	Line #	Initial/ Repair	Line Color	Line Length	Relative Elev(ft)	Elevation Change	Pressure Head(ft)	Hole Size	Flow/ Hole	Flow/ Lateral	gpm/ft	# Holes	Hole Spacing	First/Last Holes
1	14	Repair	R	42	91.7	0.0	4.0	5/32	0.5756	4.60	0.1096	8	5	3.50
	15	Repair	W	40	91.3	0.4	4.4	5/32	0.6037	4.23	0.1056	7	4	8.00
	16	Repair	B	55	90.7	1.0	5.0	5/32	0.6436	5.15	0.0936	8	6	6.50
	17	Repair	Y	60	90.2	1.5	5.5	5/32	0.6750	5.40	0.0900	8	7	5.50
	18	Repair	R	113	89.6	2.1	6.1	5/32	0.7109	9.24	0.0817	13	8	8.50
2	19	Repair	W	93	89.0	0.0	4.0	5/32	0.5756	7.48	0.0804	13	7	4.50
	20	Repair	Y	77	88.4	0.4	4.4	5/32	0.6037	6.04	0.0784	10	7	7.00
			Pump Tank =			% Decrease of gpm/ft from top to bottom line=					28.47			

Calculations:

Flow/Hole = 11.79 d^2 $h^{1/2}$
Flow/Lateral = (flow/hole) x #holes

gpm/ft = ((flow/hole) x #holes) / length
Dose Vol. = Manifold(d.vol) + 5(Lat Ln Vol)
Sup. Ln(d)Vol= (Supply Line Length/100) x Pipe Size & Vol Table
Lat Ln Vol(1&1/4)=(Total linear footage/100) x Pipe Size & Vol Table
Manifold Vol=(Manifold lengthxpip vol)/100

Design Specifications

Sup.Line (d)Vol=	
Lat. Line (d)Vol=	
Manifold (d)Vol=	
Dose Vol. Range	
Dose V.=	

@ x

Total Flow=	42.14
LTAR=	0.15
Run Time=	
Draw Down=	

Pressure Head(ft)=	4
Elevation Head(ft)=	
Friction Hd(ft) =	
TDH(ft)=	

Run Time=Vol. Dose/Total Flow
Draw Down= (Vol. Dose/(Pump Tank Volume)) x liquid depth of tank(inches)
Elev Head(EH)=Manifold - (PTank - 5)
Friction Head = [0.00113 x (Supply Line Length(ft) + 70' for fittings in pump tank) x Flow(GPM)^1.85] / Pipe Inside Diameter(in)^4.87 *Computed by the Hazen*
TDH= Pressure Head + Elevation Head + Friction Head

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