

BRUNSWICK COUNTY HEALTH DEPARTMENT

DATE REC: 9-20-88

P.I.N.:

FILE NO: 88 / 2812

CHAPPELL CHRIS

60 00 23 004

REC. FROM

AMT. PD

TAX PARCEL

401 CLUB HOUSE DRIVE

SUPPLY

NC

28467

(919) 842-5940

ADDRESS

CITY

ST

ZIP

PHONE

CHANNEL SIDE CORP

LOCKWOOD HOLLOW

CURRENT PROPERTY OWNER

SUBDIVISION

LOT

BLK

SEC

SUPPLY

ON FRONT OF PROPERTY

PROPERTY LOCATED. TOWN/CITY/AREA/

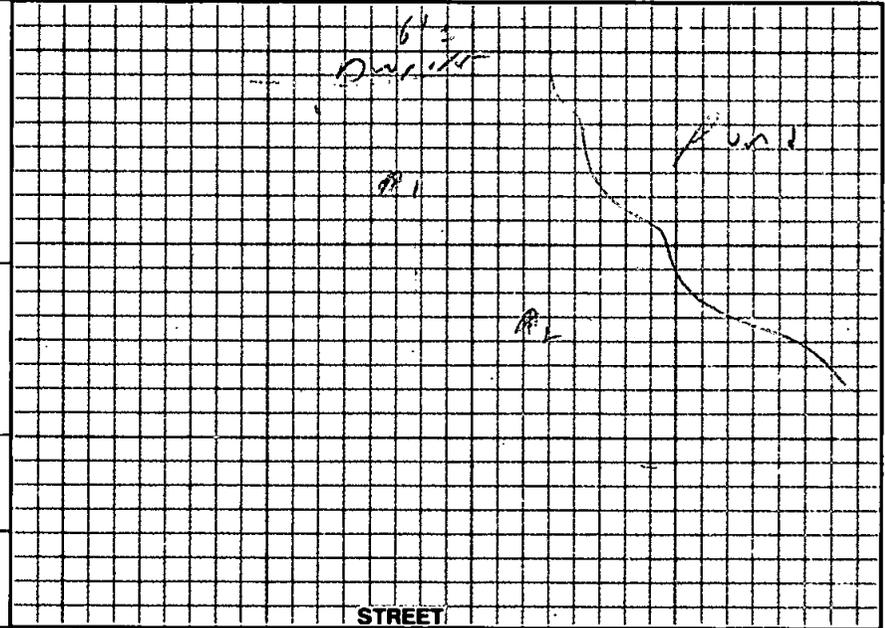
DIRECTIONS TO PROPERTY:

ON 18TH FAIRWAY

SITE EVALUATION REPORT

Diagram

FACTORS	A1	A2	A3
1) Slope/landscape position	S (PS) U	S (PS) U	
2) A. Soil Texture	I II III IV	I II III IV	
B. Soil Structure	S PS U	S PS U	
3) Soil Drainage (Wetness)	S (PS) U	S (PS) U	
4) Soil Depth	S PS U	S PS U	
5) Restrictive Horizon	S PS U	S PS U	
6) Available Space	S (PS) U	S (PS) U	



Soil Description			
	Area A1	Area A2	Area A3
A Horizon	0' - 10' sandy sand		
Bh Horizon			
B Horizon	10' - 40' yellow - red sandy sand		
C Horizon			

NOTES: Engineer's plan & specs to be followed in installing system. Note - Epic will be LPPD

Over all site classification: Suitable Provisionally suitable Unsuitable

See diagram above for location of soil borings and area location.

Evaluated by: MAC

VOID 30 DAYS FROM DATE OF ISSUANCE

Title: San Sys

Date: 9/30/88 GM

Re-evaluated by: _____ Date: _____ Reclassification: S PS U

NOTES: _____

Date Mailed: _____

Reclassification Code _____ Drainage _____ Fill _____ Alternative System _____ Other _____ SEE REVERSE SIDE OR ATTACHED

Improvement Permit/ Certificate of Completion/Operation Permit Existing System Repair Permit/File No. 88 2812

G.S. CHAPTER 130A ARTICLE 11, G.S. 130 A-333 et. Sec.

Permitted for: H MH Bus Multi-Family Trench bottom no deeper than: (18")

No. Units 3 No. Bedrooms 3 Size of Tank 1,900, 1-1500

No. Lines 3 Length ea. 100 Trench width 3

Water Supply: Private _____ Public

NOTE: ANY CHANGES IN THE NATURE AND VOLUME OF SEWAGE OR CHANGE IN LOCATION OF STRUCTURE WILL VOID PERMIT.

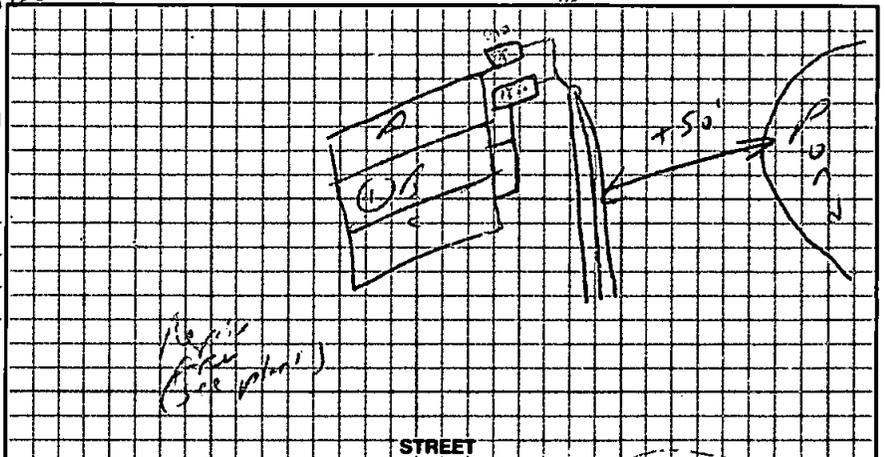
IMPROVEMENT PERMIT VOID 36 MONTHS FROM DATE OF ISSUANCE.

IMPROVEMENT PERMIT DATE: 9/30/88

Conditions: System to be installed and checked by Don Covil, P.E. Engineer before final approved by Health Dept.

By: Samuel M. Covil, P.E. SAN.

Permit Not Valid Unless Signed by Authorized Agent/Sanitarian



Installed by: Larry Cox This permit not to be altered except by authority of Health Department. Certificate of Completion/Operation Permit Approved by: Samuel M. Covil, P.E. SAN.

NOTE: See important information on reverse side. (Permit Not Valid Unless Signed by Authorized Agent/Sanitarian) Date: 11/19/88

Comments/ Conditions: _____

BCHD 04/88

HOUSTON AND ASSOCIATES, P.A.

Consulting Engineers

4918 Main Street Post Office Box 2927
Shallotte, North Carolina 28459 (919) 754-6324

JOB Lockwood Folly Villas WW

SHEET NO. _____ OF _____

CALCULATED BY Amc DATE 10/12/85

CHECKED BY _____ DATE _____

SCALE LTP Design for Bldg. # 1

Background

Since we show a LTP field as repair area for Bldg. # 1
Gang asked us to provide sufficient information documenting
that it can be used as such.

Size Pump Tank

$$Q = (3 \text{ units}) (3 \text{ RR/unit}) (120 \text{ GPD/RR}) = 1080 \text{ GPD}$$

$$\text{Vol Tank} = (4.17)(1080) + 500 = 1764 \text{ gal.}$$

⇒ Go with 2 - 900 gal sewage tanks piped together

Field Data

$$\text{Application Rate} = 0.6 \text{ GPD/1F}$$

$$\text{Size Field} = 1080 / 0.6 = 1,800 \text{ SF}$$

$$\text{Length of laterals} = 1,800 / 5 = 360 \text{ LF}$$

Om

10/12/88

THE CAPACITY OF 9 1.25 IN. LATERALS 40 FT. LONG IS 3.066406 CF

THE CAPACITY OF 1.5 INCH MANIFOLD 120 FT. LONG = 1.471875 CF.

THE DOSING FACTOR = 5 .

THIS ACTUALLY REPRESENTS THE SIZE + LENGTH OF DOSING MAIN WHICH WOULD DRAIN.

THE DOSING VOL. PER PUMPING CYCLE = 22.69141 CF 169.7317 GAL.

THE DESIGN FLOWRATE WITH 5 MINUTE DOSE = 33.94634 GPM

THE NUMBER OF DOSES PER DAY = 6.362983

THE FLOWRATE OUT OF EACH ORIFICE AT 3' HEAD = .498369 GPM

THE TOTAL NUMBER OF ORIFICES REQUIRED = 68.11488

THE SPACING OF .15625 INCH HOLES IS 5.285189 FEET

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4918 Main Street Post Office Box 2927

Shallotte, North Carolina 28459 (919) 754-6324

JOB _____

SHEET NO. _____ OF _____

CALCULATED BY Am DATE 10/12

CHECKED BY _____ DATE _____

SCALE _____

PUMP SELECTION

System Head Curve

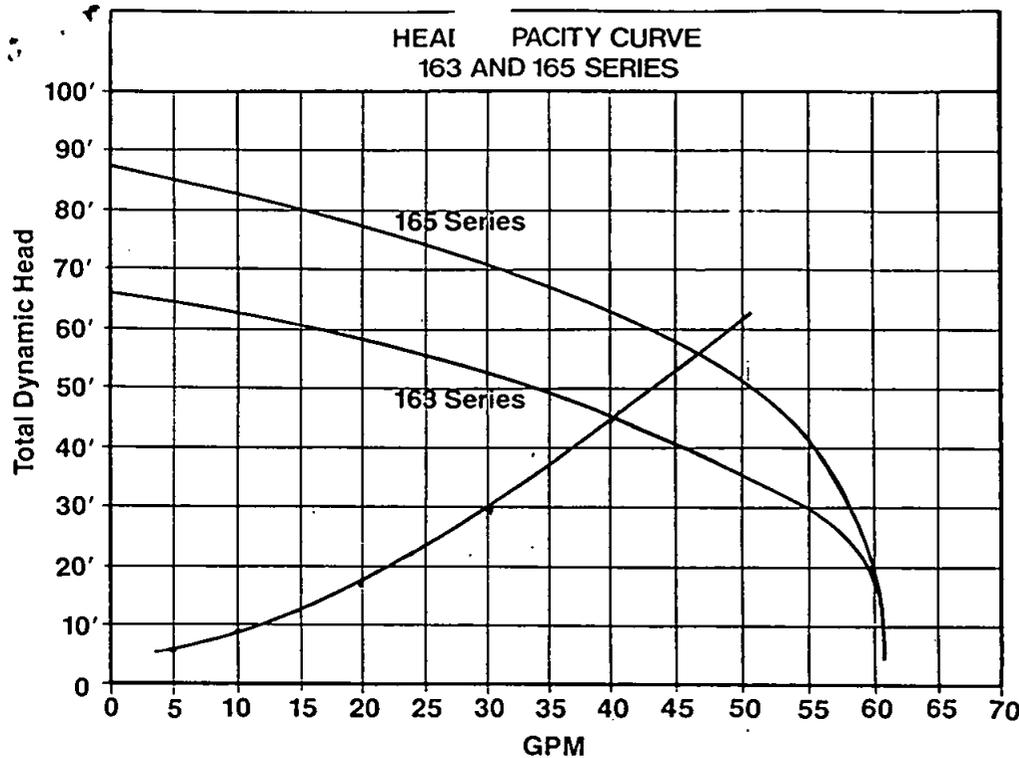
Length of Dosing Main \approx 160'

SIZE of Dosing Main = 1.5"

<u>Q</u>	<u>Static Head</u>	* <u>Friction Head</u>	<u>Total Head</u>
5	6'	0.0	6
10		3.0	9
20		11	17
30		23	30
40	↓	39	45

GO WITH E 163 ZOEGLER. (SEE CURVES NEXT CHG.)

* Based on Hazen "program" (Consider minor losses)



Total Dynamic Head/ Capacity Per Minute					
Series		163		165	
Ft	M	Gal	Ltrs	Gal	Ltrs
5	1.52	61	231	61	231
10	3.05	61	231	61	231
15	4.57	60	227	60	227
20	6.10	59	223	60	227
25	7.62	57	216	59	223
30	9.14	55	208	58	220
35	10.67	50	189	57	216
40	12.19	46	174	55	206
45	13.70	40	151	54	204
50	15.24	33	125	51	193
55	16.76	25	95	48	182
60	18.29	15	57	43	163
65	19.80			37	140
70	21.34			30	114
75	22.86			22	83
80	24.38			14	53
LOCK VALVE		66'		87'	

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.
- Combination starters are available.
- Mercury float switches are available for controlling single and three phase systems.
- Double piggyback mercury float switches are available for variable level long cycle controls.
- Long cords are available in lengths of 25 - 35 - 50 feet.
- Over 130°F. (54°C.) special quotation required.

SINGLE AND THREE PHASE UNITS

163 Series						
Cast Iron	Volts-Phase		Wt.	H.P.	Amps	Cord Length
M163	115-1Ph	Automatic	75	1/2	14.0	20 ft.
N163	115-1Ph	Non-Auto.	75	1/2	14.0	20 ft.
D163	230-1Ph	Automatic	75	1/2	7.0	20 ft.
E163	230-1Ph	Non-Auto.	75	1/2	7.0	20 ft.
E163	230-3Ph	Non-Auto.	75	1/2	13.0	20 ft.
H163	200/208-1Ph	Automatic	75	1/2	8.2	20 ft.
I163	200/208-1Ph	Non-Auto.	75	1/2	8.2	20 ft.
J163	200/208-3Ph	Non-Auto.	75	1/2	8.2	20 ft.
G163	460-3Ph	Non-Auto.	75	1/2	11.5	20 ft.

165 Series						
Cast Iron	Volts-Phase		Wt.	H.P.	Amps	Cord Length
D165	230-1Ph	Automatic	80	1	9.0	20 ft.
E165	230-1Ph	Non-Auto.	80	1	9.0	20 ft.
E165	230-3Ph	Non-Auto.	80	1	9.0	20 ft.
H165	200/208-1Ph	Automatic	80	1	10.7	20 ft.
I165	200/208-1Ph	Non-Auto.	80	1	10.7	20 ft.
J165	200/208-3Ph	Non-Auto.	80	1	10.7	20 ft.
G165	460-3Ph	Non-Auto.	80	1	13.3	20 ft.

Single phase 1 H.P. units are controlled by a float switch through a relay enclosed in the switch case. Three phase units require a control switch to operate an external magnetic or combination starter.

For information on additional Zoeller products refer to catalog on Combination Starter, FM-514; Piggyback Mercury Float Switches, FM-477; Electrical Alternator, FM-486; Mechanical Alternator, FM-495; Alarm Package, FM-513; and Sump/Sewage Basins, FM-487.

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

RESERVE POWERED DESIGN

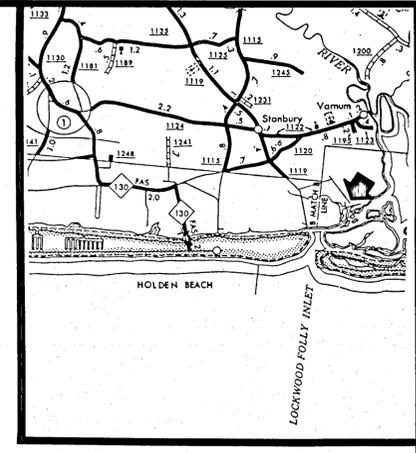
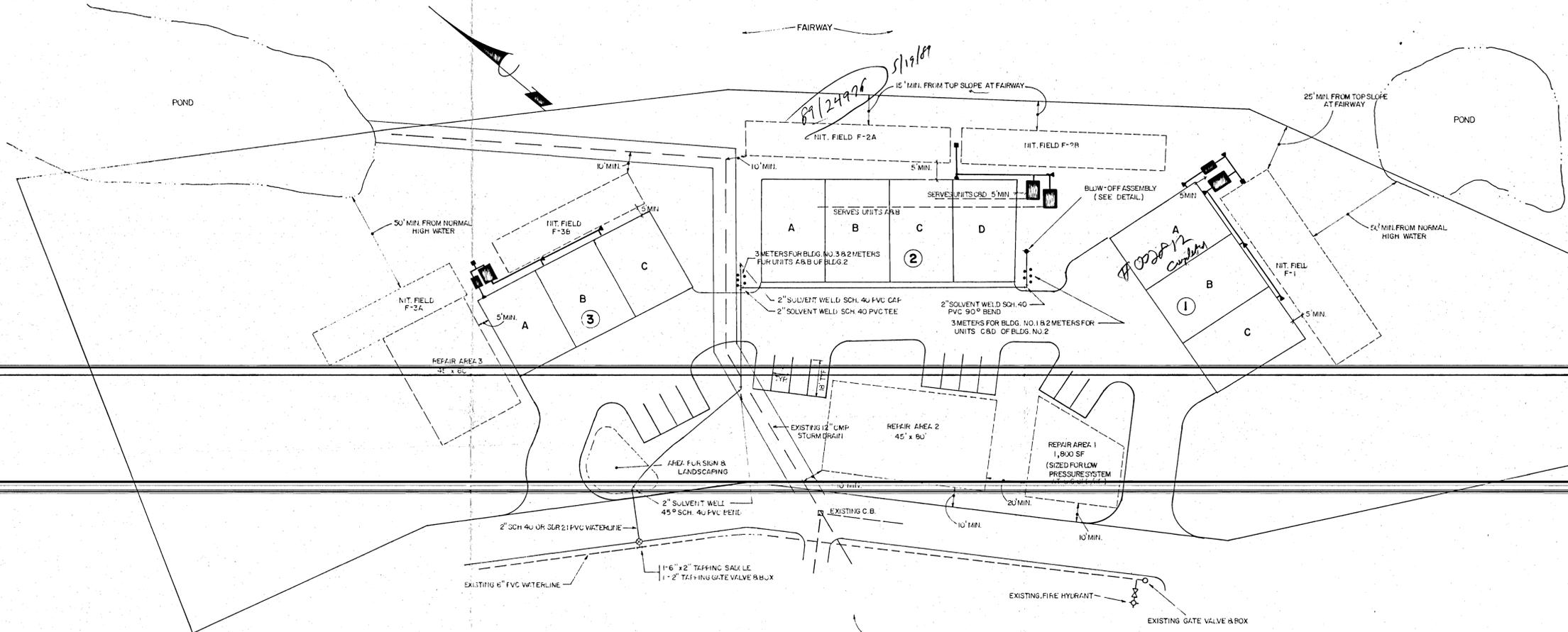
For unusual conditions a reserve safety factor is an engineered/design part of every Zoeller pump.



3280 Old Millers Lane
P.O. Box 16347
Louisville, Kentucky 40216
(502) 778-2731

Manufacturers of ...

"QUALITY PUMPS SINCE 1939"



- LEGEND:**
- 1,500 GALLON NCDHS APPROVED SEPTIC TANK
 - 900
 - CLEANOUT
 - DISTRIBUTION BOX

SITE PLAN
SCALE: 1" = 30'

DESIGN DATA AND NOTES FOR SEPTIC TANK SYSTEMS

THREE UNIT BUILDING

Design Flow: (3 units) x (3 br/unit) x (120 gpd/br) = 1,080 gpd

Septic Tanks: Using 2 tanks per building gives 2 units for one tank and 1 unit for the other tank.

Use 1,500 gal tank to serve the 2 units. (See the FOUR UNIT BUILDING notes.)
Use 900 gal tank for the other unit.

Nitrification Field and Repair Area:

Application rate = 1.2 gpd/sf

Total trench area = (1,080 gpd) / (1.2 gpd per sf) = 900 sf

Length of Trench = (900 sf of trench) / (3 ft/trench) = 300 ft

FOUR UNIT BUILDING

Design Flow: (4 units) x (3 br/unit) x (120 gpd/br) = 1,440 gpd

Septic Tanks: Using 2 tanks per building gives 2 units/tank. 2 units/tank yields 6 br/tank or 720 gpd design flow.

Min. tank size = (1.17) x (720 gpd) + 500 = 1,342 gal.

Use two 1,500 gal tanks for each 4-unit building.

Nitrification Field and Repair Area:

Application rate = 1.2 gpd/sf

Total trench area = (1,440 gpd) / (1.2 gpd per sf) = 1,200 sf

Length of Trench = (1,200 sf of trench) / (3 ft/trench) = 400 ft

GENERAL NOTES FOR SEPTIC TANK SYSTEMS

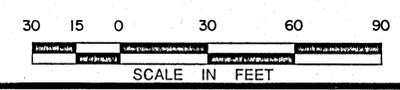
1. All sewage treatment and disposal system components shall be a minimum of ten (10) feet from waterlines. Wells shall be located no closer than one hundred (100) feet from the wastewater system.
2. All construction work shall be performed in accordance with accepted good commercial practices, the Brunswick County Health Department and any other applicable State or Local requirements.
3. All pipe shall be in accordance with ASTM standards.
4. All wastewater service lines shall be laid in accordance with N.C. State Building Code, Volume II-Plumbing of latest revision.
5. Care should be taken during installation of pipe to preclude the entrance of any sand or other foreign material into the pipe.
6. All septic tanks shall have North Carolina Division of Health Services approval.
7. Septic tanks and nitrification fields shall be separated a minimum of 5 feet from building foundations.
8. The septic tank shall be installed on a level, firm foundation. Where soft soils are encountered, a 6 inch compacted bed of sand or gravel shall be placed and leveled prior to tank installation.
9. Sanitary tee(s) must extend downward 25% of the liquid depth of the septic tank. Sanitary tee(s) shall be precast into the tank or Schedule 40 PVC.
10. Prior to backfilling, the contractor shall fill the septic tank with water to insure no outflow of liquid prior to acceptance by client. This leak test shall be a 24-hour test.
11. Recommended pipe assembly parameters for pipe and fittings: 1. All pipe and fittings shall be installed with a secondary along all seams, with two (2) coats "Sure Wall" or comparable material. The number of tank sections should be minimized.
12. The ground or slab around the septic tank shall be graded to divert surface runoff away from tank.
13. The septic tank shall be set at an elevation necessary to accommodate the building drain assuming a minimum slope of 1%.
14. The clearing and grubbing of site specific wooded areas may be required for proper installation of the septic tanks and fields. The Contractor shall stake out all septic tank and field areas prior to starting construction. Mr. Chris Chappell, General Manager of Lockwood Folly Golf Links, shall be notified following field location activities. All conflicts relative to tree removal shall be resolved to the satisfaction of Mr. Chris Chappell and the Brunswick County Health Department prior to the beginning of construction.
15. Finished grades over nitrification field areas shall be sloped to avoid ponding of water. Following final grading, the field shall be seeded to establish suitable grass cover.
16. The repair area shall remain free of permanent construction including impervious surfaces for future use, if needed.
17. No vehicles or heavy equipment shall be allowed on the drain fields.
18. The design engineer or his agent must inspect this system and certify its installation according to the approved plans and specifications prior to the final approval by the Brunswick County Health Department.
19. Any deviation from these plans, specifications, materials, layout, etc., shall be approved by the Brunswick County Health Department and the Engineer in advance of installation. Failure to do so may result in delay or disapproval of system construction.

SPECIAL NOTE: Channel Side Corporation shall provide the legal documentation necessary for septic tank system construction, operation and maintenance in compliance with the requirements of the Brunswick County Health Department. This documentation shall include but not necessarily be limited to:

1. Easements as may be required to keep septic tank system components at least ten (10) feet away from property lines outside of which the Owners of the system have "insufficient" legal rights to properly operate and maintain said system.
2. Homeowners agreements whereby the means is guaranteed for proper septic tank system operation and maintenance where said system is in common ownership and/or use.

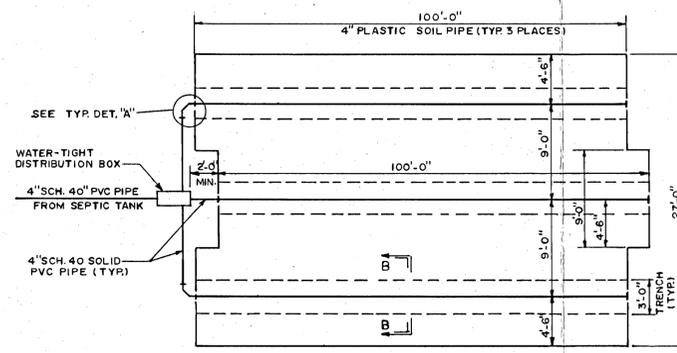
BASE INFORMATION PROVIDED BY CLIENT.

SURVEY INFORMATION PROVIDED BY ALLEN SURVEYING, SHALLOTTE, NORTH CAROLINA



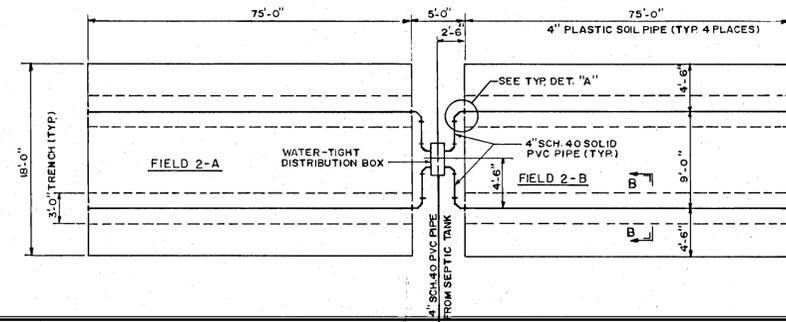
WATER AND WASTEWATER SYSTEM
 OR
 LOCKWOOD FOLLY VILLAS
 BRUNSWICK COUNTY, NORTH CAROLINA

HOUSTON AND ASSOCIATES, P.A.
 CONSULTING ENGINEERS
 SHALLOTTE, NORTH CAROLINA 28459
 919/754-6324
 POST OFFICE BOX 2827



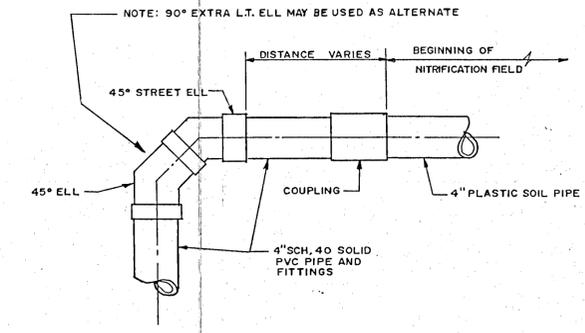
SOLID PIPE BETWEEN DISTRIBUTION BOX & SOIL PIPE SHALL BE LAID AT A MIN. OF 2% (2-1/2" PER 10') CONTINUOUS SLOPE.

**3 TRENCH NITRIFICATION FIELD
FIELD F-1 (3 UNIT BLDG.)**

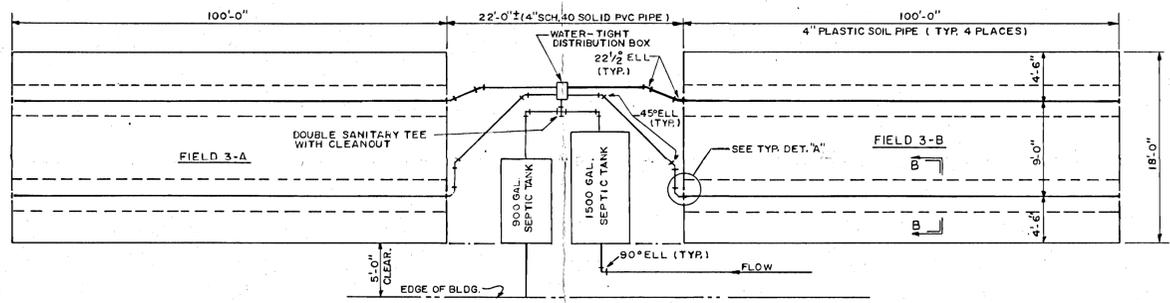


SOLID PIPE BETWEEN DISTRIBUTION BOX & SOIL PIPE SHALL BE LAID AT A MIN. OF 2% (2-1/2" PER 10') CONTINUOUS SLOPE.

**4 TRENCH NITRIFICATION FIELD
FIELD F-2 (4 UNIT BLDG.)**



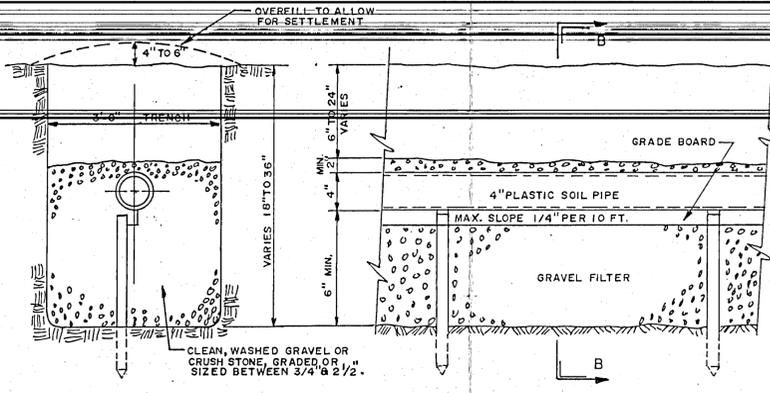
TYPICAL BEND DETAIL "A"



SOLID PIPE BETWEEN DISTRIBUTION BOX & SOIL PIPE SHALL BE LAID AT A MIN. OF 2% (2-1/2" PER 10') CONTINUOUS SLOPE.

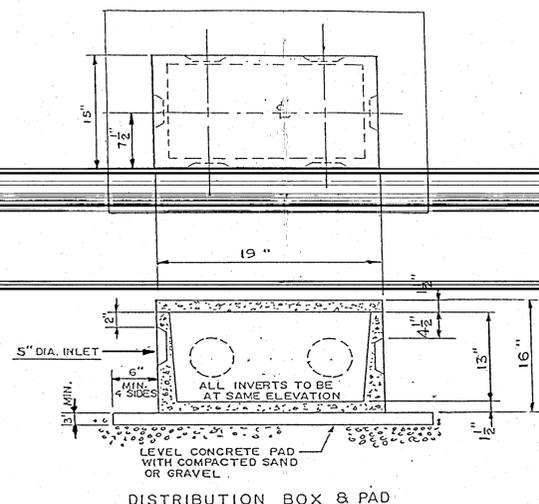
**4 TRENCH NITRIFICATION FIELD
FIELD F-3 (3 UNIT BLDG.)**

*Checked by
D/S
04
5/18/84*



DRAIN LINE DETAIL
SECT. "B-B"

DRAIN LINE DETAIL
SIDE VIEW



DISTRIBUTION BOX & PAD

Note: Precast 5-hole distribution box by Stay-Right Tank Company of Raleigh is illustrated. Equal precast boxes by other manufacturers will be acceptable if approved by the Brunswick County Health Department. Cast-in-Place, block, or brick boxes may be used upon approval by the engineer and Brunswick County Health Department.