

St. Gregorios Orthodox Church
200 Seat Church with Kitchen
Flow Equalization (379 gal/day)
See attached flow balance sheet

Summary of calculations and materials required for installation.

Design Flow:	379 gal/day (Flow Equalization)
Soil LTAR:	0.3 gal/day/ft ²
Total lateral length:	440' of Conventional Stone Trenches *Accepted Product may be used without reduction must be a 1:1 ratio with stone trenches.
Number of Pressure Manifolds:	1
Manifold #1:	4" SCH 80 PVC, 54" minimum length
New Supply Line:	2" sch 40 PVC at 131'
Trench Depth:	24"
Trench Width:	3'
Gate Valves:	1 in pressure manifold, 1 in pump tank
Check Valves:	1 in pump tank
Septic Tank:	2100 gallon with effluent filter Brantley 2100 ST 388
Pump Tank:	3500 gallon Brantley 3500 PT 484, (47.3 gal/inch)
Grease Trap:	1500 gallon Brantley Grease Trap PT 293
Grease Trap Filter:	Zabel, A300, 1/32" Filtration 8" diameter, 32" long This filter will extend down >50% of the liquid depth of the grease trap
4" pipe:	362' of SCH 40, 4" pipe for gravity sewer line from existing office to septic tank with exposed cleanouts every 50' or per local plumbing code.
Control Panel & Floats:	SJE Rhombus NC State Approved Flow Equalization (simplex) Installer Friendly Series Control Panel & floats (see attached tear sheet). Model # IFS11W114H10E15A18A
Pump:	Zoeller 140 or equivalent rated at 39.4 gpm with 7.95' of head
Drawdown:	~4", based on 47.3 gal/inch for pump tank

Calculations:

Supply Line Volume:	22.79 gallons
Pump Run Time:	4.8 minutes per cycle, 2 cycles per day 0.08 hours "on" 11.92 hours "off"
Pump Submergence Volume:	851.4 gallons 18 inches * 47.3 gallons/inch 18 inch pump height
Dosing Volume:	189 gallons (66% of system dosed) System will require two doses per day
Equalization Volume:	1242 gallons, largest accumulated volume
Emergency Storage:	1000 gallons
Minimum Pump Tank requirement:	3,282.40 gallons
Elevation Head:	-1'
Pressure Head:	2'
Friction Head:	6.95'
Total Dynamic Head:	7.95'

**Calculations based on 200 seat church at 5 gal/day seat per the attached Table 1 flow balance. The existing structure at 225 Bashford Road has an existing gravity septic system that will be abandoned. This structure will serve for the office staff at the church. The applicant has stated the usage would be for 1 to 2 employees 3 days a week but CCSC and Wake County Environmental Field Staff agreed to place a design flow of at least 100 gallons/day Monday-Thursday each week as a more conservative estimate. If possible the installer should keep the existing septic tank at 225 Bashford Road and add risers along with an effluent filter before connection to the new septic system with the church.

Additional Notes:

***Install manifold as shown on plans as well.**

***Designer must be given a 5 day notice before installation if a final inspection is required by the Local Health Department.**

***Control panel should be 36" to 60" above ground surface to center of panel.**

***Minimum Height of Risers on all tanks is 6" above finished grade.**

Table 1
200 Seat Church, Bashford Road, Raleigh NC
Flow Balance

	<u>Monday</u> gal/day	<u>Tuesday</u> gal/day	<u>Wednesday</u> gal/day	<u>Thursday</u> gal/day	<u>Friday</u> gal/day	<u>Saturday</u> gal/day	<u>Sunday</u> gal/day
Sunday attendance, sanctuary 200 seat sanctuary with kitchen							1000
Saturday sanctuary use 200 occupants 5 gal/seat/day						1000	
Friday sanctuary use 50 occupants 5 gal/seat/day					250		
Church Staff 4 employees 25 gallons employee	100	100	100	100			
Total wastewater flow per week	100	100 200	100 300	100 400	250 650	1000 1650	1000 2650

Site shall have a daily dosing cycle of
379 gallons/day using a 7 day dosing
schedule.

Flow Balance:

<u>Day</u>	<u>In</u>	<u>Out</u>	<u>Residual</u>
Saturday	1000	379	621
Sunday	1000	379	1242
Monday	100	379	963
Tuesday	100	379	684
Wednesday	100	379	405
Thursday	100	379	126
Friday	250	379	-3

Central Carolina Sol Consulting PRESSURE MANIFOLD DESIGN

Name: St. Gregorios Orthodox Church

P.I.N. #:

D#:

Address: 225 Bashford Road

Subdiv:

Lot#:

Daily Flow: 379 gal/day L.T.A.R.: 0.30 gal/day/sq.ft

Septic Tank: 2100 gals Pump Tank: 3500 gals Sq. Foot: 1320 Stone Depth:

Number of Taps: 6 Length of Trenches: 440 ft(See Tap Chart for Details)

Depth of Trenches: 24 in Manifold Length: 54 in

Manifold Diameter: 4in sch 80pvc Tap Configuration: 6 in spacing side(s) of manifold

Supply Line: length: 131 ft Diameter: 2 in sch 40pvc

Friction Loss + Fitting Loss: 6.95 ft(supply line length + 70' for fittings in pump tank)

Design Head: 2 ft Elevation Head: -1.00 ft

Total Head: 7.95 ft Pump to Deliver: 39.40 gals/min at 7.95 ft head

Dosing Volume: 189 gals,

Drawdown: 189 gals divided by 47.3 gals/in = 4.0 inches

Simplex Control Panel required; elapsed time meter and cycle counter required; Floats to be determined by type of pump tank used. A septic tank filter, or equal is required.

Possible pumps: Hydromatic:

Goulds:

Myers:

Zoeller: 140

Other:

TAP CHART

Bench Mark	0	is = 100.00	set at				Design Head:	2	
Pump tank elev.		-6	106.00	Pump elev.	101.00		Manifold elev.	100.00	
line	color	rod read	Elevation	length	hole size	flow/tap	gal/day	trench area	LINE LTAR
1	Red	1.0	99.00	55	1/2in SCH 80	5.48	52.71	165	0.319
2	Blue	1.8	98.20	80	1/2in SCH 40	7.11	68.39	240	0.285
3	Yellow	2.8	97.20	85	1/2in SCH 40	7.11	68.39	255	0.268
4	Pink	3.7	96.30	85	1/2in SCH 40	7.11	68.39	255	0.268
5	Green	4.3	95.70	80	1/2in SCH 40	7.11	68.39	240	0.285
6	Orange	4.8	95.20	55	1/2in SCH 80	5.48	52.71	165	0.319

	total	feet =	440	gal/min =	39.4		LTAR =	0.30
% of Dose Vol.	66		Des. Flow	379			(ltar + 5%)	0.32
Dose Volume	189		Pump Run=	9.62			(ltar W/ INOV)	0.40
Dose Pump Time	4.79		Tank Gal/IN	47.3			(ltar + 5%)	0.42
Drawdown in Inches	4.0		Elev. Head	-1.00				
Supply Line Length	131							
Comments:								

Central Carolina Soil Consulting **PRESSURE MANIFOLD DESIGN - REPAIR SYSTEM**

Name: St. Gregorios Orthodox Church P.I.N. #: 0 D#: 0

Address: 225 Bashford Road Subdiv: 0 Lot#: 0

of BDR: 0 Daily Flow: 379 gal/day L.T.A.R.: 0.30 gal/day/sq.ft

Septic Tank: 2100 gals Pump Tank: 3500 gals Sq. Foot: 1335 Stone Depth:

Number of Taps: 5 Length of Trenches: 445 ft(See Tap Chart for Details)

Depth of Trenches: 24 in Manifold Length: 48 in

Manifold Diameter: 4in sch 80pvc Tap Configuration: 6 in spacing 1 side(s) of manifold

Supply Line: length: 275 ft Diameter: 2 in sch 40pvc

Friction Loss + Fitting Loss: 13.15 ft(supply line length + 70' for fittings in pump tank)

Design Head: 2 ft Elevation Head: -5.70 ft

Total Head: 9.45 ft Pump to Deliver: 41.53 gals/min at 9.45 ft head

Dosing Volume: 188 gals,

Drawdown: 188 gals divided by 47.3 gals/in = 4.0 inches

Simplex Control Panel required; elapsed time meter and cycle counter required; Floats to be determined by type of pump tank used. A septic tank filter, or equal is required.

Possible pumps: Hydromatic: Goulds: Myers:
 Zoeller: Other:

TAP CHART

Bench Mark	<u>0</u>	is = 100.00	set at				Design Head:	2		
Pump tank elev.		<u>-6</u>	106.00	Pump elev.	101.00		Manifold elev.	95.30		
line	color	rod read	Elevation	length	hole size	flow/tap	gal/day	trench area	LINE	LTAR
7	Red	5.7	94.30	90	1/2in SCH 40	7.11	64.89	270		0.240
8	Blue	6.2	93.80	95	3/4in SCH 80	10.1	92.17	285		0.323
9	Yellow	6.9	93.10	100	3/4in SCH 80	10.1	92.17	300		0.307
10	Pink	7.7	92.30	90	1/2in SCH 40	7.11	64.89	270		0.240
11	Orange	7.8	92.20	70	1/2in SCH 40	7.11	64.89	210		0.309

	total	feet =	445	gal/min =	41.53	LTAR =	0.30
% of Dose Vol.	65		<u>Des. Flow</u>	<u>379</u>		(ltar + 5%)	0.32
Dose Volume	188		Pump Run=	9.13		(ltar W/ INOV)	0.40
Dose Pump Time	4.53		Tank Gal/IN	<u>47.3</u>		(ltar + 5%)	0.42
Drawdown in Inches	4.0		Elev. Head	-5.70			
Supply Line Length	275						
Comments:							

200 Seat Church
379 gal/day flow rate with
Flow Equalization
Bashford Road, Raleigh, NC

System: Pressure Manifold
Lines: 1-6, (440')
Conventional Trenches
0.3 Soil LTAR
24" Trench Bottoms

Repair: Pressure Manifold
Lines: 7-11, (445')
Conventional Trenches
0.3 Soil LTAR
24" Trench Bottoms

50' Tree Buffer

131' SCH 40 2" supply line

N89°57'40"W 168'

492.32'

Manifold

TOTAL ANNEXATION AREA
2.76 ACRES

3500 gallon
pump tank

2100 gallon
septic tank

Temporary Sediment Basin

S01°12'37"E
106.85'

S00°20'0"E
100.21'

4" SCH 40 gravity septic line with clean-outs
from office to plumbing outlet of church

EXISTING DIST.

PROP. DIST. S 88°51'49" W

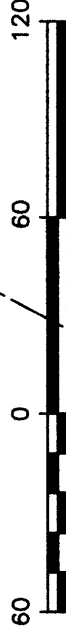
S88°51'49" W

664.93'

GRAPHIC SCALE

1" = 60'

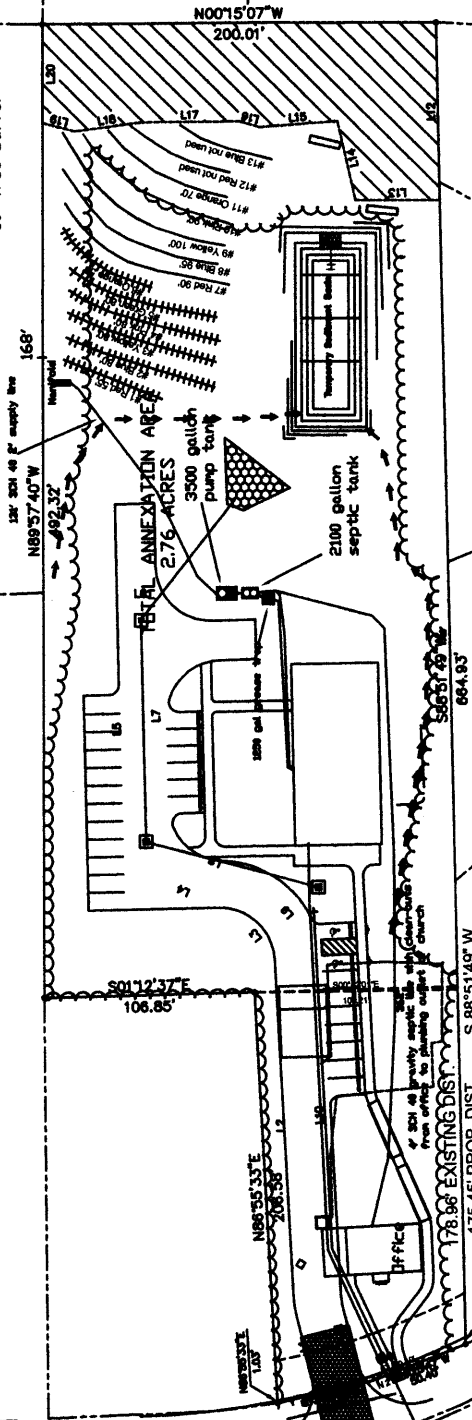
Central Carolina
Soil Consulting
919-569-6704
Project # 792



200 Seat Church 379 gal/day flow rate with Flow Equalization Bashford Road, Raleigh, NC

System: Pressure Manifold Lines: 1-6, (440') Conventional Trenches 0.3 Soil LTAR 24' Trench Bottoms	Repair: Pressure Manifold Lines: 7-11, (445') Conventional Trenches 0.3 Soil LTAR 24' Trench Bottoms
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50' Tree Buffer



Not A Survey
 *Lines Not Located
 *Keep Tanks and Drains
 >10' from property lines.

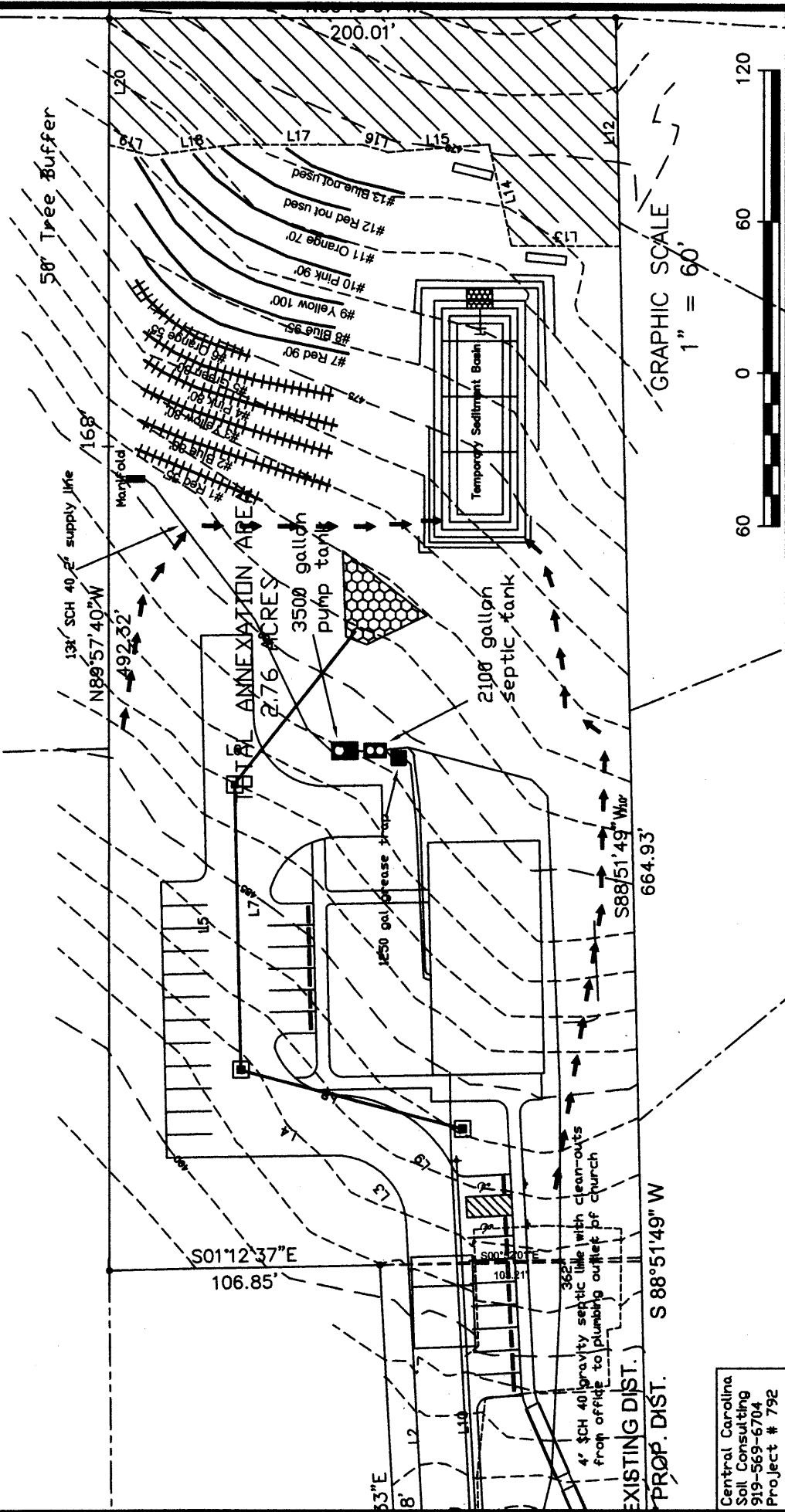
GRAPHIC SCALE
 1" = 100'



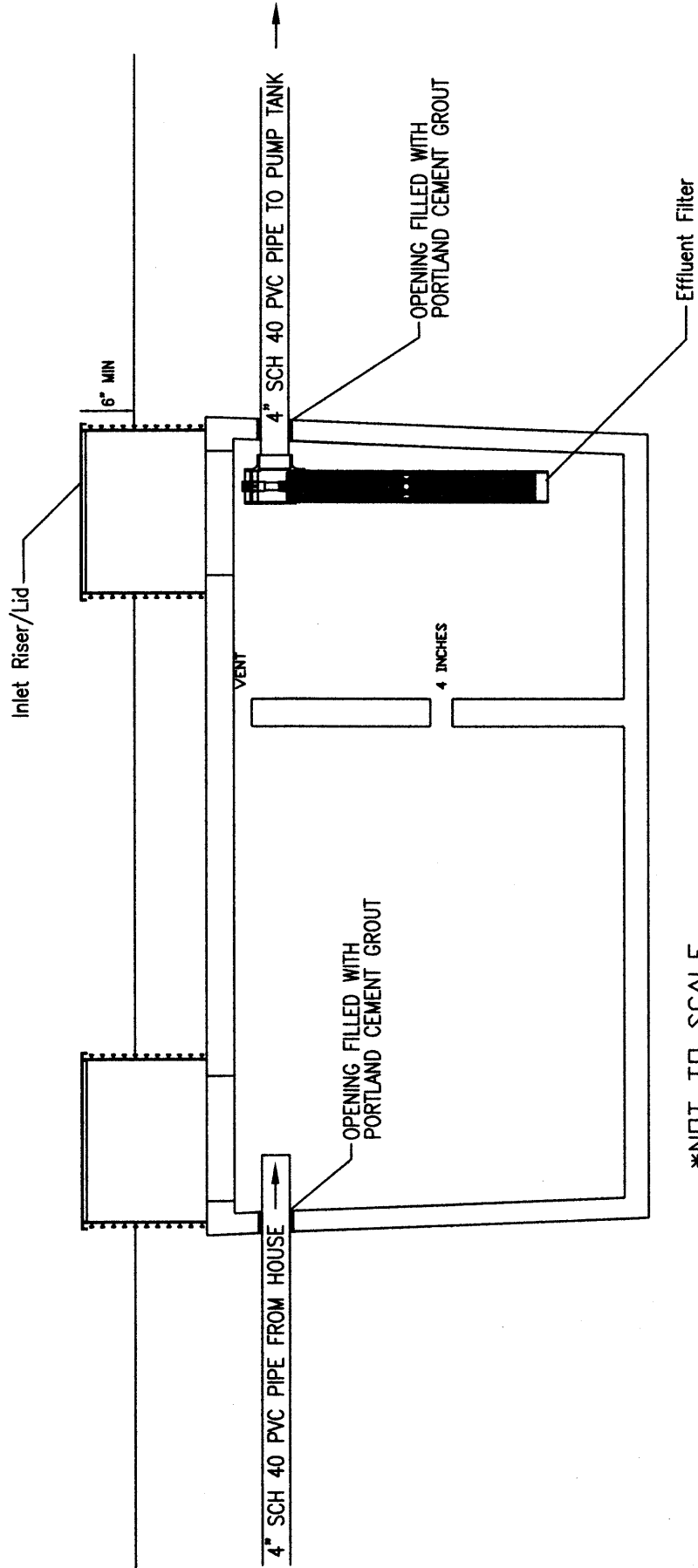
200 Seat Church
379 gal/day flow rate with
Flow Equalization
Bashford Road, Raleigh, NC

System: Pressure Manifold
Lines: 1-6, (440')
Conventional Trenches
0.3 Soil LTAR
24" Trench Bottoms

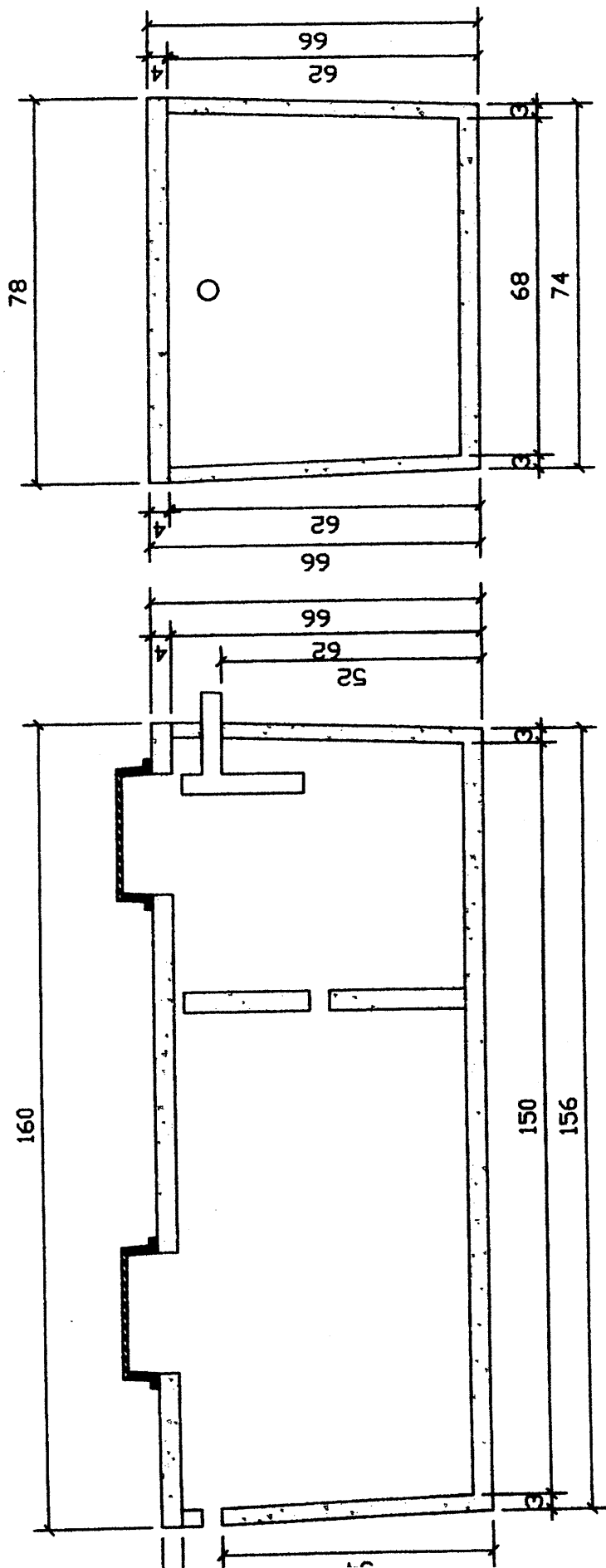
Repair: Pressure Manifold
Lines: 7-11, (445')
Conventional Trenches
0.3 Soil LTAR
24" Trench Bottoms



Example 2100 gallon SEPTIC TANK



*NOT TO SCALE
*NOT ACTUAL DIMENSIONS



2100 ST 388

NEMA 4X Simplex
Control Panel

36" 60"

24" DIAMETER OSI
RISER
6" ABOVE GRADE

STAINLESS STEEL
FLOAT BRACKET
OR PVC FLOAT TREE

FINAL GRADE = 0"

2" TRUE UNION
DISCONNECT

TOP OF TANK (OUTSIDE) = -18"

2" GATE VALVE

Auto Siphon Hole

2" SCH-40 PVC
FORCEMAIN TO PRESSURE
MANIFOLD

2" CHECK VALVE

Timer-enabling switch 24"

78"

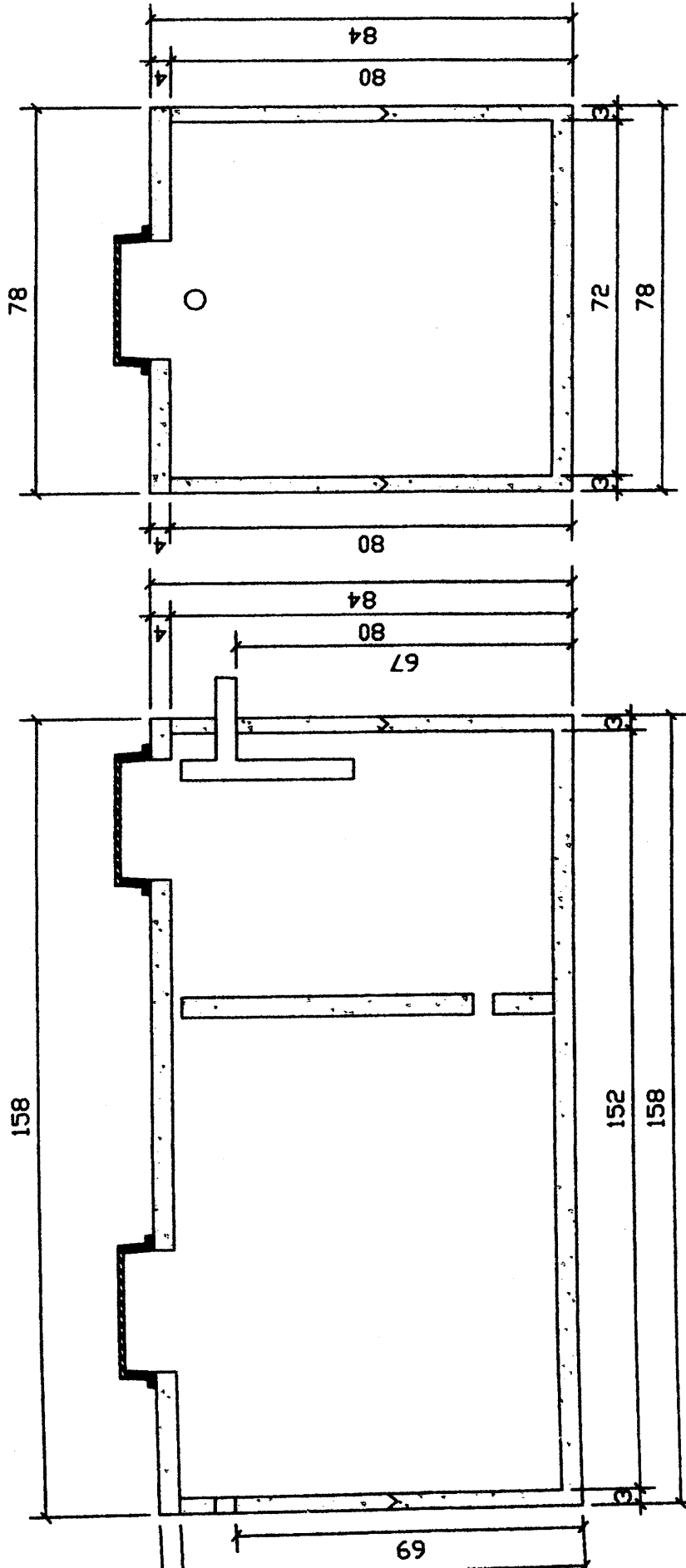
21" Emergency Storage, 1000 gal.

High Level Alarm/timer override float, 57"

Drawdown = 4"

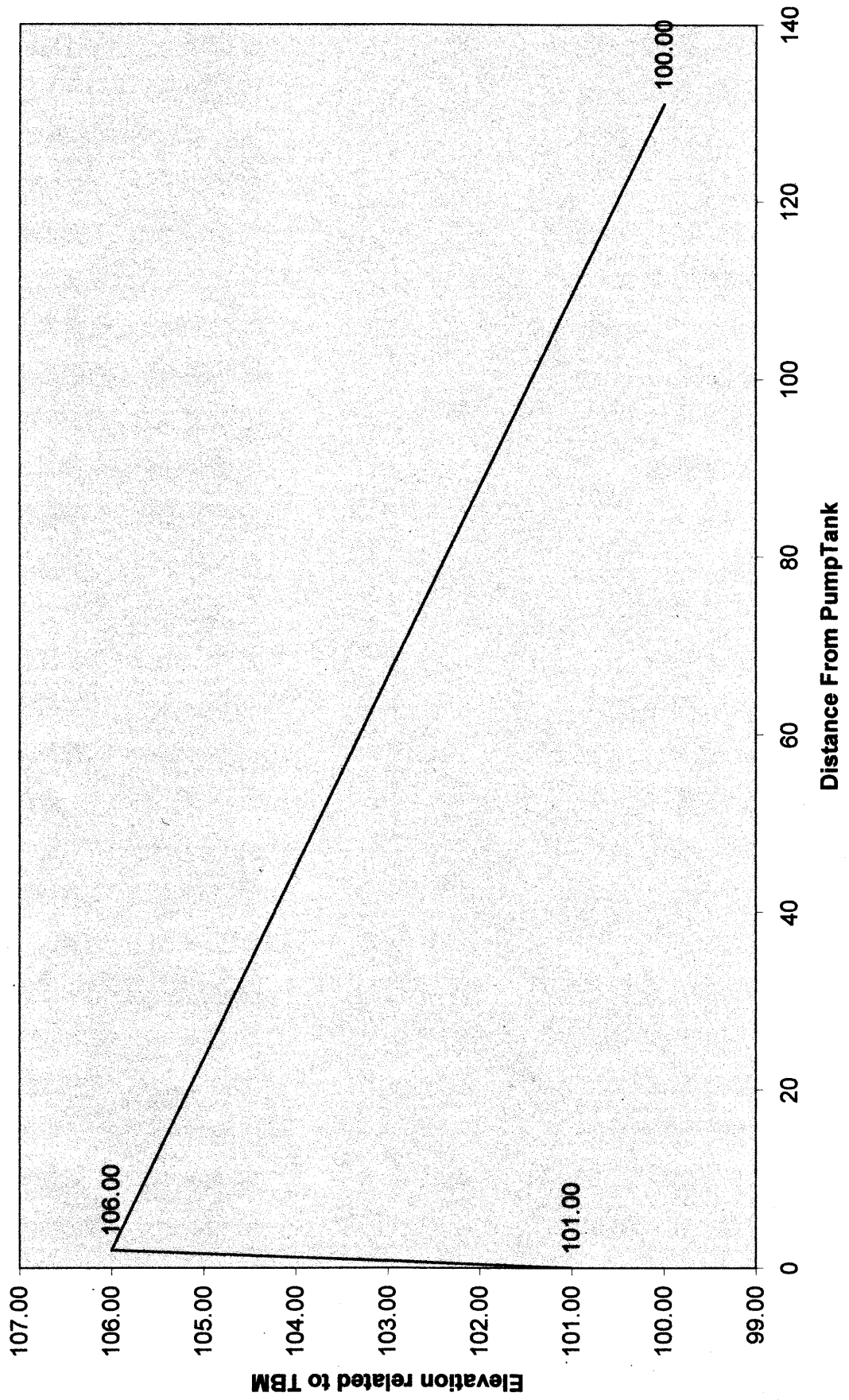
Low Level/Redundant-off, 18"

3500 Gallon PUMP TANK, Brantley 484



3500 PT 484

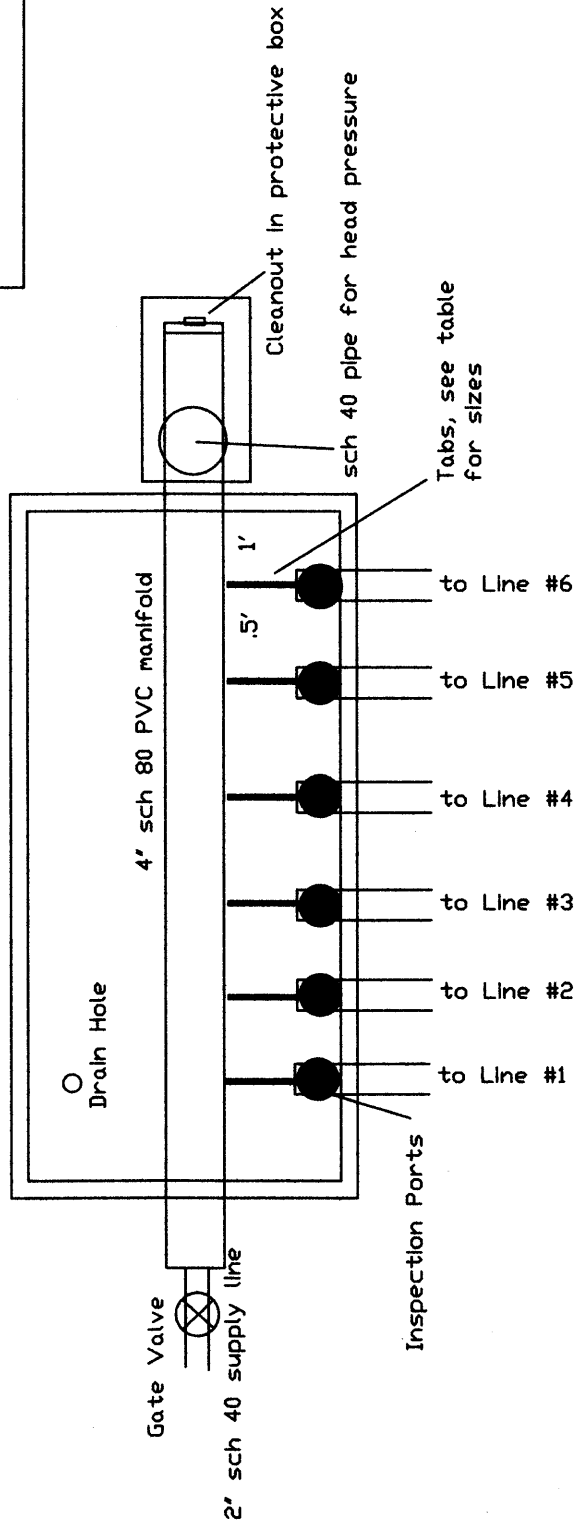
Hydraulic Profile



Tap sizes per line

Line #1	1/2"	SCH 80
Line #2	1/2"	SCH 40
Line #3	1/2"	SCH 40
Line #4	1/2"	SCH 40
Line #5	1/2"	SCH 40
Line #6	1/2"	SCH 80

*Not to Scale



"QUALITY PUMPS SINCE 1939"

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



SECTION: 2.20.045

FM1502

0701

Supersedes

1200

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
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Durable Cast Iron construction.

Non-Clogging bronze vortex impeller design, passes 1/2" solids.

Oil-filled hermetically sealed 1 HP, single phase, 3480 RPM motor, with thermal over load protection.

Available in both single or double shaft seal designs.

Carbon/Ceramic seals.

Assembled with Stainless Steel bolts.

Oil lubricated bearings.

15' UL Listed Neoprene cord with molded plug cap and ground wire.

1 1/2" NPT vertical discharge.

Stainless steel lifting handle.

BN and BE models include a variable level float switch and 1 1/2" X 2" PVC adapter fitting.

Operates at temperatures to 130°F - 54°C in effluent or dewatering applications.

Corrosion resistant powder coated epoxy finish.

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



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Manufacturers of . . .

"QUALITY PUMPS SINCE 1939"

140 / 4140 Cast Iron Series

(For Pump Prefix Identification see News & Views 0052)

"FLOW-MATE"

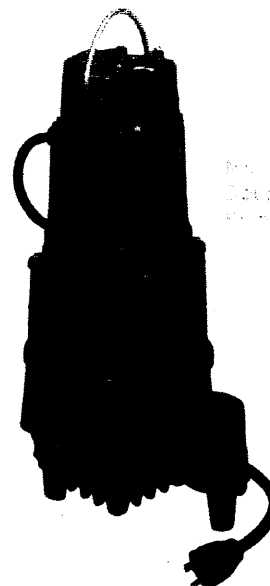
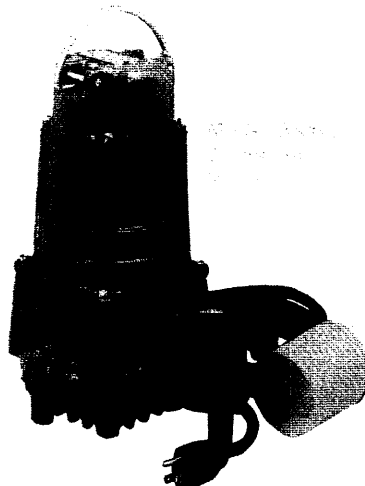
FOR SEPTIC TANK - LOW PRESSURE PIPE (LPP)
AND ENHANCED FLOW STEP SYSTEMS

EFFLUENT

OR DEWATERING PUMPS

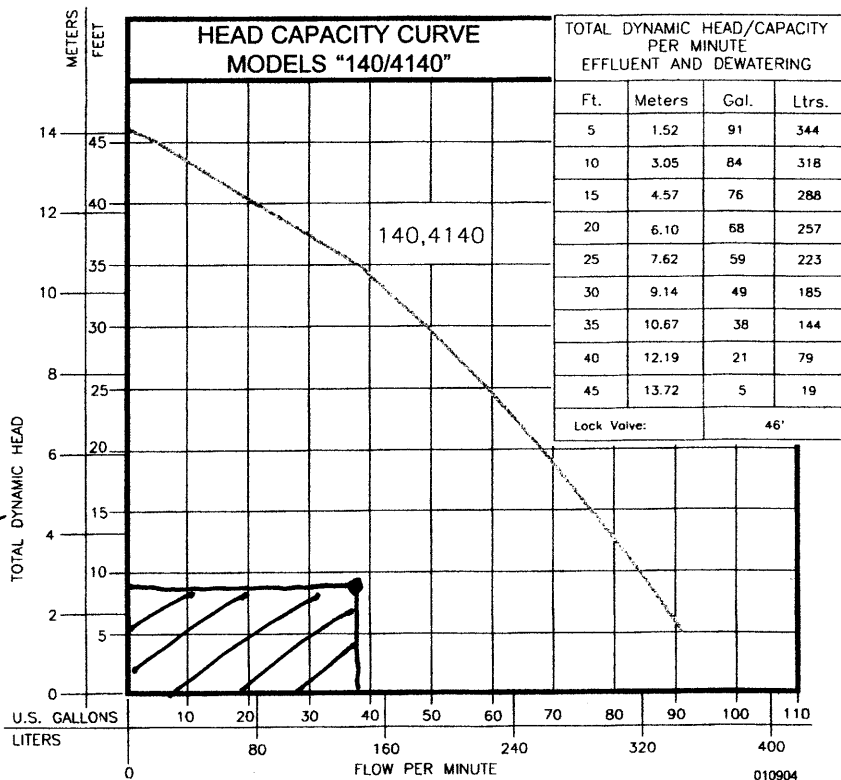
SUBMERSIBLE

1 1/2" NPT DISCHARGE



MODELS AVAILABLE

- Nonautomatic
- 1 HP, 1Ph 115V or 230V



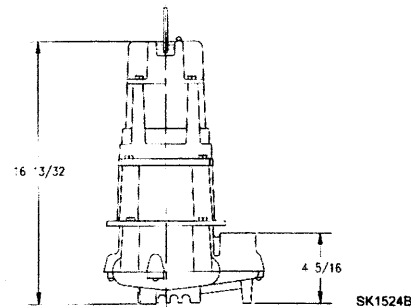
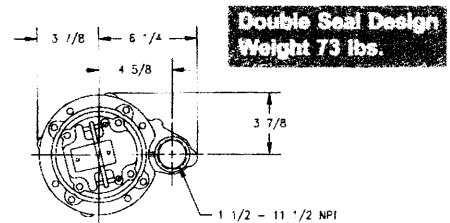
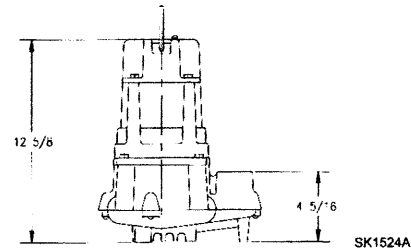
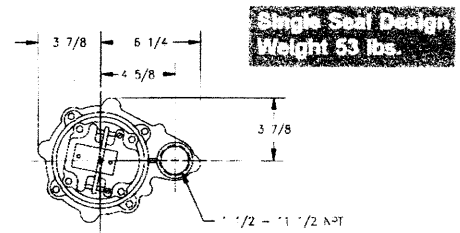
39.4 gpm

CONSULT FACTORY FOR SPECIAL APPLICATIONS

- Electrical alternators, for duplex systems, are available and supplied with an alarm.
- Mechanical alternators, for duplex systems, are available with or without alarms.
- Control alarm systems are available for 1 phase pumps used in simplex system. See FM0732.
- Variable level control switches are available for controlling single phase systems.
- Double piggyback variable level float switches are available for variable level long cycle controls.
- Sealed Qwik-Box available for outdoor installations. See FM1420.
- Over 130°F. (54°C.) special quotation required.
- Refer to FM0806 for 200° F. applications.

140/4140*** MODELS

140/4140*** MODELS						Control Selection	
Model	Model	Volts-Ph	Mode	Amps		Simplex	Duplex
N140	N4140	115	1	Non	15.0	1 or 1 & 5	2 or 3 & 4
E140	E4140	230	1	Non	7.5	1 or 1 & 5	2 or 3 & 4
BN140	BN4140	115	1	Non	15.5	1 or 1 & 5	2 or 3 & 4
BE140	BE4140	230	1	Non	7.5	1 or 1 & 5	2 or 3 & 4



SELECTION GUIDE

1. Single piggyback variable level float switch or double piggyback variable level switch. Refer to FM0477.
2. Mechanical alternator M-Pak 10-0072 or 10-0075.
3. See FM0712 for correct model of Electrical Alternator E-Pak.
4. Variable level control switch 10-0225 used as a control activator, specify duplex (3) or (4) float system.

CAUTION

All installation of controls, protective devices and wiring is to be done by a qualified licensed electrician. All electrical and safety codes must be followed including the most recent National Electrical Code (NEC) and the International Building and Fire Protection Code (IFBFC).

RESERVE POWERED DESIGN

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



<http://www.zoeller.com>

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PUMP CO.

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Manufacturers of...

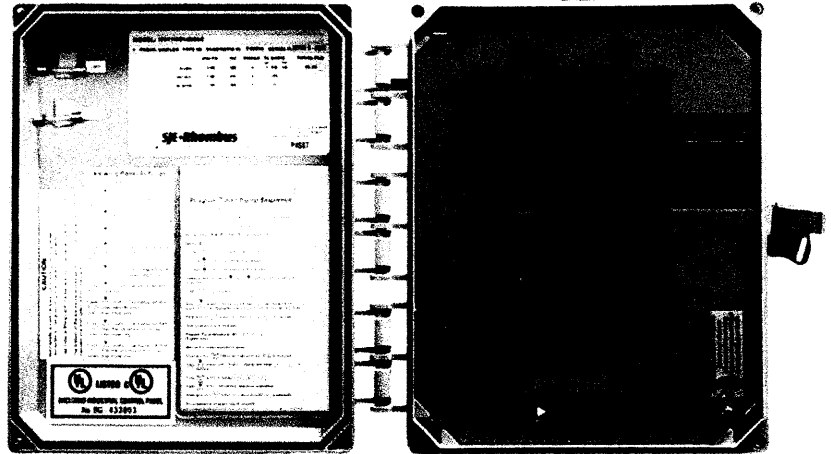
"QUALITY PUMPS SINCE 1939"

North Carolina State Approved Flow Equalization Installer Friendly Series™ Control Panel

The **NEW** North Carolina State Approved Flow Equalization Installer Friendly Series™ simplex control panel provides an **effective, reliable** means of controlling one single phase pump in water, wastewater and sewage installations.

This control panel features a **simple, easy-to-use touch pad** on the inner door for programming and monitoring pump control.

*They are that **installer friendly!***



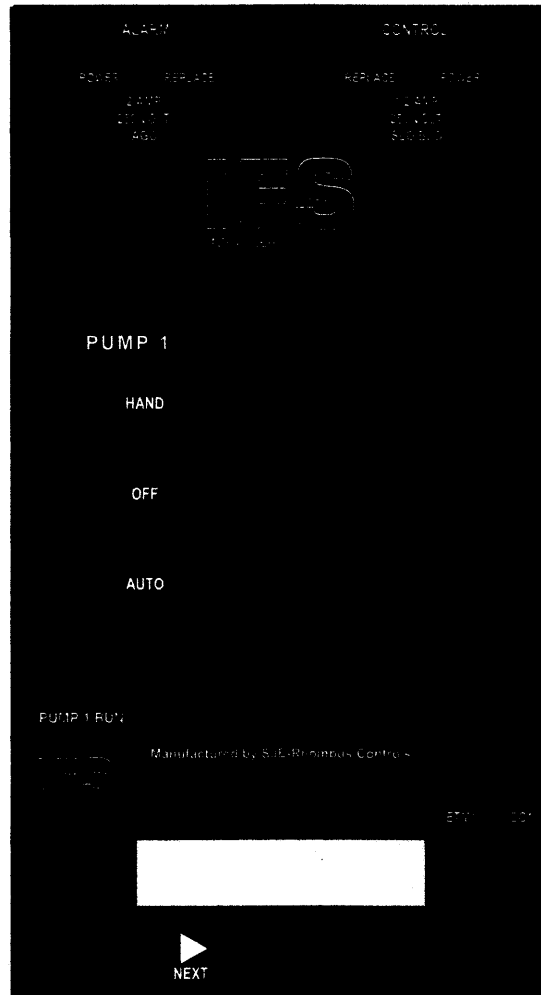
Model shown: IFS11W114H8AC10E15A

TOUCH PAD FEATURES:

- Simple-to-use touch pad for programming pump control
- Pump run indicator
- Float status indicators, including float out-of-sequence alarm
- Separate control and alarm fuses with power and replacement indicators
- HAND/OFF/AUTO pump control switch
- Optional: timer override and redundant off floats

DISPLAY BOARD FEATURES:*

- Six digit LED display
- Elapsed time meter with indicator
- Cycle counter with indicator
- Alarm counter
- Timer override counter
- Timed Dose Mode: program pump ON/OFF times



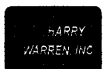
*Note: With the new IFS design, the display board with built-in Elapsed Time Meters and Event Counters is now optional for the Demand Dose models only. If your application requires these features, select option '8AC' when ordering. The display board can be added in the field, if necessary.

IFS PANEL FEATURES:

- **NEMA 4X** weatherproof enclosure for indoor/outdoor use
- Inner door for added safety
- UL/cUL Listed
- Alarm beacon and horn (85 decibel rating) provides visual and audio warning of alarm condition
- Test / normal / silence switch
- Large, easy-to-use terminal blocks
- 120 VAC control/alarm breaker
- Locking latch
- 120/230 VAC pump circuit breaker for branch circuit protection and pump disconnect
- Float/pump wiring diagram mounted to backplate
- Includes float switches and step-by-step installation instructions
- Instruction label on inside cover for viewing and programming digital display
- Three-year limited warranty



For pricing and availability, please contact:



HARRY WARREN, LLC

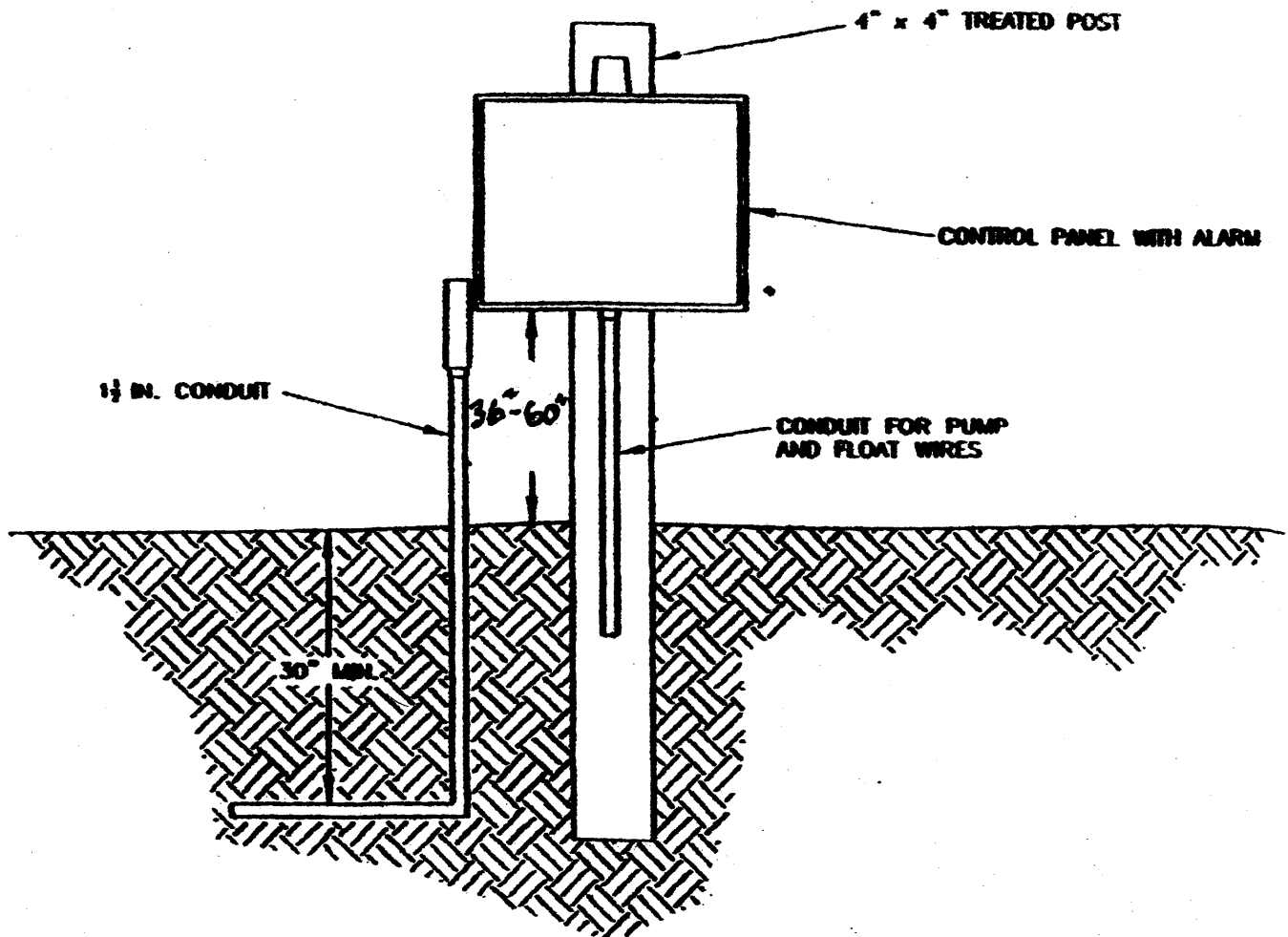
(800) 521-7377

111D Gralin Road, Kenersville, NC 27284

SJE Rhombus
CONTROLS

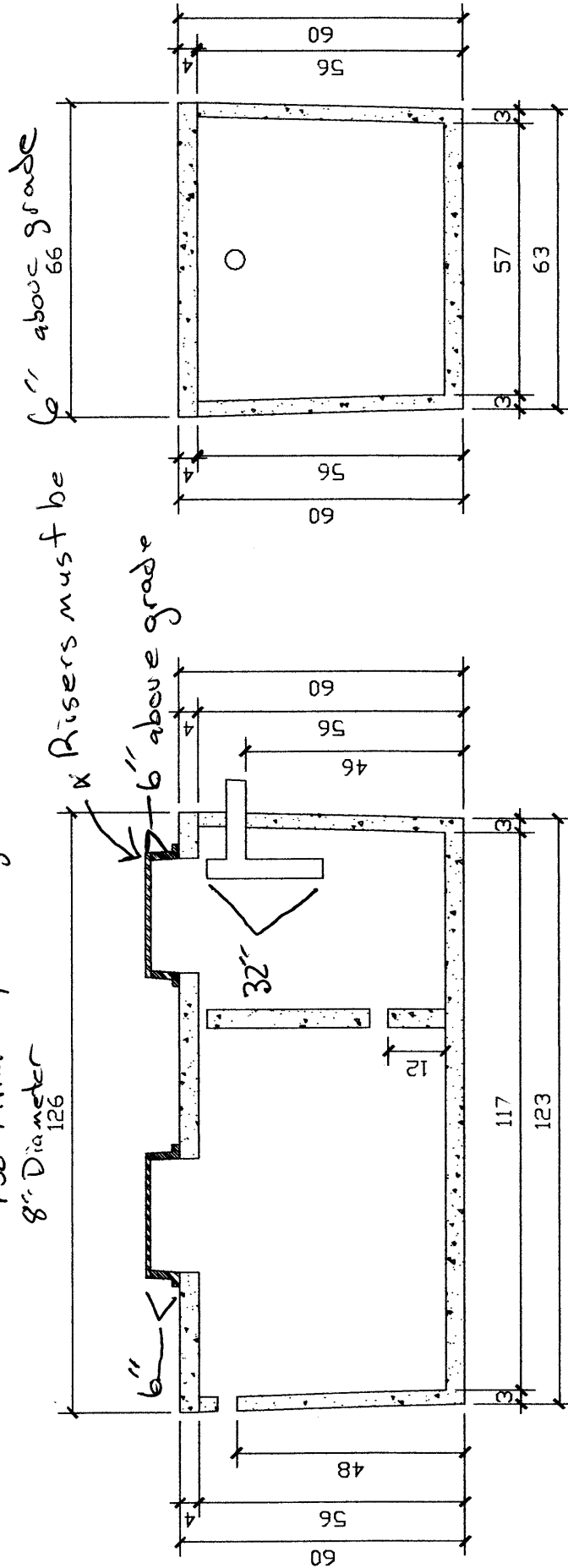
www.sjerrhombus.com

ELECTRIC BOX



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.

* Zabel A300 Filter
 1/32" Filtration, 32" Long
 8" Diameter
 126

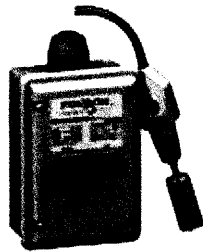
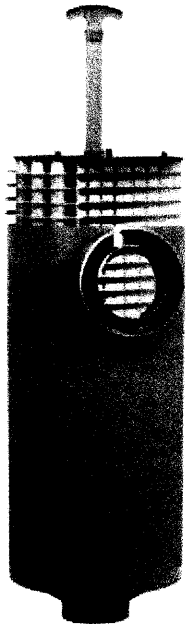


1500 ~~293~~ 293

Bantley Grease Trap

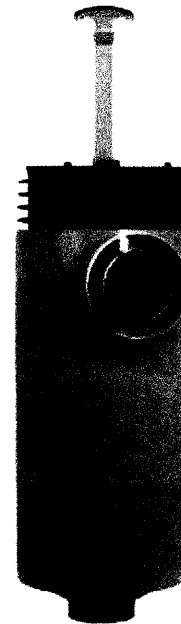
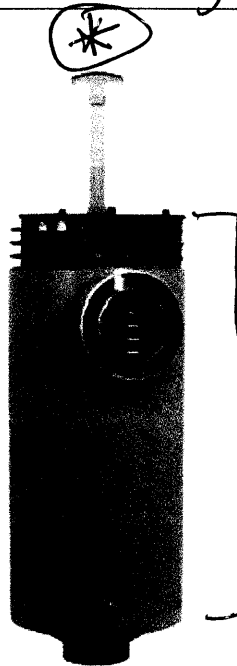
A-300, 8" Diameter
32" Long

ZABEL Filters



**OutdoorSmart
Filter Alarm**

All Polylok/Zabel
filters accept the
SmartFilter®
switch and alarm.



**A100 Filter 1/16" Filtration
8" and 12" Diameter**

This filter is ideal for larger homes, multi-family homes or light commercial settings where increased flows or higher quality effluent is required. The A100-8 Series is sized to handle flow rates from 1200 to 2400 GPD and is available in three different lengths. The A100-12 Series, installed in more locations than any other filter on the market, is sized to handle flow rates from 3000 to 6000 GPD. The A100-12 Series can be used in almost any application. Independent research has shown the A100-12 decreases TSS by 50-90% and CBOD⁵ by 20-40%. With 1/16" filtration, the A100-8 Series filter is available in 18", 26" and 32" lengths. The A100-12 Series filter is available in 20", 28" and 36" lengths.

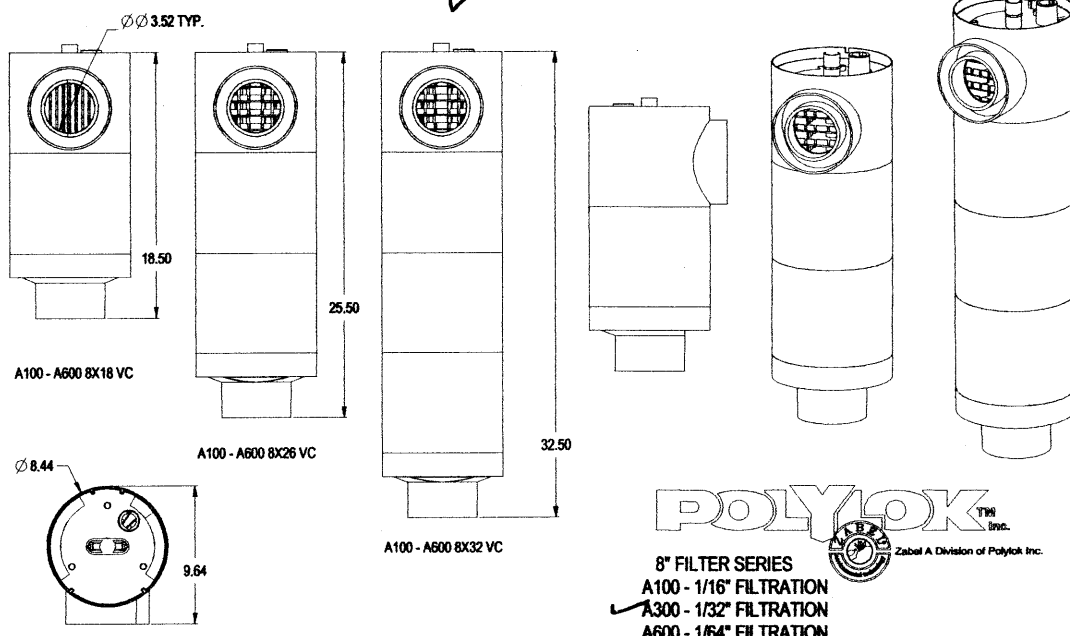
**A300 Filter 1/32" Filtration
8" and 12" Diameter**

The finer 1/32" level of filtration achieved with the A300-8 filter makes this the perfect effluent filter for small grease trap applications, dog kennels, laundromats and other applications where fine suspended solids are present. The A300 offers flow rates between 1200-2400 GPD. The A300-12 Series provides 1/32" filtration and has been shown to reduce FOG by as much as 50-98%. The A300-12 is also used for onsite wastewater systems which require a finer level of TSS removal. The A300-8 Series filter is available in 12", 26" and 32" lengths. The A300-12 Series filter is available in 20", 28" and 36" lengths.

**A600 Filter 1/64" Filtration
8" and 12" Diameter**

The A600 is ideal for specialty applications where very fine filtration is required and low flows are expected. Due to fine, 1/64" level filtration, every A600 comes equipped with a SmartFilter® switch and alarm. The SmartFilter® switch provides notification of required filter servicing through the use of both an audible and visual alarm. A minimum of a 3" drop is required in the tank for proper SmartFilter® operation. The A600-8 Series filter is available in 18", 26" and 32" lengths. The A600-12 Series is available in 20", 28" and 36" lengths.

ZABEL 8" CASES



ZABEL 8" FILTER SERIES

