Design Calculations

Design Input: **Calculations:**

Capacity requirements

number of lots	1	Max. Daily Flow	600 gpd
bedrooms per lot	4	Average Daily Flow	300 gpd
use rate per bedroom	150 gpd	Maximum Daily Flow	0.42 gpm
		Average Daily Flow	0.21 gpm

Drainfield Requirements

Application Rate	0.8 gpd/sq ft	Standard Trench Length	250.00 ft
Trench width	3 ft	Deep Trench Conversion Factor	83.33 %
trench gravel depth	1 ft	Deep Trench Length for MDF	208.325 ft
number of trenches	4	total trench length for 100% capacity	208.325 ft
trench spacing center-center	10 ft	individual trench length	52.1 ft
		Approx. Lateral Length	48.10 ft

Tanks and Capacities

BAT tank	1,300	gallons	minimum req. area	2499.9 sf
2nd settling tank	NA	gallons	req. capacity (1125+(0.75*MDF))	1575 gal.
Equalization Tank	NA	gallons	design settling capacity NA	gal.
pump tank size	1,500	gallons	min. pump tank capacity (ADF)	407 gal.

Distribuition system

number of cells	1		
		Total Number of Pumps	1
trenches first system	4	laterals served by pump	4
lateral length per pump	216.4 ft	Vol./100 ft 1.25" SCH 40	7.8 gal.
ID 1.25" SCH 40 PVC	inches	Vol. of laterals served	16.9 gal.
Max. Manifold length	128 ft	Vol./100 ft 2.0" SCH 40	17.4 gal.
ID 2.0" SCH 40 PVC	inches	Max. Main volume	22.3 gal.

Static Hydraulic Profile

Ground Elev. At BAT tank	618.00 ft		Tank #1 effulent out elev	615.17 ft
Tank #1 invert in	615.50 ft			
Cover	1.50 ft			
Tank #1 top	616.50 ft	okay		
Fall in tanks	0.33 ft		Pump Tank effulent in elev	615.07 ft
Fall between tanks	0.10 ft		Invert of pump tank	611.15 ft
Ground Elev. at pump tank	618.00 ft			
Pump Tank invert in	615.07 ft			
inv. into pump tank to top	0.83 ft		Pump Elevation	611.65 ft
Pump Tank top	615.90 ft	okay	pump intake elev.	611.92 ft
Pump Block Height	0.50 ft			
Height of Intake	0.27 ft			
Highest lateral	619.90 ft	Cell 1		

Perforation Design:

		Distal Pressure =	2.0 ft
Size of Perforation	5/16 inches	Flow	1.63 gpm
Design Separation	8.00 ft	Perforations per Lateral	6.51
Use Perforations	6	Perforation Actual Spacing	8.68 ft
Perforations per field	24	Flow rate	39.08 gpm

Dosing volume, flow rates and Pressures

lateral flow rate per pump	39.08 gpm	Static Head	7.16 ft Cell 1
Friction (C) for PVC	150	Friction Head	5.29 ft Cell 1
Miscellaneous Losses	0 ft	Distal Head	2 ft
Estimated Run Time	4.00 Min.	Max. Total Dynamic Head	14.45 ft
Cells in simultaneous use	1	Estimated Dose (5xLateral+1xMain) Vol.	106.67 gal.
Pump tank Volume	35.91 Gal/in	Min. Runtime	4.09 min.
		Minimum Dose Volume	159.83 gal.
		Average Doses	1.88 per day

Tank and Float Design:

Ground over Tank =	618.00 ft	Inside Tank Dimenions	
Top of Tank =	615.90 ft	Height =	4.42 ft
Invert of Tank =	611.15 ft	Width =	4.58 ft
Pump Block=	0.50 ft	Length =	12.58 ft
Water End and Motor =	1.00 ft	Number of Tanks =	1

minimum Pump off =	612.65 ft	
Pump Off Float =	612.74 ft	
Dose =	21.37 cf	
Area of Pit	57.62 sf	Use one 1,500 gallon pump tank
Pump on dist. =	0.37 ft	
Pump on Elev. =	613.11 ft	
Distance between Pump on and Highwater Alarm =		0.5 ft
Highwater Alarm Elevation =		613.61 ft
High Water Alarm to inlet =	1.46	
Volume Above Alarm Float to Inlet =	84.36 cf or	631.00 gallons
One Day Flow =	600.00 gallons	okay

Lateral Pressure Calculations

Cell	Trench	Pipe Elev.	Beginning Manifold Loss	Gate Valve	Manifold Bends 45D	Manifold Length	Manifold velocity	Manifold Thru Tees	Delta Loss Manifold	Total Manifold Loss	Lateral 90 degree side tee loss	Sudden Reduction Loss	Lateral Bends 45 deg. Loss	Lateral Length to first perf. Loss	Lateral Loss Summation	Total Loss to First Perf.	Total Design Head (ft)	Lateral Pressure Head (ft)	Trench Flow Rate (gpm)
1	4	619.3	0		0	77	39.08	0	1.94	1.94	0.14	0.01	0.0337	0.14	0.32	2.26	10.82	2.70	11.35
	3	619.5	1.94		0	19	29.31	1	0.31	2.25	0.14	0.01	0.0337	0.17	0.36	2.60	11.37	2.50	10.92
	2	619.9	2.25		0	13	19.5	1	0.11	2.35	0.14	0.01	0.0337	0.10	0.28	2.63	11.80	2.10	11.68
	1	620.0	2.35		1	19	9.8	1	0.08	2.44	0.14	0.01	0.0000	0.06	0.21	2.64	11.91	2.00	8.14

Perforation Diameter = 5/16 inches Distal Heac 2 feet

Trenches are unequal length, trench 1-1 is shorter

Trench and Lateral Design

Cell	Trench	Pipe Inv. Elev.	Trench Bottom Elev.	Highest Ground Over	Lowest Ground Over	Lateral Pressure Head (ft)	Approx. Lateral Length (ft)	Number of Perforations	Flow per Perforation (gpm)	Trench Flow Rate (gpm)	Lateral Flow Differential	Flow per LF Trench (gpm)	LR Differential
1	1	620.0	614.5	622.5	622.5	2.00	41	5	1.63	8.14	16.7%	0.20	0.00%
	2	619.9	613.9	621.9	621.9	2.10	56	7	1.67	11.68	19.5%	0.21	5.03%
	3	619.5	613.5	621.5	621.5	2.50	63	6	1.82	10.92	11.8%	0.20	1.77%
	4	619.3	612.8	620.8	620.8	2.70	58	6	1.89	11.35	16.2%	0.20	2.08%

Perforation Diameter = 5/16 inches Target Flow = 9.77 gpm

Cell	Flow Rate
1	42.09

	Depth To Effective Sidewall	Deep Trench Depth	Depth to Inlet
Trench 1	7 ft	8 ft	2.5 ft
Trench 2	7 ft	8 ft	2.0 ft
Trench 3	7 ft	8 ft	2.0 ft
Trench 4	7 ft	8 ft	1.5 ft

Perforation Design

Cell	Trench	Number of Perforations	Manifold to Trench (ft)	Trench Length (ft)	Perforation Spacing (ft)	Dist. Manifold to First Perf. (ft)	Dist. Last Perf. to Trench Edge	Lateral Length (ft.)
1	1	5	0.0	41	8.20	4.10	4.10	36.90
	2	7	2.9	56	8.00	6.90	4.00	52.00
	3	6	7.6	56	9.33	12.27	4.67	51.33
	4	6	5.0	56	9.33	9.67	4.67	51.33
			Total:	209				

Lateral Length is distance from beginning of trench to end of lateral, does not include mainfold to trench.

TRENCH DATA - LOT 1

INITIAL SYSTEM		FIRST REPLACEMENT		SECOND REPLACEMENT	
TRENCH 1-1		**TRENCH 2-1**		**TRENCH 3-1**	
LENGTH	41 ft	LENGTH	70 ft	LENGTH	70 ft
GROUND ELEVATION	622.4	GROUND ELEVATION	620.3	GROUND ELEVATION	618.6
INVERT ELEVATION	619.9	INVERT ELEVATION	618.3	INVERT ELEVATION	616.6
MAX BOTTOM ELEVATION	614.4	MAX BOTTOM ELEVATION	612.3	MAX BOTTOM ELEVATION	610.6
TRENCH 1-2		**TRENCH 2-2**		**TRENCH 3-2**	
LENGTH	56 ft	LENGTH	70 ft	LENGTH	70 ft
GROUND ELEVATION	621.9	GROUND ELEVATION	619.8	GROUND ELEVATION	618.1
INVERT ELEVATION	619.9	INVERT ELEVATION	617.8	INVERT ELEVATION	616.1
MAX BOTTOM ELEVATION	613.9	MAX BOTTOM ELEVATION	611.8	MAX BOTTOM ELEVATION	610.1
TRENCH 1-3		**TRENCH 2-3**		**TRENCH 3-3**	
LENGTH	56 ft	LENGTH	70 ft	LENGTH	70 ft
GROUND ELEVATION	621.5	GROUND ELEVATION	619.2	GROUND ELEVATION	617.6
INVERT ELEVATION	619.5	INVERT ELEVATION	617.2	INVERT ELEVATION	615.6
MAX BOTTOM ELEVATION	613.5	MAX BOTTOM ELEVATION	611.2	MAX BOTTOM ELEVATION	609.6
TRENCH 1-4					
LENGTH	56 ft				
GROUND ELEVATION	620.8				
INVERT ELEVATION	619.3				
MAX BOTTOM ELEVATION	612.8				

Friction Head
main

Friction Head = Head loss due to pipe friction

2.0" pipe = 128 feet

45° bends	3 loss for manifold bend	12.0 feet	per table 4.3
90° Bend	3 loss for manifod bend	30.0 feet	per table 4.3
Str. Coupling	3 loss for straight tee	6.0 feet	per table 4.3
90 deg. Side tee	1 loss for tee bend	10.0 feet	per table 4.3 for smaller pipe
Sudden reduction	1 loss for reduction	1.0 feet	per Crane Co. technical paper
45° bends	1 loss for lateral bend	2.4 feet	per table 4.3
Gate Valve	0 loss for valve	0.0 feet	per table 4.3

Equivalent Manifold Length = 176.0 Friction loss = 4.43 feet

1.25" lateral 61.50 feet Friction loss = 0.86 feet

Total Friction Head = 5.29

STATE OF MARYLAND
JOHN M. CARNEY
45577
PROFESSIONAL ENGINEER

6/15/22

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 45577, Expiration Date: 06-08-2024.

OWNER:
HOMES FOR OUR TROOPS, INC.
6 MAIN STREET
TAUNTON, MA 02780

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(P) 410-465-6105 ▲ (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.COM

PROJECT: **SPRING ROCK FARM LOT 1**

LOCATION: TAX MAP: 07, GRID: 21, PARCEL 392
2301 WOODBINE ROAD, WOODBINE, MD 21797
FOURTH ELECTION DISTRICT, HOWARD COUNTY, MARYLAND
ACCOUNT IDENTIFIED 04-354524

TITLE: BAT SITE PLAN

HOUSE TYPE: AMERICAN DREAM PLAN B -4B

DATE: JUNE, 2022 PROJECT NO. 3038

SCALE: AS SHOWN DRAWING 3 OF 5

Trusted. Tested. Tough.™

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

ZOELLER PUMP COMPANY

SECTION: 2.20.030
FM27B9
0621
Supersedes
0220

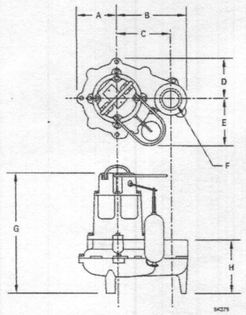
TECHNICAL DATA SHEET

WASTE-MATE SERIES

Models 266 & 267 Sewage/*Effluent or Dewatering Pumps

PRODUCT SPECIFICATIONS

MOTOR	Horse Power	1/2
	Voltage	115 - 460
	Phase	1 or 3 Ph
	Hertz	60 Hz
	RPM	1725
	Type	Permanent split capacitor
	Insulation	Class B
	Amps	1.5 - 9.4
PUMP	Operation	Automatic or nonautomatic
	Auto On/Off Points	12" (30 cm) / 4" (10 cm)
	Discharge Size	2" NPT
	Solids Handling	2" (50 mm) spherical solids
	Cord Length	10' (3 m) automatic or 15' (5 m) nonautomatic
	Cord Type	UL listed neoprene cord and plug
	Max. Head	21.5' (6.6 m)
	Max. Flow Rate	128 GPM (484 LPM)
	Max. Operating Temp.	130° F (54° C)
	Cooling	Oil filled
	Motor Protection	Auto reset thermal overload (1 Ph)
MATERIALS	Cap	Cast iron
	Motor Housing	Cast iron
	Pump Housing	Cast iron
	Base	Cast iron or engineered plastic
	Upper Bearing	Sleeve bearing
	Lower Bearing	Sleeve bearing
	Mechanical Seals	Carbon and ceramic
	Impeller Type	Non-clogging vortex
	Impeller	Engineered plastic w/ metal insert
	Hardware	Stainless steel
	Motor Shaft	AISI 1215 cold rolled steel
	Gasket	Neoprene
	Min. Basin Size	Simplex: 18" x 30" (45.7 x 76.2 cm) Duplex: 30" x 36" (76.2 x 91.4 cm)



NOTE: The sizing of effluent systems normally requires variable level float(s) controls and properly sized basins to achieve required pumping cycles or dosing timers with nonautomatic pumps. See model comparison chart for specific details.

* May be used in those states where codes do not restrict solids size in effluent systems.

MODEL DIMENSIONS

MODEL	A	B	C	D	E	F	G	H
266	4-3/4" (12.1 cm)	8-5/16" (21.1 cm)	6-13/32" (16.3 cm)	4-13/16" (12.2 cm)	6-7/32" (15.6 cm)	2" NPT	14-1/4" (36.2 cm)	6-3/8" (16.2 cm)
267	4-3/4" (12.1 cm)	8-5/16" (21.1 cm)	6-13/32" (16.3 cm)	4-13/16" (12.2 cm)	6-7/32" (15.6 cm)	2" NPT	14-5/16" (36.4 cm)	6-7/16" (16.4 cm)

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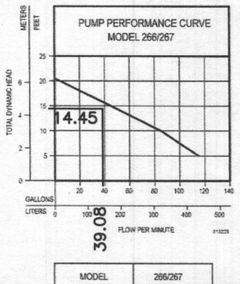
SELECTION GUIDE

1. Integral float operated mechanical switch, no external control required.
2. For automatic use single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. See FM1228 for correct model of simplex control panel.
4. See FM0712 for correct model of duplex control panel or FM1063 for a residential alternator system.

SPECIAL MODEL FEATURES

- Model 266 features a plastic base.
- Model 267 feature a cast iron base.
- Model 267 is available with a cast iron impeller, which is standard on all 3 Ph units.
- SW and BE models include a variable level pump switch.
- Additional cord lengths are available in 15' (5 m), 35' (11 m) and 50' (15 m).



CONSULT FACTORY FOR SPECIAL APPLICATIONS

- Minimum recommended basin size (Small load applications)
  Simplex - 18" x 30" (45.7 x 76.2 cm)
  Duplex - 30" x 36" (76.2 x 91.4 cm)
- High water alarms available

Standard All Models:
266 - Weight 41 lbs. (18.6 kg)
267 - Weight 47.5 lbs. (21.5 kg)

For "M" and "D" models, the approximate volume pumped out per cycle are:

Tank Diameter	Volume Pumped
18" Simplex	8 Gal (30.2 L)
24" Simplex	15 Gal (56.8 L)
30" Duplex	22 Gal (83.3 L)
36" Duplex	33 Gal (124.9 L)
48" Duplex	60 Gal (227.1 L)

MODEL	266/267	
Feet	Meters	Gal.	Liters
5	1.5	115	435
10	3.0	85	322
15	4.6	45	170
Shut-off Head:		20.5 ft.(6.2 m)	

⚠ CAUTION Maximum temperature of sewage or dewatering must be limited to 130°F (54°C). For over 130°F (54°C), special quotation required.

USE BN266 PUMP OR EQUIVALENT

Model	MODEL COMPARISON										CERTIFICATIONS	
	Seal	Mode	Volts	Ph	Amps	HP	Hz	Lbs	Kg	Simplex	Duplex	cCSAus	UL
M266/BN266	Single	Auto	115	1	9.4	1/2	60	41.0	19	1	4	Y	Y
N266	Single	Non	115	1	9.4	1/2	60	41.0	19	2 or 3	2 or 4	Y	Y
D266/BE266	Single	Auto	230	1	5.5	1/2	60	41.0	19	1	---	Y	Y
E266	Single	Non	230	1	5.5	1/2	60	41.0	19	2 or 3	4	Y	Y
H266	Single	Auto	200-208	1	6.2	1/2	60	41.0	19	1	---	Y	N
I266	Single	Non	200-208	1	6.2	1/2	60	41.0	19	3	4	Y	N
J266	Single	Non	200-208	3	2.6	1/2	60	41.0	19	3	4	Y	Y
F266	Single	Non	230	3	2.8	1/2	60	40.0	18	3	4	Y	Y
G266	Single	Non	460	3	1.5	1/2	60	40.0	18	3	4	Y	Y
M267/BN267	Single	Auto	115	1	9.4	1/2	60	47.5	22	1	4	Y	Y
N267	Single	Non	115	1	9.4	1/2	60	47.5	22	2 or 3	4	Y	Y
D267/BE267	Single	Auto	230	1	5.5	1/2	60	47.5	22	1	---	Y	Y
E267	Single	Non	230	1	5.5	1/2	60	47.5	22	2 or 3	4	Y	Y
H267	Single	Auto	200-208	1	6.2	1/2	60	47.5	22	1	---	Y	N
I267	Single	Non	200-208	1	6.2	1/2	60	47.5	22	3	4	Y	N
J267	Single	Non	200-208	3	2.8	1/2	60	47.5	22	3	4	Y	Y
F267	Single	Non	230	3	2.8	1/2	60	47.5	22	3	4	Y	Y
G267	Single	Non	460	3	1.5	1/2	60	47.5	22	3	4	Y	Y

⚠ 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 Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

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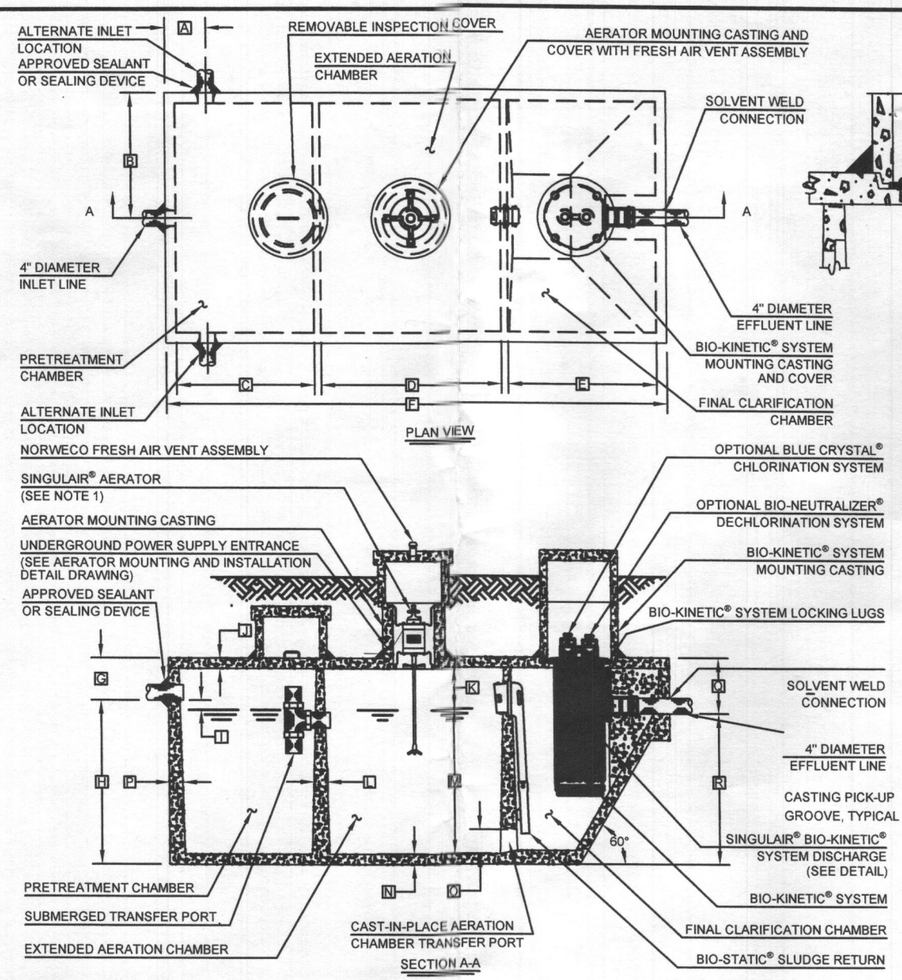
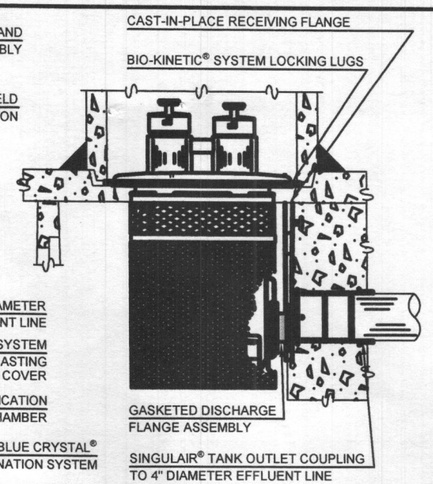
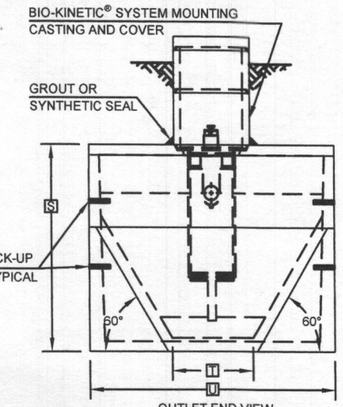




BIO-KINETIC® SYSTEM DISCHARGE DETAIL



OUTLET END VIEW

NOTE: TOTAL SYSTEM CAPACITY: 1,300 GALLONS
RATED CAPACITY: 500 GALLONS PER DAY

GENERAL NOTES:

1. SINGULAIR® AERATOR, AS TESTED AND ACCEPTED BY NSF, OPERATING 60 MINUTES ON / 60 MINUTES OFF.
2. FALL THROUGH SINGULAIR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TWELVE INCHES BELOW TANK TOP.
3. ON DEEPER INSTALLATIONS, PRECAST RISERS MUST BE USED TO EXTEND AERATOR MOUNTING CASTING AND BIO-KINETIC® SYSTEM MOUNTING CASTING TO GRADE.
4. TANK REINFORCED PER ACI STD. 318-05.
5. REMOVABLE COVERS ON RISERS WEIGH IN EXCESS OF SEVENTY-FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.
6. CONTACT THE LOCAL, LICENSED SINGULAIR® DISTRIBUTOR FOR ELECTRICAL REQUIREMENTS.

CRITICAL DIMENSIONS			
A	1'- 0"	N	0'- 3"
B	3'- 0"	O	0'- 6"
C	3'- 4"	P	0'- 3"
D	4'- 5"	Q	1'- 4"
E	3'- 7"	R	3'- 8"
F	12'- 2"	S	5'- 0"
G	1'- 0"	T	2'- 0"
H	4'- 0"	U	6' - 0"
I	0'- 3"	V	
J	0'- 3"	W	
K	1'- 0"	X	
L	0'- 2"	Y	
M	3'- 6"	Z	

U.S. AND FOREIGN PATENTS PENDING

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norweco

LOW-PROFILE SINGULAIR® BIO-KINETIC® WASTEWATER TREATMENT SYSTEM
MODEL TNTLP-500 GPD

REVISION DATE	REVISION
3-26-07	B
DRAWN BY	BDS
APPROVED BY	JMM
DATE	10-16-06
SCALE	NTS
DRAWING NO	PC-5-7091

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Required BAT Site Plan Notes

1. Any change to the locations or depths to any components must be approved by the engineer and the Howard County Health Department prior to installation. A revised sit plan may be required.
2. The maximum depth of the BAT shall be per the manufacturer's specification, 3.0'.
3. The blower may not be located further from the tank than the manufacturer's specifications, 75'.
4. The BAT system shall be maintained and operated for the life of the system.
5. The BAT shall be operated by and maintained by a certified service provider.
6. Within one month of installation, a person installing the BAT system shall report to the Maryland Department of the Environment (MDE) in a manner acceptable to MDE, the address and date of completion of the BAT installation and the type of BAT installed.
7. Electrical work for the BAT installation must be performed by a licensed electrician.
8. An agreement and Easement must be completed and signed by all applicable parties, and recorded in Land Records of Howard County.
9. The Health Department requires documentation for the start-up certification from the manufacturer prior to final approval of the installation.

Pump Requirements:

Performance = 39.08 gpm
Head of Water = 14.45 feet of head

Pump Selection: Zoeller Pump BN266
1/2 horse power 115 Volts Single Phase

SIGNATURE AND SEAL ARE FOR SEPTIC PROFILE AND CALCULATIONS ONLY, TANK, PUMP AND DETAILS WERE NOT DESIGNED OR REVIEWED BY THE ENGINEER:

THIS PLAN IS FOR SEPTIC DESIGN ONLY

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 45577, Expiration Date: 06-08-2024.

STATE OF MARYLAND · JOHN M. CARNEY · 45577 · PROFESSIONAL ENGINEER

6/15/22

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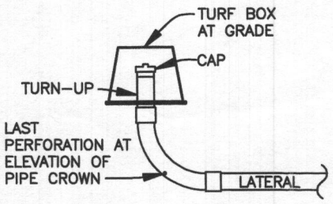
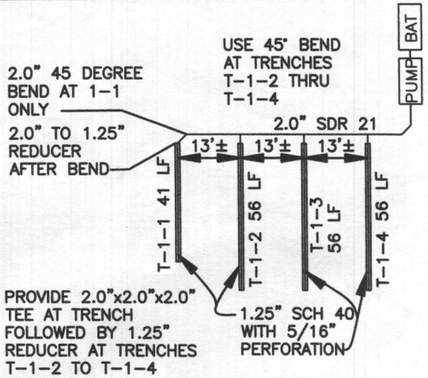
WWW.BEI-CIVILENGINEERING.COM

OWNER:
HOMES FOR OUR TROOPS, INC.
6 MAIN STREET
TAUNTON, MA 02780

PROJECT:	SPRING ROCK FARM LOT 1		
LOCATION:	TAX MAP: 07, GRID: 21, PARCEL 392 2301 WOODBINE ROAD, WOODBINE, MD 21797 FOURTH ELECTION DISTRICT, HOWARD COUNTY, MARYLAND ACCOUNT IDENTIFIED 04-354524		
TITLE:	BAT SITE PLAN		
HOUSE TYPE:	AMERICAN DREAM PLAN B -4B		
DATE:	JUNE, 2022	PROJECT NO.	3038
SCALE:	AS SHOWN	DRAWING	4 OF 5

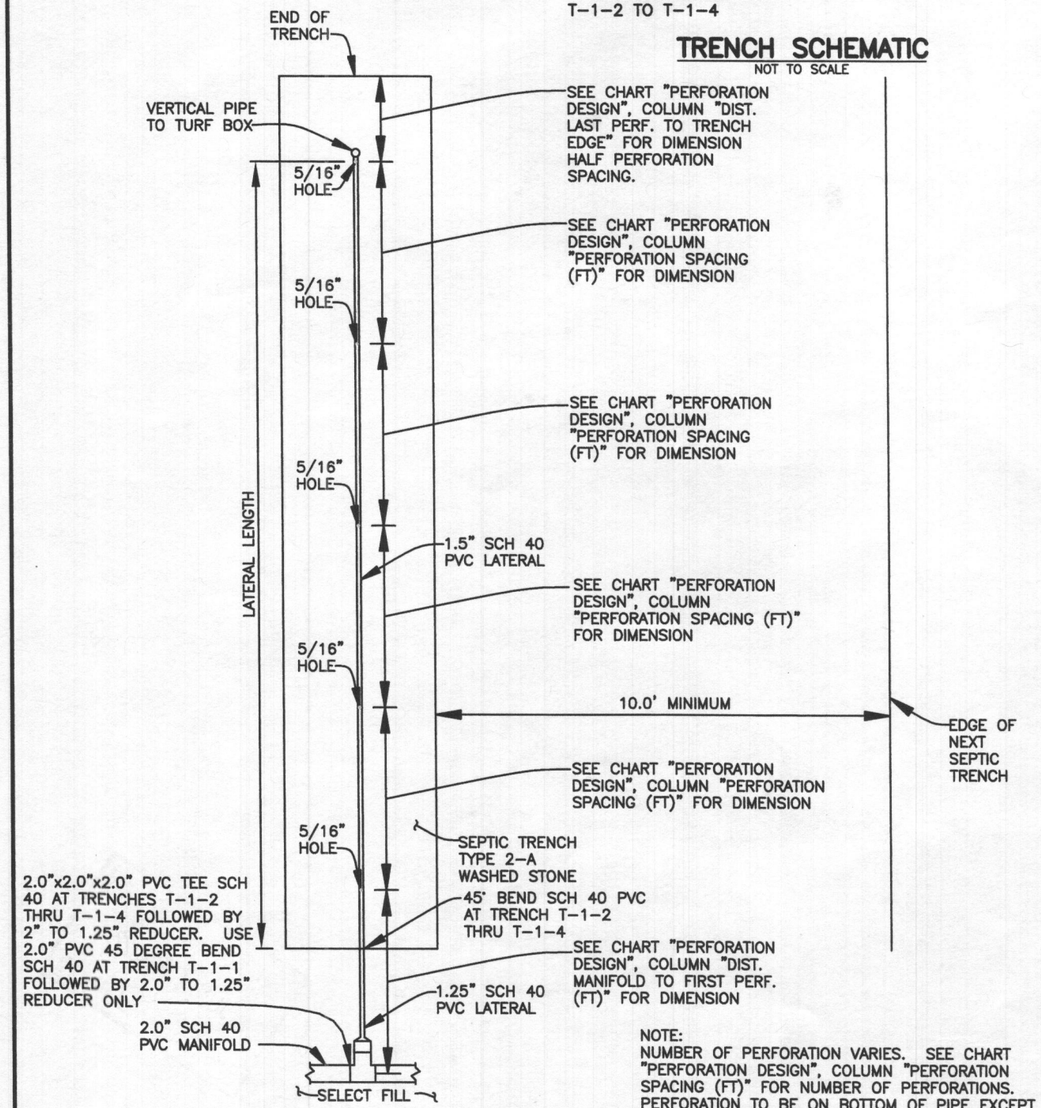


END PERFORATION AND TURN-UP DETAIL



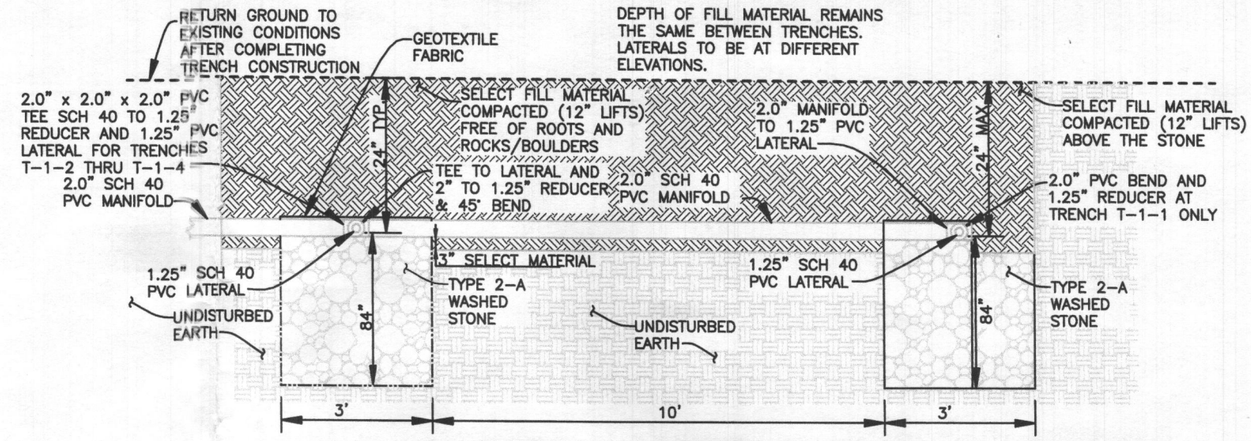
TRENCH SCHEMATIC

NOT TO SCALE

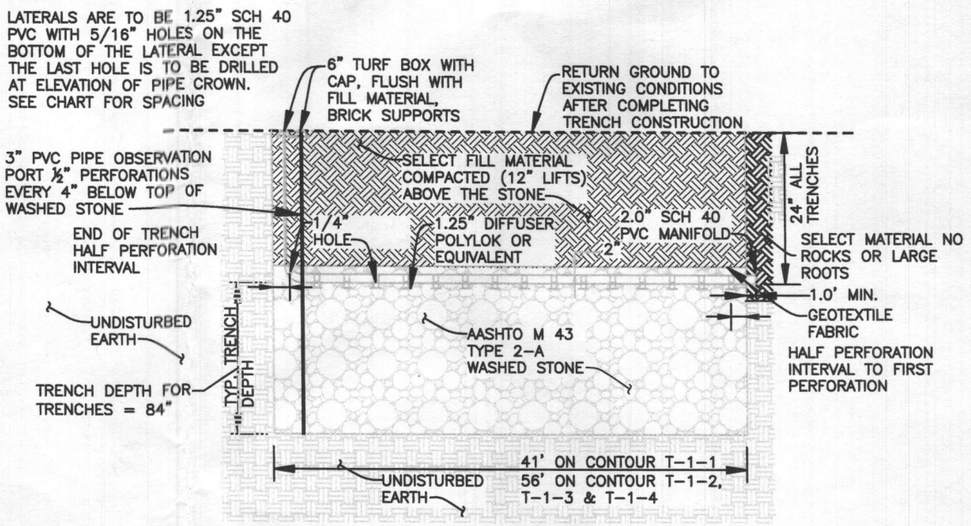


PERFORATION SPACING AND LATERAL LENGTH DIAGRAM

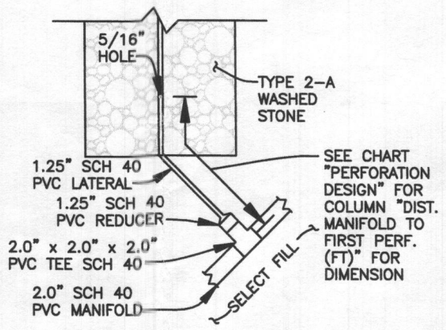
NOTE:
NUMBER OF PERFORATION VARIES. SEE CHART "PERFORATION DESIGN", COLUMN "PERFORATION SPACING (FT)" FOR NUMBER OF PERFORATIONS. PERFORATION TO BE ON BOTTOM OF PIPE EXCEPT THE LAST PERFORATION TO BE AT VERTICAL BEND SET ON THE OUTSIDE OF THE PIPE BEND AT ELEVATION OF TOP OF PIPE.



TRENCH AND MANIFOLD SECTION



LATERAL AND TRENCH DESIGN



OVERHEAD VIEW OF MANIFOLD AND LATERAL CONNECTION SECTION

OWNER:
HOMES FOR OUR TROOPS, INC.
6 MAIN STREET
TAUNTON, MA 02780

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 45577, Expiration Date: 06-08-2024.

STATE OF MARYLAND · JOHN M. CARNEY · 45577 · PROFESSIONAL ENGINEER

6/15/22

BENCHMARK
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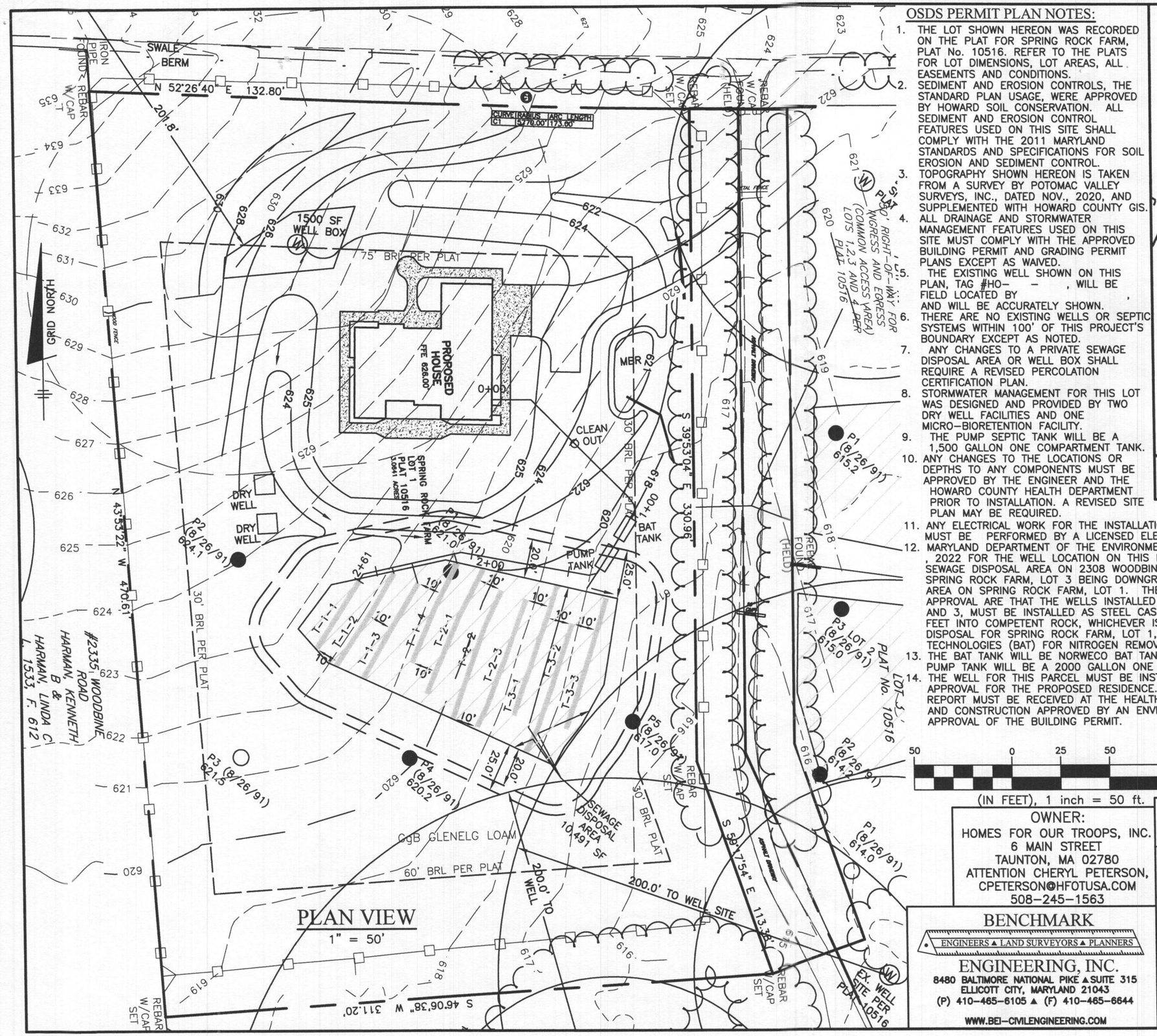
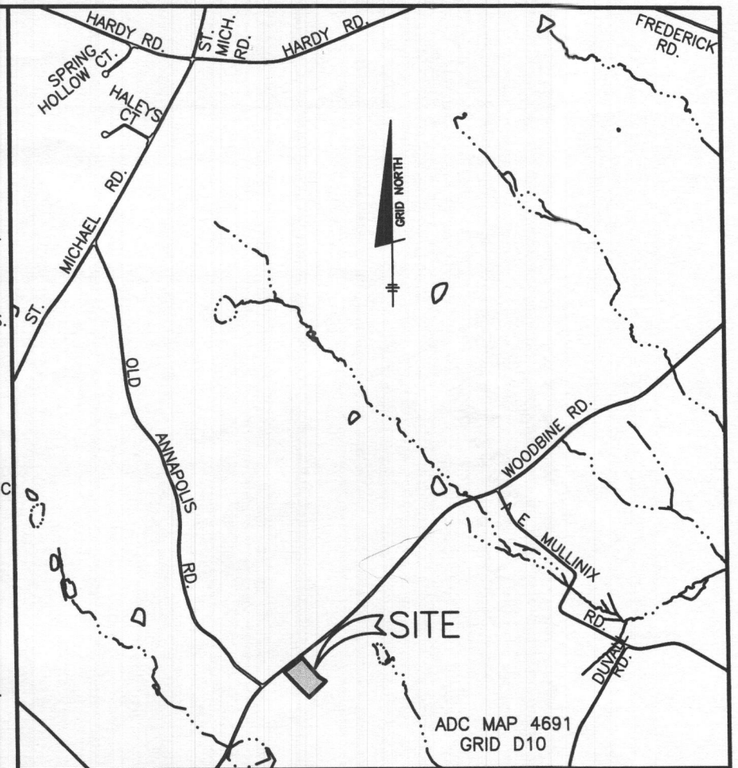
ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 ▲ (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.COM

PROJECT:	SPRING ROCK FARM LOT 1
LOCATION:	TAX MAP: 07, GRID: 21, PARCEL 392 2301 WOODBINE ROAD, WOODBINE, MD 21797 FOURTH ELECTION DISTRICT, HOWARD COUNTY, MARYLAND ACCOUNT IDENTIFIED 04-354524
TITLE:	BAT SITE PLAN
HOUSE TYPE:	AMERICAN DREAM PLAN B -4B
DATE:	JUNE, 2022
PROJECT NO.	3038
SCALE:	AS SHOWN
DRAWING	5 OF 5



OSDS PERMIT PLAN NOTES:

1. THE LOT SHOWN HEREON WAS RECORDED ON THE PLAT FOR SPRING ROCK FARM, PLAT No. 10516. REFER TO THE PLATS FOR LOT DIMENSIONS, LOT AREAS, ALL EASEMENTS AND CONDITIONS.
2. SEDIMENT AND EROSION CONTROLS, THE STANDARD PLAN USAGE, WERE APPROVED BY HOWARD SOIL CONSERVATION. ALL SEDIMENT AND EROSION CONTROL FEATURES USED ON THIS SITE SHALL COMPLY WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
3. TOPOGRAPHY SHOWN HEREON IS TAKEN FROM A SURVEY BY POTOMAC VALLEY SURVEYS, INC., DATED NOV., 2020, AND SUPPLEMENTED WITH HOWARD COUNTY GIS.
4. ALL DRAINAGE AND STORMWATER MANAGEMENT FEATURES USED ON THIS SITE MUST COMPLY WITH THE APPROVED BUILDING PERMIT AND GRADING PERMIT PLANS EXCEPT AS WAIVED.
5. THE EXISTING WELL SHOWN ON THIS PLAN, TAG #HO- - , WILL BE FIELD LOCATED BY , AND WILL BE ACCURATELY SHOWN.
6. THERE ARE NO EXISTING WELLS OR SEPTIC SYSTEMS WITHIN 100' OF THIS PROJECT'S BOUNDARY EXCEPT AS NOTED.
7. ANY CHANGES TO A PRIVATE SEWAGE DISPOSAL AREA OR WELL BOX SHALL REQUIRE A REVISED PERCOLATION CERTIFICATION PLAN.
8. STORMWATER MANAGEMENT FOR THIS LOT WAS DESIGNED AND PROVIDED BY TWO DRY WELL FACILITIES AND ONE MICRO-BIORETENTION FACILITY.
9. THE PUMP SEPTIC TANK WILL BE A 1,500 GALLON ONE COMPARTMENT TANK.
10. ANY CHANGES TO THE LOCATIONS OR DEPTHS TO ANY COMPONENTS MUST BE APPROVED BY THE ENGINEER AND THE HOWARD COUNTY HEALTH DEPARTMENT PRIOR TO INSTALLATION. A REVISED SITE PLAN MAY BE REQUIRED.
11. ANY ELECTRICAL WORK FOR THE INSTALLATION MUST BE PERFORMED BY A LICENSED ELECTRICIAN.
12. MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED VARIANCES ON , 2022 FOR THE WELL LOCATION ON THIS PARCEL BEING DOWNGRADE OF THE SEWAGE DISPOSAL AREA ON 2308 WOODBINE ROAD, AND FOR THE WELL ON SPRING ROCK FARM, LOT 3 BEING DOWNGRADE OF THE SEWAGE DISPOSAL AREA ON SPRING ROCK FARM, LOT 1. THE CONDITIONS OF THE VARIANCE APPROVAL ARE THAT THE WELLS INSTALLED ON SPRING ROCK FARM, LOTS 1 AND 3, MUST BE INSTALLED AS STEEL CASING TO A DEPTH OF 50 FEET OR 10 FEET INTO COMPETENT ROCK, WHICHEVER IS DEEPER, AND THAT THE SEWAGE DISPOSAL FOR SPRING ROCK FARM, LOT 1, MUST UTILIZE BEST AVAILABLE TECHNOLOGIES (BAT) FOR NITROGEN REMOVAL AND LOW PRESSURE DOSING.
13. THE BAT TANK WILL BE NORWECO BAT TANK, MODEL TNTLP-500 GPD. THE PUMP TANK WILL BE A 2000 GALLON ONE COMPARTMENT TANK.
14. THE WELL FOR THIS PARCEL MUST BE INSTALLED PRIOR TO BUILDING PERMIT APPROVAL FOR THE PROPOSED RESIDENCE. THE OFFICIAL WELL COMPLETION REPORT MUST BE RECEIVED AT THE HEALTH DEPARTMENT, AND THE WELL YIELD AND CONSTRUCTION APPROVED BY AN ENVIRONMENTAL SANITARIAN BEFORE APPROVAL OF THE BUILDING PERMIT.



VICINITY MAP

SCALE: 1" = 2000'

LEGEND

- S 46°06'38" W 311.20' — PROPERTY BOUNDARY
- 620 / 624 — EXISTING CONTOURS
- (W) — WELL LOCATION
- ● — PASSED PERCOLATION TEST PER TEST NOTES
- ○ — FAILED PERCOLATION TEST PER TEST NOTES
- Ggc GLENELG LOAM / Ggb GLENELG LOAM — SOILS DELINEATION
- EXISTING TREELINE
- EXISTING APPROVED SEWAGE DISPOSAL AREA

PLAN VIEW

1" = 50'

50 0 25 50 100

(IN FEET), 1 inch = 50 ft.

OWNER:
HOMES FOR OUR TROOPS, INC.
6 MAIN STREET
TAUNTON, MA 02780
ATTENTION CHERYL PETERSON,
CPETERSON@HFOTUSA.COM
508-245-1563

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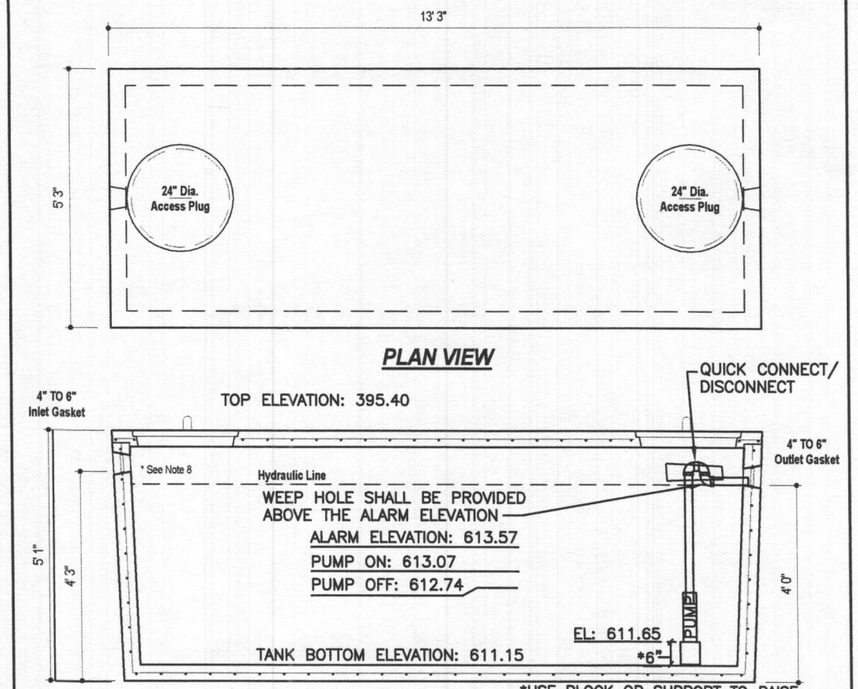
PROJECT:	SPRING ROCK FARM LOT 1
LOCATION:	TAX MAP: 07, GRID: 21, PARCEL 392 2301 WOODBINE ROAD, WOODBINE, MD 21797 FOURTH ELECTION DISTRICT, HOWARD COUNTY, MARYLAND ACCOUNT IDENTIFIED 04-354524
TITLE:	BAT SITE PLAN
HOUSE TYPE:	AMERICAN DREAM PLAN B -4B
DATE: MARCH, 2022	PROJECT NO. 3038
SCALE: AS SHOWN	DRAWING 1 OF 5

J:\3038 Spring Rock Farm Lot 1\dwg\1000V2 alt.dwg, OSDS, 3/7/2022 1:38:37 PM



PLAN VIEW

SECTION A-A

*USE BLOCK OR SUPPORT TO RAISE PUMP INLET A MINIMUM OF 0.5' OFF TANK BOTTOM

DESIGN DATA & GENERAL NOTES

[1] Concrete strength f'c=4,000 p.s.i. @ 28 days. Density = 150 pcf.
[2] Cement - Portland Type I/II per ASTM C 150-92.
[3] Admixtures & plasticizers per ASTM C 260-86 & C 494-92.
[4] Reinforcing per ASTM A185. Min. 1-1/2" cover.
[5] Top slab sealed with butyl rope mastic.
[6] 4" wall, base, & top thickness.
[7] Max 3' of cover
*[8] Depending on use of tank, inlet & Outlet baffle may be required by code.

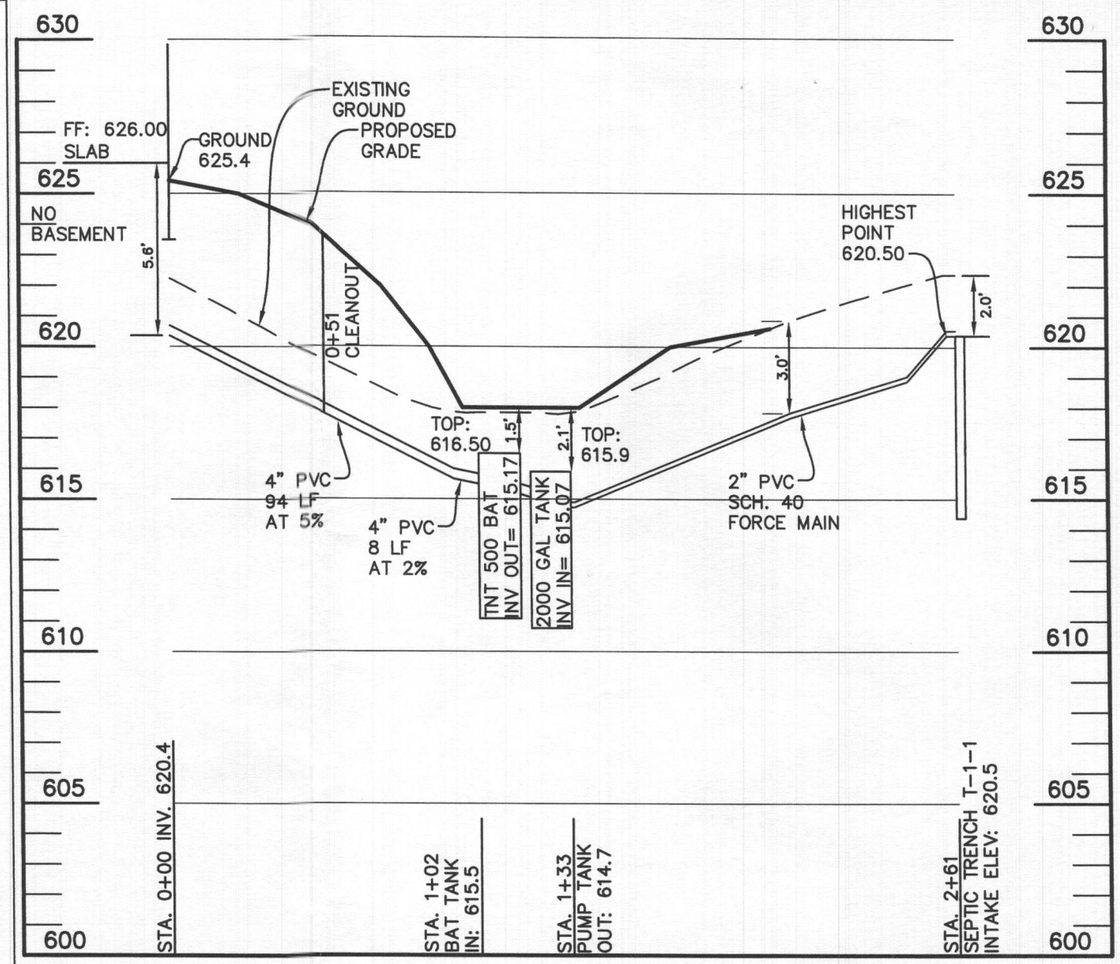
Float Tree:	Elev.	Relative to Bottom
Bottom of Tank	611.15	
Top of Pump	612.65	1' 6"
Pump Off	612.74	1' 7"
Pump On	613.07	1' 11 1/16"
High Alarm	613.57	2' 5 1/16"

WEIGHT = 16,000 lbs.

MBI Mayer Bros., Inc.
6264 Race Road
Elkridge, Maryland 21075
Tel. 410.796.1434
Fax. 410.796.1438
www.mayerbrosprecast.com

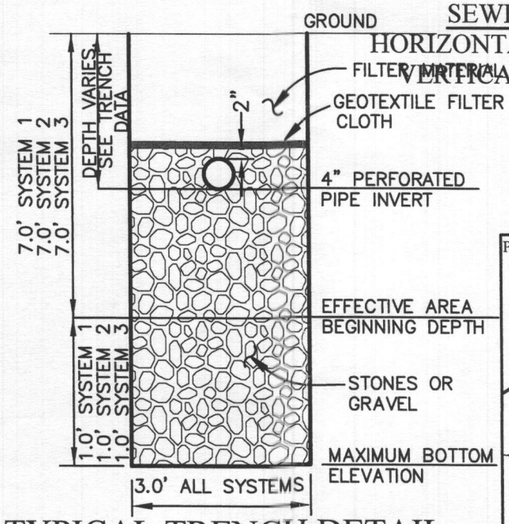
1,500 GALLON SEPTIC/PUMP TANK
1-Compartment
NON-TRAFFIC MAX 3 ft. OF COVER

Dwg. No. 1500-1C	No Scale	Aug. 11, 2008



SEWER PROFILE

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



TYPICAL TRENCH DETAIL

NOT TO SCALE

INITIAL SYSTEM		
Number of Bedrooms	4	
Application Rate	0.8	gpd/sf
Effective Area Beginning Depth	7.0	ft
Bottom Max Depth	8.0	ft
Design Flow	600	gpd
Drainage Field square footage	750	sf
Sidewall Reduction Credit	0.83	
Trench width	3	ft
Effective Area Depth	1	ft
Trench Spacing	10	ft
Linear Length of trench Required	**208**	lf

1st REPAIR SYSTEM		
Number of Bedrooms	4	
Application Rate	0.8	gpd/sf
Effective Area Beginning Depth	7.0	ft
Bottom Max Depth	8.0	ft
Design Flow	600	gpd
Drainage Field square footage	750	sf
Sidewall Reduction Credit	0.83	
Trench width	3	ft
Effective Area Depth	1	ft
Trench Spacing	10	ft
Linear Length of trench Required	**208**	lf

2nd REPLACEMENT SYSTEM		
Number of Bedrooms	4	
Application Rate	0.8	gpd/sf
Effective Area Beginning Depth	7.0	ft
Bottom Max Depth	8.0	ft
Design Flow	600	gpd
Drainage Field square footage	750	sf
Sidewall Reduction Credit	0.83	
Trench width	3	ft
Effective Area Depth	1	ft
Trench Spacing	10	ft
Linear Length of trench Required	**208**	lf

SPEC SHEET INFORMATION - Lot 1 10/26/2020			
System	Application Rate	Effective Depth	Bottom Depth
Initial	0.8	7.0	8.0
1st Repair	0.8	7.0	8.0
2nd Replacement	0.8	7.0	8.0

Trench	LF
T-1-1	41
T-1-2	56
T-1-3	56
T-1-4	56
Total Initial System	209
T-2-1	70
T-2-2	70
t-2-3	70
Total First Repair	210
T-3-1	70
T-3-2	70
T-3-3	70
Total Second Repair	210

OWNER:
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TAUNTON, MA 02780

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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 45577, Expiration Date: 06-08-2022.

STATE OF MARYLAND JOHN M. CARNEY 45577 PROFESSIONAL ENGINEER 5/7/22

PROJECT: **SPRING ROCK FARM LOT 1**

LOCATION: TAX MAP: 07, GRID: 21, PARCEL 392
2301 WOODBINE ROAD, WOODBINE, MD 21797
FOURTH ELECTION DISTRICT, HOWARD COUNTY, MARYLAND
ACCOUNT IDENTIFIED 04-354524

TITLE: BAT SITE PLAN

HOUSE TYPE: AMERICAN DREAM PLAN B -4B

DATE: MARCH, 2022 | PROJECT NO. 3038

SCALE: AS SHOWN | DRAWING 2 OF 5

J:\3038 Spring Rock Farm Lot 1\dwg\1000V2 alt.dwg, OSDS, 3/7/2022 1:11:33 PM

Design Calculations

Design Input: | **Calculations:**

Capacity requirements

number of lots	1	Max. Daily Flow	600 gpd
bedrooms per lot	4	Average Daily Flow	300 gpd
use rate per bedroom	150 gpd	Maximum Daily Flow	0.42 gpm
		Average Daily Flow	0.21 gpm

Drainfield Requirements

Application Rate	0.8 gpd/sq ft	Standard Trench Length	250.00 ft
Trench width	3 ft	Deep Trench Conversion Factor	83.33 %
trench gravel depth	1 ft	Deep Trench Length for MDF	208.325 ft
number of trenches	4	total trench length for 100% capacity	208.325 ft
trench spacing center-center	10 ft	individual trench length	52.1 ft
		Approx. Lateral Length	48.10 ft

Tanks and Capacities

		minimum req. area	2499.9 sf
BAT tank	1,300 gallons	req. capacity (1125+(0.75*MDF))	1575 gal.
2nd settling tank	NA gallons	design settling capacity	NA gal.
Equalization Tank	NA gallons		
pump tank size	1,000 gallons	min. pump tank capacity (ADF)	437 gal.

15000

Distribuition system

number of cells	1		
		Total Number of Pumps	1
trenches first system	4	laterals served by pump	4
lateral length per pump	216.4 ft	Vol./100 ft 1.5" SCH 40	10.6 gal.
ID 1.5" SCH 40 PVC	inches	Vol. of laterals served	22.9 gal.
Max. Manifold length	128 ft	Vol./100 ft 2.0" SCH 40	17.4 gal.
ID 2.0" SCH 40 PVC	inches	Max. Main volume	22.3 gal.

Static Hydraulic Profile

Ground Elev. At BAT tank	618.00 ft		Tank #1 effulent out elev	615.17 ft
Tank #1 invert in	615.50 ft			
Cover	1.50 ft			
Tank #1 top	616.50 ft	okay		
Fall in tanks	0.33 ft		Pump Tank effulent in elev	615.07 ft
Fall between tanks	0.10 ft		Invert of pump tank	611.15 ft
Ground Elev. at pump tank	618.00 ft			
Pump Tank invert in	615.07 ft			
inv. into pump tank to top	0.83 ft		Pump Elevation	611.65 ft
Pump Tank top	615.90 ft	okay	pump intake elev.	611.92 ft
Pump Block Height	0.50 ft			
Height of Intake	0.27 ft			
Highest lateral	620.50 ft	Cell 1		

Perforation Design:

		Distal Pressure =	3.0 ft
Size of Perforation	1/4 inches	Flow	1.28 gpm
Design Separation	7.00 ft	Perforations per Lateral	7.44
Use Perforations	7	Perforation Actual Spacing	7.44 ft
Perforations per field	28	Flow rate	35.74 gpm

Dosing volume, flow rates and Pressures

lateral flow rate per pump	35.74 gpm	Static Head	7.76 ft Cell 1 ✓
Friction (C) for PVC	150	Friction Head	4.11 ft Cell 1
Miscellaneous Losses	0 ft	Distal Head	3 ft
Estimated Run Time	4.00 Min.	Max. Total Dynamic Head	14.88 ft
Cells in simultaneous use	1	Estimated Dose (5xLateral+1xMain) Vol.	136.96 gal. ✓
Pump tank Volume	35.91 Gal/in	Min. Runtime	4.09 min.
		Minimum Dose Volume	146.16 gal.
		Average Doses	2.05 per day

Tank and Float Design:

Ground over Tank =	618.00 ft	Inside Tank Dimenions	
Top of Tank =	615.90 ft	Height =	4.42 ft
Invert of Tank =	611.15 ft	Width =	4.58 ft
Pump Block=	0.50 ft	Length =	12.58 ft
Water End and Motor =	1.00 ft	Number of Tanks =	1

minimum Pump off =	612.65 ft	
Pump Off Float =	612.74 ft	
Dose =	19.54 cf	.146 gallons
Area of Pit	57.62 sf	Use one 1,500 gallon pump tank
Pump on dist. =	0.34 ft	
Pump on Elev. =	613.07 ft	
Distance between Pump on and Highwater Alarm =		0.5 ft
Highwater Alarm Elevation =		613.57 ft
High Water Alarm to inlet =	1.50	
Volume Above Alarm Float to Inlet =	86.19 cf or	644.67 gallons
One Day Flow =	600.00 gallons	okay

Lateral Pressure Calculations

Cell	Trench	Pipe Elev.	Beginning Manifold Loss	Gate Valve	Manifold Bends 45D	Manifold Length	Manifold velocity	Manifold Thru Tees	Delta Loss Manifold	Total Manifold Loss	Lateral 90 degree side tee loss	Sudden Reduction Loss	Lateral Bends 45 deg. Loss	Lateral Length to first perf. Loss	Lateral Loss Summation	Total Loss to First Perf.	Total Design Head (ft)	Lateral Pressure Head (ft)	Flow per Lateral (gpm)
1	4	618.8	0		0	77	35.74	0	1.64	1.64	0.06	0.01	0.0057	0.05	0.12	1.76	10.83	4.70	12.78
	3	619.5	1.64		0	22	26.80	1	0.30	1.95	0.06	0.01	0.0057	0.08	0.15	2.10	11.86	4.00	11.79
	2	619.9	1.95		0	10	17.9	1	0.07	2.02	0.06	0.01	0.0057	0.03	0.11	2.13	12.29	3.60	12.58
	1	620.5	2.02		1	19	8.9	1	0.04	2.05	0.06	0.01	0.0000	0.02	0.08	2.14	12.90	3.00	8.93

Perforation Diameter = 1/4 inches Distal Heac 3 feet

Trench and Lateral Design

Cell	Trench	Pipe Inv. Elev.	Trench Bottom Elev.	Highest Ground Over	Lowest Ground Over	Lateral Pressure Head (ft)	Approx. Lateral Length (ft)	Number of Perforations	Flow per Perforation (gpm)	Flow per Lateral (gpm)	Lateral Flow Differential	Loading Rate per lf Trench	LR Differential
1	1	620.5	614.5	622.5	622.5	3.00	41	7	1.28	8.93	0.0%	0.22	0.00%
	2	619.9	613.9	621.9	621.9	3.60	56	9	1.40	12.58	40.8%	0.22	3.12%
	3	619.5	613.5	621.5	621.5	4.00	63	8	1.47	11.79	32.0%	0.21	3.38%
	4	618.8	612.8	620.8	620.8	4.70	58	8	1.60	12.78	43.0%	0.23	4.73%

Perforation Diameter = 1/4 inches Target Flow = 8.93 gpm

	Depth To Effective Sidewall	Deep Trench Depth	Depth to Inlet
Trench 1	7 ft	8 ft	2.0 ft
Trench 2	7 ft	8 ft	2.0 ft
Trench 3	7 ft	8 ft	2.0 ft
Trench 4	7 ft	8 ft	2.0 ft

Perforation Design

Cell	Trench	Number of Perforations	Manifold to Trench (ft)	Trench Length (ft)	Perforation Spacing (ft)	Dist. Manifold to First Perf. (ft)	Dist. Last Perf. to Trench Edge	Lateral Length (ft)
1	1	7	0.0	41	5.86	2.93	2.93	38.07
	2	9	2.9	56	6.22	6.01	3.11	55.79
	3	8	10.5	56	7.00	14.00	3.50	63.00
	4	8	5.0	56	7.00	8.50	3.50	57.50

Cell 1 Flow Rate 46.09

Lat. length
41 - ½(5.86) = 38'
Trench length
7 X 5.86 = 41'

38
52.89
52.5
52.5

Trench flow rate = Flow

8.93/41' = 0.22 ✓
12.58/56 = 0.22 ✓
11.79/56 = 0.21 ✓
12.78/56 = 0.23 ✓

Is "Trench flow Rate" the same as "flow per lateral"?

7 x 1.28 = 8.96
9 x 1.40 = 12.6
8 x 1.47 = 11.76

match in LPD chart with pressure head

TRENCH DATA - LOT 1

INITIAL SYSTEM		FIRST REPLACEMENT		SECOND REPLACEMENT	
TRENCH 1-1		**TRENCH 2-1**		**TRENCH 3-1**	
LENGTH	41 ft	LENGTH	70 ft	LENGTH	70 ft
GROUND ELEVATION	622.5	GROUND ELEVATION	620.3	GROUND ELEVATION	618.6
INVERT ELEVATION	620.5	INVERT ELEVATION	618.3	INVERT ELEVATION	616.6
MAX BOTTOM ELEVATION	614.5	MAX BOTTOM ELEVATION	612.3	MAX BOTTOM ELEVATION	610.6
TRENCH 1-2		**TRENCH 2-2**		**TRENCH 3-2**	
LENGTH	56 ft	LENGTH	70 ft	LENGTH	70 ft
GROUND ELEVATION	621.9	GROUND ELEVATION	619.8	GROUND ELEVATION	618.1
INVERT ELEVATION	619.9	INVERT ELEVATION	617.8	INVERT ELEVATION	616.1
MAX BOTTOM ELEVATION	613.9	MAX BOTTOM ELEVATION	611.8	MAX BOTTOM ELEVATION	610.1
TRENCH 1-3		**TRENCH 2-3**		**TRENCH 3-3**	
LENGTH	56 ft	LENGTH	70 ft	LENGTH	70 ft
GROUND ELEVATION	621.5	GROUND ELEVATION	619.2	GROUND ELEVATION	617.6
INVERT ELEVATION	619.5	INVERT ELEVATION	617.2	INVERT ELEVATION	615.6
MAX BOTTOM ELEVATION	613.5	MAX BOTTOM ELEVATION	611.2	MAX BOTTOM ELEVATION	609.6
TRENCH 1-4					
LENGTH	56 ft				
GROUND ELEVATION	620.8				
INVERT ELEVATION	618.8				
MAX BOTTOM ELEVATION	612.8				

Friction Head
main

Friction Head = Head loss due to pipe friction
2.0" pipe = 128 feet

45° bends	3 loss for manifold bend	12.0 feet	per table 4.3
90° Bend	3 loss for manifod bend	30.0 feet	per table 4.3
Str. Coupling	3 loss for straight tee	6.0 feet	per table 4.3
90 deg. Side tee	1 loss for tee bend	10.0 feet	per table 4.3 for smaller pipe
Sudden reduction	1 loss for reduction	1.0 feet	per Crane Co. technical paper
45° bends	1 loss for lateral bend	3.0 feet	per table 4.3
Gate Valve	0 loss for valve	0.0 feet	per table 4.3

1.5" lat.

Equivalent Manifold Length = 176.0 Friction loss = 3.76 feet

1.5" lateral 62.10 feet Friction loss = 0.36 feet

Total Friction Head = 4.11

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 45577, Expiration Date: 06-08-2022.

STATE OF MARYLAND · JOHN M. GARNEY · 45577 · PROFESSIONAL ENGINEER

3/7/22

OWNER:
HOMES FOR OUR TROOPS, INC.
6 MAIN STREET
TAUNTON, MA 02780

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PROJECT: **SPRING ROCK FARM LOT 1**

LOCATION: TAX MAP: 07, GRID: 21, PARCEL 392
2301 WOODBINE ROAD, WOODBINE, MD 21797
FOURTH ELECTION DISTRICT, HOWARD COUNTY, MARYLAND
ACCOUNT IDENTIFIED 04-354524

TITLE: BAT SITE PLAN

HOUSE TYPE: AMERICAN DREAM PLAN B -4B

DATE: MARCH, 2022 | PROJECT NO. 3038

SCALE: AS SHOWN | DRAWING 3 OF 5

Trusted. Tested. Tough.®

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

ZOELLER® PUMP COMPANY

SECTION: 2.30.030
FM2769
0821
Supersedes
0220

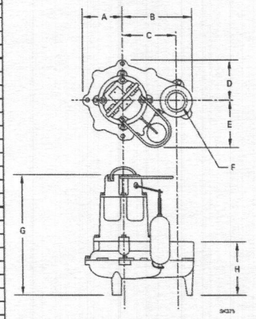
TECHNICAL DATA SHEET

WASTE-MATE SERIES

Models 266 & 267 Sewage/*Effluent or Dewatering Pumps

PRODUCT SPECIFICATIONS

MOTOR	Horse Power	1/2
	Voltage	115 - 460
	Phase	1 or 3 Ph
	Hertz	60 Hz
	RPM	1725
	Type	Permanent split capacitor
	Insulation	Class B
	Amps	1.5 - 9.4
PUMP	Operation	Automatic or nonautomatic
	Auto On/Off Points	12" (30 cm) / 4" (10 cm)
	Discharge Size	2" NPT
	Solids Handling	2" (50 mm) spherical solids
	Cord Length	10' (3 m) automatic or 15' (5 m) nonautomatic
	Cord Type	UL listed neoprene cord and plug
	Max. Head	21.5' (6.6 m)
	Max. Flow Rate	128 GPM (484 LPM)
	Max. Operating Temp.	130° F (54° C)
	Cooling	Oil filled
	Motor Protection	Auto reset thermal overload (1 Ph)
MATERIALS	Cap	Cast iron
	Motor Housing	Cast iron
	Pump Housing	Cast iron
	Base	Cast iron or engineered plastic
	Upper Bearing	Sleeve bearing
	Lower Bearing	Sleeve bearing
	Mechanical Seals	Carbon and ceramic
	Impeller Type	Non-clogging vortex
	Impeller	Engineered plastic w/ metal insert
	Hardware	Stainless steel
	Motor Shaft	AISI 1215 cold rolled steel
	Gasket	Neoprene
	Min. Basin Size	Simplex: 18" x 30" (45.7 x 76.2 cm) Duplex: 30" x 36" (76.2 x 91.4 cm)



NOTE: The sizing of effluent systems normally requires variable level float(s) controls and properly sized basins to achieve required pumping cycles or dosing timers with nonautomatic pumps. See model comparison chart for specific details.

* May be used in those states where codes do not restrict solids size in effluent systems.

MODEL DIMENSIONS

MODEL	A	B	C	D	E	F	G	H
266	4-3/4" (12.1 cm)	8-5/16" (21.1 cm)	6-13/32" (16.3 cm)	4-13/16" (12.2 cm)	6-7/32" (15.8 cm)	2" NPT	14-1/4" (36.2 cm)	6-3/8" (16.2 cm)
267	4-3/4" (12.1 cm)	8-5/16" (21.1 cm)	6-13/32" (16.3 cm)	4-13/16" (12.2 cm)	6-7/32" (15.8 cm)	2" NPT	14-5/16" (36.4 cm)	6-7/16" (16.4 cm)

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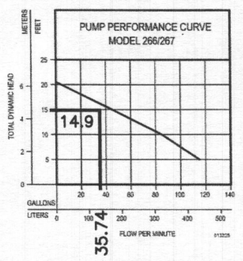
SELECTION GUIDE

1. Integral float operated mechanical switch, no external control required.
2. For automatic use single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. See FM1228 for correct model of simplex control panel.
4. See FM0712 for correct model of duplex control panel or FM1663 for a residential alternator system.

SPECIAL MODEL FEATURES

- Model 266 features a plastic base.
- Model 267 feature a cast iron base.
- Model 267 is available with a cast iron impeller, which is standard on all 3 Ph units.
- BN and BE models include a variable level pump switch.
- Additional cord lengths are available in 15' (5 m), 35' (11 m) and 50' (15 m).



CONSULT FACTORY FOR SPECIAL APPLICATIONS

- Minimum recommended basin size (Small load applications)
  Simplex - 18" x 30" (45.7 x 76.2 cm)
  Duplex - 30" x 36" (76.2 x 91.4 cm)
- High water alarms available

Standard All Models:
266 - Weight 41 lbs. (18.6 kg)
267 - Weight 47.5 lbs. (21.5 kg)

For "M" and "D" models, the approximate volume pumped out per cycle are:

Tank Diameter	Volume Pumped
18" Simplex	8 Gal (30.2 L)
24" Simplex	15 Gal (56.8 L)
30" Duplex	22 Gal (83.3 L)
36" Duplex	33 Gal (124.9 L)
48" Duplex	60 Gal (227.1 L)

MODEL	266/267	
Feet	Meters	Gal.	Liters
5	1.5	115	435
10	3.0	85	322
15	4.6	45	170
Shut-off Head:		20.5 ft.(6.2 m)	

⚠ CAUTION Maximum temperature of sewage or dewatering must be limited to 130°F (54°C). For over 130°F (54°C), special quotation required.

USE BN266 PUMP OR EQUIVALENT

Model	MODEL COMPARISON											CERTIFICATIONS	
	Seal	Mode	Volts	Ph	Amps	HP	Hz	Lbs	Kg	Simplex	Duplex	cCSAus	UL
M266/BN266	Single	Auto	115	1	9.4	1/2	60	41.0	19	1	4	Y	Y
N266	Single	Non	115	1	9.4	1/2	60	41.0	19	2 or 3	2 or 4	Y	Y
D266/BE266	Single	Auto	230	1	5.5	1/2	60	41.0	19	1	—	Y	Y
E266	Single	Non	230	1	5.5	1/2	60	41.0	19	2 or 3	4	Y	Y
H266	Single	Auto	200-208	1	6.2	1/2	60	41.0	19	1	—	Y	N
I266	Single	Non	200-208	1	6.2	1/2	60	41.0	19	3	4	Y	N
J266	Single	Non	200-208	3	2.8	1/2	60	41.0	19	3	4	Y	Y
F266	Single	Non	230	3	2.8	1/2	60	40.0	18	3	4	Y	Y
G266	Single	Non	460	3	1.5	1/2	60	40.0	18	3	4	Y	Y
M267/BN267	Single	Auto	115	1	9.4	1/2	60	47.5	22	1	4	Y	Y
N267	Single	Non	115	1	9.4	1/2	60	47.5	22	2 or 3	4	Y	Y
D267/BE267	Single	Auto	230	1	5.5	1/2	60	47.5	22	1	—	Y	Y
E267	Single	Non	230	1	5.5	1/2	60	47.5	22	2 or 3	4	Y	Y
H267	Single	Auto	200-208	1	6.2	1/2	60	47.5	22	1	—	Y	N
I267	Single	Non	200-208	1	6.2	1/2	60	47.5	22	3	4	Y	N
J267	Single	Non	200-208	3	2.8	1/2	60	47.5	22	3	4	Y	Y
F267	Single	Non	230	3	2.8	1/2	60	47.5	22	3	4	Y	Y
G267	Single	Non	460	3	1.5	1/2	60	47.5	22	3	4	Y	Y

⚠ 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 Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

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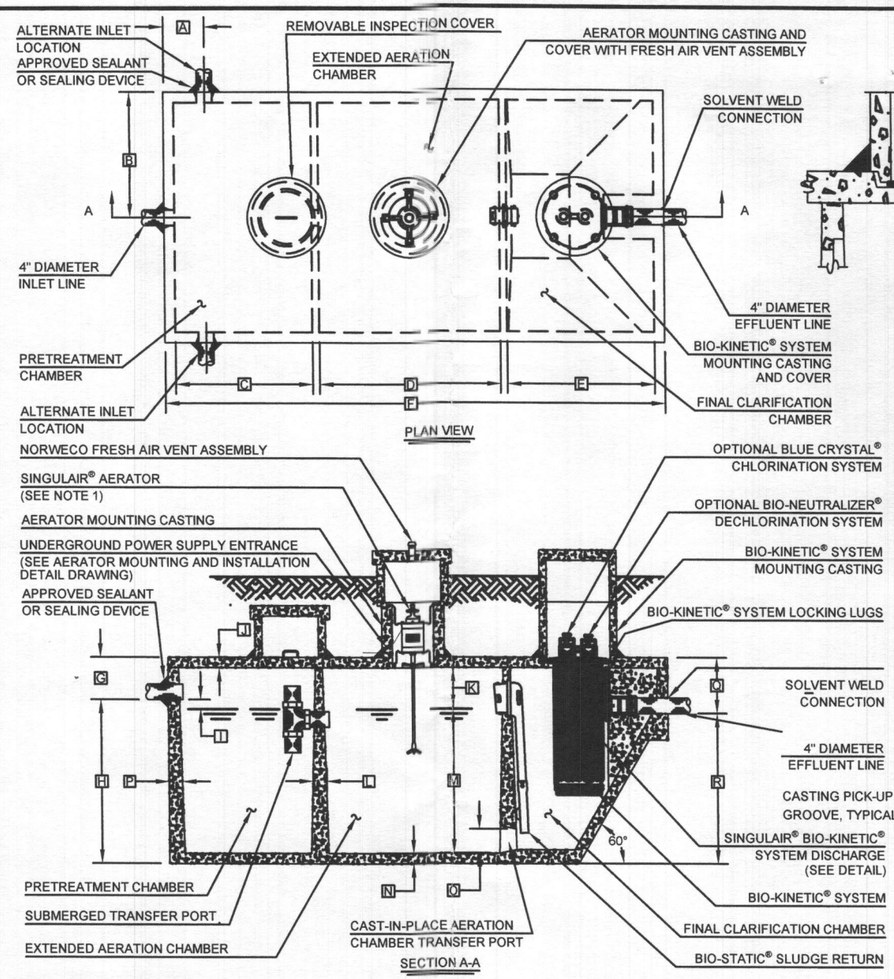

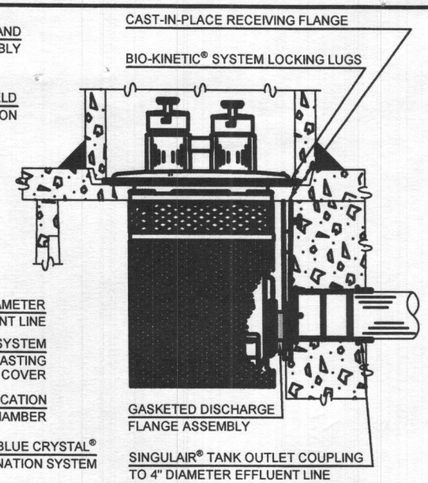

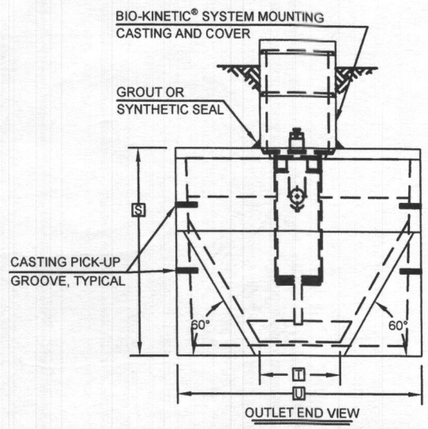

NOTE: TOTAL SYSTEM CAPACITY: 1,300 GALLONS
RATED CAPACITY: 500 GALLONS PER DAY

CRITICAL DIMENSIONS			
A	1'- 0"	N	0'- 3"
B	3' - 0"	O	0'- 6"
C	3'- 4"	P	0'- 3"
D	4'- 5"	Q	1'- 4"
E	3'- 7"	R	3'- 8"
F	12'- 2"	S	5'- 0"
G	1'- 0"	T	2'- 0"
H	4'- 0"	U	6' - 0"
I	0'- 3"	V	
J	0'- 3"	W	
K	1'- 0"	X	
L	0'- 2"	Y	
M	3'- 6"	Z	

U.S. AND FOREIGN PATENTS PENDING	norweco® LOW-PROFILE SINGULAIR® BIO-KINETIC® WASTEWATER TREATMENT SYSTEM MODEL TNTLP-500 GPD	REVISION DATE / REVISION	3-26-07 / B
		DRAWN BY	BDS
		APPROVED BY	JMM
		DATE	10-16-06
© MMVII	THIS DRAWING IS THE PROPERTY OF NORWECO INC. AND IS LOANED SUBJECT TO AGREEMENT THAT IT WILL NOT BE COPIED OR REPRODUCED IN WHOLE OR IN PART WITHOUT WRITTEN PERMISSION FROM NORWECO.	SCALE	NTS
		DRAWING NO	PC-5-7091

Required BAT Site Plan Notes

1. Any change to the locations or depths to any components must be approved by the engineer and the Howard County Health Department prior to installation. A revised sit plan may be required.
2. The maximum depth of the BAT shall be per the manufacturer's specification, 3.0'.
3. The blower may not be located further from the tank than the manufacturer's specifications, 75'.
4. The BAT system shall be maintained and operated for the life of the system.
5. The BAT shall be operated by and maintained by a certified service provider.
6. Within one month of installation, a person installing the BAT system shall report to the Maryland Department of the Environment (MDE) in a manner acceptable to MDE, the address and date of completion of the BAT installation and the type of BAT installed.
7. Electrical work for the BAT installation must be performed by a licensed electrician.
8. An agreement and Easement must be completed and signed by all applicable parties, and recorded in Land Records of Howard County.
9. The Health Department requires documentation for the start-up certification from the manufacturer prior to final approval of the installation.

GENERAL NOTES:

1. SINGULAIR® AERATOR, AS TESTED AND ACCEPTED BY NSF, OPERATING 60 MINUTES ON / 60 MINUTES OFF.
2. FALL THROUGH SINGULAIR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TWELVE INCHES BELOW TANK TOP.
3. ON DEEPER INSTALLATIONS, PRECAST RISERS MUST BE USED TO EXTEND AERATOR MOUNTING CASTING AND BIO-KINETIC® SYSTEM MOUNTING CASTING TO GRADE.
4. TANK REINFORCED PER ACI STD. 318-05.
5. REMOVABLE COVERS ON RISERS WEIGH IN EXCESS OF SEVENTY-FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.
6. CONTACT THE LOCAL, LICENSED SINGULAIR® DISTRIBUTOR FOR ELECTRICAL REQUIREMENTS.

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 45577, Expiration Date: 06-08-2022.

STATE OF MARYLAND · JOHN M. CARNEY · 45577 · PROFESSIONAL ENGINEER

3/7/22

SIGNATURE AND SEAL ARE FOR SEPTIC PROFILE AND CALCULATIONS ONLY, TANK, PUMP AND DETAILS WERE NOT DESIGNED OR REVIEWED BY THE ENGINEER:

THIS PLAN IS FOR SEPTIC DESIGN ONLY

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315
ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 ▲ (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.COM

Pump Requirements:

Performance = 35.74 gpm
Head of Water = 14.88 feet of head

Pump Selection: Zoeller Pump BN266
1/2 horse power 115 Volts Single Phase

OWNER:
HOMES FOR OUR TROOPS, INC.
6 MAIN STREET
TAUNTON, MA 02780

PROJECT:	SPRING ROCK FARM LOT 1		
LOCATION:	TAX MAP: 07, GRID: 21, PARCEL 392 2301 WOODBINE ROAD, WOODBINE, MD 21797 FOURTH ELECTION DISTRICT, HOWARD COUNTY, MARYLAND ACCOUNT IDENTIFIED 04-354524		
TITLE:	BAT SITE PLAN		
HOUSE TYPE:	AMERICAN DREAM PLAN B -4B		
DATE:	MARCH, 2022	PROJECT NO.	3038
SCALE:	AS SHOWN	DRAWING	4 OF 5

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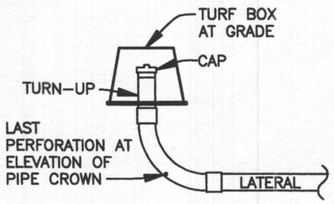
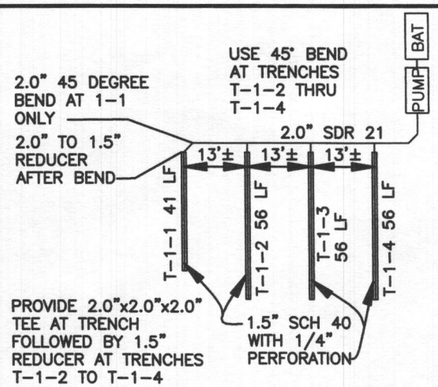
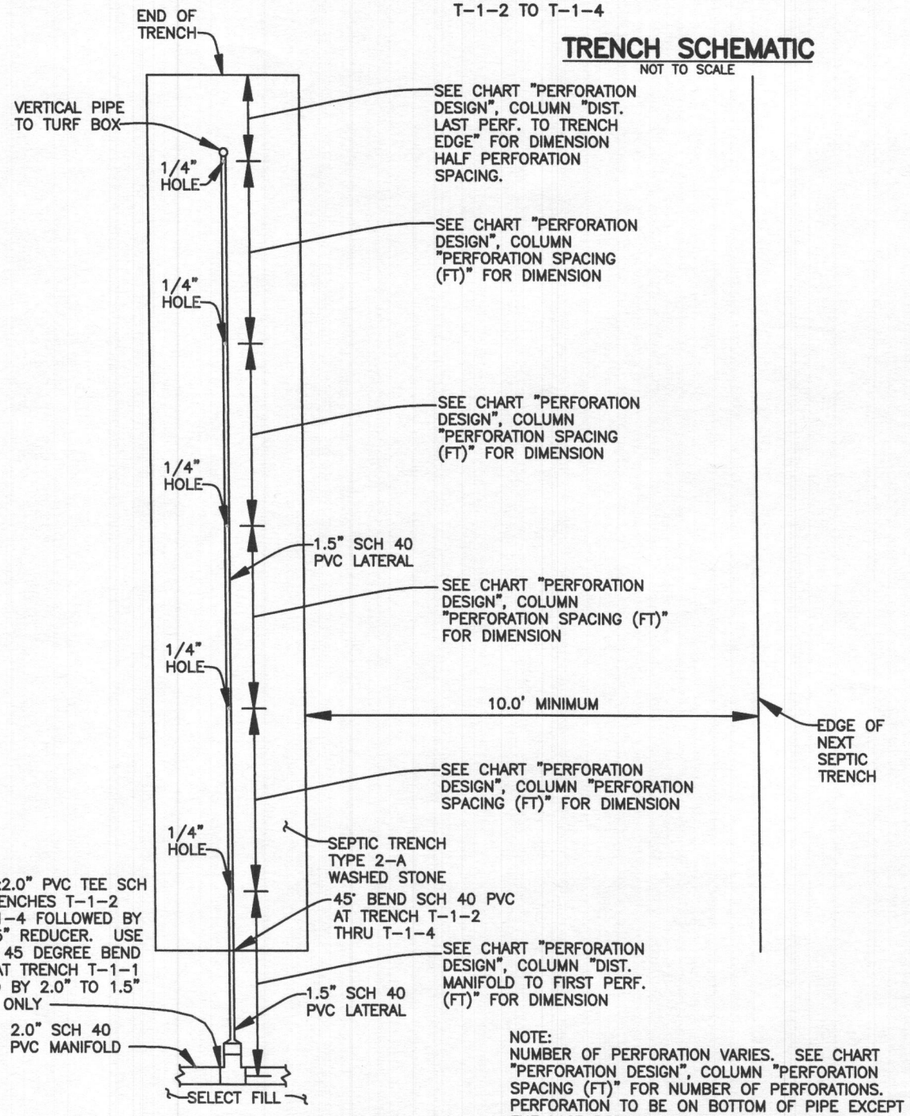


END PERFORATION AND TURN-UP DETAIL

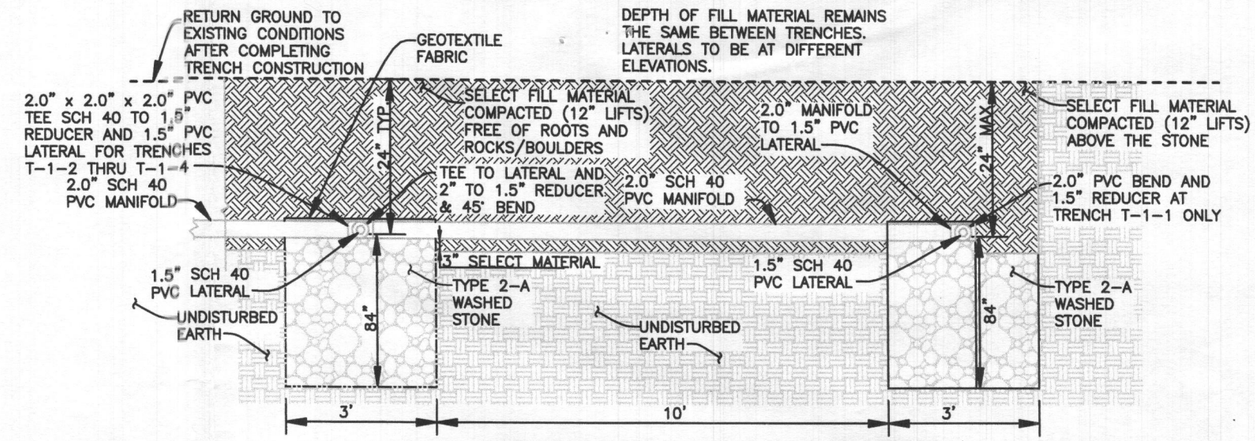


TRENCH SCHEMATIC
NOT TO SCALE

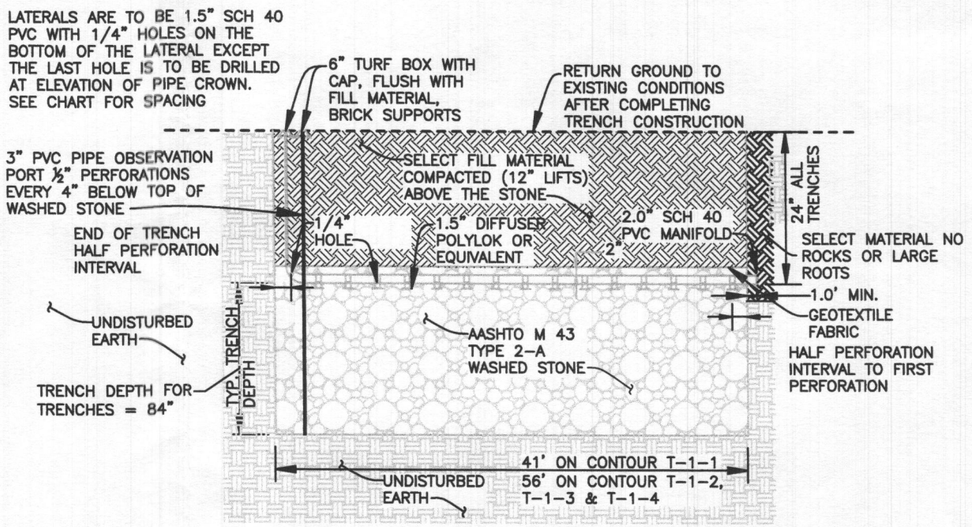


PERFORATION SPACING AND LATERAL LENGTH DIAGRAM

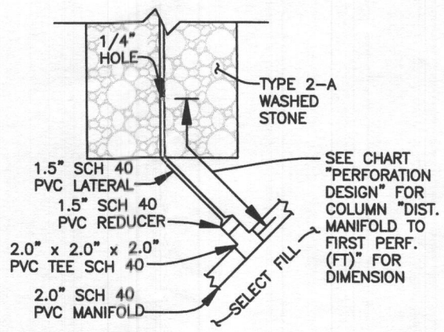
NOTE:
NUMBER OF PERFORATION VARIES. SEE CHART "PERFORATION DESIGN", COLUMN "PERFORATION SPACING (FT)" FOR NUMBER OF PERFORATIONS. PERFORATION TO BE ON BOTTOM OF PIPE EXCEPT THE LAST PERFORATION TO BE AT VERTICAL BEND SET ON THE OUTSIDE OF THE PIPE BEND AT ELEVATION OF TOP OF PIPE.



TRENCH AND MANIFOLD SECTION



LATERAL AND TRENCH DESIGN



OVERHEAD VIEW OF MANIFOLD AND LATERAL CONNECTION SECTION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 45577, Expiration Date: 06-08-2022.

STATE OF MARYLAND · JOHN M. CARNEY · 45577 · PROFESSIONAL ENGINEER

3/7/22

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