

LAYOUT \_\_\_\_\_ INSP 4 \_\_\_\_\_  
INSP 2 \_\_\_\_\_ INSP 5 \_\_\_\_\_  
INSP 3 \_\_\_\_\_ INSP 6 \_\_\_\_\_

ISSUE DATE: 9/28/06

APPROVAL DATE: 10/30/06

P 525579

A 59207

**PERMIT**  
**INDEXED**  
**SANDMOUND SYSTEM**  
**ON-SITE SEWAGE DISPOSAL SYSTEM**  
**HOWARD COUNTY HEALTH DEPARTMENT**  
**BUREAU OF ENVIRONMENTAL HEALTH**  
**TAX ID # 04-328140**

Trinity Homes IS PERMITTED TO INSTALL  ALTER

ADDRESS: 3675 Park Avenue, Ellicott City 21042 PHONE NUMBER: 410-480-0023

SUBDIVISION: The Chase at Stonybrook Pres. Parcel A.

ADDRESS: 1815 Woodbine Rd. PROPERTY OWNER: Trinity Homes

SEPTIC TANK CAPACITY (GALLONS): 1250 OUTLET BAFFLE FILTER REQUIRED

PUMP CHAMBER CAPACITY (GALLONS): 1250 COMPARTMENTED TANK REQUIRED

NUMBER OF BEDROOMS: 4 DUAL MANHOLE ACCESS TO SEPTIC TANK REQUIRED

LOCATION:	Install as per approved plan. Mound site must be staked per plan prior to start of installation.
NOTES:	No Heavy equipment is to be on or around the mound site. A skid steer or bobcat loader should be used to place the sand.

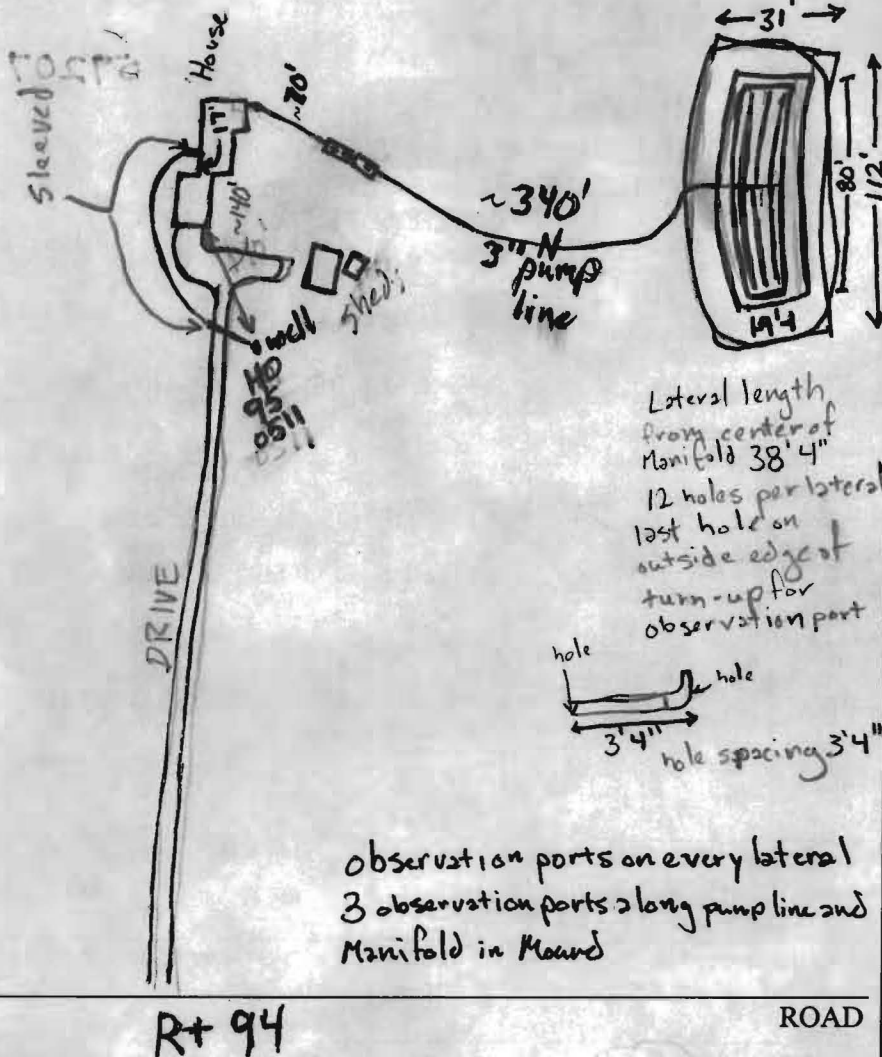
PLANS APPROVED: Gabriel Creighton/ **GAC** DATE: 9/22/06

NOTES: PERMIT VOID AFTER 2 YEARS  
CONTRACTOR IS RESPONSIBLE FOR SCHEDULING A PRE-CONSTRUCTION INSPECTION FOR ALL INSTALLATIONS  
WATERTIGHT SEPTIC TANKS REQUIRED  
ALL PARTS OF SEPTIC SYSTEM SHALL BE 100 FEET FROM ANY WATER WELL UNLESS SPECIFICALLY AUTHORIZED  
MANHOLE RISERS REQUIRED ON ALL SEPTIC TANKS AND PUMP CHAMBERS UNLESS SPECIFICALLY AUTHORIZED  
CONTRACTOR RESPONSIBLE FOR COMPLIANCE WITH APPLICABLE REGULATIONS, GUIDELINES AND THE TERMS OF THIS PERMIT

**NEITHER THE HOWARD COUNTY COUNCIL NOR THE HEALTH DEPARTMENT IS RESPONSIBLE FOR THE SUCCESSFUL OPERATION OF ANY SYSTEM PERMITTEE RESPONSIBLE FOR OBTAINING FINAL APPROVAL ON THIS PERMIT CALL 410-313-2640 FOR INSPECTION OF SEPTIC SYSTEM**

P 525579

NOT TO SCALE



**SEPTIC TANK -**

Level Yes  
 Capacity 1500 Gal  
 Seam Loc Top  
 Tank Lid Depth ~6"  
 Baffles Yes 4  
 Baffle Filter Yes 4" 2able  
 Manhole Loc Both (Inlet & Outlet)  
 Watertight Test N/A

**DOSING CHAMBER**

Tank Level Yes  
 Capacity 1500 Gal  
 Seam Location Top  
 Tank Lid Depth 20"  
 Manhole Location Outlet  
 Water Tight Test N/A

**FLOAT SETTINGS (below grade)**

Low Off 1 70"  
 Low On 2 64"  
 High On 3 48"  
 Alarm 4 44"  
 Dose Volume 374 gallons or 50 cuts

**SAND MOUND I**

Bed Length 80' Curved  
 Bed Width 9-10  
 Bed Area 760 sq ft  
 Mound Length 112' ETE  
 Mound Width 31' ETE  
 Mound Area 3472 sq. ft  
 Basal Area 3472 sq. ft

PRE-CONSTRUCTION 10/13/06 Layout. Site staked, area fenced off, obvious contour discrepancy w/ the approved plan. Put on hold until resolved. Eng. to resubmit revised plan w/ better topo. GAC

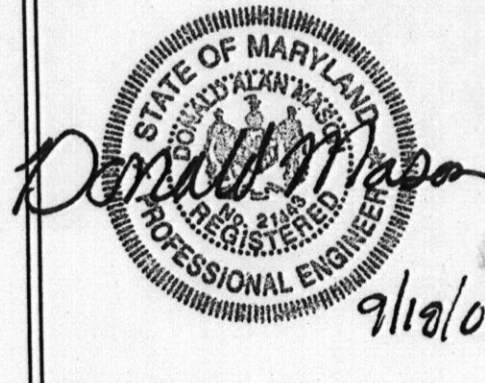
INSTALLATION 10/23/06 layout. Plans ok. Contractor ok to start plowing etc. 10/24 site plowed, majority of pump line laid, no sand as of yet. 10/24/06. Bed/Mound site plowed sand arriving. 10/25/06 Mound mostly done, tanks installed, pump set, WPL OK. 10/26/06 Bed and laterals installed, pump test done and ok. OK to cover, cap and cover mound. 10/30/06 Mound covered, capped, seeded. GAC

FINAL INSPECTOR [Signature] DATE OF APPROVAL 10/30/06

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Approved Septic System Plan  
Howard County Health Department  
Signature: [Signature] Date: 9/22/06

**BENCHMARK ENGINEERING, INC.**  
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3480 BALTIMORE NATIONAL PIKE • SUITE 418  
ELLCOTT CITY, MARYLAND 21043  
phone: 410-465-6105 • fax: 410-465-6644  
www.bvl-engineering.com



9/11/06

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OWNER/DEVELOPER: TRINITY QUALITY HOMES, INC.  
3675 PARK AVENUE SUITE 301  
ELLCOTT CITY, MD 21043  
410-480-0023

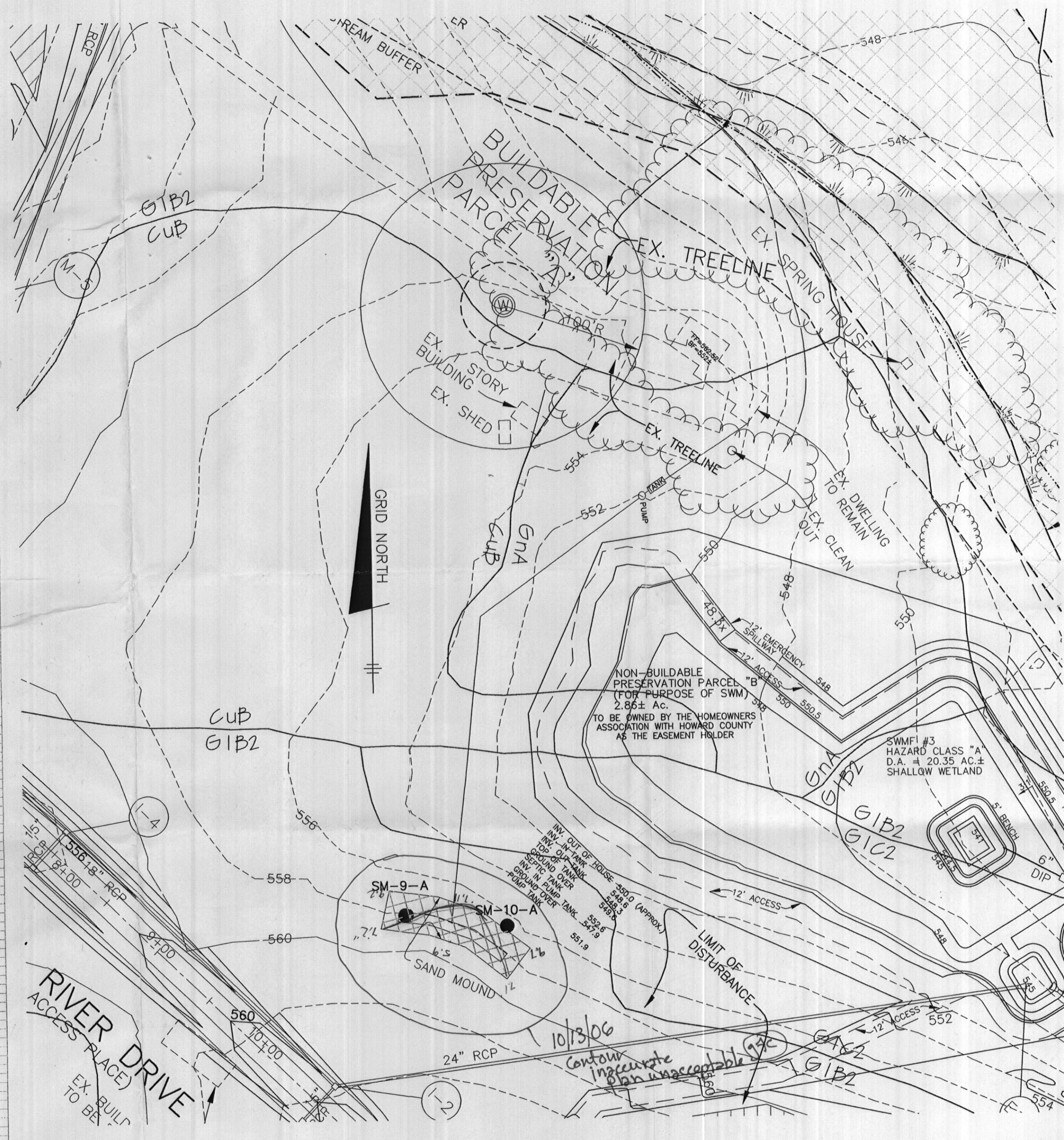
PROJECT: THE CHASE AT STONEY BROOK  
LOTS 1-20, PRESERVATION PARCEL "A" AND NON-BUILDABLE PRESERVATION PARCELS "B" THROUGH "D"

LOCATION: TAX MAP No. 7, BLOCK No. 17, PARCEL No. 133  
4th ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND

TITLE: SAND MOUND DESIGN PRESERVATION PARCEL A

DATE: SEPTEMBER, 2006 PROJECT NO. 1187

DES: JMC DRAFT: JMC CHECK: DAM SCALE: 1" = 50' SHEET 1 OF 2



**Distribution Network Design**

Manifold Design:  
Bed Length = 80 feet  
Manifold Location = Center

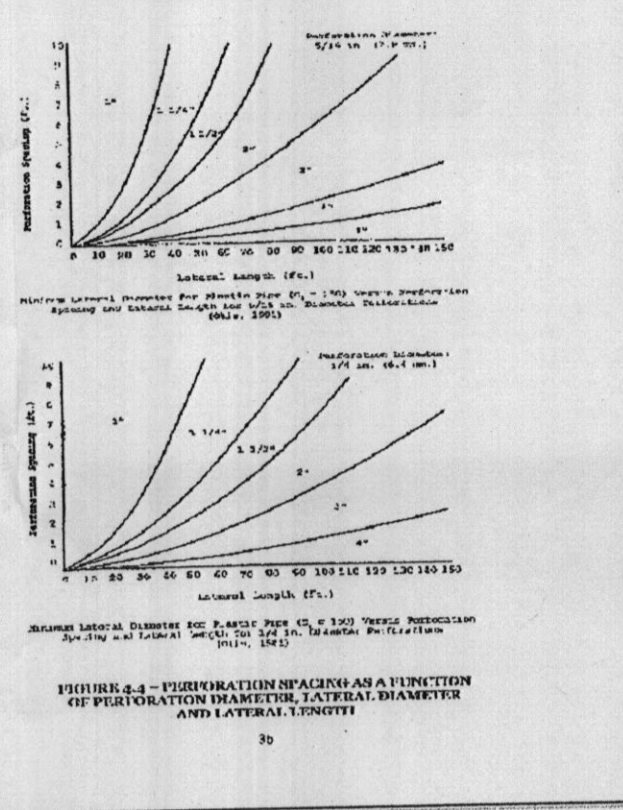
Perforations:  
Center Feed? Yes End Feed? No  
Bed Length = 80 feet Bed Length = N/A feet  
Perforation Spacing = 3.6 feet Perforation Spacing = N/A feet  
Lateral Length = 38.4 feet Lateral Length = N/A feet

Number of Perf = 11,428.57 Number of Perf = 0  
Use # perf = 12 Use # perf =

Design spacing = 3.33 feet Design spacing =

Perf. Diameter = 5/16 inch Options are 5/16 inch or 1/4 inch. 5/16 inch perforated

Determine Lateral Diameter from Figure 4.4 of the Design and Construction Manual for Sand Mound Systems



Lateral Diameter is the curve at the intersection of lateral length and perforation spacing:  
Lateral Diameter = 1.5 inches  
Lateral spacing between 2 and 4 feet

Bed Width = 7.60 feet  
# of Laterals = 3  
Lateral Spacing = 2.5 feet okay  
Diameter of Manifold = 3 inches

**Pumping Station**  
Diameter of Force Main and Manifold = 3 inches of SDR 21 pipe  
Length of Force Main = 364 feet SDR 21 gallons/100 feet = 40.9 Table 4.2  
Length of Manifold = 7.60 feet SDR 21 gallons/100 feet = 12.1 Table 4.2  
Length of Main and Manifold = 361.60

Length of Laterals = 230.4 feet of 1.5 inch pipe  
Volume of Main and Manifold = 147.9 gallons  
Volume of Laterals = 27.9 gallons  
Total Volume = 175.7 gallons  
Minimum Dose must be greater than 1/6 of the design flow 100 gallons  
Minimum Dose must be greater than the volume of the main, manifold and five times the lateral 287 gallons  
Use minimum dose of 300 gallons okay

**Size Pump Chamber**  
Pump chamber must be able to hold one dose and one days design flow  
One day Capacity = 600 gallons  
Dose = 300 gallons  
Totals = 900 gallons

Use 2,000 gallon pump tank (originally tried 1,000 and 1,600 gallon tanks but inlet elevation above top of tank)  
Tank Dimensions: Exterior Length: 13.75 feet Interior Length: 13.08 feet Walls: 0.33 feet  
Width: 6.25 feet Width: 4.75 feet Top: 0.33 feet  
Height: 6.42 feet Height: 4.75 feet Bottom: 0.42 feet  
Area: 73.06 sq ft Area: 347.22 sq ft Inlet: 4.68 feet  
Volume: 347.22 cf

**Sizing the Pump**  
Flow: 1.63 gpm for 5/16 inch perforations  
1.28 gpm for 1/4 inch perforations  
Flow = number of perforations times flow rate  
Flow = 117.36 gpm

**Design Head**  
Design Head = Static Head + Friction Head + Distal End Head  
Static Head = highest elevation of main - pump off elevation = 660.43 highest corner of system + sand + bed depth  
Highest component of system = 646.48  
Pump off elevation = 14.95 feet  
Static Head = 14.95 feet  
Friction Head = Head loss due to pipe friction  
9" pipe = 354 feet  
Manifold = 3 feet  
45' bends = 3 losses for bend 18 feet per table 4.3  
90' Tee = 1 loss for tee 15 feet per table 4.3  
Equivalent Length = 360 Friction loss = 8.16 feet  
1.6" lateral = 38.4 feet Friction loss = 0.84 feet  
Total Friction Head = 9.10  
Distal End Head = 2 feet  
Design Head = 28.05 feet

**Pump Requirements**  
Performance = 117.36 gpm  
Head of Water = 28.05 feet of head

**Pump Selection**  
Goulds Pumps Model 3885 VVE Series, Order Number VVE1512H  
1.5 horse power 230 Volts (Single Phase) 16.7 Amps 3500 RPM  
www.goulds.com

**Design Pump Chamber**  
Ground over Tank = 661.90  
Top of Tank = 648.73  
Invert of Tank = 543.64  
6" Reser = 0.50 feet  
16" Pump = 1.33 feet  
Pump off = 648.48  
Dose = 40.1 cf  
Area of Pit = 73.05 sq ft  
Pump on dist. = 0.65  
Pump on Elev. = 648.03  
Distance between Pump on and Highwater Alarm = 0.6 feet  
Highwater Alarm Elevation = 648.53  
High Water Alarm to Inlet = 1.10  
Inlet Elev. = 647.62  
Tank Inlet = 647.89 okay

**EQUATIONS FOR CALCULATING SAND MOUND DIMENSIONS FROM DESIGN AND CONSTRUCTION MANUAL FOR SAND MOUND SYSTEMS**

TABLE 3.1

% slope = 7.7% or 0.077 ft./ft.  
Upslope correction factor = 0.8 see Table 3.2 below  
Downslope correction factor = 1.32 see Table 3.2 below  
Absorption rate = 1.6 gpm/ft.  
Number of Bedrooms = 4  
Design Flow = 600 gpd (150 gpd/bedroom)  
Depth to water table (Z) = 36 in. (min.)  
Absorption bed E<sup>2</sup> (A x B) = Design Flow / Absorption rate = 600 E<sup>2</sup>  
Bed length (B) = 80 ft. (42 ft. to 104 ft. dependent on site)  
Bed width (A) = Absorption bed E<sup>2</sup> = 7.50 ft. (12 ft. or less)  
Upslope sand fill depth (S) = 48 in. = 12 in. (12 in. min.)  
Down slope sand fill depth (S) = 12 A x % slope + D in. = 18.93 in.  
Cap + topsoil at bed center (H) = 18 in.  
Cap + topsoil at bed edge (G) = 12 in.  
Total bed depth (D) = (H + G) / 2 + S = 33.46 in. or 2.79 ft.  
Sideslope setback (K) = (D + E) / 2 + 28 in. = 33.46 in. or 2.79 ft.  
Upslope setback (L) = (22 in. + D) x 3 + upslope corr. factor = 81.60 in. or 6.80 ft.  
Downslope setback (M) = (22 in. + E) x 3 + downslope corr. factor = 162.08 in. or 13.51 ft.  
Total width of mound (W) = 12A + J + I = 333.68 in. or 27.81 ft.  
Total length of mound (L) = 12B + K + K = 1220.78 in. or 101.73 ft.  
area = 2,829 sq. ft.

**Basal Area Required:**  
test time per BA = 22 min./inch  
test time per 10A = 40 min./inch  
Per section 3.2.15 of the Design and Construction Manual for Sand Mound Systems there is no additional basal area requirement as the test times are less than 45 minutes per inch.

TABLE 3.2  
Downslope and upslope correction factors for sand mounds on sloping sites

Slope %	Downslope Correction Factor	Upslope Correction Factor
0	1.00	1.00
2	1.06	0.94
4	1.14	0.89
6	1.22	0.86
8	1.32	0.80
10	1.44	0.77
12	1.57	0.73

**Waste Water Flows**

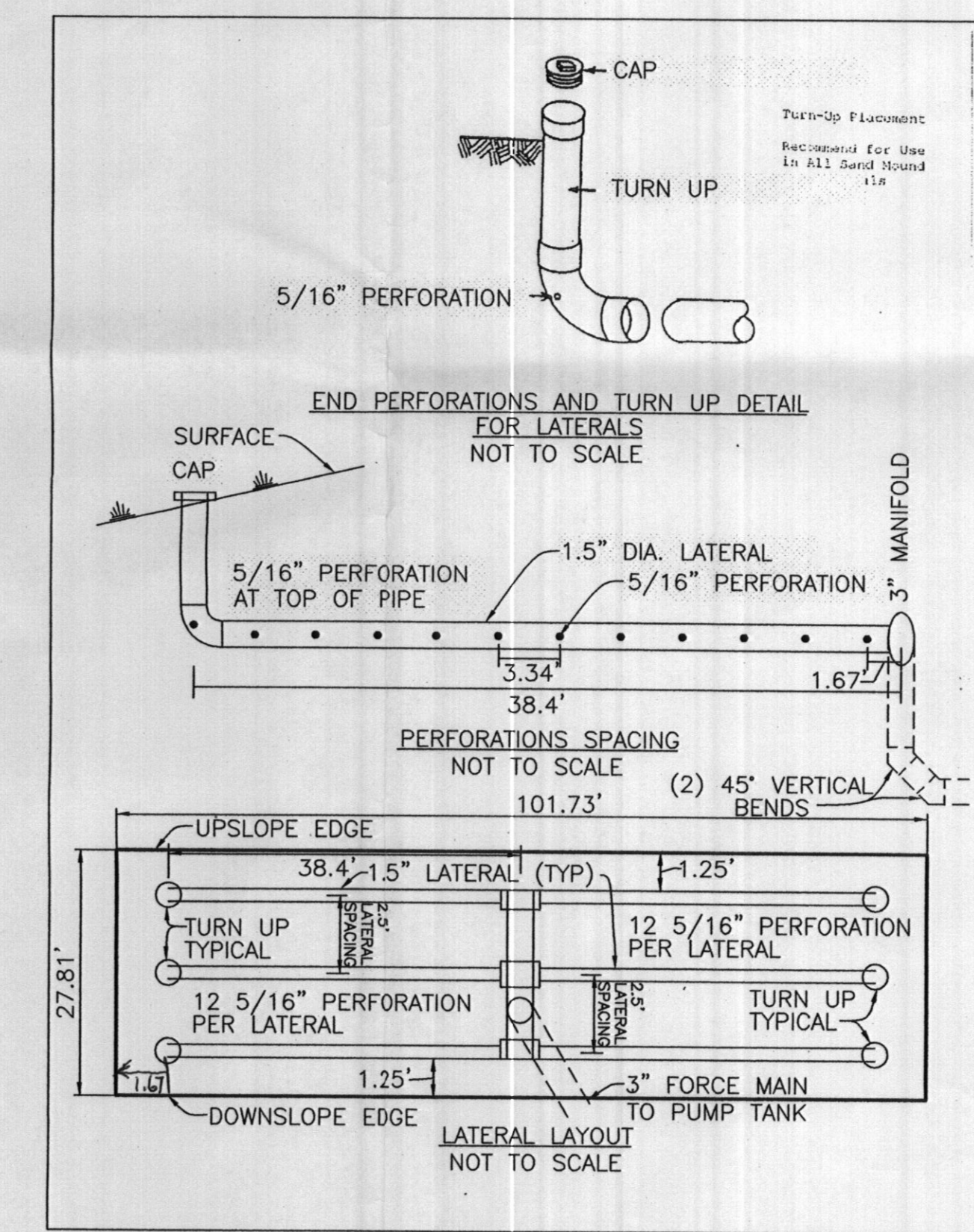
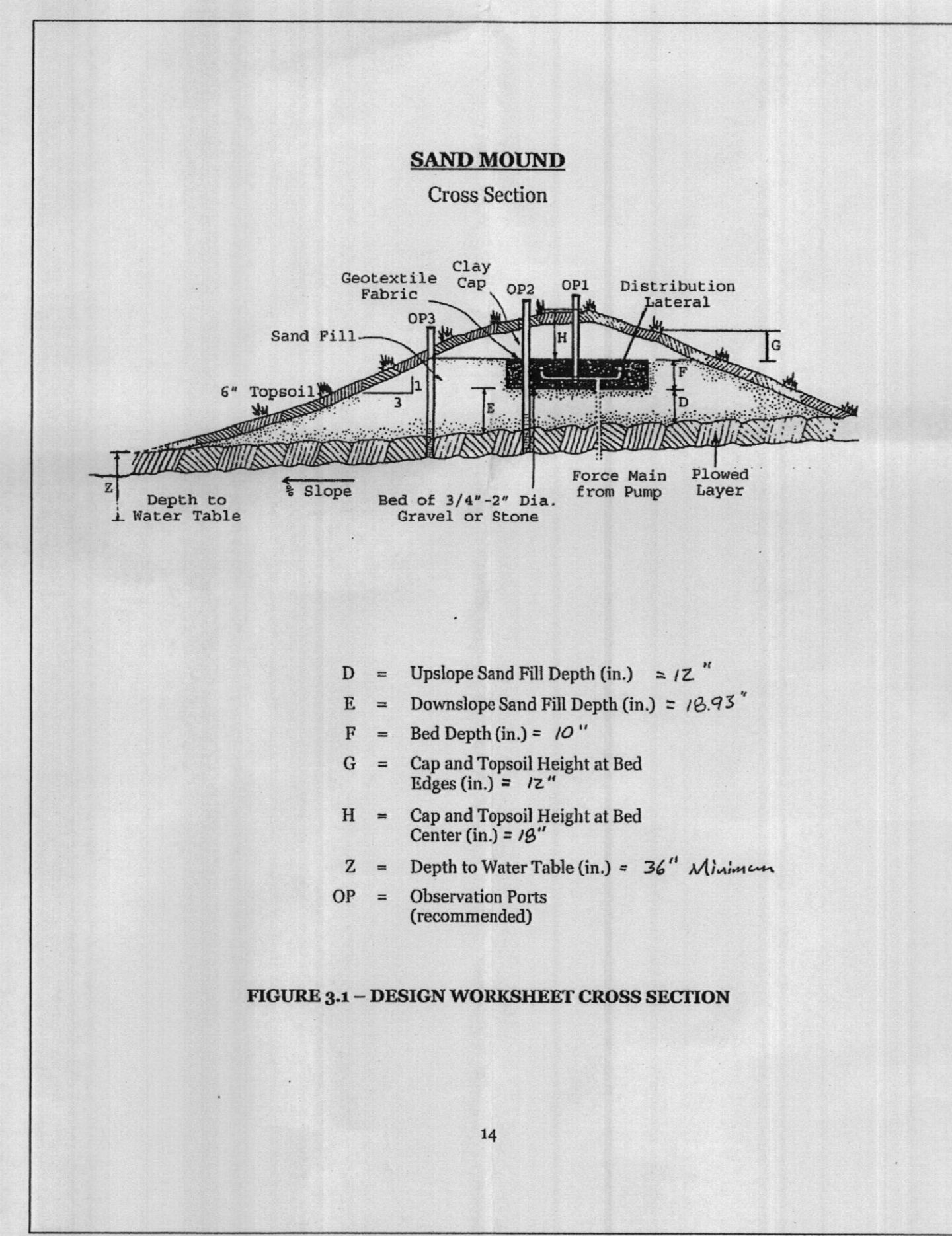
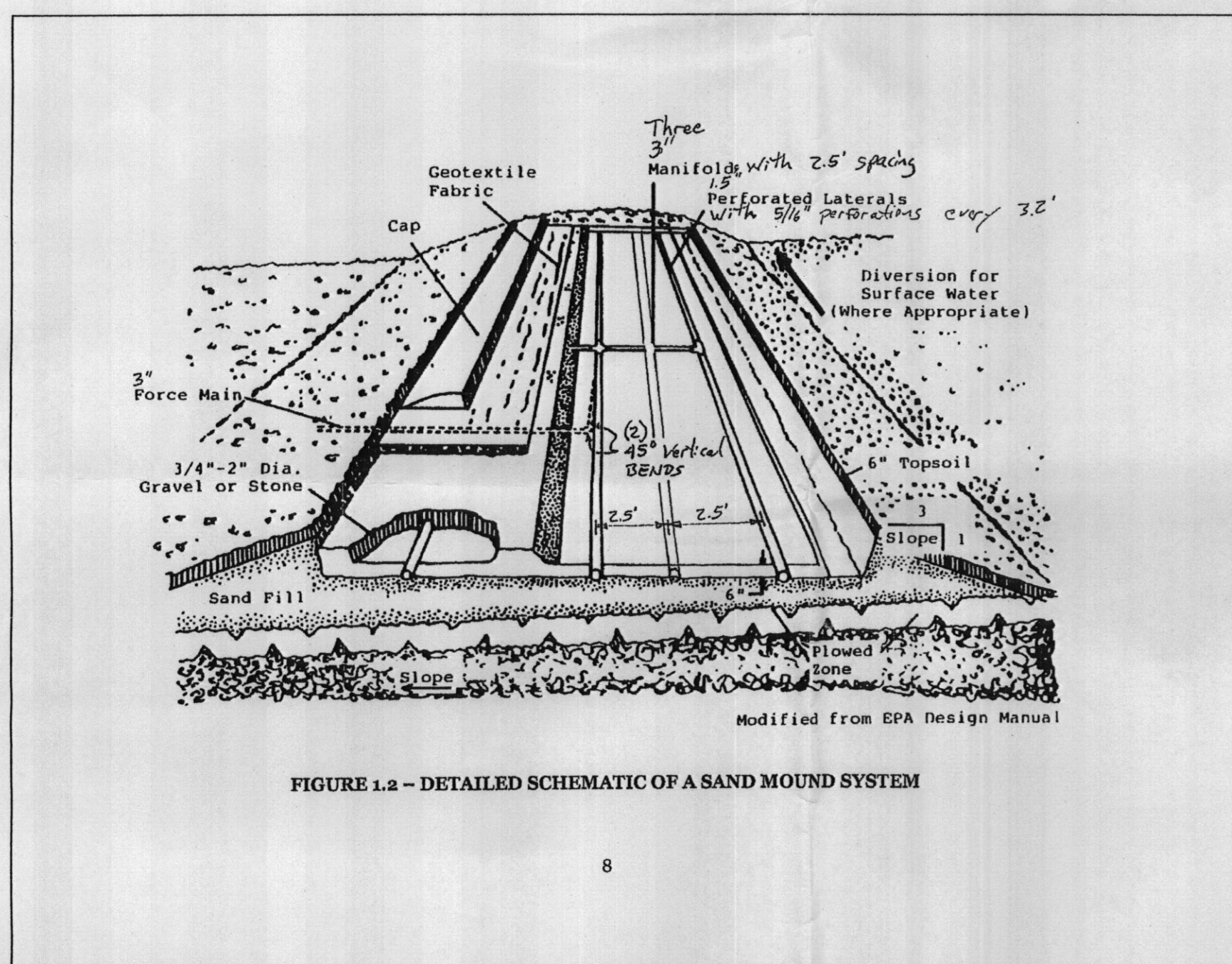
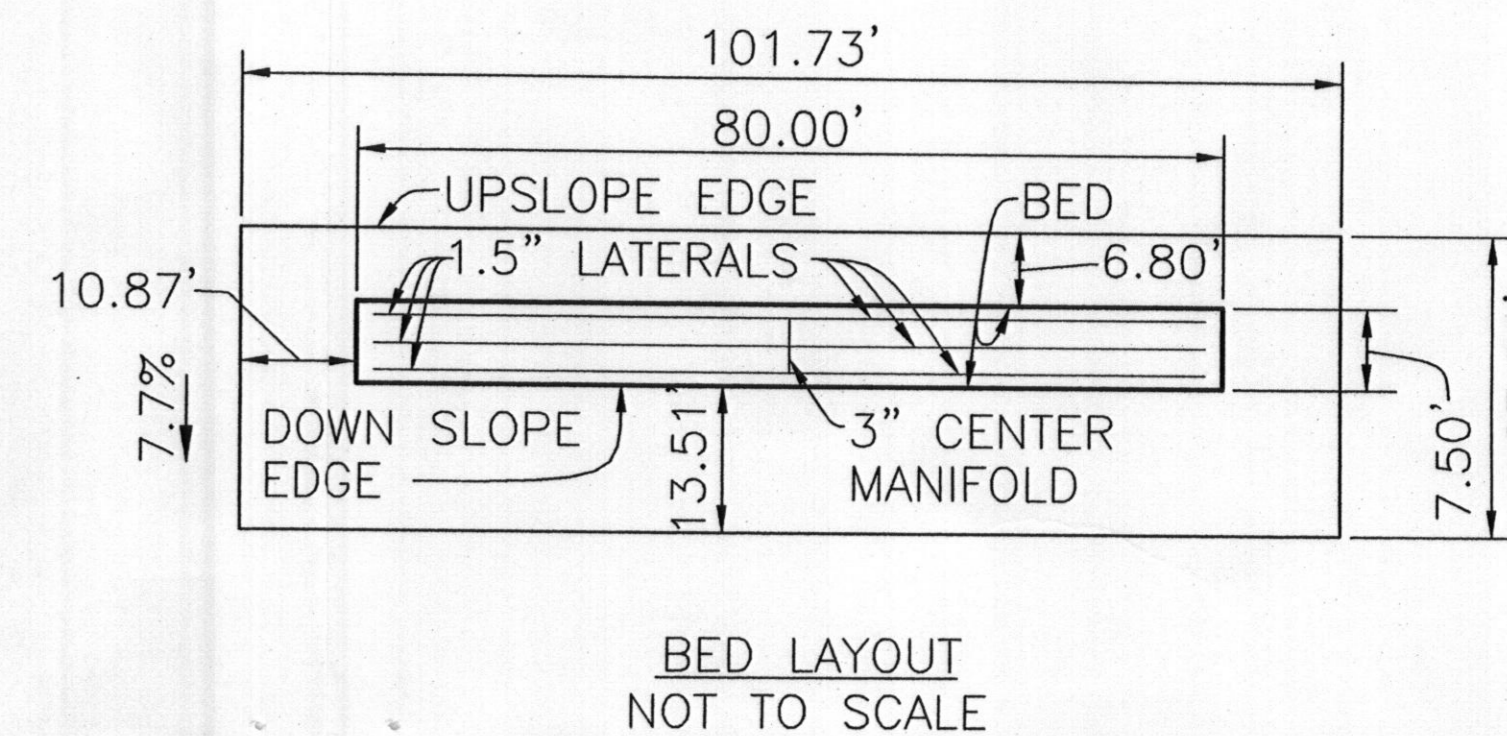
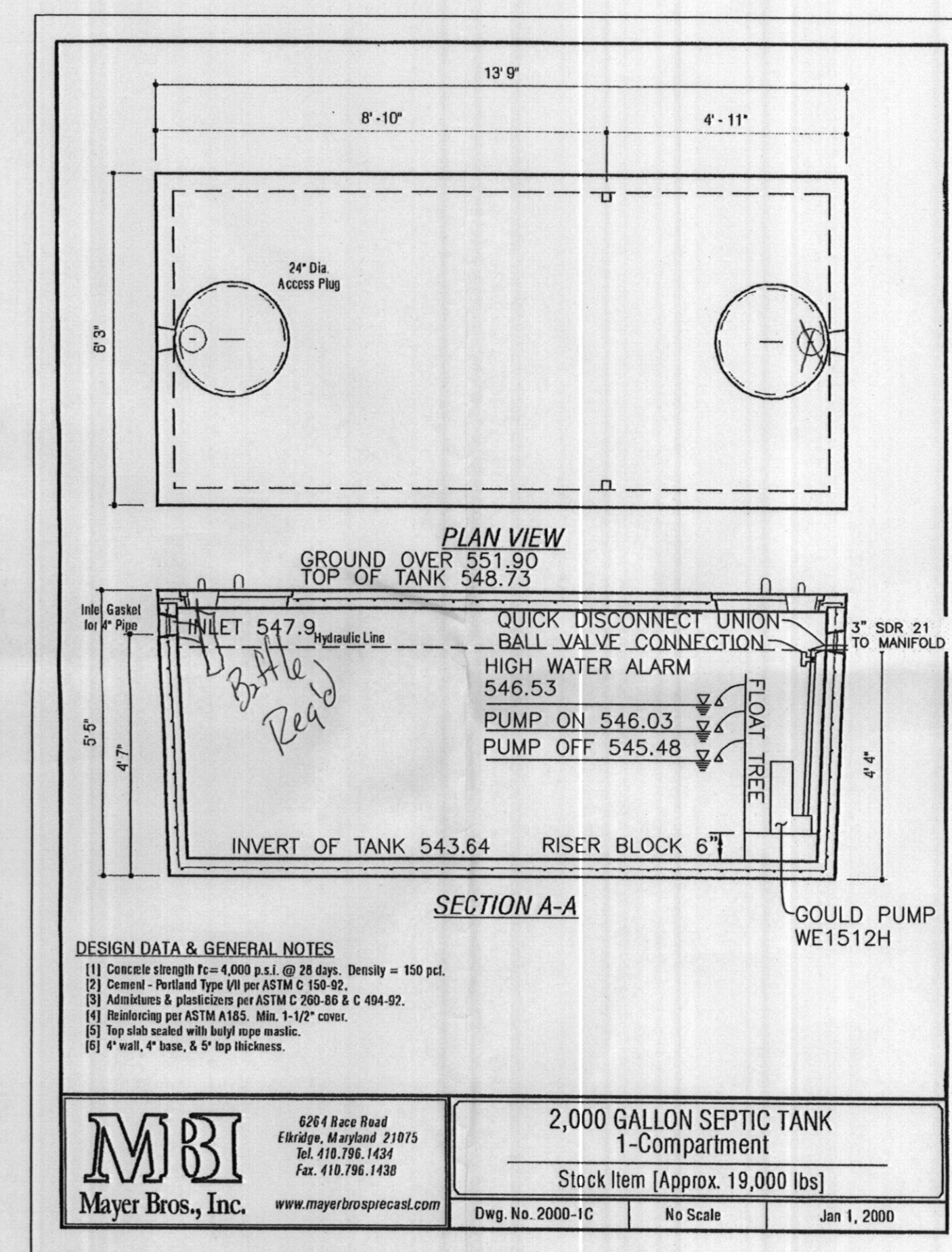
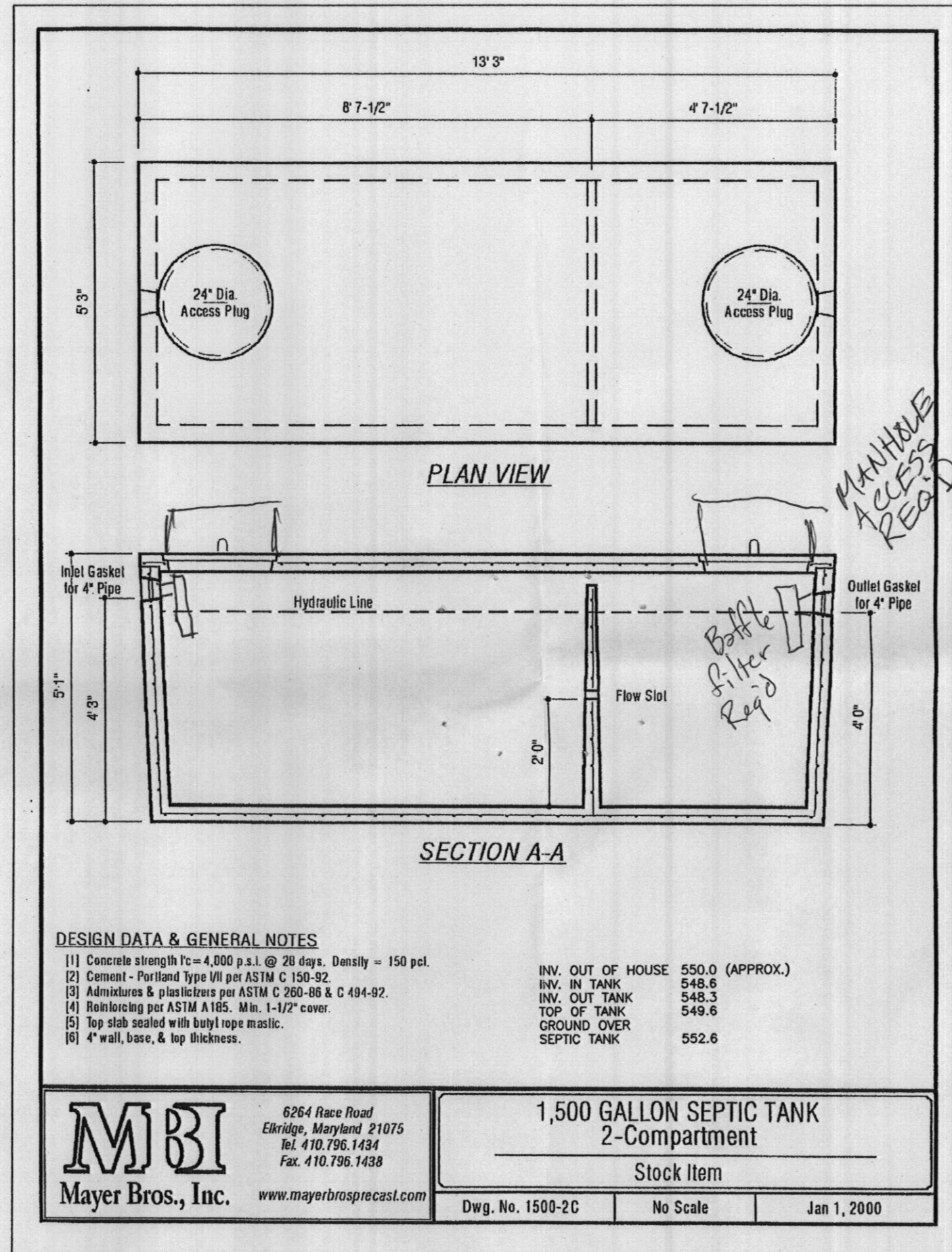
1 family existing dwelling	150
bedrooms = 4 gal/day/bedroom	
Total flow = 600 gallons/day	
COMAR tank sizing = 1,250 gallons	
Design Size = 1,500 gallons	

**SOILS LEGEND**

SOIL	NAME
**Ba	Baile silt loam
**CuB	Comus silt loam, local alluvium, 3 to 8 percent slopes
GLB2	Glenelg loam, 3 to 8 percent slopes, moderately eroded
GLC2	Glenelg loam, 8 to 15 percent slopes, moderately eroded
GLC3	Glenelg loam, 8 to 15 percent slopes, severely eroded
GLD3	Glenelg loam, 15 to 25 percent slopes, severely eroded
GLD2	Glenelg loam, 15 to 25 percent slopes, moderately eroded
*OnA	Glenville silt loam, 0 to 3 percent slopes
*CnB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded
**Ha	Hutboro silt loam
MIC2	Mt. Airy channery loam, 8 to 15 percent slopes, moderately eroded
MIC3	Mt. Airy channery loam, 8 to 15 percent slopes, severely eroded
MD2	Mt. Airy channery loam, 15 to 25 percent slopes, moderately eroded
ME	Mt. Airy channery loam, 25 to 45 percent slopes

**NOTES:**  
\* Hydric soils and/or contains hydric inclusions  
\*\* May contain hydric inclusions  
† Generally only within 100-year floodplain areas

TEST DATA						
NAME	FILE NO.					
LOCATION	Smith Prop	COUNTY				
DATE	4/5/00	Howard Co				
RECORDED BY	Amy Mermiken	GRID				
HOLE NO.	TEST NO.	DEPTH	CLOCK TIME	ELAPSED TIME	MEASUREMENT	REMARKS (Method, Moisture, Bloppes)
9 A		9:21			7.0	
		9:35	14min		4.31w	2.813 5 min/inch
		9:55			7.0	
		9:55	20min		4.18w	2.25 9
		10:15	80min		1.0	3.625 27
						22 min/inch OK
10-A		8:44			7.0	
		8:59	15min		6.91w	.813 18 min/inch
		9:13	14min		5.91w	.438 32
		9:30	17min		5.91w	.563 30
		9:50	20min		4.91w	.409 46
		10:10	20min		4.91w	.325 34
		10:30	20min		3.91w	.438 46
						40 min/inch OK



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 www.bei-civilengineering.com

OWNER/DEVELOPER:  
 TRINITY QUALITY HOMES, INC.  
 3675 PARK AVENUE  
 SUITE 301  
 ELLICOTT CITY, MD 21043  
 410-480-0023

PROJECT:  
**THE CHASE AT STONEY BROOK**  
 LOTS 1-20, PRESERVATION PARCEL "A" AND NON-BUILDABLE PRESERVATION PARCELS "B" THROUGH "D"

LOCATION:  
 TAX MAP No. 7, BLOCK No. 17, PARCEL No. 133  
 4th ELECTION DISTRICT  
 HOWARD COUNTY, MARYLAND

TITLE:  
**SAND MOUND DESIGN PRESERVATION PARCEL A**

DATE: SEPTEMBER, 2006 PROJECT NO. 1187

SCALE: 1" = 50' SHEET 2 OF 2