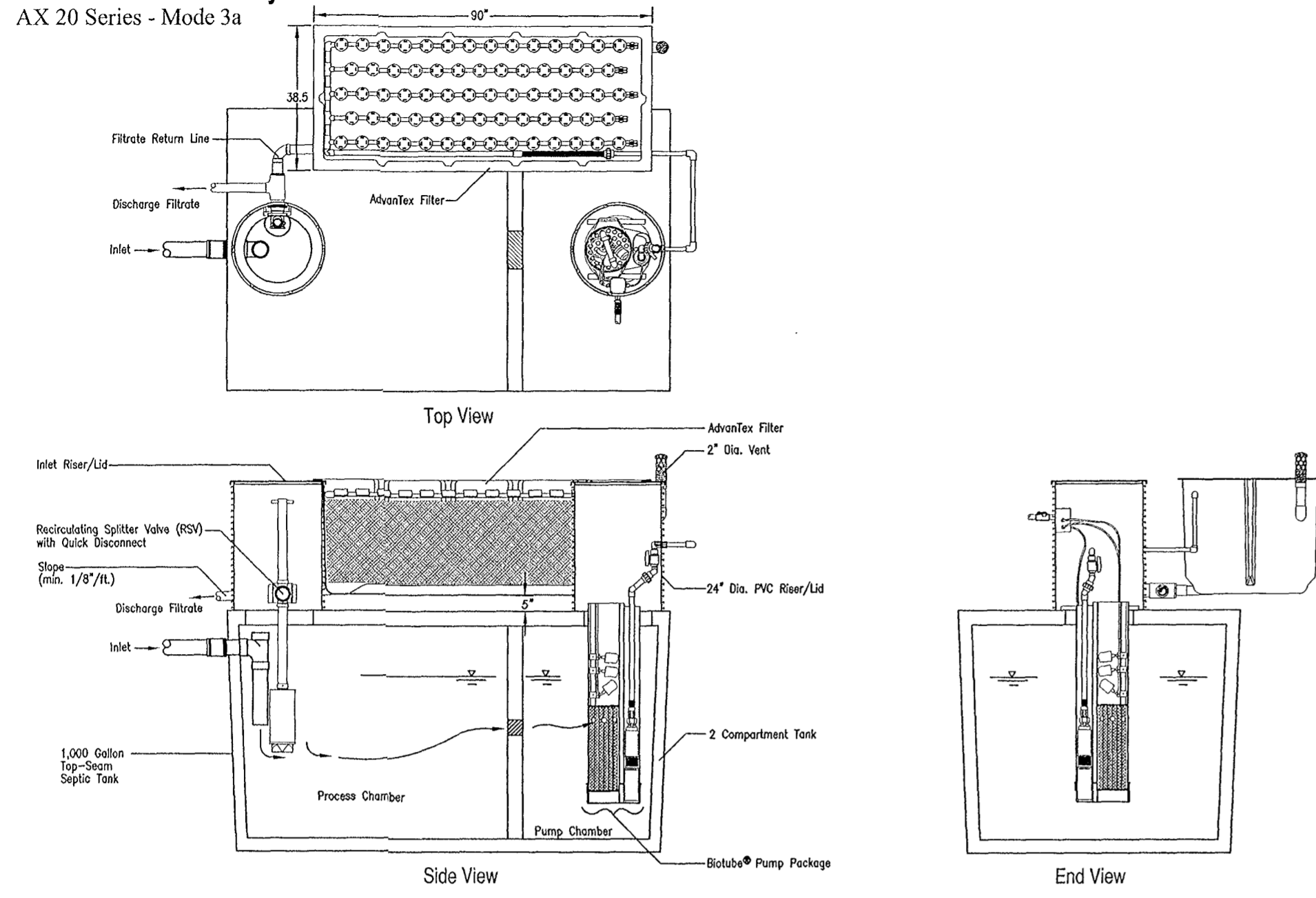


90 PAGE 90

### AdvanTex™ Treatment System AX 20 Series - Mode 3a



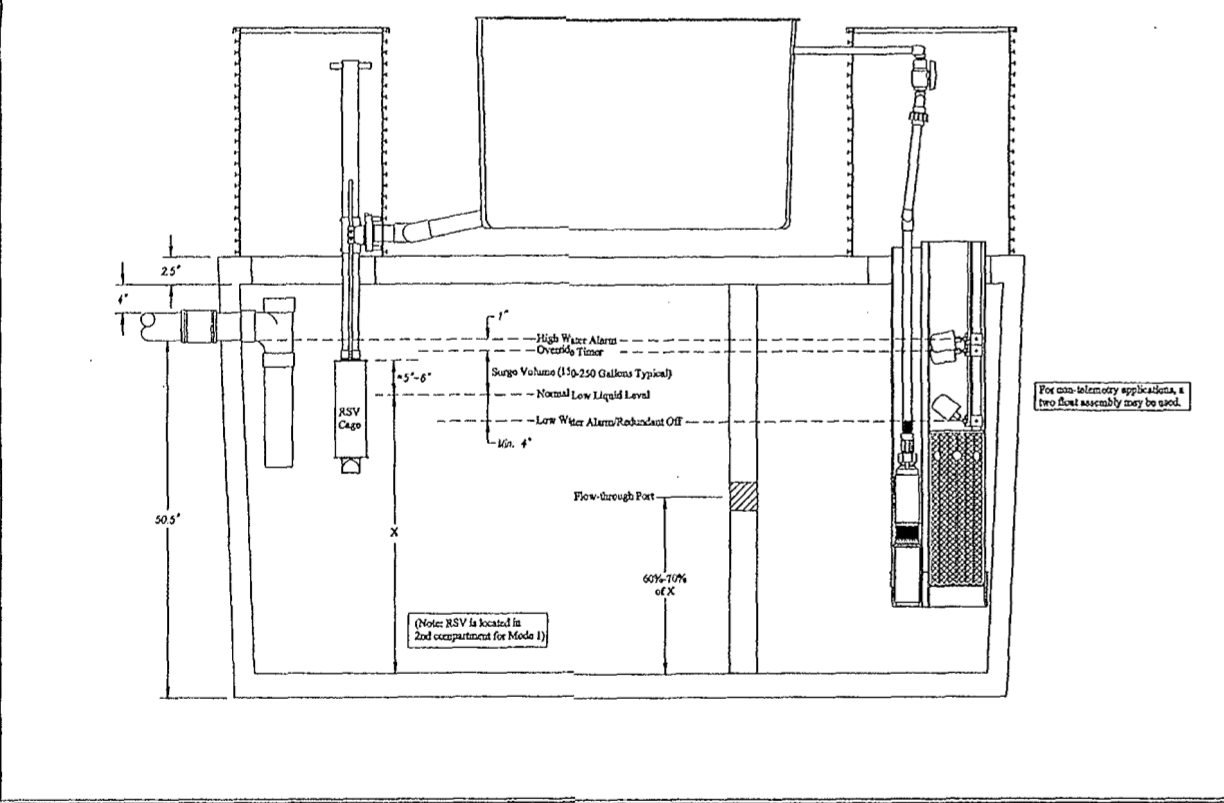
**Orengo Systems**  
**AdvanTex™ - AX 20 Mode 3a**  
 Title: AdvanTex™ - AX 20 Mode 3a  
 Scale: 1" = 2'-0"  
 Drawing No. 618/01  
 Date: 6/18/01  
 Drawn By: Chris Johnson  
 Designed By: ENGINEERING  
 Approved By: [Signature]  
 Date Approved: [Signature]  
 U.S. Patents 5,571,684 and 5,460,261  
 4,932,272 and 5,402,235  
 © 2001 Orengo Systems, Inc.

### SPECIFICATIONS

- ALL WORK SHALL MEET VIRGINIA DEPARTMENT OF HEALTH REQUIREMENTS. THE CONTRACTOR MUST BE FAMILIAR WITH "DESIGN AND CONSTRUCTION CRITERIA" OF VDH "SEWAGE HANDLING AND DISPOSAL REGULATIONS" AND GMP #114 (ADVANTEX TREATMENT SYSTEM), TO INCLUDE ANY LOCAL INTERPRETATIONS OF THE REGULATIONS. ALL WORK SHALL CONFORM TO CURRENT FEDERAL, STATE AND LOCAL STANDARDS. WHERE STANDARDS CONFLICT, OR WHERE THESE SPECIFICATIONS CONFLICT WITH ANY STANDARDS, CONTACT THE ENGINEER FOR GUIDANCE.
- WHERE REMOVAL OF UNSATISFACTORY WORK IS DUE TO FAULT OR NEGLIGENCE OF THE CONTRACTOR, ANY WORK DEEMED NECESSARY BY THE ENGINEER TO CORRECT THE FAULTY CONDITION SHALL BE PERFORMED AT NO ADDITIONAL COST.
- GRAVEL FOR STRUCTURE BEDDING SHALL CONFORM TO ASTM C3, SIZE #57 COARSE AGGREGATE. ALL STRUCTURES SHALL HAVE 6" GRAVEL BEDDING. SAND FOR PIPE BEDDING SHALL BE VDOT/ASTM GRADE A, AND SHALL BE FREE OF ORGANIC MATERIALS. ALL PIPES SHALL HAVE 4" SAND BEDDING. CLEAN EARTH FILLS SHALL BE APPROVED MATERIAL FREE OF DEBRIS, ROOTS, FROZEN MATERIALS, ORGANIC MATTER, ROCK OR GRAVEL LARGER THAN 2 IN. IN ANY DIMENSION OR OTHER HARMFUL MATTER.
- CONCRETE OR MORTAR FOR BEDDING, BLOCKING, OR ENCASMENT SHALL BE CLASS A-3.
- PIPE USED FOR GRAVITY MAINS SHALL BE SCHEDULE 40 PVC DRAIN, WASTE, AND VENT PIPE. JOINTS SHALL BE SOLVENT WELDED.
- THE CONTRACTOR SHALL PROVIDE PRECAST CONCRETE TANKS AS SHOWN IN THE DRAWINGS. 1,000 GALLON SEPTIC TANK AND PROCESS TANK SHALL BE 1,000 GALLON TOP SEAM SEPTIC TANK AS MANUFACTURED BY HANOVER MATERIALS INC. (804-798-5254), OR APPROVED EQUAL. MINIMUM 28-DAY COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE 4000 PSI. REINFORCEMENT SHALL BE PROVIDED TO ALLOW THE STRUCTURE TO WITHSTAND DEAD LOADS PLUS A H-10 VEHICLE LIVE LOAD OVER THE TANK. ACCESSWAYS SHALL BE CONCRETE WITH 24" DIAMETER CLEAR OPENING AND A SHOEBOX-TYPE LOCKABLE COVER, OR "EZ-SET" PVC RISER, FASTENED TO THE TANK WITH ANCHOR BOLTS. THE TANKS SHALL BE LINED, WITH EPOXY RESIN OR BITUMASTIC TYPE SEALER, INSIDE AND OUTSIDE. PIPES WHICH PENETRATE THE WALLS SHALL BE PROVIDED WITH A WATERSTOP CONSISTING OF A DOUBLE LAYER OF POLYSULFIDE CAULK, OR OTHER APPROVED DEVICE. TANKS SHALL WEIGH ENOUGH TO PREVENT FLOATATION WHEN EMPTY OR SHALL BE FILLED WITH CAST-IN-PLACE CONCRETE. SEPTIC TANK SHALL BE EQUIPPED WITH INSPECTION PORT NEAR INLET AND AN EFFLUENT FILTER (ORENCO FTSP0436-28MA OR APPROVED EQUAL).
- THE CONTRACTOR SHALL FURNISH AND INSTALL THE "ADVANTEX" PRETREATMENT UNITS, MANUFACTURED BY ORENCO SYSTEMS INC. THE SYSTEM SHALL BE SET UP IN MODE 3, WHICH RECIRCULATES EFFLUENT THROUGH THE INLET SIDE OF THE PROCESS TANK. THE CONTRACTOR SHALL SUPPLY THE CONCRETE TANK, AND ALL OTHER VALVES, PIPING AND OTHER ACCESSORIES REQUIRED TO MAKE THE SYSTEM COMPLETE AND OPERATIONAL. THE PRETREATMENT SYSTEM MUST BE PLACED BY AN AUTHORIZED INSTALLER. ALL WORK SHALL CONFORM TO THE MANUFACTURER'S RECOMMENDATIONS. ADVANTEX PACKAGE SHALL INCLUDE THE PACKED BED UNITS (MODEL AX-20) PIPED IN PARALLEL, SCREENED PUMP VAULT (MODEL X451254-1819 BIOTUBE PUMP VAULT WITH 4-INCH DIAMETER FLOW INDUCER TO ACCEPT THE HIGH-HEAD EFFLUENT PUMP), AND DISCHARGE HOSE AND VALVE ASSEMBLY (MODEL HV 100BC, 1-INCH DIAMETER, 150 PSI PVC BALL VALVE, 150 PSI PVC CHECK VALVE, PVC FLEX HOSE WITH WORKING PRESSURE RATING OF 100 PSI, AND SCHEDULE 40 PVC PIPE, MODEL HVA5100 ANTI-SIPHON ASSEMBLY, IF NECESSARY).
- THE CONTRACTOR SHALL INSTALL CONTROLS AND SWITCHES TO OPERATE ALL PUMPS, FILTERS AND ALARMS AS REQUIRED. EACH UNIT SHALL HAVE A SEPARATE CIRCUIT. ALL CONTROL ELEMENTS SHALL BE HOUSED IN NEMA 3R ENCLOSURES MOUNTED ON POLES OR THE HOUSE ADJACENT TO THE TREATMENT UNITS. THE OPERATION OF THE PUMP FOR THE ADVANTEX UNIT IS CONTROLLED BY A PROGRAMMABLE TIMER IN THE ADVANTEX CONTROL PANEL (BY ORENCO). CONTROL PANEL SHALL BE EQUIPPED WITH TELEMETRY TO BROADCAST ALARMS TO THE SYSTEM MAINTENANCE PROVIDER. TELEMETRY SYSTEM SHALL BE VERICOMM WEB-BASED MONITORING SYSTEM OR APPROVED EQUAL. IN NORMAL OPERATION, THE ADVANTEX UNIT PUMP DOES THE FILTER BETWEEN 72 AND 240 TIMES PER DAY. THE UPPER AND LOWER LIQUID LEVEL LIMITS ARE CONTROLLED BY TWO FLOATS. IF THE LIQUID LEVEL RISES TO THE TOP FLOAT, THE HIGH WATER ALARM IS SOUNDED AND A SECOND PROGRAMMABLE TIMER IS INITIATED. IF THE LIQUID LEVEL DROPS BELOW THE BOTTOM FLOAT, AN ALARM SOUNDS AND THE PUMPS ARE SHUT OFF. FOR A MORE COMPLETE DESCRIPTION OF OPERATION, SEE THE MANUFACTURER'S LITERATURE.
- REMOVE ALL HYDROPHILIC TREES FROM THE ABSORPTION AREA AND WITHIN 20 FEET OF THE ABSORPTION AREA. CUT STUMPS AT GROUND LEVEL WITH CHAINSAW, BUT LEAVE ROOT SYSTEM IN THE GROUND. STUMPS MAY BE REMOVED WITH A STUMP GRINDER, HOWEVER, NO GRUBBING WILL BE ALLOWED. REMOVE TOPSOIL AND ORGANIC MATERIALS FROM THE TRENCH AREA ONLY; PLACE ADJACENT TO THE TRENCH FOR BACKFILL. IF TOPSOIL IS REMOVED FROM BETWEEN THE TRENCHES, VDH WILL REJECT THE SITE. WHERE REMOVAL OF UNSATISFACTORY MATERIAL IS DUE TO FAULT OR NEGLIGENCE OF THE CONTRACTOR, ANY WORK DEEMED NECESSARY BY THE ENGINEER TO CORRECT THE FAULTY CONDITION SHALL BE PERFORMED AT NO ADDITIONAL COST. THE CONTRACTOR SHALL REMOVE ANY WASTE MATERIALS AND SOIL NOT USED IN CONSTRUCTION FROM THE SITE AND PROPERLY DISPOSE OF THEM.
- NO VEHICLES WILL BE ALLOWED IN THE DRAINFIELD AREA. ALL CLEARING MUST BE DONE BY HAND. DO NOT ATTEMPT CONSTRUCTION DURING WET SOIL CONDITIONS. ALL LINES SHALL BE ACCURATELY STAKED BEFORE BEGINNING WORK. DRAIN LINES SHALL BE PLACED ON CONTOUR, WITH A SLOPE OF 2"-4" PER 100 FT. PLACE PERFORATED DRAINFIELD PIPE SO THAT THE CENTER HOLES FACE VERTICALLY DOWNWARD. APPLY DUCT TAPE TEMPORARILY TO ANY OPEN ENDS TO PREVENT DIRT FROM ENTERING THE PIPING. REMOVE TAPE PRIOR TO PLACING THE SYSTEM IN OPERATION. 6" OF GRAVEL SHALL BE PLACED BETWEEN THE BOTTOM OF THE TRENCH AND THE PIPING. 2" OF GRAVEL SHALL BE PLACED ABOVE THE PIPING. PLACE FILTER FABRIC OVER GRAVEL PRIOR TO PLACING BACKFILL. CAREFULLY REMOVE ANY ROCKS, ROOTS OR OTHER DEBRIS IN DIRECT CONTACT WITH THE FILTER FABRIC. BACKFILL OVER LINES WITH UNCOMPACTED TOPSOIL. REMOVE ANY ROCKS, ROOTS OR DEBRIS FROM BACKFILL. FOR BACKFILL LESS THAN 6" DEEP, IMPORT ADDITIONAL TOPSOIL AND PLACE CAREFULLY OVER THE COMPLETED SYSTEM TO PROVIDE 6" COVER. THIS FILL SHALL BE SHAPED TO PREVENT STANDING WATER ON THE SURFACE. APPLY MULCH AND SEED IN ACCORDANCE WITH PERMANENT SEEDING SCHEDULE.
- PLACE PIPES AND STRUCTURES TRUE TO GRADE. IF NECESSARY, THIS MAY BE INCREASED TO PROVIDE 12" CLEARANCE BENEATH OTHER EXISTING UTILITIES. PLACE WATERPROOFING AROUND STRUCTURES AND OPENINGS. BACKFILL OVER PIPES AND AROUND STRUCTURES WITH CLEAN SOIL TO WITHIN 6" OF FINISHED GRADE. BACKFILL SHOULD BE COMPACTED IN 6" LAYERS USING VIBRATORY TAMPER TO 90% MAXIMUM DRY DENSITY PER ASTM D-698. THE FINAL 6" LAYER SHALL BE LIGHTLY COMPACTED TOPSOIL, WHICH SHALL BE SEEDED AND MULCHED.
- THE CONTRACTOR SHALL COORDINATE WITH VDH AND THE ENGINEER FOR REQUIRED INSPECTIONS. THE CONTRACTOR SHALL CONTACT THE ENGINEER AT LEAST 24 HOURS IN ADVANCE OF THE FOLLOWING MILESTONES TO SCHEDULE HIS INSPECTION: (1) PLACEMENT OF STRUCTURES. PRECAST STRUCTURES SHOULD BE PLACED; CAST-IN-PLACE STRUCTURES SHOULD HAVE FORMWORK READY. DO NOT POUR CONCRETE OR INSTALL PIPING OR FILTER MEDIA BEFORE THE INSPECTION. (2) BACKFILL OF TRENCHES. HAVE TRENCHES OPEN WITH EXPOSED PIPING PRIOR TO PLACEMENT OF FILTER FABRIC. (3) FINAL INSPECTION/TEST. FILL THE PUMP CHAMBER TO JUST BELOW "PUMP ON" BEFORE THE INSPECTIONS. THE SYSTEM SHALL BE OPERATIONAL, BUT DO NOT BACKFILL AGAINST STRUCTURES UNTIL THE INSPECTION IS COMPLETE.

#030020787

### Typical Liquid Level Positions for Residential AdvanTex™ Treatment System

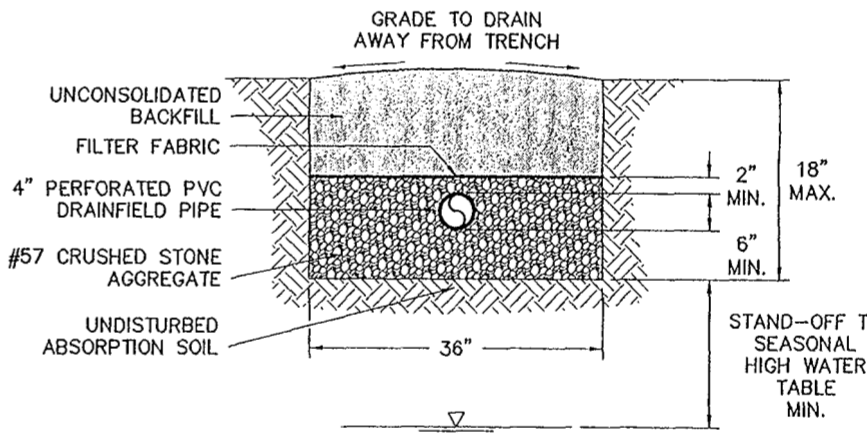


**Orengo Systems**  
 Title: Typical Liquid Level Positions for Residential AdvanTex™ Treatment System  
 Scale: 1" = 1'-0"  
 Drawing No. 617/01  
 Date: 6/27/01  
 Drawn By: Chris Johnson  
 Designed By: ENGINEERING  
 Approved By: [Signature]  
 Date Approved: [Signature]  
 U.S. Patents 5,571,684 and 5,460,261  
 4,932,272 and 5,402,235  
 © 2001 Orengo Systems, Inc.

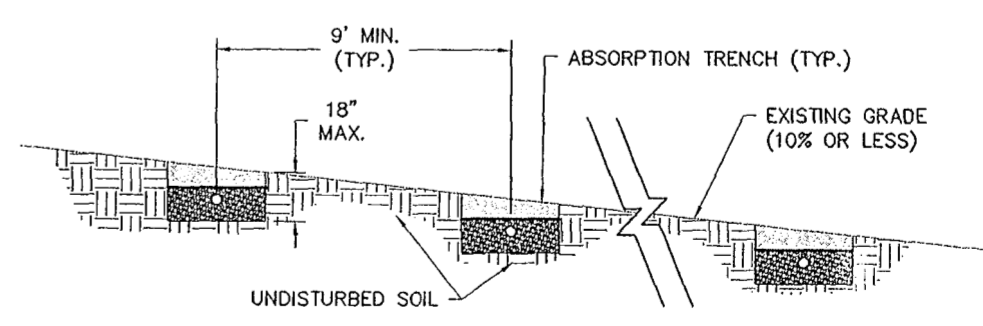
### Advantex Pretreatment Gravity Trench Disposal Field Calculation

Job Description: 9537 Barnes Road (Parcel A, Racefield Tract), James City County, Virginia  
 Contact: Steve and Mary Hetzler  
 Prepared by: Aaron B. Small, P.E.  
 Date: June 11, 2003

Worksheet: Field Design	
A) Size of residence	5 Bedrooms
B) Average Daily Flow	750 gallons / day
C) Soil percolation rate	45 min/inch
D) Trench width	3 ft.
E) Hydraulic loading rate (from GMP #114)	0.99 gallons / sq.ft. / day
F) Minimum standoff from seasonal water table	11 inches
G) Minimum field size required	758 sq.ft.
H) Minimum linear ft. required	253 ft.
I) Number of Lines	10
J) Length of Lines	30.0 ft.
K) Percolation Line Diameter	4 inches
L) Total absorption field area provided	900.0 sq.ft.
M) Max. land slope at absorption field	10 %
N) Minimum line separation	9.0 ft.
O) Minimum field width (1 Zone)	84.0 ft.
P) Minimum field size	2,520.0 sq.ft.



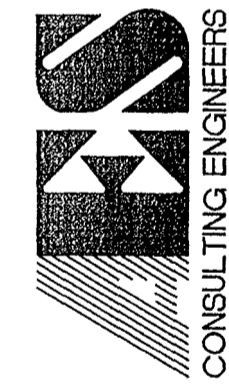
ABSORPTION TRENCH SECTION  
NOT TO SCALE



TYPICAL DRAINFIELD SECTION ON A SLOPE  
NOT TO SCALE



5248 Old Towne Road, Suite 1  
 Williamsburg, Virginia 23188  
 (757) 253-0040  
 Fax (757) 220-8994



NOTES AND DETAILS  
**ALTERNATIVE SEPTIC SYSTEM**  
 9537 BARNES ROAD  
 OWNERS: STEVEN AND MARY HERTZLER  
 STONEHOUSE DISTRICT  
 JAMES CITY COUNTY, VIRGINIA

City of Williamsburg & County of James City  
 Circuit Court: This PLAT was recorded on  
 14 July 2003  
 at 3:25 AM/PM, PB 90, PG 89-91  
 DOCUMENT # 030020787  
 BETSY B. WOOLRIDGE, CLERK  
 [Signature] Clerk

Designed	ABS	Drawn	SJP
Scale		Date	
AS NOTED		06/20/03	
Project No.	9265-01	Drawing No.	2 OF 3