



HOWARD COUNTY HEALTH DEPARTMENT

62354

DATE 12/11/17

Received From

PHONE #

PS 240 338-0998

☐ CASH
☒ CHECK

NO.

198

For

Septic Permit (conventional)

12470 Potomac Dr.

Seven hundred twenty five

Dollars

\$

726 00

Received By

Shirley



Howard County
Health Department

Bureau of Environmental Health

8930 Stanford Boulevard, Columbia, MD 21045

Main: 410-313-2640 | Fax: 410-313-2648

TDD 410-313-2323 | Toll Free 1-866-313-6300

www.hchealth.org

Facebook: www.facebook.com/hocohealth

Maura J. Rossman, M.D., Health Officer

RECEIPT DATE: 2/11/17

ONSITE SEWAGE DISPOSAL SYSTEM

P 562354

APPROVAL DATE: 5/18/2018 *km*

PERMIT:

BRF REPAIR

LPD BED

A _____

PROPERTY ADDRESS: 12470 Petrillo Drive

SUBDIVISION: Waterman Est.

LOT: 19

TAX ID: 05-046978

CONTRACTOR: Garland Brian Sr., LLC

EMAIL: econno@aol.com

CONTRACTOR ADDRESS: 12871 Highland Road, Highland MD 20777

PHONE: 301-854-2161

CONTRACTOR CERTIFIED FOR BAT INSTALLATION:

☒ MDE

☒ MANUFACTURER:

Norweco

PROPERTY OWNER: Charles Mess, Jr

EMAIL: cfmessjr@verizon.net

OWNER ADDRESS: 12470 Petrillo Drive

PHONE: 240-338-0998

BAT UNIT MODEL: Norweco TNTLP 750

PUMP SIZE: 6/10 HP

PUMP TANK CAPACITY: 2000g

OPERATION & MAINTENANCE AGREEMENT

DATE SIGNED: 6/21/16

DATE RECORDED:

DISTRIBUTION SYSTEM:

☐ GRAVITY

☒ PRESSURE DOSED

BEDROOMS: 6

APPLICATION RATE: 0.6

TRENCHES:	LINEAR FEET REQUIRED: <u>n/a</u>	INLET DEPTH: <u>n/a</u>
	TRENCH WIDTH: <u>n/a</u>	MAXIMUM BOTTOM DEPTH: <u>n/a</u>
	MINIMUM SPACE BETWEEN TRENCHES: _____	EFFECTIVE AREA BEGINNING DEPTH: _____
LOCATION:	SYSTEM TO BE STAKED BY DESIGNER AND VERIFIED BY APPROVING AUTHORITY DURING PRE-CONSTRUCTION INSPECTION.	
NOTES:	Install system per approved design plans by Adam Browning Penns Tail. All inspections must be called in by installer. Norweco representative must be onsite for installation of the BAT system.	

ISSUED BY: Kevin M. Wolf, L.E.H.S.

ISSUE DATE: 12/8/2017

EXPIRATION DATE: 12/8/2018

NOTE: CONTRACTOR MUST SCHEDULE A PRE-CONSTRUCTION INSPECTION PRIOR TO BEGINNING ANY INSTALLATION

NOTE: CONTRACTOR MUST SCHEDULE AN INSPECTION AND GAIN APPROVAL OF ALL COMPONENTS PRIOR TO COVERING

NOTE: STONE MUST BE APPROVED BY HEALTH DEPARTMENT AND GRAVEL TICKET MUST BE AVAILABLE FOR REVIEW.

NOTE: WATERTIGHT SEPTIC TANKS REQUIRED

NOTE: ALL PARTS OF SEPTIC SYSTEM SHALL BE AT LEAST 100 FEET DOWNGRADE FROM ANY WATER WELL

NOTE: MANHOLE RISERS REQUIRED ON ALL SEPTIC TANKS AND PUMP CHAMBERS

NOTE: AN ELECTRICAL PERMIT IS REQUIRED FOR INSTALLATION OF ANY ELECTRICAL COMPONENTS OF THE SYSTEM

☒ ELECTRICAL PERMIT ISSUED E _____

NOTE: THE HCHD DOES NOT WARRANT ANY SYSTEM AND CANNOT GUARANTEE THE PERFORMANCE OF THIS SYSTEM AS DESIGNED. BY ACCEPTING THIS PERMIT, THE OWNER AND/OR APPLICANT ACKNOWLEDGE THAT THE SPECIFICATIONS DETAILED IN THIS DESIGN ARE ONE POSSIBLE OPTION AND THAT THE HCHD WILL REVIEW OTHER PROPOSALS. YOU HAVE THE OPTION TO SEEK THE ADVICE OF A QUALIFIED DESIGN CONSULTANT OR PROFESSIONAL ENGINEER FOR FURTHER GUIDANCE.

NOTE: AN INDIVIDUAL CERTIFIED BY MDE AND THE MANUFACTURER FOR BAT INSTALLATION MUST BE PRESENT AT ALL TIMES DURING BAT INSTALLATION.

NOTE: MDE RECOMMENDS SEPTIC TANKS, BAT, AND OTHER PRETREATMENT UNITS BE PUMPED AT A FREQUENCY ADEQUATE TO ENSURE THAT SOLIDS ARE NOT DISCHARGED TO THE DISPOSAL AREA

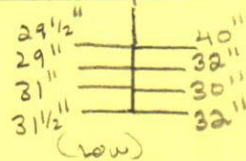
NEITHER THE HOWARD COUNTY COUNCIL NOR THE HEALTH DEPARTMENT IS RESPONSIBLE FOR THE SUCCESSFUL OPERATION OF ANY SYSTEM.

PERMITTEE RESPONSIBLE FOR OBTAINING FINAL APPROVAL ON THIS PERMIT.

CALL 410-313-1771 TO SCHEDULE INSPECTIONS.

Pressure test Detail (head)

(Hwy) P.T.



12/14/17 Contractor waiting on stone to cover laterals at A end.
B laterals covered. (SC)

12/18/17 Pump tank set. Contractor digging BAT tank hole, hitting rock ~7'. No water @ bottom of pump tank hole. (SC)
12/19/17 Line installed from clo to pump tank. Force main connected from pump tank to manifold. (SC)
12/20/17 Norweco tank set.

5/29/16 On site to check final grading. Norweco risers only ~2" above grade. Pump chamber inlet lid 0-1" above grade. Same ponding above berm @ top of bed, looks to be a former channel of water to bed (SC)

See Separate sheet for As-Built

Matt Geckle from Norweco on site to help with install + certify contractors. (SC)

12/20/17 Line from Norweco to pump tank installed. (SC)

(1/26/18) On-site w/ Gerhard, Carroll Helms (STH), Matt Geckle (Backriver Fire-coat). Verified panel dosing times per plan. Adjusted dose rate to 70% of design flow (from 630g). Laterals tested per 28" x 35" spoke w/ Adam Browning + Steve K. Both said this would be OK. Pump installed was Mayes Mesas 1/2 HP. BAT unit working approved. Need final grading prior to permit approval. (xmas)

5/18/2018 Rough final grade done (xmas)

ROAD NAME

TRENCH/DRAINFIELD DATA

WIDTH INLET BOTTOM

NUMBER OF TRENCHES
TOTAL LENGTH
ABSORPTION AREA
DISTRIBUTION BOX LEVEL
DISTRIBUTION BOX BAFFLE
DISTRIBUTION BOX PORT

SEPTIC TANK DATA

SEPTIC TANK 1 LEVEL YES

MANUFACTURER BACKRIVER/NORWECO
CAPACITY 1600 GAL
SEAM LOC TDP
TANK LID DEPTH 2.5-3.5'
BAFFLES NO
BAFFLE FILTER NO
MANHOLE LOC FRONT, MID, 2 REAR
6" PORT LOC NONE
WATERTIGHT TEST NO
SLOTTED NO
DATE ON LID 1-12-17

PUMP/SEPTIC TANK LEVEL YES

MANUFACTURER BABYLON
CAPACITY 2000 GAL
SEAM LOC TOP
TANK LID DEPTH 2-3'
BAFFLES NO
BAFFLE FILTER NO
MANHOLE LOC FRONT + REAR
6" PORT LOC NONE
WATERTIGHT TEST NO
SLOTTED NO
DATE ON LID 11-3-17

Mayes 0.5 hp (ME50)

PRE-CONSTRUCTION:

12/7/17 Met on-site w/ contractor, MOE and designer Adam Browning. Re-shot elevations; measurements for bed design, met over plan details including repetitions (which are to be called in when working) (xmas)

INSTALLATION: 12/12/17 Bed dug + stoned ~1/3 of the way, starting at house end. Upper depth ~32"; lower 18". First observation port installed 6" into ground per detail on plan. Stone is washed river gravel, fairly clean, ~8" deep in bed. (SC) 12/12/17 (pm) On-site as contractor continue digging bed. River gravel washed clean. Elevations confirmed. Soil somewhat dry, silt + roots. OK to continue (xmas) 12/13/17 Contractor adding stone, bed completely dug. On site while T1B + T2B installed, used later to confirm elevation before setting pipe. Force main + manifold installed. (SC) 12/13/17 (pm) A laterals almost complete. All stone added under pipe + 2nd obs. port installed to ground (SC)

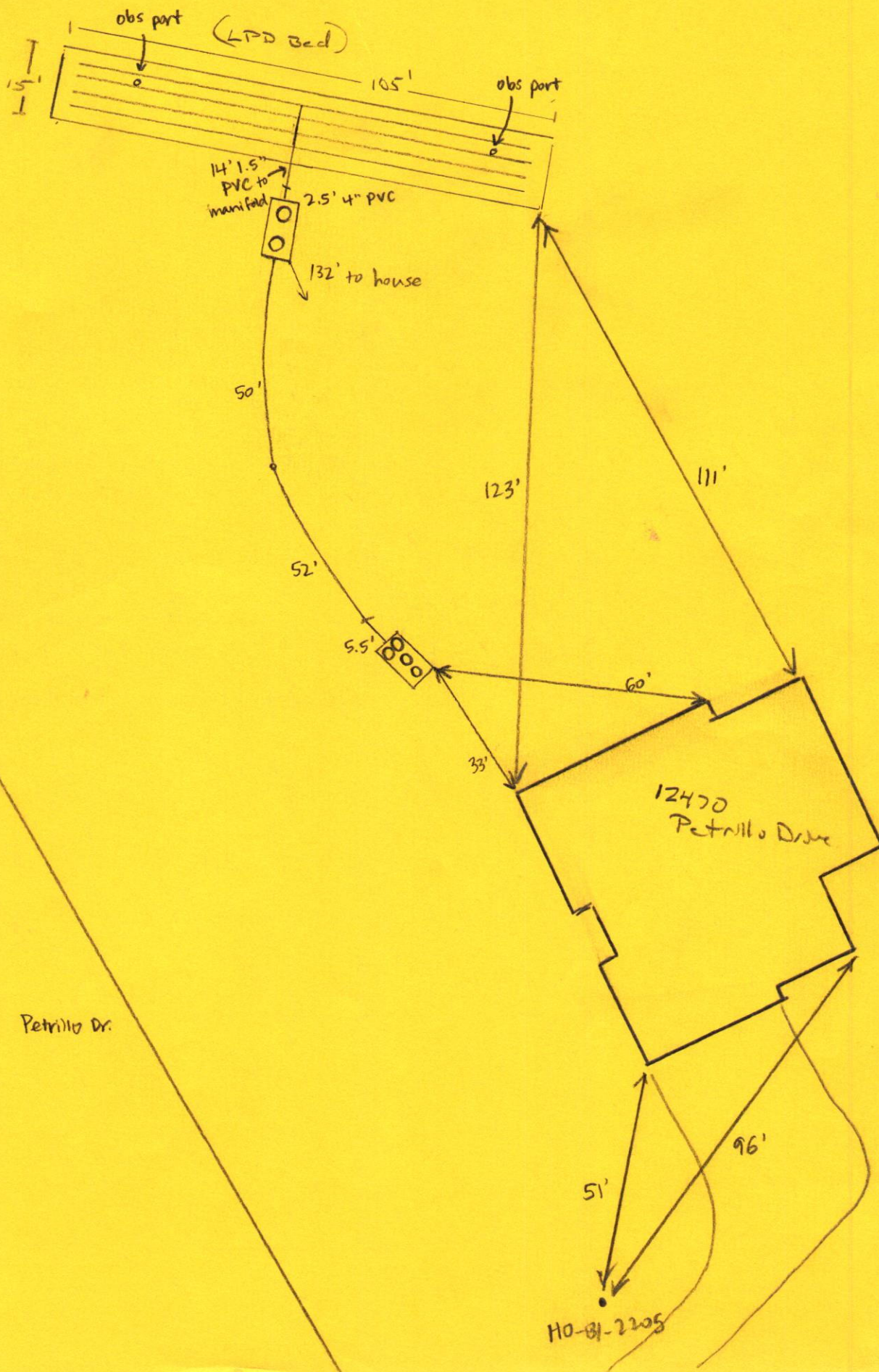
FINAL INSPECTOR

K. Wolf

DATE OF APPROVAL

5/18/2018

1" = 30'



5/29/18

12470 Petrillo Drive



Ponding at upper edge of bed



Channel at the upper edge of the bed

5/29/18

12470 Petrillo Drive



View of the berm from the N end



View of the berm from the S end

Wolf, Kevin

From: Wolf, Kevin
Sent: Thursday, February 01, 2018 11:33 AM
To: Steven Krieg -MDE-; Adam Browning
Subject: 12470 Petrillo Drive
Attachments: O-M Manual rev0.pdf; 20180131162327390.pdf

Attached is the septic permit as-built with corresponding field notes. I also attached the pump detail that Carroll Holmes with STH had installed. I indicated the lateral distal head measurements in the upper right corner of the notes section. I will not final the permit until we have verified grading on the site, which is to occur sometime in the next couple months.

Upon the start-up inspection, I had Garland lower the "redundant off" float about 4", which put it roughly 15" off the bottom of the tank. The "Redundant off" is about 2" lower than the "timer enable" float. The dose amount was adjusted also so that we had 14" (or approximately 630gallons) between the "timer enable" and the "alarm on". This equates to about 70% of the design flow (900gpd). The average distal head measurements were shown to be between 28 ½" to 32" ; lateral closes to the pump chamber was measured to 40". Lateral furthest from the pump tank measured 31 ½ " to 32" respectively. There was some discussion about switching out the pump to a higher HP (possibly 3/4hp) but was not finalized.

Adam – we spoke briefly on the phone about this. Please indicate if you are 'ok' with leaving the ½ hp Meyers in place. Honestly I do not think 6-8" of head will affect the hydraulics of the system including scouring but please advise.

-Kevin

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5/29/18

12470 Petrillo Drive

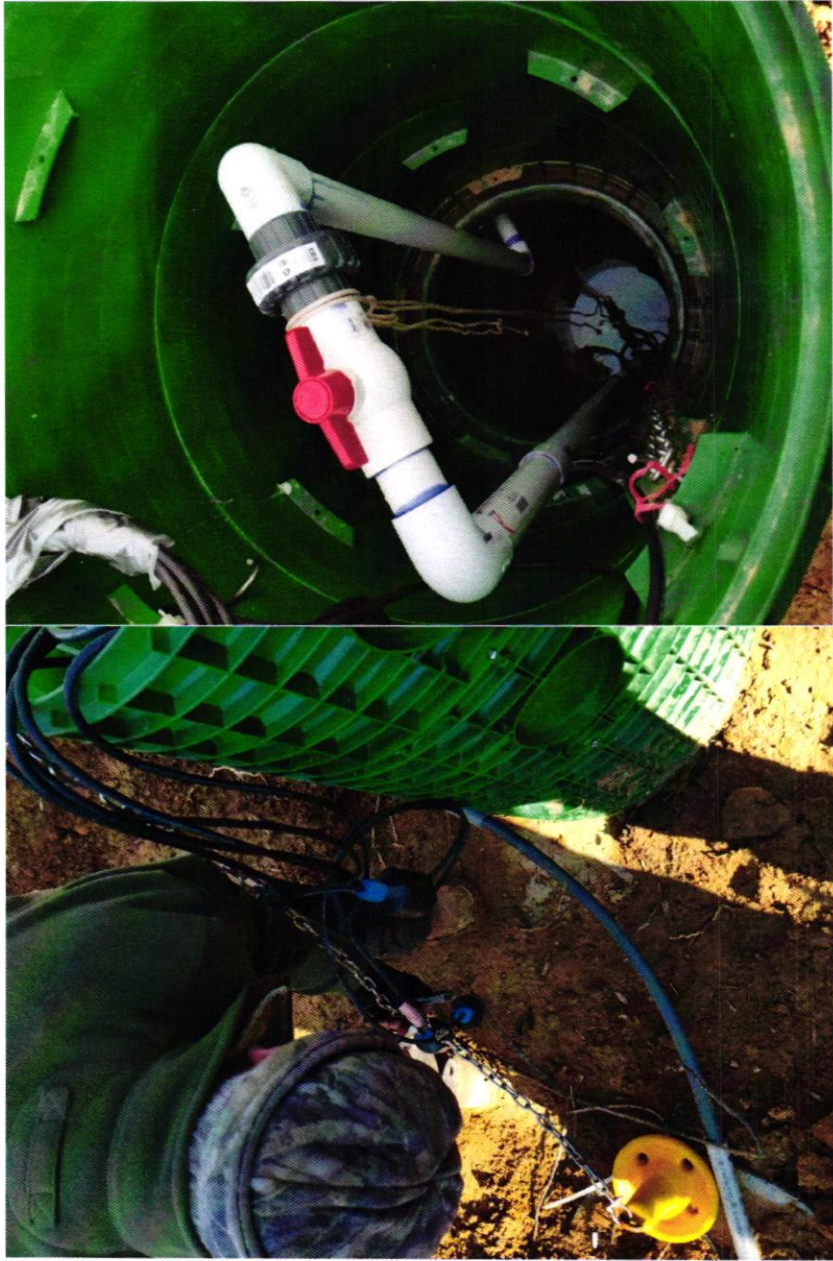


Grading around the septic tank



Grading around the pump tank

12470 Petrillo Drive - Pump Chamber - Floats on stainless steel check



12470 Petrillo Drive – Washed river gravel LPD bed being installed with first of two obs. Pipes. –kmw 12/13/2017



12/19/17
12470 Petrillo Dr.



12/18/17 12470 Petrillo Dr.



12/14/17 12470 Petrillo Dr.



12/14/17 12470 Petrillo Dr.



12/13/17 12470 Petrillo Dr.



12/13/17 12470 Petrillo Dr.



12/13/17

12470 Petrillo Dr.



Septic Design & Component Report

Prepared for

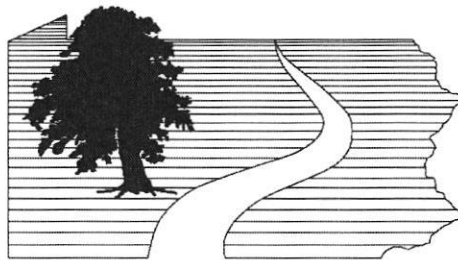
12470 Petrillo Drive Tract

Parcel# 05-046978

Situate in

*Clarksville, 5th Election District,
Howard Co., MD*

Prepared by



Penn's Trail Environmental, LLC

21 E. Lincoln Ave. - Suite 160

Hatfield, PA 19440

Phone: (215) 362-4610

Fax: (215) 362-4620

www.pennstrail.com

March 2, 2017

PTE#2803

FINAL

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Appendices

Soil Reporting Forms & Data

System Component #1 – Treatment Tank

System Component #2 – Dose Tank

Maintenance Logs



Note: "System Component Identification Number (I.D.) below corresponds to numbers as found on the design plan set(s) and Appendices of this report.

SYSTEM COMPONENT I.D. #1 – Primary Treatment

Primary treatment of the sewage will be through a Norweco Singulair Model TNT 1000 gallon aerobic treatment plant. For pumping schedule please contact manufacturer or speak with a representative of the permitting agency.

SYSTEM COMPONENT I.D. #2 – Dose Tank & Pump

Time-dosed distribution required. Design specification sheets are attached.

OPERATION OF SYSTEM

The system has been designed to operate daily all months of the year with minimal user intervention. In the event an alarm sounds or is seen, it is recommend the owner contact the installer and/or manufacturer for inspection, service and if needed repair.

OPERATION & MAINTENANCE NOTES

By this reference the manufactures maintenance agreement, installation manual and the manufacture's owner's manual and requirements, local permitting agency's permit conditions and general regulations as they relate to the Clean Streams Law and Water Quality are hereby incorporated. In the cases of dispute in frequency or necessity of operational procedures, the most restrictive recommendation shall apply.

COPYRIGHT & INFRINGEMENT STATEMENT

This maintenance and operation manual and attached plans are proprietary and copyright© 2017 by Penn's Trail Environmental, LLC. The format style and content has been developed solely for the use of the client and/or property owner of the tract specifically identified herein. Duplication, re-use, or generation of reports substantially similar in content, language and format is expressly forbidden. Any other copy or transmission will be considered a violation of copyright protection and subject to recovery of damages as permitted by state and federal statutes.

MATERIAL SUBSTITUTIONS

The materials specified are based on manufacturer's publications and specifications contained herein or by reference. By recognition of continually evolving materials and methods, local availability, costs, as well as contractor experience, substitution is permitted of equivalent and similar materials for the following components: tanks, and electrical devices and float systems.

Pumps have been specifically calculated based on existing and proposed components to operate within an acceptable range of performance without developing diminished or excessive system pressures, thus better assuring long-term components and economical performance. Pumps are not to be substituted without suppliers and manufacturer's approval.



Soil Reporting Forms & Data



AP 558076

(A)

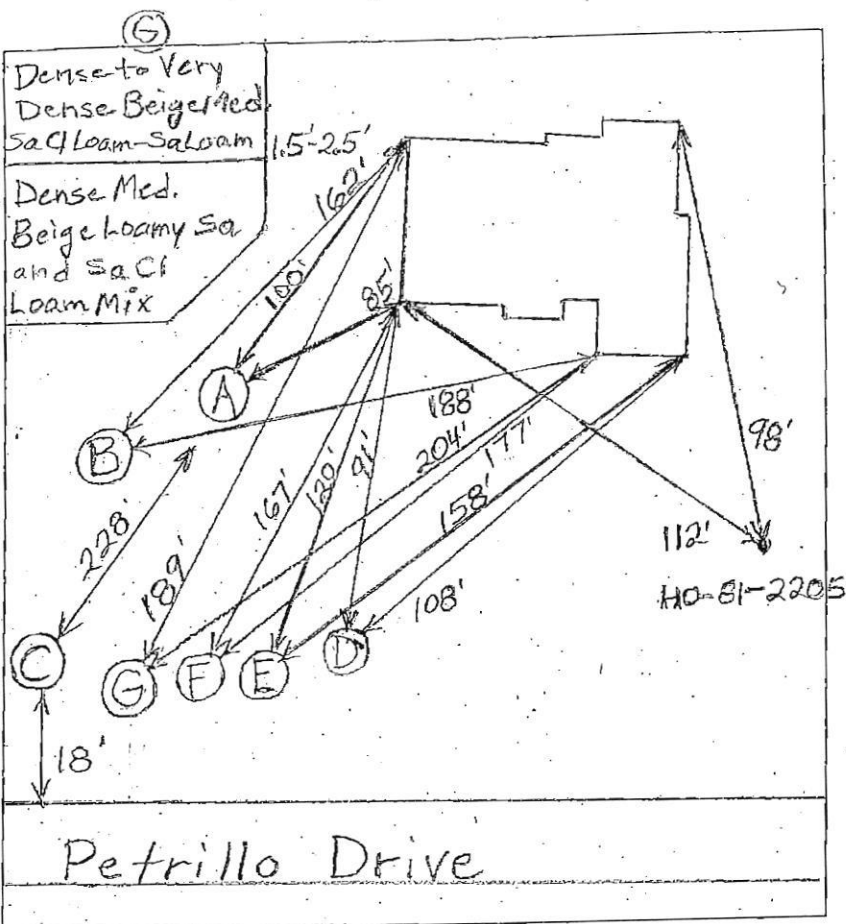
3'-3.5' Very Dense Or Br Sa Cl Loam
 8.5' Very Dense Sa Cl Loam - Sa Loam Turning to a Med. Fine Dense Loamy Sa Deeper Trace Rock
 9.5' Mottling
 12' Water Seepage Hard Bottom

(B)

3.5'-4' Dense Or Br Sa Cl Loam
 Dense Sa Cl Loam Turning to a Med Loamy Sa Deeper Trace Rock
 9.5' Water Seepage
 10' Water
 11'

(C)

2'-2.5' Dense Br Sa Cl Loam (Fill?)
 3'-3.5' Dense Or Br Med Sa Cl Loam
 Mod. Dense Med. Fine Sa Loam Turning to a Med. Fine Beige and Gray Loamy Sa Deeper
 11.5' Water Seepage
 12' Water



(D)

Dense and Very Dense Br Cl Loam 5.5'
 Dense Or Br Sa Cl Loam 5.5'
 Mod. Dense Or Br Sa Cl Loam 8.5'
 Gray Med. Fine Mod. Dense Sa Loam Turning to a Loamy Sa Deeper ~10% Rock 13'

(E)

Dense to Very Dense Or Br Sa Cl Loam 6'
 Mixture of Dense Sa Cl Loam and Sa Loam ~8'
 Dense Or Br Sa Loam ~15% Rock 9'

(F)

Dense to Very Dense Red Br Cl Loam 2'
 Mixture of Dense to Very Dense Red Br and Beige Cl Loam and Med. Fine Sa Loam 15-20% Rock 6'

DATE	TEST #	DEPTH	START	BREAK 1" DROP	STOP 2" DROP	TIME OF 2ND INCH	P/F/H
4/27/2016	A	4.5'/12'	11:25	Pulled After 80 Minutes, ~3/4"			F
	B	4.5'/11'	12:13	1:10 ~3/16" Drop			F
	C	4.5'/12.5'	12:45	12:49	12:54	5	P
	D	4.5'/13'	1:22	Pulled - Slow			F
		7.5'	1:33	Pulled - Slow			F
		9'	2:02	2:12	2:36	24	H
	E	6'/9'	2:39	~5/8" in 30 Minutes			F
	F	7'/6'	3:12	3:47 ~5/8" in 30 Minutes			F
	G	7'/6'	3:29	4:10 Pulled - Slow			F

REMARKS Soil Seems to Become More Porous With Depth

SANITARIAN B. Baker BACKHOE/Hatfields OTHERS

TEST HOLES USED IN SOA AVG. PERC TIME SQ. FT/BR

TRENCH WIDTH INLET DEPTH MAX. BOT DEPTH EFFECTIVE SW

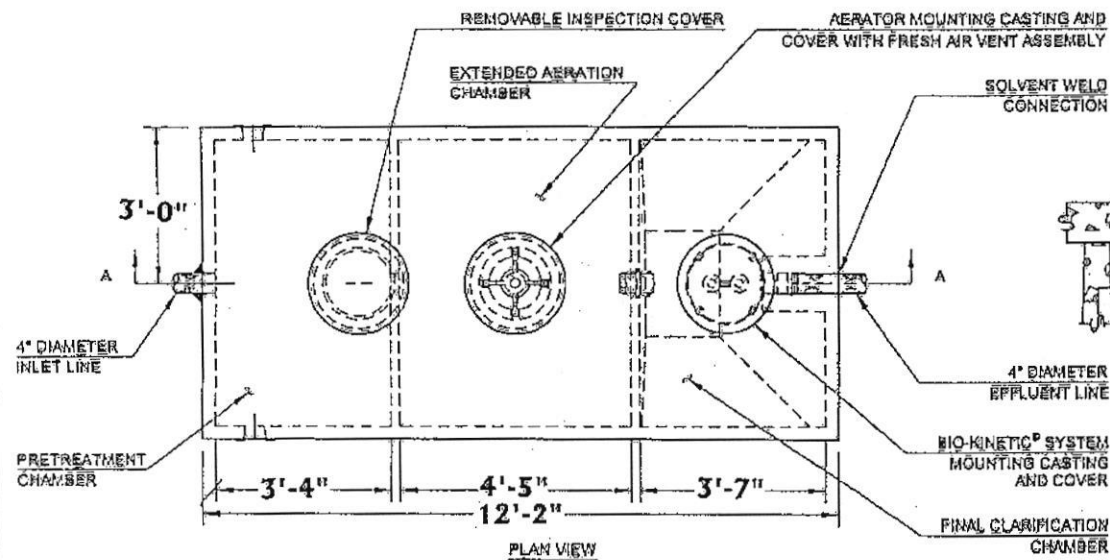
System Component #1 – Treatment Tank



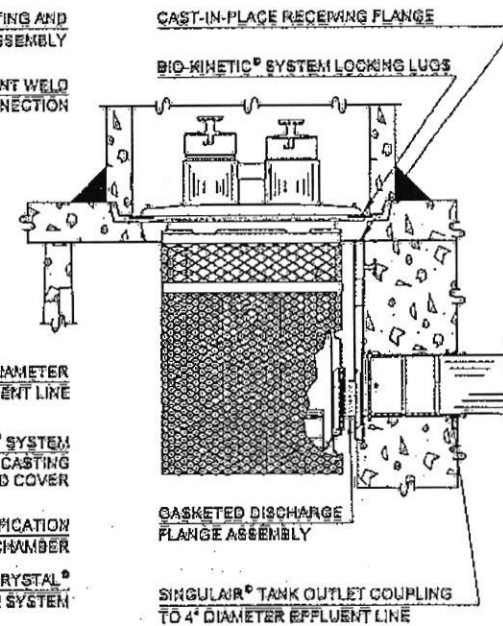
301-824-2780

C. R. Semler, Inc.
11664 Mapleville Road
Smithsburg MD 21783

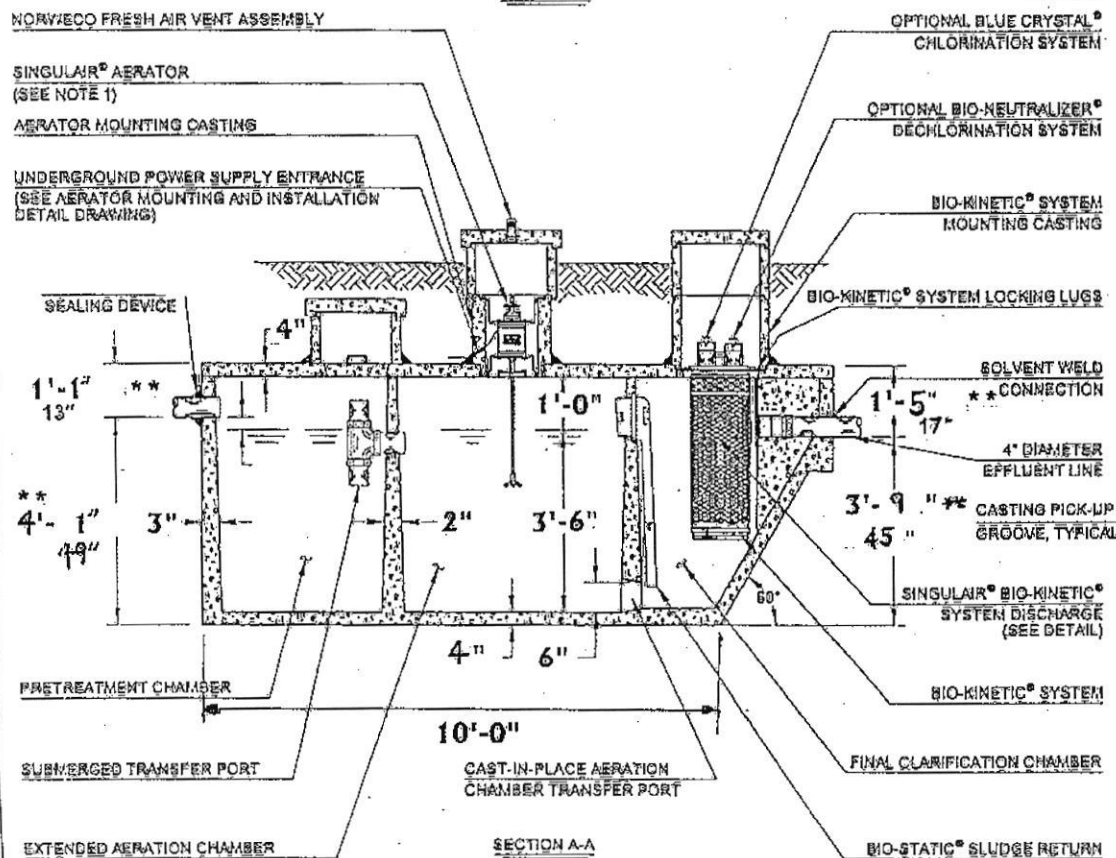
301-416-0414



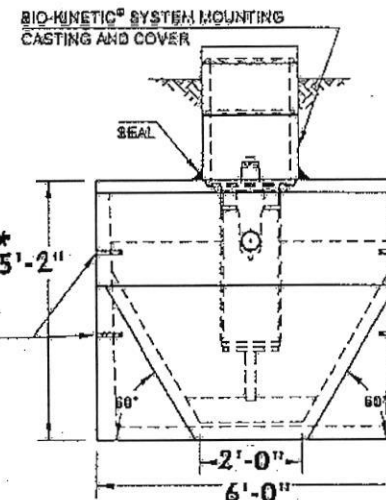
PLAN VIEW



BIO-KINETIC® SYSTEM DISCHARGE DETAIL



SECTION A-A



OUTLET END VIEW

GENERAL NOTES:

- ① SINGULAR® AERATOR, AS TESTED AND ACCEPTED BY NSF, OPERATING 60 MINUTES ON / 60 MINUTES OFF.
- ② FALL THROUGH SINGULAR® PLANT FROM INLET INVERT TO OUTLET INVERT FOUR INCHES. INLET INVERT IS 13 1/2" 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. 318-85.
- ⑤ REMOVABLE COVERS ON RISERS WEIGH IN EXCESS OF SEVENTY-FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.
- ⑥ CONTACT THE LOCAL LICENSED SINGULAR® DISTRIBUTOR FOR ELECTRICAL REQUIREMENTS.

PROJECT ENGINEER'S APPROVAL:
I (WE) HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.

DATE: _____

NAME: _____

CONTRACTOR'S CERTIFICATION:
I (WE) HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.

DATE: _____

NAME: _____

C. R. Semler, Inc.
11664 Mapleville Road
Smithsburg MD 21783

301-824-2780

301-416-0414

301-824-3520

(Fax)

01-01-2011

CRS Rev

U.S. AND FOREIGN PATENTS PENDING	norweco	3-75-07	B
LOW-PROFILE SINGULAR® BIO-KINETIC® WASTEWATER TREATMENT SYSTEM MODEL THIRTY-500 GPD	DESIGNED BY	GBS	
	DRAWN BY	JRM	
	CHECKED BY	10-16-05	
	APPROVED BY	NTS	

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

Back River Pre-Cast, LLC

T/A Back River Supply

PO BOX 329

Glyndon, MD 21071-0329

PH # 410-833-3394

FAX # 410-833-4116

NORWECO SINGLAIR TNT- 600 GPD ELECTRICAL INSTRUCTIONS

FAILURE TO FOLLOW THESE INSTRUCTIONS WILL RESULT IN THE VOIDING OF THE WARRANTY.

- 1) Installation to be performed by an NEC defined qualified person, in accordance with COMAR 26.04.02.07. & all local codes.
- 2) Install 14/2 UF wire from the aerator riser to the control panel in PVC conduit. The wire must extend at least 30" past the last aerator riser. *** at a minimum conduit must be used to go from the aerator riser to at least 5 feet past the tank excavation & above grade to the control panel ***
- 3) Connect 14/2 UF wire to the female plug connector supplied with system. *** use only the female connector supplied do not substitute it with another type or parts from another type in it *** Strip the outer insulation of the UF wire 1-1/2" from the end. Then strip 1/2" of insulation on the hot & neutral wires. Disassemble the female connector. To remove the inner connector push from the bottom with a screwdriver *** do not cut the outer housing *** Attach hot wire to brass screw, neutral wire to chrome screw & the ground wire to the green screw. Assemble the connector, align the male tab on the inner connector with the slot of the outer housing.
- 4) Connect the female connector to the male connector on the aerator securely *** if this connection is not made properly it will cause the alarm to eventually go off ***
- 5) Verify the yellow mark on the aerator shaft is lined up with the yellow mark on intermediate shaft.
- 6) Seal the outer & inner wire penetrations made in the aerator riser with duct seal to prevent moisture from getting in & sewer gases from escaping.
- 7) The control panel is to be located outside the structure. Preferably in line of sight of the tank. *** do not put control panel inside the structure or under any decks. The control panel must be accessible for service which occurs every 6 months. *** Control panel is to be located 3 - 4 feet above grade. Remove control panel insert.
- 8) Install 14/2 wire from a dedicated 15-amp 115 volt breaker to the control panel.
- 9) Install wires into control panel.
- 10) Attach control panel to the structure or pole using non-corrosive screws (tapcons, deck, galvanized or stainless screws. NOT SHEETROCK SCREWS
- 11) Attach wires to control panel insert using wire nuts.
Control panel wires:
Ground - attach all grounds
White - attach all neutrals
Black - line in (hot from breaker)
Red - load (hot from aerator)
- 12) Turn power on.



13) If after 5 minutes the aerator is running & the alarm is not sounding or the red light is not flashing the system is operating correctly.

TROUBLESHOOTING

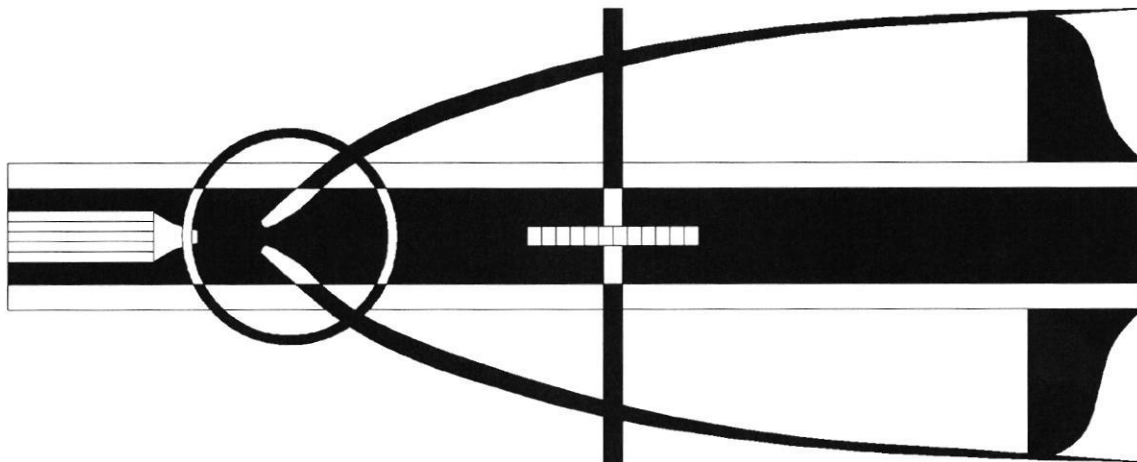
- 1) Check all connections to verify they are correct & secure.
- 2) Check the voltage at the control panel. Cannot be less than 103 volts & not more than 126 volts.
- 3) Disconnect black & red wire on the control panel & wire them up direct. Check voltage & polarity at the female connector must be at least 103 volts & not more than 126 volts. (the reason for wiring up direct is because you have only 10 seconds to anything before the control panel will turn the power off.)
- 4) Call Matt Geckle at Back River Pre-Cast 410-833-3394

norweco[®]

SINGULAIR[®] BIO-KINETIC[®]
WASTEWATER TREATMENT SYSTEM
MODEL TNT

GENERAL SPECIFICATIONS

The contractor shall furnish and install one complete Singulair Bio-Kinetic Model TNT system for Total Nitrogen Treatment with all necessary parts and equipment as described in the following specifications. Treatment of the domestic wastewater shall be accomplished by the extended aeration process with non-mechanical flow equalization, pretreatment of the influent and filtration of the final effluent. In addition to primary, secondary and tertiary treatment of the wastewater flow, the treatment system shall provide nitrification, denitrification, and if required, chlorination and dechlorination of the effluent prior to discharge. All treatment processes shall be contained within reinforced precast concrete tankage meeting the requirements of ACI Standard 318. The wastewater treatment system shall be a Singulair Model TNT as manufactured by Norweco, Inc., Norwalk, Ohio, USA. Systems utilizing fiberglass, steel, or plastic tankage are subject to flotation when dewatered and shall not be considered for this application.



The wastewater treatment system shall be capable of reducing Total Nitrogen without the addition of chemicals, specialized add-on processes or additional components. Nitrification and denitrification shall be accomplished within the chambers of the treatment system prior to effluent disposal. Biological reduction of nitrogen shall occur naturally by autotrophic bacteria, capable of converting ammonium nitrogen to nitrate and heterotrophic bacteria, capable of transforming nitrate to harmless gas. The treatment system shall include precast concrete tankage providing separate pretreatment, aeration and clarification chambers. Principal items of electro-mechanical equipment shall be a 1725 RPM mechanical aerator, UL listed Service Pro control center with MCD technology, Bio-Static sludge return and Bio-Kinetic tertiary treatment device for flow equalization and final filtration of system effluent.

SPECIFICATIONS

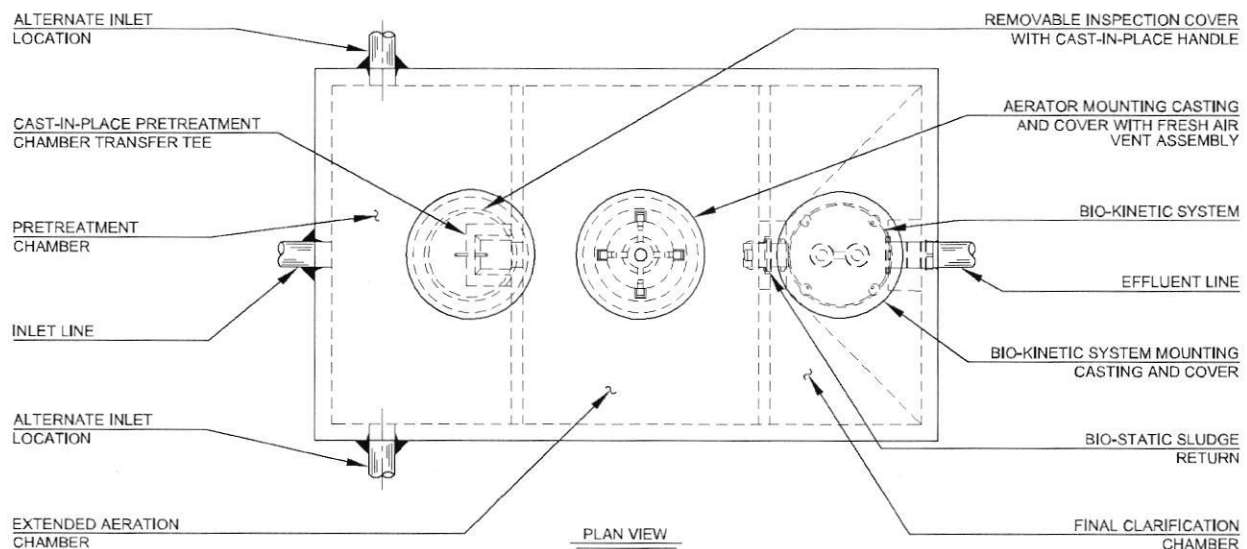
SINGULAIR®

OPERATING CONDITIONS

Total holding capacity of the system shall provide a minimum of 48 hour retention of the daily flow. The pretreatment chamber shall provide at least 18 hour retention, the extended aeration chamber shall provide at least 24 hour retention and the clarification chamber shall provide at least 6 hour retention. The non-mechanical flow equalization device shall increase each individual chamber and total system retention time in direct proportion to loading. Design of the system shall include a compartmented tank and non-mechanical flow equalization device to insure successful treatment performance without upset even when the significant runoff period is six hours. Hydraulic design considerations of the system and flow equalization device shall be such that intermittent peak flow factors as high as four shall not upset hydraulic reliability within the system. System performance in compliance with the requirements of NSF Standard 245 shall be recognized by an ANSI accredited third-party laboratory and be approved for use by the local governing regulatory agency.

PRETREATMENT CHAMBER

The pretreatment chamber shall be an integral part of the wastewater treatment system. All domestic wastewater shall be preconditioned and flow equalized while passing through the pretreatment chamber prior to being introduced to the extended aeration chamber. The outlet of the pretreatment chamber shall be equipped with a discharge tee that extends vertically into the liquid so that only the preconditioned equalized flow from the center area of the chamber is displaced to the extended aeration chamber. The discharge tee and transfer port shall be of adequate size to handle a peak flow factor of four without restricting the outlet and disturbing hydraulic displacement to the extended aeration chamber. A removable inspection cover shall be cast into the top of the pretreatment chamber to allow tank and transfer tee inspection. As a safety measure, the uncovered opening shall be small enough to insure that the tank cannot be entered for inspection or service.



AERATION CHAMBER

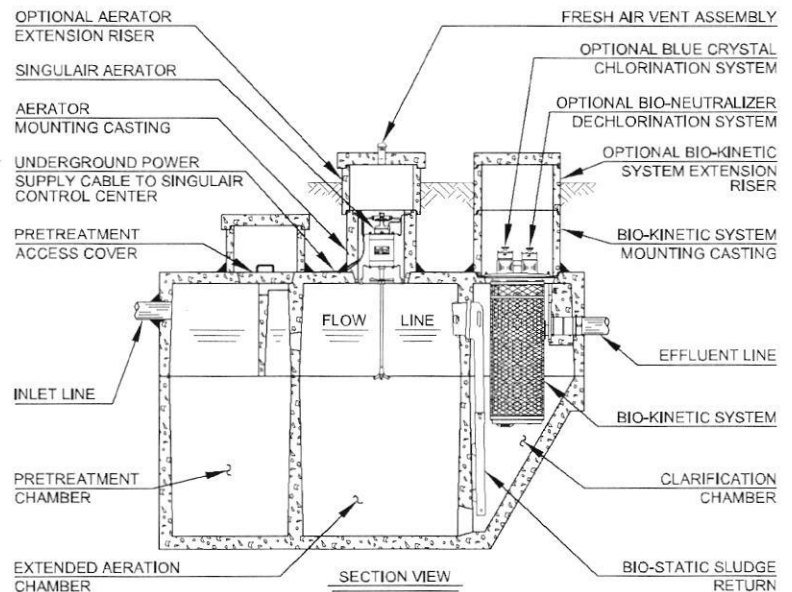
The extended aeration chamber shall provide in excess of 24 hour retention of the equalized daily flow. The chamber shall be of sufficient size to provide a minimum of 80 cubic feet of tank capacity per pound of applied BOD. The aeration chamber length-width-depth ratio shall be designed to insure uniform tank mixing and provide optimum treatment. The aeration chamber(s) shall be an integral part of the system flow path and constructed of properly reinforced 5,000 PSI, 28 day compression strength precast concrete. All castings used to construct the precast concrete tankage shall be monolithic units with external and internal walls incorporated into each section.

FINAL CLARIFICATION CHAMBER

The final clarification chamber shall consist of 5 functionally independent zones operating together to provide satisfactory settling and clarification of the equalized flow. An inlet zone shall be provided and shall dissipate transfer turbulence at the flow inlet of the clarification chamber. Its performance shall also eliminate turbulence in other zones of the clarifier. Liquid shall be hydraulically displaced from the inlet zone to the sludge return zone. Hydraulic currents shall sweep settled sludge from the hopped walls and return these solids via the inlet zone to the aeration chamber. As solids are removed, liquid is displaced to the hopper zone of the clarifier. In this zone, settling by gravity takes place. Three of the four sidewalls are slanted to form a hopper which directs all settled material back to the sludge return zone. Clarified liquid from the hopper zone shall be displaced into the final settling zone to provide additional clarification of the liquid. The liquid is finally displaced to the outlet zone for final filtration and discharge from the system. Non-mechanical equalization of the flow, through all 5 independent zones, shall provide optimal settling and clarification.

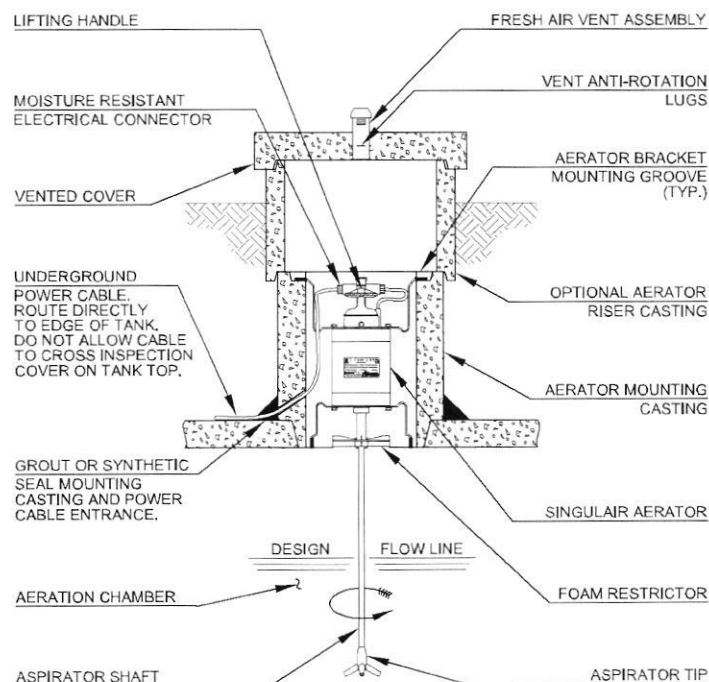
BIO-STATIC® SLUDGE RETURN

A Bio-Static sludge return shall be installed into the cast-in-place opening(s) in the aeration/clarification chamber wall to provide positive return of settled solids. Aeration chamber hydraulic currents shall enter the sludge return(s) and be directed into the sludge return zone of the clarification chamber. The Bio-Static sludge return shall accomplish resuspension and return of settled solids without disturbing the clarified liquid in the final settling zone and outlet zone.



MECHANICAL AERATOR

Each Singlair aerator shall be installed in a concrete aerator mounting casting above the aeration chamber. Fresh air shall be supplied through a molded plastic vent assembly cast into the concrete access cover above the aerator. The Singlair aerator shall include plated mounting brackets, NEMA 6 rated electrical connector, UL recognized fractional horsepower motor, molded

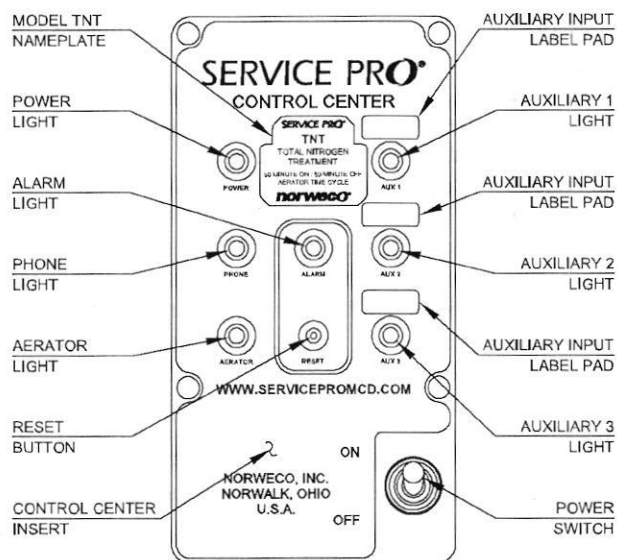


plastic lifting handle, molded plastic air intake screens, molded plastic foam restrictor, stainless steel aspirator shaft and molded glass-filled nylon aspirator tip. The motor shall contain precision manufactured o-ring type seals installed between the motor shell and the machined aluminum endbells to insure watertight integrity is maintained. Molded Viton elastomer shaft seals shall be utilized to protect the bearings from contamination. Only the stainless steel aspirator shaft and glass-filled nylon aspirator tip shall be installed in contact with the liquid. There shall be no submerged electrical motors, bearings or fixed air piping in the aeration system. Singlair aerator motors shall be designed not to exceed the motor nameplate rating when installed and operated as recommended for the system. The fractional horsepower aerator motor shall be equipped with a foam restrictor to protect the motor against high water and foam. The motor shall be 4 pole, 1725 RPM, 115 volt, 60 Hertz, single phase, ball bearing constructed with a 1.0 service factor. It shall draw less than 4.0 amps when operating at the rated nameplate voltage. Aerator motors without UL recognition have not demonstrated compliance with international electrical standards for safety and reliability and shall not be considered for this application.

BIO-KINETIC®

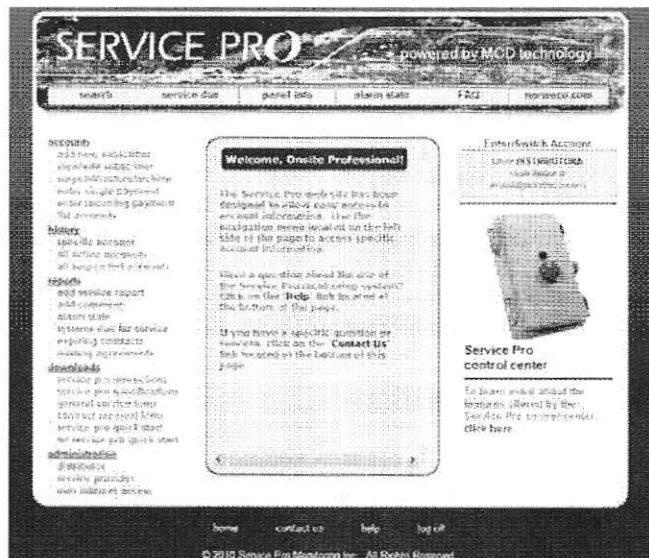
SERVICE PRO® CONTROL CENTER

The Service Pro electrical control center with MCD technology shall provide Monitoring, Compliance and Diagnostic functions for the Singulair treatment plant using a microprocessor based platform. The Service Pro control center shall contain nonvolatile memory to prevent loss of programming in the event of a power failure. The pre-wired controls shall be mounted in a lockable NEMA rated enclosure designed specifically for outdoor use. Each Service Pro control center shall be a UL listed assembly and shall include a factory-programmed timer, alarm light, reset button, power switch, power light, phone light, aerator alarm light and three auxiliary alarm lights. The control center shall monitor all treatment system operating conditions including aerator over current, aerator under current and open motor circuit. In the event the control center detects one of these conditions, power to the aerator shall be interrupted, a diagnostic sequence shall begin and the visual alarm shall activate. After a programmed recovery interval, an automatic restart attempt shall be initiated. If normal aerator operation does not resume during 24 programmed recovery and restart cycles, the audible alarm shall activate and the telemetry system shall report the specific condition to the Service Pro monitoring center. In the event that any of the auxiliary inputs detect abnormal operation of the treatment system auxiliary equipment, the audible and visual alarms shall immediately activate and the telemetry system shall report the alarm condition to the monitoring center. The service provider shall automatically be notified by the Service Pro monitoring center of the specific alarm condition using phone, fax or email.



AERATOR TIME CYCLE

A factory-programmed timer built into the Service Pro control center shall provide a total of twelve hours of aerator operation per day. The non-adjustable timer shall create a 60 minute aeration cycle followed by a 60 minute anoxic cycle during which the aerator shall be off. Use of an aerator timer can seriously affect system performance and operating cost. Systems that have not been performance certified, at a timed aeration cycle, by an independent ANSI accredited testing laboratory shall not be considered for this application.



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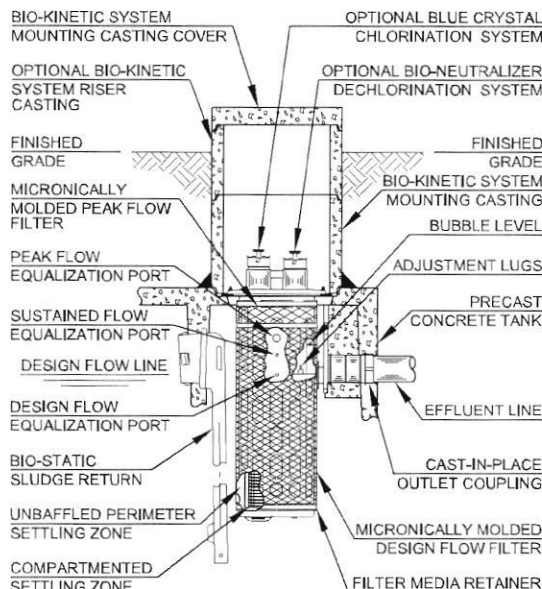
SERVICE PRO® MONITORING CENTER

The Service Pro monitoring center shall include a 128 bit encrypted password protected website for interface with the monitoring center database. Access to the secure website shall be obtained through a unique user name and password that provides tiered access to data from monitored treatment systems. Access level tiers shall include distributors, service providers, regulatory agencies and individual system owners. Distributors and service providers shall be able to create accounts, maintain service records and grant regulatory agencies access to the information. Individual system owners shall be able to view information regarding their own wastewater treatment systems, as well as download and print instructional information. Integrity of stored data shall be maintained through the use of multiple servers operating in geographically isolated locations.

SPECIFICATIONS

BIO-KINETIC® SYSTEM

A Bio-Kinetic system shall be installed in the mounting casting(s) above the clarification chamber. Each Bio-Kinetic system shall provide non-mechanical flow equalization through all plant processes including pretreatment, aeration, clarification, tertiary filtration, chlorination and dechlorination. The assembly shall be supplied with locking lugs and removable moisture/vapor shield and shall consist of a design flow and peak flow micronically molded filter, baffled perimeter settling zone, flow distribution deck, lifting handles, level indicator, adjustment lugs, optional chlorination feed tube, unbaffled perimeter settling zone, solids contact zone, vertical inlet zone, compartmented settling zone consisting of 42 baffled chamber plates, effluent stilling well, final discharge zone, adjustable outlet weir, optional dechlorination feed tube, outlet zone and gasketed discharge flange. All components shall be manufactured from inert synthetic materials or rubber, assembled in circular fashion and connected to a plastic outlet coupling. The outlet coupling shall accept a 4" diameter, Schedule 40, PVC pipe. Each Bio-Kinetic system shall be installed with the inverts of the design flow equalization ports located at the normal liquid level of the clarifier. If intermittent flow rates exceed the capacity of the design flow ports, flow shall be held upstream until the intermittent flow dissipates. If the intermittent flow continues to increase, the liquid level may reach a pair of sustained flow equalization ports. With four ports in use, flow through the system increases while continuing to provide flow equalization to all upstream and downstream processes. Peak flow equalization ports are supplied but should not be required in a properly sized system. Optional Blue Crystal and Bio-Neutralizer tablet feed tubes shall be positioned such that the flow-activated chemical cannot make contact with the liquid upstream of the feed tubes.



FLOW EQUALIZATION

The wastewater treatment system shall include a non-mechanical, demand use, flow equalization device. The device shall control normal residential flow rates and reduce typical residential flow surges. The flow equalization rate shall be dependent upon the specific loading pattern and the duration of flow surges. At the 600 gallon per day design loading schedule of NSF Standard 40 and NSF Standard 245, minimum performance of the device shall equalize daily flow an average of 50%.

BLUE CRYSTAL® CHLORINATION SYSTEM (Optional)

The Singulair system shall be furnished complete with a tablet feeder and a six month supply of Blue Crystal disinfecting tablets. Blue Crystal tablets shall be specifically formulated for consistent chlorine dosage and effluent disinfection to the sustained, variable and intermittent flows that are typical of domestic wastewater treatment systems. The tablets shall be manufactured from pure calcium hypochlorite and contain a minimum of 70% available chlorine. Each tablet shall be 2⁵/₈" diameter, compressed to a 1" thickness, weigh approximately 5 ounces and be white in color with blue crystals for easy identification. The tablets shall dissolve in direct proportion to the flow rate, releasing controlled amounts of chlorine.

BIO-NEUTRALIZER® DECHLORINATION SYSTEM (Optional)

The Singulair system shall be furnished complete with a tablet feeder and a six month supply of Bio-Neutralizer dechlorination tablets. The dechlorination tablets shall contain active ingredients specially formulated to chemically neutralize both free and combined chlorine. Each tablet shall be 2⁵/₈" diameter, compressed to a 1³/₁₆" thickness, weigh approximately 5 ounces and be green in color for easy identification. The tablets shall dissolve slowly, releasing controlled amounts of chemical for the instantaneous removal of residual chlorine from the system effluent.

WARRANTY AND EXCHANGE PROGRAM

The manufacturer shall provide a three year limited warranty for each Singulair aerator, Service Pro control center and Bio-Kinetic system purchased from the manufacturer. A comprehensive exchange program offers Singulair owners a lifetime of equipment protection. The distributor shall provide warranty and exchange program details to the regulatory agency, contractor and customer as required.



EQUIPMENT MANUFACTURER

The equipment specified herein shall be the product of a manufacturer having a minimum of seven years experience in the construction of prefabricated wastewater treatment equipment and systems. Bids shall be prepared on the basis of the equipment and material specified herein for purposes of determining the low bid. This is not done, however, to eliminate other products or equipment of equal quality and efficiency. If equipment is to be substituted, approval of such substitution must be made prior to execution of any order. It is assumed that substitution will result in a reduction of cost to the contractor and that if accepted, these savings will be passed along by a reduction in the base bid.

SINGULAIR® MODEL TNT DATA CHART

Designation: Model TNT	500 GPD	750 GPD	1000 GPD	1250 GPD	1500 GPD
Daily Treatment Capacity (Gallons Per Day)	500/600	750/800	1000	1250	1500
Total System Capacity (Gallons)	1300	1600	2300	2850	3400
Number of Singulair Aerators	1	1	2	2	2
Number of Bio-Kinetic Systems	1	2	2	3	3
Number of Bio-Static Sludge Returns	1	1	1	2	2
Drawing Number (PC-5-)	7103	7065	7067	7068	7069

PROGRESS THROUGH SERVICE SINCE 1906

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and wastewater treatment*

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SINGULAIR[®] BIO-KINETIC[®]

WASTEWATER TREATMENT SYSTEM WITH SERVICE PRO[®] CONTROL CENTER

MODELS 960 AND TNT OWNER'S MANUAL

INTRODUCTION

The Singulair system is the finest equipment available and utilizes the most up-to-date wastewater treatment technology. It is a sound investment that protects you and the environment. Please take the time to familiarize yourself with the contents of this manual.

HOW THE SINGULAIR[®] SYSTEM WORKS

Developed to serve homes and small businesses beyond the reach of city sewers, the Singulair system employs the extended aeration process. Similar to the treatment method used by most municipal wastewater treatment facilities, this process involves a natural, biological breakdown of the organic matter in wastewater.

Wastewater enters the pretreatment chamber where anaerobic bacterial action combines with the effects of gravity to precondition the waste before it flows into the aeration chamber. Once in the aeration chamber, aerobic bacteria utilize the organic matter in the wastewater to biologically convert the waste into stable substances. Following aeration, flow is transferred to the clarification chamber where the effects of gravity settle out biologically active material. The Bio-Static sludge return, located in the clarification chamber, creates hydraulic currents that gently transfer settled particles back to the aeration chamber. As clarified liquids pass through the Bio-Kinetic system, they are filtered, settled and flow equalized. As a result, complete pretreatment, aeration, clarification and final filtration are assured. The Singulair system reliably protects you, your property and the environment.

FEATURES AND ADVANTAGES

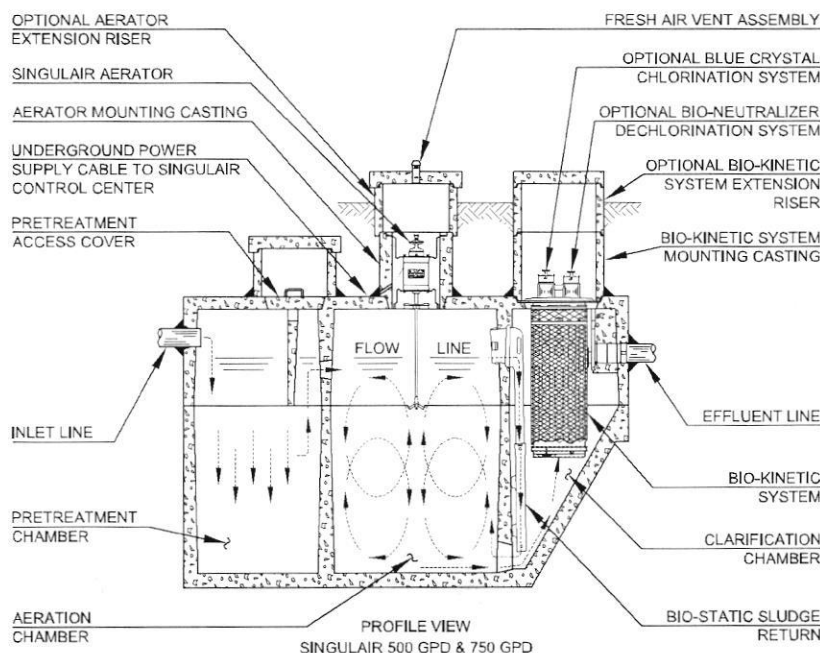
Singulair tanks are reinforced precast concrete, manufactured by the licensed Norweco distributor. Internal walls and baffles are cast-in-place to insure uniformity and maximum strength. Risers and access covers are either heavy duty plastic or concrete construction. All components within the system that will contact the wastewater are constructed entirely of molded plastic, stainless steel or rubber.

The Singulair aerator is powered by a 1725 RPM, 115 volt, 60 hertz, single-phase, fractional horsepower motor. It is the only electrically powered component in the Singulair system. The aerator has been designed specifically for use in the Singulair system. It costs less to operate and consumes fewer kilowatt hours of electricity than most major appliances.

Singulair aerators are supplied with a Service Pro control center with MCD technology. The NEMA rated control center contains a power switch and time clock that control aerator operation. The local distributor's name, address and telephone number are displayed on the control center cover.

All system controls and necessary owner information are conveniently located at your fingertips.

Non-mechanical flow equalization and final filtration is accomplished within the Singulair tank by the Bio-Kinetic system. This revolutionary device is installed in the clarification chamber and connected to the system outlet. Optional chlorination and dechlorination may be included in the Bio-Kinetic system if required. All Singulair components work together to assure complete pretreatment, aeration, clarification and final filtration.



SINGULAIR® SYSTEM PERFORMANCE

Rivalling the performance of the most advanced wastewater treatment plants in the world, the Singulair system complies with USEPA wastewater treatment guidelines for secondary treatment systems and meets all requirements of NSF/ANSI Standard 40. In ecologically sensitive areas, the most stringent effluent standards are 10 mg/L CBOD and 10 mg/L TSS. Rated Class I after successfully completing the 7 month Standard 40 test protocol, the Model 960 system averaged effluent of 6 mg/L CBOD and 10 mg/L TSS. The Model TNT system averaged effluent of 4 mg/L CBOD, 9 mg/L TSS and 12 mg/L Total Nitrogen.

OPERATIONAL REQUIREMENTS

The Singulair system is designed to treat only domestic wastewater. Domestic wastewater is defined as the waste generated from a typical residence. This includes flows originating from: bathtubs, clothes washers, dishwashers, drinking fountains, water coolers, food grinders, kitchen sinks, lavatories, mop basins, service sinks, shower stalls, sinks, wash sinks, water closets and whirlpool baths. While the use of bio-degradable detergents is recommended, the Singulair system has been designed to handle any reasonable amount of bathroom, kitchen or laundry waste. However, some care should be exercised to insure that non-biodegradable and/or toxic materials are not disposed of via the domestic wastewater plumbing. Do not use the plumbing system for disposal of lint, cooking grease, scouring pads, diapers, sanitary napkins, cotton balls, cotton swabs, cleaning rags, dental floss, strings, cigarette filters, rubber or plastic products, paints and thinning agents, gasoline, motor oil, drain cleaners or other harsh chemicals. These items could plug portions of the plumbing, interfere with biological treatment, accumulate in the treatment system and adversely affect system performance. Never connect roofing down spouts, footer drains, sump pump piping, garage and basement floor drains or water softener backwash to the domestic wastewater plumbing or the treatment system. Water softener backwash will interfere with biological treatment and must be disposed of separately.

ELECTRICAL REQUIREMENTS

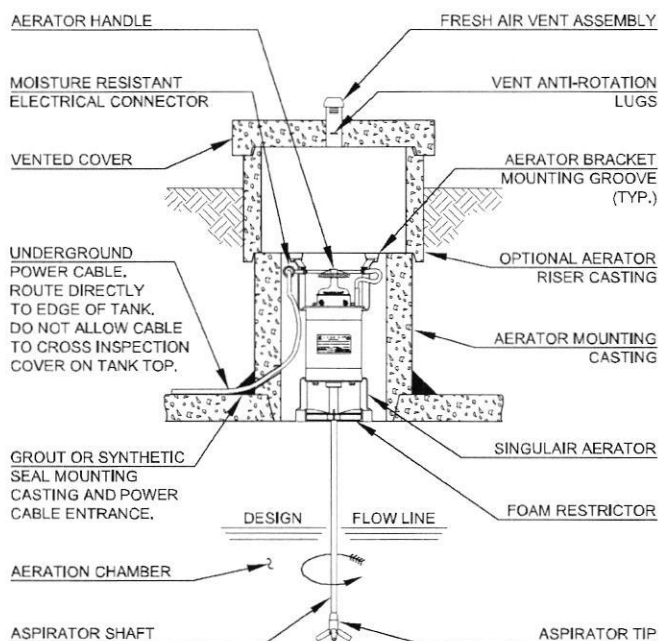
Each Singulair control center must be wired to a dedicated 115 VAC, single-phase circuit at the main electrical service panel. A 15 amp circuit is recommended (10 amp minimum). A pictorial wiring diagram is provided inside the control center enclosure. All electrical work must be performed in accordance with the requirements of the National Electrical Code and all applicable local codes. Electrical connections should be made only by a qualified electrician following proper procedures and using safe tools.

CAUTION: Any time service is required, first shut off the dedicated circuit breaker in the main electrical service panel. Next, shut off the power switch in the Singulair control center. Failure to do so could result in personal injury or equipment damage.

SINGULAIR® AERATOR

The aerator has been specifically designed for use in the Singulair system and includes special alloy and molded plastic parts to prolong aerator life. Aerator bearings are pre-lubricated and sealed. Singulair aerators are installed in a concrete mounting casting above the aeration chamber. Fresh air enters the aerator through four intake ports located under the aerator handle. The air is drawn down the hollow aspirator shaft where it is introduced below the liquid surface. Only the molded plastic aspirator and the lower portion of the stainless steel aspirator shaft are submerged.

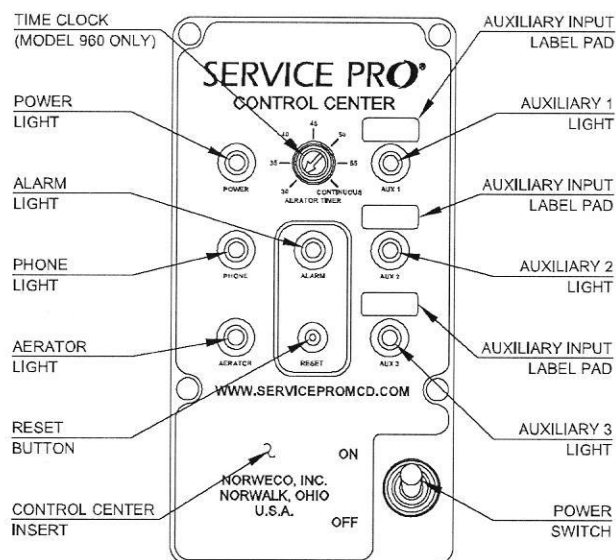
The aerator is not designed to run under water and will automatically shut off if a high water condition occurs. If the liquid rises to the level of the foam restrictor, the control center will shut off power to the aerator. Next, an automatic diagnostic sequence begins, as outlined in the section titled "Service Pro Control Center".



Each Singulair aerator is a precision engineered electro-mechanical device. Do not remove it from its installed position. Do not attempt any type of repair. Contact your Singulair service provider if service is needed. Unauthorized tampering or repair will void important provisions of the limited warranty and exchange program.

FRESH AIR VENTING SYSTEM

An aerator vent assembly is cast into the concrete access cover above each aerator. The vent assembly supplies fresh air to the aerator, which is drawn through the aspirator and into the wastewater. Finished landscaping should be maintained six inches below the top of the vented access cover and graded to drain runoff away from the cover. Do not allow plants, shrubbery, mulch or landscaping of any type to restrict the flow of air to the vent assembly or obstruct the access cover.



SERVICE PRO® CONTROL CENTER

Every Singulair aerator is supplied with a prewired UL Listed Service Pro control center featuring MCD technology to permit fully automatic aerator operation. The control center provides MONITORING, COMPLIANCE and DIAGNOSTIC functions complete with telemetry for communication with the Service Pro remote monitoring center. If an alarm condition occurs for any reason within the Singulair system or monitored auxiliary equipment, the red alarm light will flash. If aerator operation has been interrupted, the Service Pro control center will attempt to restart the aerator every five minutes for two hours. If the aerator does not restart after two hours, the audible alarm will sound. If the Singulair system is covered by a Service Pro monitoring agreement, the Singulair service provider will be automatically notified and the alarm condition will be displayed on the remote monitoring center website, www.servicepromcd.com. Each control center for the Model 960 treatment system is supplied with a time clock adjustable in five minute increments up to continuous run. This clock is factory preset to run 30 minutes per hour and should only be adjusted by an authorized Singulair service provider. Each control center for the Model TNT system is supplied with a non-adjustable time clock.

SERVICE PRO® MONITORING CENTER

When connected to a telephone line, the control center will automatically notify the Service Pro monitoring center of any service required by the Singulair system or accessory components. The Service Pro monitoring center will automatically record the time and date of any alarm condition and post this information to your system's history record accessible at www.servicepromcd.com. The monitoring center will also notify your Singulair service provider that the system needs attention and record the time and date when service is performed. All information regarding your system is available to you on the secure, password protected Service Pro website. Contact your Singulair service provider for your user name and password.

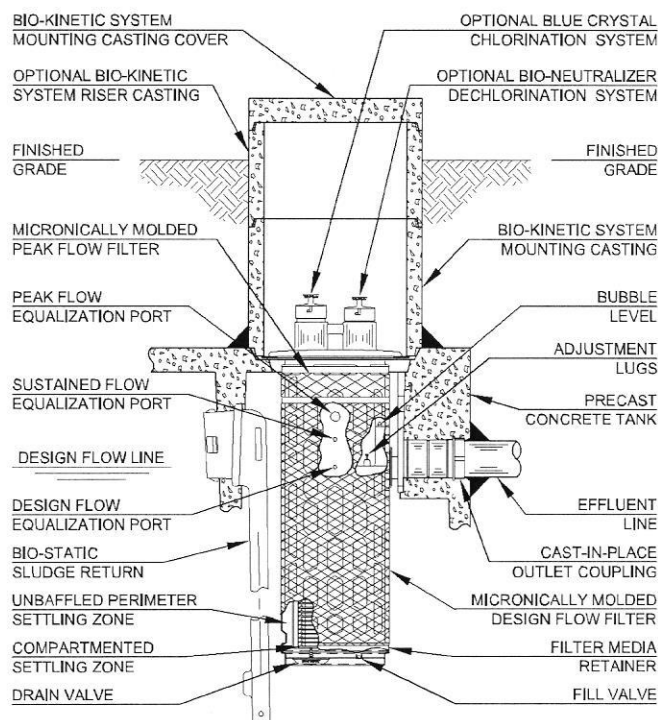
NOTE: The control center regularly communicates with the Service Pro monitoring center using your telephone line and a toll free number. If the control center is using the line when you attempt to place a call, a high pitched digital communication signal will be heard. Hang up all telephones sharing the line and wait a few seconds. This will automatically disconnect the control center and make the line available for use.

BIO-STATIC® SLUDGE RETURN

Each Bio-Static sludge return is installed in the aeration/clarification chamber wall. Aeration chamber hydraulic currents enter the sludge return(s) and transfer solids from the clarification chamber back to the aeration chamber for additional treatment. The Bio-Static sludge return accomplishes resuspension and return of settled solids without disturbing the contents of the clarification chamber.

BIO-KINETIC® SYSTEM

Bio-Kinetic systems provide non-mechanical flow equalization through all plant processes. The Bio-Kinetic system contains 3 separate filtration zones, 8 independent settling zones, optional chlorination and dechlorination tablet feed systems and serves as its own chlorine contact chamber. When used with Blue Crystal disinfecting tablets, the performance of the Bio-Kinetic system as a chlorination device is certified to NSF/ANSI Standard 46, Section 11. All components are manufactured from plastic or rubber. Your service provider has the necessary training, tools and equipment for removal and cleaning. If your Bio-Kinetic system is in need of service, contact your service provider. During each semi-annual service inspection, your service provider will remove and clean the Bio-Kinetic system or replace it with a unit from their service stock.



NON-MECHANICAL FLOW EQUALIZATION

The patented design of the Bio-Kinetic system provides non-mechanical flow equalization for the Singulair wastewater treatment plant. Equalization reduces incoming hydraulic surges (e.g. typical shower of 10 minutes duration, bathtub discharge of 5 minutes duration, clothes washer discharge of 2 minutes duration and dishwasher discharge of 2 minutes duration) throughout the system. The flow equalization provided by the Bio-Kinetic system causes wastewater to be held upstream of the final outlet during hydraulic surges, which preserves treatment integrity and enhances system operation. The actual rate of equalization varies and depends upon specific loading patterns and the duration of each flow surge. At the design loading pattern used during the NSF/ANSI Standard 40 performance evaluation, the Singulair system equalizes all flow an average of 48%. As a result, hydraulic surges and periods of high wastewater flow are automatically reduced to protect the environment and all treatment plant processes on a demand use, as needed, basis.

BLUE CRYSTAL® RESIDENTIAL DISINFECTING TABLETS

If local regulations require, an initial supply of Blue Crystal disinfecting tablets will be placed in the Bio-Kinetic system chlorine feed tube(s) at system start-up. Specifically formulated for use in the Singulair system, Blue Crystal disinfecting tablets provide efficient and reliable disinfection when effluent chlorination is desirable. Manufactured from calcium hypochlorite, Blue Crystal disinfecting tablets provide effective, economical bacteria killing power. Liquid entering the Bio-Kinetic system contacts the installed Blue Crystal disinfecting tablets, just downstream of the equalization ports. A fully charged feed tube will last an average of six months. During each semi-annual inspection, your Singulair service provider will check system operation, the rate of tablet consumption and install tablets during routine service inspections.

NOTE: USEPA guidelines state "On the average, satisfactory disinfection of secondary wastewater effluent can be obtained when the chlorine residual is 0.5 ppm after 15 minutes contact." Retention time must comply with the controlling regulatory jurisdiction.

CAUTION: *The improper handling of Blue Crystal tablets may cause personal injury or property damage. Keep out of the reach of children and do not allow the tablets or feed tube to contact skin, eyes, or clothing. Tablets may be fatal if swallowed and tablet dust is irritating to the eyes, nose and throat. Do not handle the tablets or feed tubes without first carefully reading the product container label, MSDS information and the handling and storage instructions. Mixing of chemicals may cause a violent reaction leading to fire or explosion. For additional information about Blue Crystal tablets contact your Singulair service provider.*

BIO-NEUTRALIZER® DECHLORINATION TABLETS

In environmentally sensitive areas, environmental regulations may require the use of Bio-Neutralizer dechlorination tablets. Manufactured as an efficient and dependable means to chemically neutralize both free and combined chlorine, Bio-Neutralizer dechlorination tablets provide consistent reduction or elimination of chlorine residual without unnecessarily reducing the level of dissolved oxygen in the treatment system effluent. Bio-Neutralizer dechlorination tablets utilize a unique chemical mixture for chlorine reduction and environmental protection. As liquid passes through the final discharge zone of the Bio-Kinetic system, the flow contacts the installed Bio-Neutralizer tablets and residual chlorine is removed from the system effluent. A fully charged Bio-Neutralizer feed tube will last an average of six months. During each semi-annual inspection, your Singulair service provider will check system operation, the rate of tablet consumption and install tablets during routine service inspections.

CAUTION: *Bio-Neutralizer tablets or feed tubes should not be mixed with Blue Crystal tablets. Do not handle the tablets or feed tubes without first carefully reading the product container label, MSDS information and the handling and storage instructions. For additional information about Bio-Neutralizer tablets contact your Singulair service provider.*

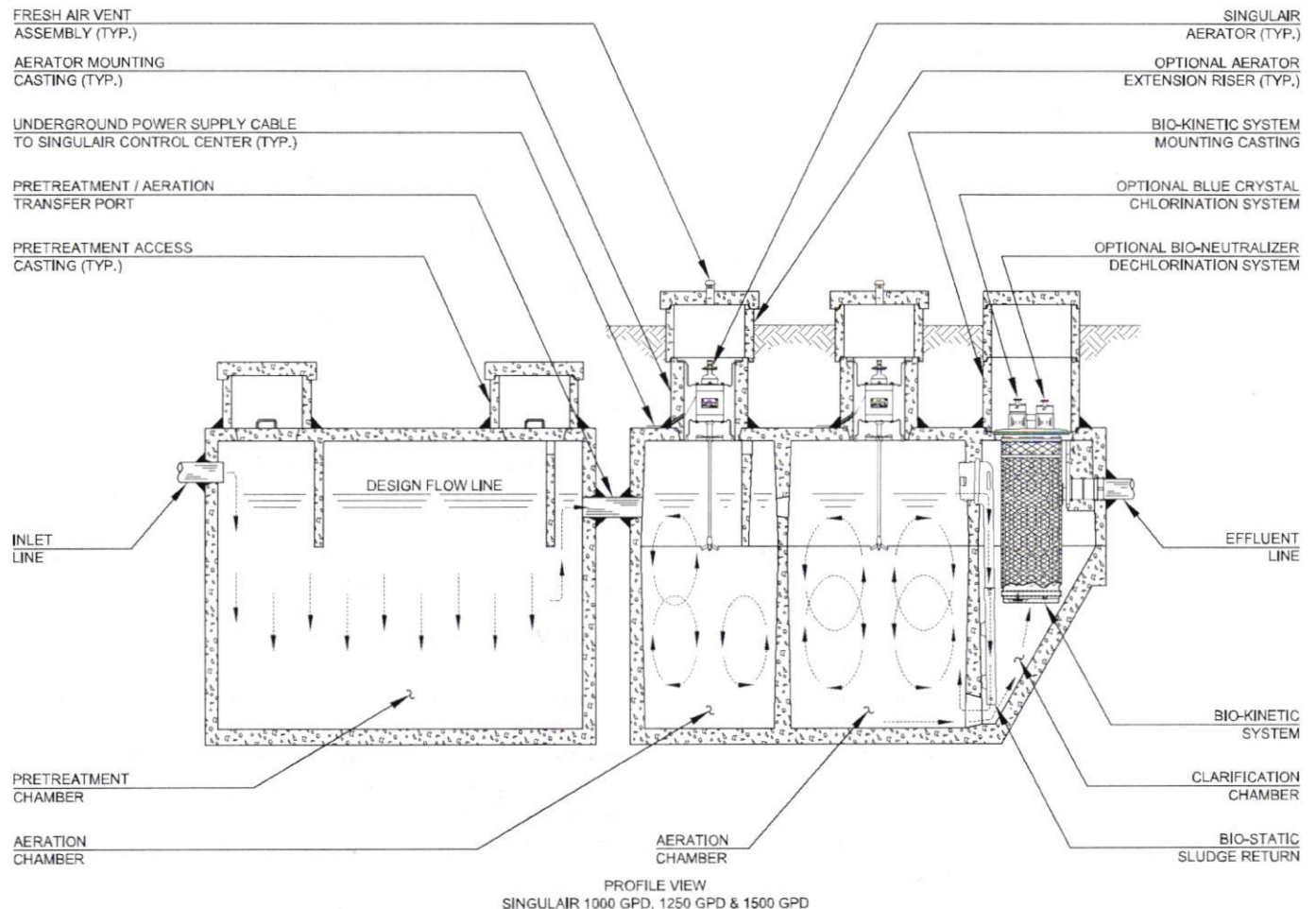
NO OWNER MAINTENANCE

The Singulair system is inspected and serviced by a local, factory-trained service provider, therefore, no owner maintenance is required during the warranty period. The Singulair system does not require pumping as often as a septic tank. Under normal use only the pretreatment chamber should be pumped. How often pumping is necessary depends on system use. The local Singulair service provider will inspect the aeration chamber contents and plant effluent at six month intervals to determine if the pretreatment chamber is discharging excessive solids. Every three years, the pretreatment chamber should be inspected. The pretreatment chamber will normally require pumping at three to five year intervals. Contact your local service provider prior to tank pumping for complete information on removal of equipment, access to individual chambers, coordination of services and proper disposal of tank contents. A tank pumping service licensed by the local regulatory agency must be used for removal and disposal of tank contents. The tank pumper should consult with local authorities to determine the proper disposal method.

If a period of intermittent use, or an extended period of non-use of the Singulair system is anticipated, contact your Singulair service provider for instructions. Your service provider has comprehensive Singulair service instructions and has been factory-trained in troubleshooting procedures. Contact your service provider if you require service or information regarding tank pumping.

SINGULAIR® SERVICE PROGRAM

Semi-annual service inspections, at six month intervals for the first two years of system operation, are provided by your local Norweco distributor and are included in the original purchase price of the Singulair system. Costs for travel and labor are not charged to the owner. During an inspection, each mechanical aerator, Bio-Kinetic system and other plant components are serviced as outlined in the Singulair Service Manual. After the initial two year service program is completed, the local service provider will provide continued service at the owner's option. The service program should be renewed by the owner to insure maximum system performance.



Ask your Singulair service provider about a renewable service contract. If you allow service coverage to expire, you can still obtain the professional assistance of a factory-trained technician. However, these special service calls will be performed on a time and materials basis. Professional service is important to proper system operation and should not be allowed to lapse. Be sure to consider the advantages of a renewable service contract.

The Singulair service provider will perform the following services during each service inspection:

- | | |
|--|--|
| ✓ Check aerator operation | ✓ Inspect outlet coupling |
| ✓ Check aerator power consumption | ✓ Install a clean Bio-Kinetic system |
| ✓ Check aerator air delivery | ✓ Fill Blue Crystal feed tube |
| ✓ Clean stainless steel aspirator shaft | ✓ Fill Bio-Neutralizer feed tube |
| ✓ Clean aspirator tip | ✓ Inspect effluent quality |
| ✓ Clean fresh air vent in concrete cover | ✓ Inspect outlet line |
| ✓ Inspect aeration chamber contents | ✓ Inspect ground water relief point |
| ✓ Check operation of control center | ✓ Inspect effluent disposal system |
| ✓ Adjust time clock when required | ✓ Complete 3-part service record |
| ✓ Remove the Bio-Kinetic system | ✓ Hang owner's record on front door |
| ✓ Scrape the clarification chamber | ✓ Enter record into www.servicepromcd.com |
| ✓ Inspect the Bio-Static sludge return | ✓ Mail health department notification |

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WARRANTY REGISTRATION

A Warranty Registration Card was included with the Model 206C aerator before it was shipped from the factory. If this card has not been returned to Norweco, complete and mail it immediately. If it is not returned within thirty days of the installation date, the three year limited warranty and lifetime aerator exchange program will begin on the date of component shipment from the factory.

Remove the aerator model number and serial number record card and store it in a safe location with this Owner's Manual for future reference. If it is necessary to call your service provider for service, make note of the information on the control center data plate and the aerator serial number before calling. Warranty and service records are cross-indexed by owner name, aerator serial number or control center serial number. Supplying the aerator serial number and control center serial number with the service request will give the service provider a ready reference so that changes in system ownership will not delay service.

SINGULAIR® LIMITED WARRANTY

The Singulair aerator enjoys the distinction of being the only aerator on the market today backed by a lifetime warranty and exchange program. Each Singulair aerator, Service Pro control center, Bio-Kinetic system and any other components manufactured by Norweco, are warranted to be free from defects in material and workmanship, under normal use and service, for a period of three years from the date of purchase. The three year limited warranty is included in the original purchase price of every Singulair system. The comprehensive aerator exchange program offers Singulair owners a lifetime of protection. Owners with a Singulair system may exchange any aerator of any age for a replacement unit at a prorated cost. If the Singulair aerator or Service Pro control center fails, do not use or dismantle the unit. The local, licensed distributor has detailed warranty and exchange information and should be contacted for service or replacement instructions.

SERVICE PRO® SECURITY LOG IN

For your convenience, record your www.servicepromcd.com access information here:

User name:	Password:
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SUPPLEMENTAL SERVICE RECORD

For your reference, please document service performed on the following chart:

DATE	DESCRIPTION

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and wastewater treatment*

220 REPUBLIC STREET
NORWALK, OHIO, USA 44857-1156
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System Component #2 – Dose Tank



MEMBER N. C. B. V. A.

MEMBER P. C. B. V. A.

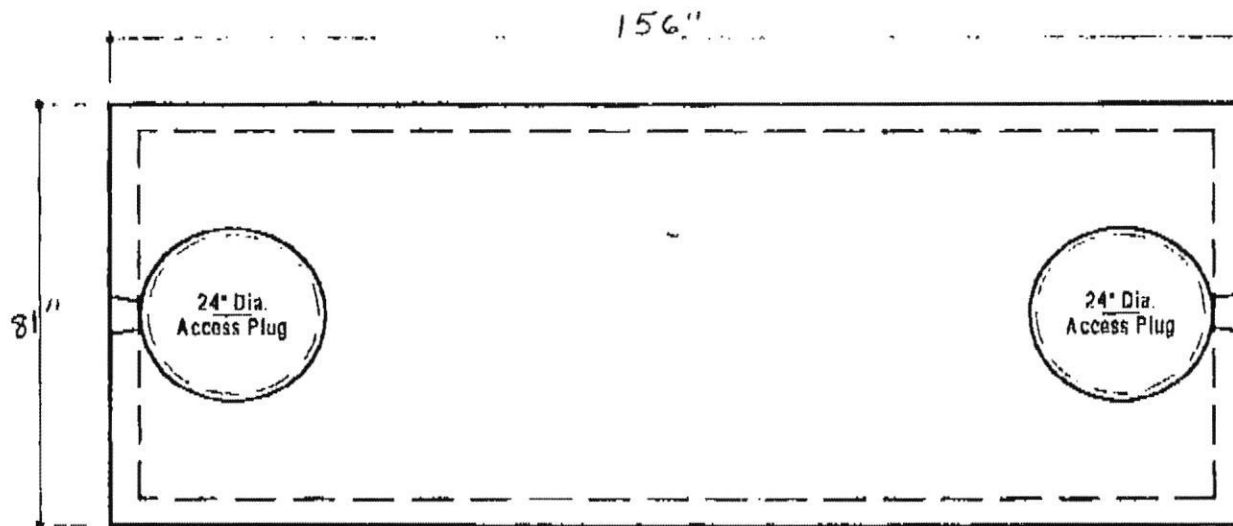
Babylon

VAULT
SINCE 1930

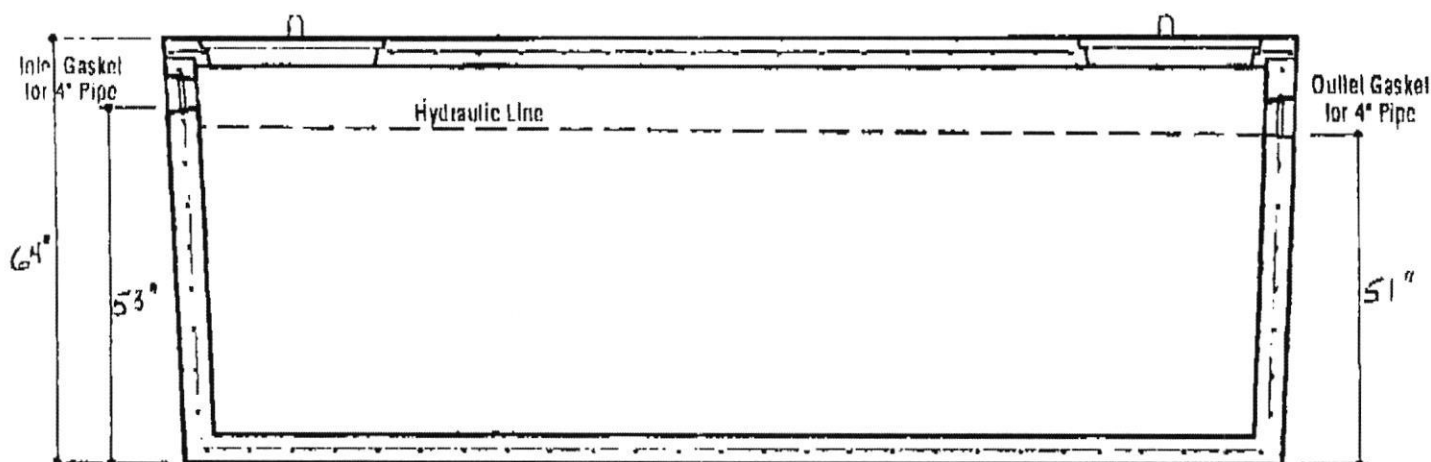
PHONE:
410-848-0393
FAX:
410-848-3551

Burial Vaults - Septic Tanks
2000 GALLON Septic or Pump TANK

925 WAKEFIELD VALLEY ROAD
NEW WINDSOR, MD 21776



Top VIEW



side view

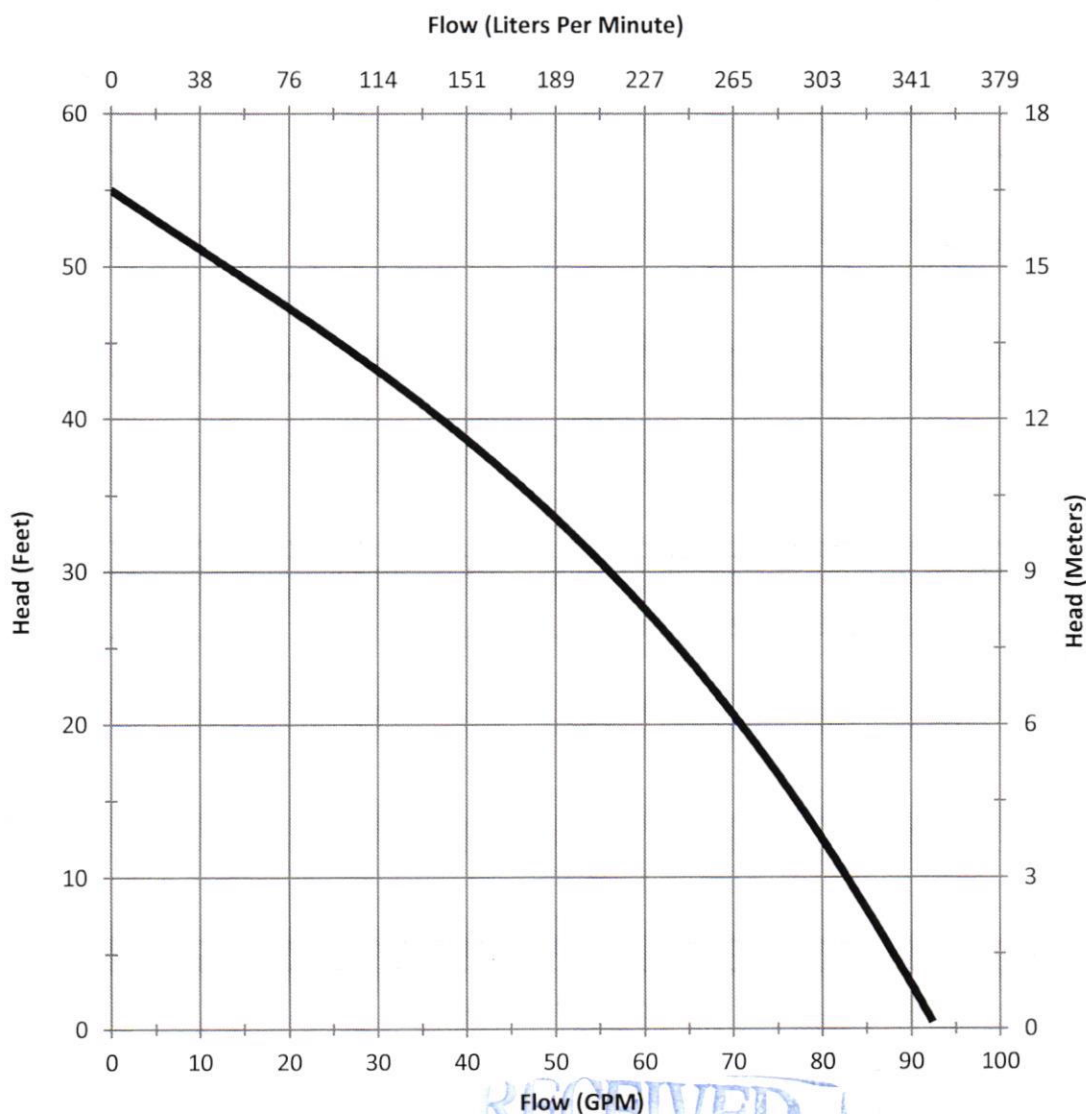
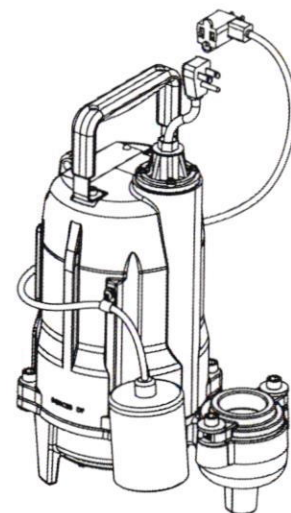
Design Data + General INFO.

- (1) Concrete STRENGTHS = 6000 psi @ 28 days
- (2) Cement PORTLAND Type I/II per ASTM C-150-92
- (3) Admixtures - Plasticeizers per ASTM C-260-86 + C-494-92
- (4) Reinforcing per ASTM A-185 min 1-1/2 inch COVER
- (5) TOP SLAB SEALED WITH BUTYL TAPE
- (6) 4" walls, bottom, TOP

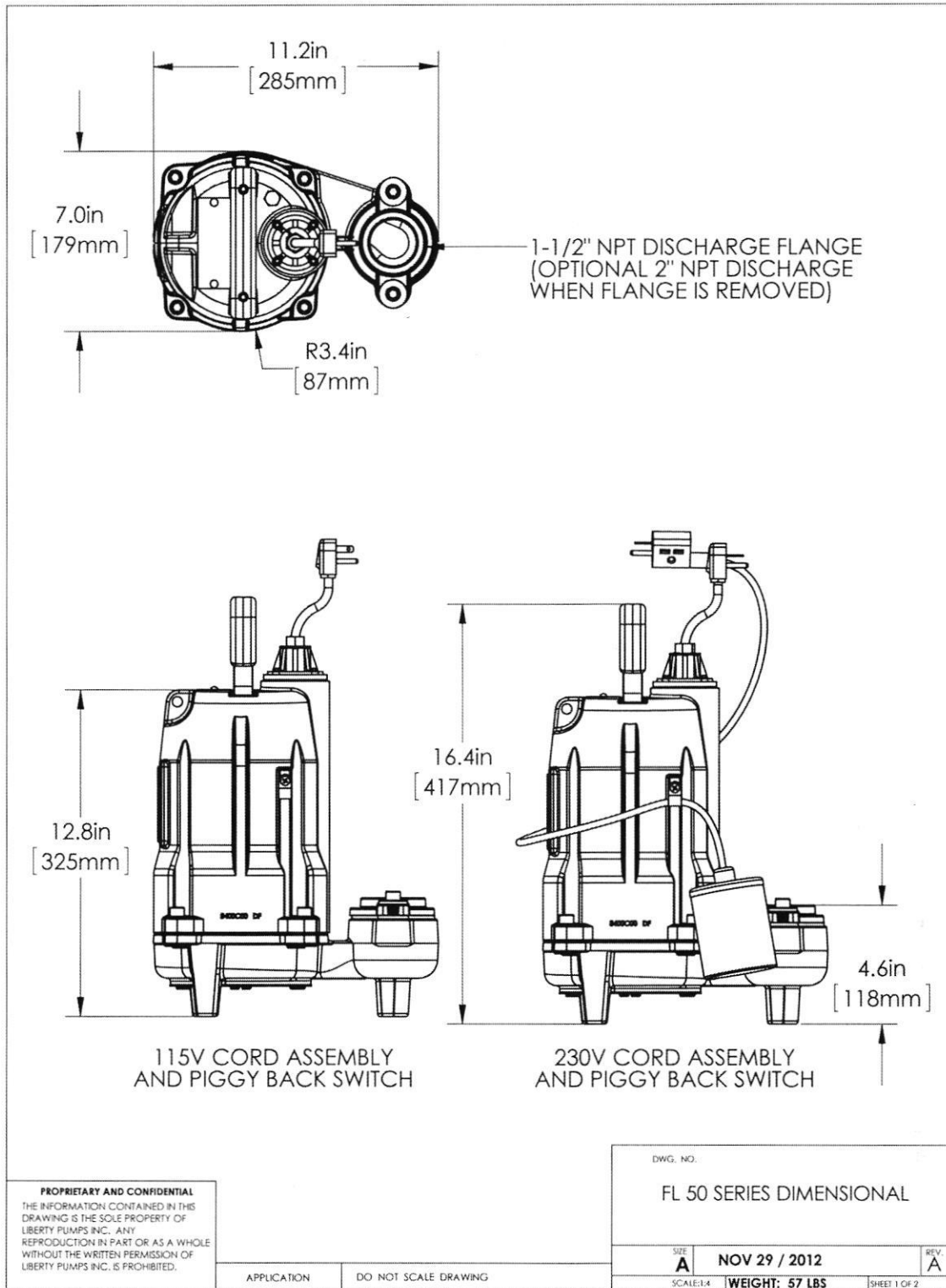


Pump Specifications

FL50 Series 1/2 hp Submersible Effluent Pump



FL50-Series Dimensional Data



FL50-Series Electrical Data

MODEL	HP	VOLTAGE	PHASE	FULL LOAD AMPS	LOCKED ROTOR AMPS	THERMAL OVERLOAD TEMP	STATOR WINDING CLASS	CORD LENGTH FT	DISCHARGE	AUTOMATIC	WGT.
FL51A	1/2	115	1	12	48.6	120°C 248°F	B	10	1 ½ OR 2"	YES	53 lbs.
FL51A-2	1/2	115	1	12	48.6	120°C 248°F	B	25	1 ½ OR 2"	YES	55 lbs.
FL51A-3	1/2	115	1	12	48.6	120°C 248°F	B	35	1 ½ OR 2"	YES	58 lbs.
FL51M	1/2	115	1	12	48.6	120°C 248°F	B	10	1 ½ OR 2"	NO	52 lbs.
FL51M-2	1/2	115	1	12	48.6	120°C 248°F	B	25	1 ½ OR 2"	NO	53 lbs.
FL51M-3	1/2	115	1	12	48.6	120°C 248°F	B	35	1 ½ OR 2"	NO	55 lbs.
FL52A	1/2	208-230	1	6.5	24.1	120°C 248°F	B	10	1 ½ OR 2"	YES	53 lbs.
FL52A-2	1/2	208-230	1	6.5	24.1	120°C 248°F	B	25	1 ½ OR 2"	YES	55 lbs.
FL52A-3	1/2	208-230	1	6.5	24.1	120°C 248°F	B	35	1 ½ OR 2"	YES	58 lbs.
FL52M	1/2	208-230	1	6.5	24.1	120°C 248°F	B	10	1 ½ OR 2"	NO	52 lbs.
FL52M-2	1/2	208-230	1	6.5	24.1	120°C 248°F	B	25	1 ½ OR 2"	NO	53 lbs.
FL52M-3	1/2	208-230	1	6.5	24.1	120°C 248°F	B	35	1 ½ OR 2"	NO	55 lbs.

FL50-Series Technical Data

IMPELLER	MULTI-VANE CAST IRON
PAINT	POWDER COAT
SOLIDS HANDLING CAPABILITY	3/4"
MAX LIQUID TEMP	60°C 140°F
MAX STATOR TEMP	130°C 266°F
THERMAL OVERLOAD	120°C 248°F
POWER CORD TYPE	SJTW (1-PH) or SEOOW (3-PH), or SJOOW (35' – 1PH)
MOTOR HOUSING	CLASS 25 CAST IRON
VOLUTE	CLASS 25 CAST IRON
IMPELLER	CLASS 25 CAST IRON
SHAFT	STAINLESS
HARDWARE	STAINLESS
ORINGS	BUNA N
MECHANICAL SEAL	UNITIZED CERAMIC CARBON

FL50-Series Specifications

1.01 GENERAL:

The contractor shall provide labor, material, equipment, and incidentals required to provide _____ (QTY) centrifugal pumps as specified herein. The pump models covered in this specification are Series FL50 single phase pumps. The pump furnished for this application shall be model _____ as manufactured by Liberty pumps.

2.01 OPERATING CONDITIONS:

Each submersible pump shall be rated at 1/2 hp _____ volts single phase 60 Hz. 3450 RPM. The unit shall produce _____ G.P.M. at _____ feet of total dynamic head.

The submersible pump shall be capable of handling sewage effluent with 3/4" solid handling capability. The submersible pump shall have a shut-off head of 55 feet and a maximum flow of 76 GPM @ 15 feet of total dynamic head.

The pump shall be controlled with:

_____ A piggy back style on/off float switch.

_____ A NEMA 4X simplex control panel with three float switches and a high water alarm.

_____ A NEMA 4X duplex control panel with three float switches and a high water alarm.

3.01 CONSTRUCTION:



Each centrifugal sewage pump shall be equal to the ^C_{us} certified Series FL50 SERIES pumps as manufactured by Liberty Pumps, Bergen NY. The castings shall be constructed of class 25 cast iron. The motor housing shall be oil filled to dissipate heat. Air filled motors shall not be considered equal since they do not properly dissipate heat from the motor. All mating parts shall be machined and sealed with a Buna-N o-ring. All fasteners exposed to the liquid shall be stainless steel. The motor shall be protected on the top side with sealed cord entry plate with molded pins to conduct electricity eliminating the ability of water to enter internally through the cord. The motor shall be protected on the lower side with a unitized ceramic/carbon seal with stainless steel housings and spring. The pump shall be furnished with stainless steel handle.

4.01 ELECTRICAL POWER CORD

The submersible pump shall be supplied with a 10, 25 or 35 feet of multiconductor power cord. It shall be cord type SJTW (1-PH) or SEOOW (3-PH), SJOOW (35' – 1PH), capable of continued exposure to the pumped liquid. The power cord shall be sized for the rated full load amps of the pump in accordance with the National Electric Code. The power cable shall not enter the motor housing directly but will conduct electricity to the motor by means of a water tight compression fitting cord plate assembly, with molded pins to conduct electricity. This will eliminate the ability of water to enter internally through the cord, by means of a damaged or wicking cord.

5.01 MOTORS

Single phase motors shall be oil filled, permanent split capacitor, class B insulated NEMA B design, rated for continuous duty. At maximum load the winding temperature shall not exceed 130 degrees C unsubmerged. Since air filled motors are not capable of dissipating heat they shall not be considered equal. The pump motor shall have an integral thermal overload switch in the windings for protecting the motor. The capacitor circuit shall be mounted internally in the pump.

6.01 BEARINGS AND SHAFT

Upper and lower ball bearings shall be required. The bearings shall be a single ball / race type bearing. Both bearings shall be permanently lubricated by the oil, which fills the motor housing. The motor shaft shall be made of 17-4 PH stainless steel and have a minimum diameter of .625".

7.01 SEALS

The pump shall have a unitized carbon / ceramic seal with stainless steel housings and spring equal to Crane Type 6A. The motor plate / housing interface shall be sealed with a Buna-N o-ring.

8.01 IMPELLER

The impeller shall be a class 25 iron. It shall be threaded to the motor shaft.

9.01 CONTROLS

All units can be supplied with CSA and UL approved automatic wide angle tilt float switches. The switches shall be equipped with piggy back style plug that allows the pump to be operated manually without the removal of the pump in the event that a switch becomes inoperable. Manual Pumps are operable by means of a pump control panel.

10.01 PAINT

The exterior of the casting shall be protected with Powder Coat paint.

11.01 SUPPORT

The pump shall have cast iron support legs, enabling it to be a free standing unit.

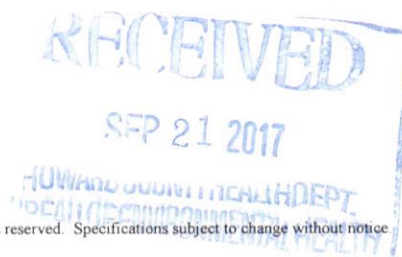
12.01 SERVICEABILITY

Components required for the repair of the pump shall be shipped within a period of 24 hours.

13.01 FACTORY ASSEMBLED TANK SYSTEMS WITH GUIDE RAIL AND QUICK DISCONNECT DISCHARGE

_____ Guide factory mounted rail system with pump suspended by means of bolt on quick disconnect which is sealed by means of nitrile grommets or o-rings. The Discharge piping shall be schedule 80 PVC and furnished with a PVC check valve and shut-off ball valve. The Tank shall be wound fiberglass or roto-molded plastic. An inlet hub shall be provided with the fiberglass systems.

- _____ Stainless steel Guide Rail
- _____ Zinc plated steel Guide Rail
- _____ "diameter of basin size
- _____ "height of basin size
- _____ "distance from top of tank to discharge pipe outlet
- _____ Fiberglass cover
- _____ Structural foam polymer cover
- _____ Steel cover
- _____ Simplex System with Outdoor panel and alarm
- _____ Duplex System with Outdoor panel and alarm
- _____ Separate Outdoor Alarm
- _____ Remote Outdoor Alarm



14.01 TESTING

The pump shall have a ground continuity check and the motor chamber shall be Hi-potted to test for electrical integrity, moisture content and insulation defects. The motor and volute housing shall be pressurized, and an air leak decay test is performed to ensure integrity of the motor housing. The pump shall be run, voltage current monitored, and the tester checks for noise or other malfunction.

15.01 QUALITY CONTROL

The pump shall be manufactured in an ISO 9001 certified Facility.

16.01 WARRANTY

Standard limited warranty shall be 3 years.

EZ Series® - Single Phase Simplex (Demand/TD)

Single phase, simplex demand dose or timed dose float controlled system for pump control and system monitoring.

The EZ Series® simplex control panel is designed to control one 120, 208, 240 VAC single phase pump in water and sewage installations.

The EZ Series® simplex control panel features a display on the inside of the front cover for programming and system monitoring.

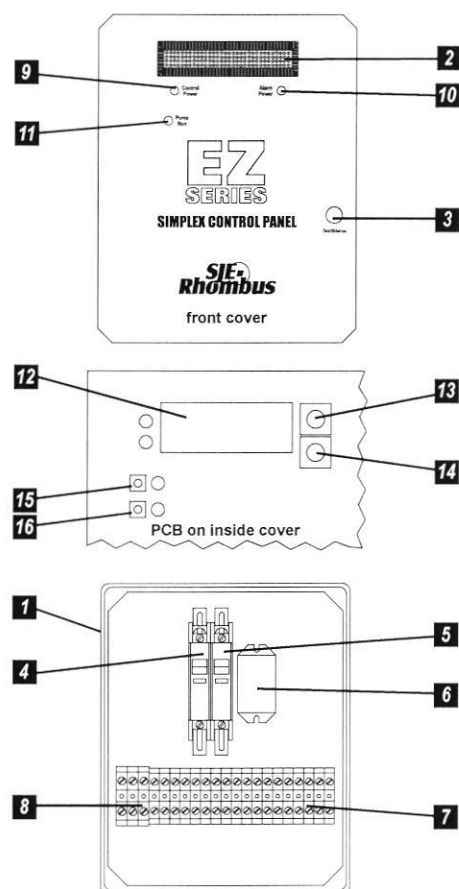
The panel configuration can be easily converted in the field to either a timed dose or demand dose.

The optional post models include an access door. The post can be mounted in the ground directly, over a 4X4, or conduit. The panel is also available with optional duo alarm to meet the needs of various applications.

PANEL COMPONENTS

1. **Enclosure** base measures 10 X 8 X 6 inches (25.4 X 20.32 X 15.24 cm). NEMA 4X (ultraviolet stabilized thermoplastic with removable mounting feet for outdoor or indoor use). Includes locking latch as standard. **Note:** Options, voltage, and amp range selected may change enclosure size and component layout.
2. **Red Alarm Beacon** provides visual check of alarm condition.
3. **Exterior Alarm Test/Silence Switch** allows horn and light to be tested and horn to be silenced in an alarm condition. Alarm automatically resets once alarm condition is cleared.
4. **Circuit Breaker** provides pump power disconnect and branch circuit protection.
5. **Circuit Breaker** provides control/alarm power disconnect.
6. **Power Relay** controls pump by switching electrical lines.
7. **Float Connection Terminal Block**
8. **Incoming Control/Alarm Power & Pump Power Terminal Block**
9. **Control Power Indicator** indicator light illuminates if control power is present in panel.
10. **Alarm Power Indicator** indicator light illuminates if alarm power is present in panel.
11. **Pump Run Indicator** will illuminate when pump is called to run.
12. **LED Display** shows system information including: pump elapsed time (hh:mm), events (cycles).
13. **Menu/Enter Button** used for viewing panel settings.
14. **Set/Change Button** used for programming panel settings.
15. **Pump 1 Push To Run Momentary Switch** - Pump activates when pressed
16. **Alarm Horn** provides audio warning of alarm condition (83 to 85 decibel rating). (Located inside panel on cover, not shown)

NOTE: Schematic/Wiring Diagram and Pump Specification Label are located inside the panel.



Model Shown EZS21W914X6A8AC10E15A
(Inside view)

Reg. Cdn Pat. & TM Off

FEATURES

- Entire control system (panel and switches) is UL Listed to meet and/or exceed industry safety standards
- Dual safety certification for the United States and Canada
- Standard package includes:
Demand Dose - three 20' SJE MilliAmpMaster™ control switches
Timed Dose - two 20' SJE MilliAmpMaster™ control switches
- Complete with step-by-step installation instructions
- Five-year limited warranty



SJE Rhombus

PO Box 1708, Detroit Lakes, MN 56502

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email: customer.service@sjerhombus.com

www.sjerhombus.com B.1

SEE BACKSIDE FOR COMPLETE LISTING OF AVAILABLE OPTIONS.
SEE PRICE BOOK FOR LIST PRICE.

EZS	1	W	4	3A 6A 8AC 10E 15A
------------	----------	----------	----------	--------------------------

MODEL EZS

MODEL TYPE
☐ 1 = SPLX TIMED DOSE
☐ 2 = SPLX DEMAND DOSE

☒ **ALARM PACKAGE**
 1 = alarm package (includes test/normal/silence switch, fuse, red light & horn)

☒ **ENCLOSURE RATING**
 W = NEMA 4X

☐ **STARTING DEVICE**
☐ 1 = 120/208/240 VAC
☐ 9 = 120 VAC

☐ **PUMP FULL LOAD AMPS**
☐ 0 = 0-7 FLA
☐ 1 = 7-15 FLA
☐ 2 = 15-20 FLA

☒ **PUMP DISCONNECTS**
 4 = circuit breaker(s)
 120 VAC (must select starting device option 9)
 120/208/240 VAC (must select starting device option 1)

☐ **SWITCH APPLICATIONS**
☐ H = floats (Timed dose = timer enable and alarm / Demand dose = stop, start, and alarm) (select 17 option)
☐ X = no float (Time dose)
 (Demand dose)

Note: Pump down applications only.

OPTIONS *Listed below*

CODE	DESCRIPTION	LIST PRICE	CODE	DESCRIPTION	LIST PRICE
☐	1J Duo alarm inputs		☐	17C Sensor Float® / internally weighted ▲ (per float)	
☒	3A Alarm Flasher (included as standard)		☐	17D Sensor Float® / externally weighted ▲ (per float)	
☐	4A Redundant off (timed dose only) (select 4D if floats are required)		☐	17G MilliAmpMaster™ / pipe clamp ● (per float)	
☐	4D Redundant off float (must select 4A option) (must select 17 option)		☐	17H MilliAmpMaster™ / externally weighted ● (per float)	
☒	6A Auxiliary alarm contact, form A (included as standard)		☐	17J Sensor Float® / pipe clamp ▲ (per float)	
☒	8AC Display board includes: ETM counter, events (cycles) counter, alarm counter (included as standard)		☐	18A Timer override float (timed dose only)	
☒	10E Lockable latch - NEMA 4X (included as standard)		☐	22G 2 1/2" hub installed with 6 hole cord seal	
☐	10P Mounting post (factory installed with 2.5" cord seal)				
☒	15A Control / Alarm circuit breaker (included as standard)				
☐	16A 10' cord in lieu of 20' (per float)				
☐	16B 15' cord in lieu of 20' (per float)				
☐	16C 30' cord in lieu of 20' (per float)				
☐	16D 40' cord in lieu of 20' (per float)				

● Mechanically-activated ▲ Mercury-activated

If additional features are required, call the factory for a quote on an Engineered Custom control panel.

SAMPLE

MODEL	EZS	2	1	W	1	1	4	H	3A 6A 8AC 10E 15A 17G
--------------	------------	----------	----------	----------	----------	----------	----------	----------	------------------------------

Model Type —

Alarm Package —

Enclosure Rating —

Starting Device —

Pump Full Load Amps —

Pump Disconnects —

Switch Application —

Options: Auxiliary alarm contact, form C, —
 Display, Lockable Latch, Control/Alarm breaker,
 SJE MilliAmpMaster™/pipe clamp

SJE SIGNALMASTER® Control Switch

Mechanically-activated, narrow-angle float switch designed to activate pump control panels and alarms.

This narrow-angle sensing device is used to accurately monitor liquid levels in:

- potable water
- water
- sewage applications

The SJE SignalMaster® control switch is not sensitive to rotation.

Normally Open Model (high level)

The control switch turns on (closes) when the switch tips slightly **above** horizontal signaling a high level, and turns off (opens) when the switch drops slightly below horizontal.

Normally Closed Model (low level)

The control switch turns on (closes) when the switch tips slightly **below** horizontal signaling a low level, and turns off (opens) when the switch tips slightly above horizontal.



FEATURES

- Passed NSF Standard 61 protocol by an approved Water Quality Association laboratory.
- Mechanically-activated, snap action contacts.
- High impact, corrosion resistant, polypropylene float housing.
- Not sensitive to rotation.
- Control differential of 1.5 inches (4 cm) above or below horizontal.
- Yellow colored cap for easy identification of normally open control switch.
- White colored cap for easy identification of normally closed control switch.
- UL Listed for use in water and sewage.
- CSA Certified.
- Five-year limited warranty.



OPTIONS

This switch is available:

- CE certified unit available upon request.
- for normally open (high level) applications or normally closed (low level) applications.
- in standard cable lengths of 10, 15, 20, or 30 feet and 3, 5, 6, or 10 meters (longer lengths available)
- with two mounting options that allow for flexibility in installation:

Mounting Clamp: for applications where the switch can be attached to a discharge pipe or similar mounting device.

Externally Weighted: for applications where the switch can be suspended from above.

SPECIFICATIONS

CABLE: flexible 18 gauge, 2 conductor (UL, CSA) SJOW, water-resistant (CPE)

FLOAT: 2.74 inch diameter x 4.83 inch long (7.0 x 12.3 cm) high impact, corrosion resistant, polypropylene housing for use in sewage and water up to 140°F (60°C)

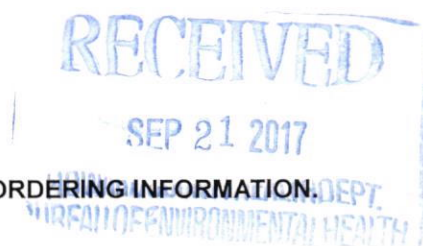
MAXIMUM WATER DEPTH: 30 feet (9 meters), 13 PSI (90 kPa)

ELECTRICAL: 5 amp, 125/250 VAC, 50/60 Hz

NOTE: This switch is not recommended for controlling:

- electric loads less than 100 milliamps, 12 VAC
- non-arcing electric loads

SEE BACKSIDE FOR ORDERING INFORMATION.



SJE Rhombus

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SJE SIGNALMASTER® Control Switch

Mechanically-activated, narrow-angle float switch designed to activate pump control panels and alarms.

ORDERING INFORMATION

Normally Open		Normally Closed		List Price	Shipping Weight
Part#	Description	Part#	Description		
1006042	10SGMPCNO	1006046	10SGMPCNC	\$34.39	1.04 lbs.
1006050	10SGMWENO	1006054	10SGMWENC	\$42.14	2.73 lbs.
1006043	15SGMPCNO	1006047	15SGMPCNC	\$37.63	1.37 lbs.
1006051	15SGMWENO	1006055	15SGMWENC	\$45.39	3.05 lbs.
1006044	20SGMPCNO	1006048	20SGMPCNC	\$40.87	1.69 lbs.
1006052	20SGMWENO	1006056	20SGMWENC	\$48.65	3.30 lbs.
1006045	30SGMPCNO	1006049	30SGMPCNC	\$47.93	2.34 lbs.
1006053	30SGMWENO	1006057	30SGMWENC	\$55.66	4.03 lbs.

PC = Pipe Clamp WE = Weighted Externally NO = Normally Open NC = Normally Closed

NOTE: Descriptions are grouped by cable length measured in feet (10, 15, 20, 30).

OPTIONS

MOUNTING CLAMP
is standard - deduct optional

PACKAGING
Bagged - standard.
Boxed - optional
Bulk - optional

ADDITIONAL CABLE
Longer cable lengths available. Please call for details.

UL Listed for
Water & Sewage



Passed NSF standard 61 protocol by an approved
Water Quality Association laboratory.



SPECIFICATIONS

CABLE: flexible 18 gauge, 2 conductor (UL) SJOW, water-resistant (CPE)

FLOAT: 2.74 inch diameter x 4.83 inch long (7 x 12.3 cm), high impact, corrosion resistant polypropylene for use in sewage and water up to 140°F (60°C)

MAXIMUM WATER DEPTH: 30 feet (9 meters), 13 psi

ELECTRICAL: 5 amp, 125/250 VAC, 50/60 Hz

This switch is not recommended for controlling:

- electric loads less than 100 milliamps, 12 VAC
- non-arcing electric loads

OTHER INFORMATION

NORMALLY OPEN (high level) OPERATION

The control switch closes (turns on) when the float tips slightly **above** horizontal signaling a high level, and opens (turns off) when the float drops slightly **below** horizontal in potable water, water or sewage applications.

NORMALLY CLOSED (low level) OPERATION

The control switch closes (turns on) when the float tips slightly **below** horizontal signaling a low level, and opens (turns off) when the float tips slightly **above** horizontal in potable water, water or sewage applications.

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customer.service@sjrhombus.com

Call or fax your order!

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Product offering and pricing are subject to change without notice.
Please visit www.sjrhombus.com for the most current information.

Cat Page PN 1011937P-WEB
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SJE-Rhombus

Control Switch Installation Instructions

SJE-Rhombus® narrow angle control switches accurately monitor liquid levels in sewage, and non-potable water applications. These switches are designed to activate pump control panels and alarms.

The SJE SignalMaster® and SJE SignalMaster® SPDT control switches passed NSF Standard 61 protocol by an approved Water Quality Association laboratory for use in potable water applications.

SJE SIGNALMASTER®



- Mechanically activated.
- Control differential of 1.5 inches above or below horizontal.
- Not sensitive to rotation.
- Mounting options: mounting clamp or cable weight.

SJE SIGNALMASTER® SPDT



- Mechanically activated.
- Control differential of 1.5 inches above or below horizontal.
- Not sensitive to rotation.
- Mounting options: mounting clamp or cable weight.

SENSOR FLOAT®



- Mercury activated.
- Suitable for use with an intrinsically safe circuit.**
- Not sensitive to rotation.
- Mounting options: mounting clamp, internal or cable weight.

SENSOR FLOAT® MINI



- Mercury activated.
- Narrow angle float switch in a small float housing.
- Suitable for use with an intrinsically safe circuit.**
- Not sensitive to rotation.
- Mounting options: mounting clamp or cable weight.

**Contact SJE-Rhombus for specific intrinsically safe applications.

**Contact SJE-Rhombus for specific intrinsically safe applications.

PREVENTATIVE MAINTENANCE

- Periodically inspect the product. Check that the cable has not become worn or that the housing has not been damaged so as to impair the protection of the product. Replace the product immediately if any damage is found or suspected.
- Periodically check to see that the float is free to move and operate the switch.
- Use only SJE-Rhombus® replacement parts.
- The Sensor Float® and Sensor Float® Mini control switches contain mercury and **MUST** be recycled or disposed of according to local, state, and federal codes.

SJE-RHOMBUS® FIVE-YEAR LIMITED WARRANTY

SJE-RHOMBUS® warrants to the original consumer that this product shall be free of manufacturing defects for five years after the date of consumer purchase. During that time period and subject to the conditions set forth below, **SJE-RHOMBUS®** will repair or replace, for the original consumer, any component which proves to be defective due to defective materials or workmanship of **SJE-RHOMBUS®**.

THIS EXPRESS WARRANTY DOES NOT APPLY TO THE MOTOR START KIT COMPONENT. SJE-RHOMBUS® MAKES NO WARRANTIES OF ANY TYPE WITH RESPECT TO THE MOTOR START KIT.

ELECTRICAL WIRING AND SERVICING OF THIS PRODUCT MUST BE PERFORMED BY A LICENSED ELECTRICIAN.

THIS WARRANTY DOES NOT APPLY: (A) to damage due to lightning or conditions beyond the control of **SJE-RHOMBUS®**; (B) to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided; (C) to failures resulting from abuse, misuse, accident, or negligence; (D) to units which are not installed in accordance with applicable local codes, ordinances, or accepted trade practices, and (E) to units repaired and/or modified without prior authorization from **SJE-RHOMBUS®**.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE: The consumer shall assume all responsibility and expense for removal, reinstallation, and freight. Any item to be repaired or replaced under this warranty must be returned to **SJE-RHOMBUS®**, or such place as designated by **SJE-RHOMBUS®**.

ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS ARE LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. SJE-RHOMBUS® SHALL NOT, IN ANY MANNER, BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AS A RESULT OF A BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.

NOTICE!

Products returned must be cleaned, sanitized, or decontaminated as necessary prior to shipment to ensure that employees will not be exposed to health hazards in handling said material. All applicable laws and regulations shall apply.

⚠ WARNING**ELECTRICAL SHOCK HAZARD**

Disconnect power before installing or servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes.

⚠ WARNING**EXPLOSION OR FIRE HAZARD**

Do not use this product with flammable liquids. Do not install in hazardous locations as defined by National Electrical Code, ANSI/NFPA 70.

Failure to follow these precautions could result in serious injury or death. Replace product immediately if switch cable becomes damaged or severed. Keep these instructions with warranty after installation. This product must be installed in accordance with National Electric Code, ANSI/NFPA 70 so as to prevent moisture from entering or accumulating within boxes, conduit bodies, fittings, float housing, or cable.

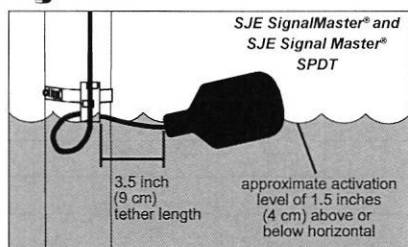
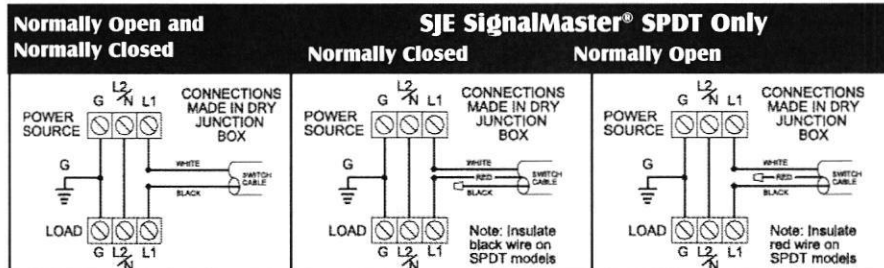
For detailed specifications on this product, or for the complete line of SJE-Rhombus® panel, alarm, and switch products, visit our web-site at www.sjerrhombus.com.

MOUNTING THE SWITCH

WARNING: Do not install switch in direct line of incoming liquid.

1. Place the cord into the clamp as shown in Figure C.
2. Locate clamp at desired activation level and secure the clamp to the discharge pipe as shown in Figures A and B. **Note:** Do not install cord under hose clamp.
3. Tighten the hose clamp using screwdriver. Over tightening may result in damage to the plastic clamp. Make sure the float cable is not allowed to touch the excess hose clamp band during operation.
4. Wire switch as shown in Figure D.
5. Check installation. Allow system to cycle to insure proper operation.

Note: All hose clamp components are made of 18-8 stainless steel material. See your SJE-Rhombus® supplier for replacements.

Figure A**Figure D****⚠ WARNING**

In 230 VAC installations, one side of the line going to the load is always **HOT**. This condition exists if the switch is on or off. Install double pole disconnect on all 230 VAC circuits.

On SPDT Models, insulate unused red or black wires with wire nut. Wire can become electrically hot.

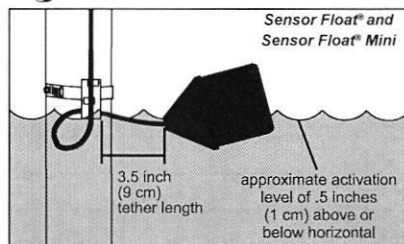
Ensure cable connections are performed in a **dry** junction box or other watertight seal that seals both conductors and cable jacket. Failure to do so could result in electrical shock hazard and/or water traveling down cable and entering the switch. Failure to guard against this may affect switch performance.

CABLE WEIGHT

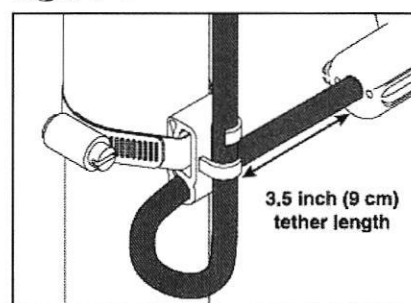
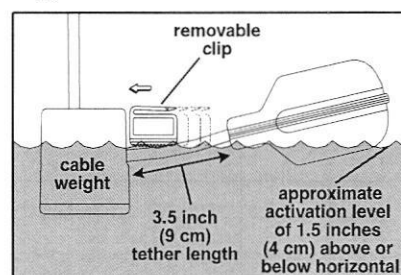
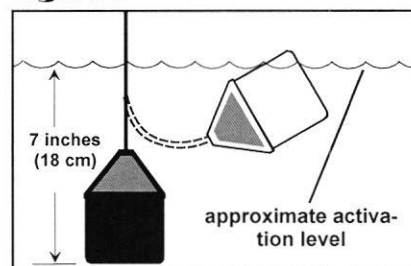
1. Determine desired activation level.
2. Suspend switch and cable weight at desired activation level as shown in Figure E.
3. Wire switch as shown in Figure D.
4. Check installation. Allow system to cycle to insure proper operation.

To adjust cable weight tether length:

1. Release clip.
2. Adjust cable weight to desired position.
3. Lay switch cable in weight channel.
4. Align clip with weight channel and slide towards switch cable as shown in Figure E.
5. Snap clip snugly up to cable, moving clip to tightest possible position.

Figure B**INTERNAL WEIGHT****SENSOR FLOAT® CONTROL SWITCH ONLY**

1. Determine desired activation level as shown in Figures A & B.
2. Suspend switch 7 inches below desired activation level as shown in Figure F. Switch remains partially submerged during the "on" tipping action. Switch can be totally submerged and still continue to operate properly.
3. Wire switch as shown in Figure D.
4. Check installation. Allow system to cycle to insure proper operation.

Figure C**Figure E****Figure F**

SJE-Rhombus®

22650 County Highway 6 ■ P.O. Box 1708 ■ Detroit Lakes, Minnesota 56502 USA

1-888-DIAL-SJE (1-888-342-5753) ■ Phone: 218-847-1317 ■ Fax: 218-847-4617 ■ E-mail: customer.service@sjerrhombus.com

Instl. Instr. PN 1011974L
©SJE-Rhombus 11/14

Maintenance Log

[illegible]

Maintenance Log

[illegible]

LEGEND:

- ▲ TP XX = TEST EXCAVATIONS
- • • = PERCOLATION HOLES
- - - = EXISTING CONTOUR
- - - = PROPOSED CONTOUR
- ⊕ = BENCHMARK LOCATION

SITE PLAN & DATA

SCALE: 1"= 50'

LOT# 19 (WATERMAN ESTATES)

AREA = +/- 3.0003 AC.

TAX ID.# 05-046978

MAP#0040 GRID#0024 PARCEL#0250

PLAT# 7483

**SITE PLAN DERIVED FROM RECORDED SUBDIVISION PLANS. PLAN IS NOT OF SURVEY ACCURACY AND IS INTENDED FOR USE IN SEPTIC SYSTEM INSTALLATION ONLY.

**OWNER OF RECORD:
MR. CHARLES MESS
12470 PETRILLO DRIVE
HIGHLAND, MD 20777-9567

CROSS SECTION DETAIL:

AGGREGATE DIMENSION - 105'-0"

LATERAL LENGTH - 97'-6"

OBSERVATION PORT (TYP.)

4"PVC CLEANOUT SLEEVE (SEE DETAIL)

MINIMUM EXCAV DEPTH = 3'-0"

FINISHED GRADE

SPUN GEOTEXTILE FABRIC

3/4" TO 2" WASHED RIVER GRAVEL FREE OF FINES
MIN. 6" UNDER PIPE - 2" OVER PIPE
10" TOTAL DEPTH

1 1/2" SCH. 40 PVC SWEEP 90°EL

1 1/2" SCH. 40 PVC DELIVERY PIPE

1 1/2" SCH. 40 PVC PIPE (LATERAL-TYP.)

EXISTING CONDITIONS:

- 15' x 105' ABSORPTION BED
- 20 L.F. 1 1/2" SCH. 40 PVC DELIVERY LINE
- 2000 GAL. DOSE TANK
- CONTRACTOR IS TO CONTACT SANITARIAN FOR A PRE-CONSTRUCTION MEETING ON SITE BEFORE ANY EXCAVATION. THE DESIGNER MUST ALSO BE PRESENT FOR THIS MEETING. A TEST PIT IS TO BE EXCAVATED AT THE LOCATION OF THE PUMP TANK IF EVIDENCE OF A SEASONAL HIGH WATER TABLE EXISTS THAT COULD RESULT IN INFILTRATION OF GROUND-WATER INTO THE TANK(S). A DRAINAGE SYSTEM WILL BE REQUIRED IN ORDER TO DIVERT GROUND-WATER FROM TANKS
- 118 L.F. 4" SCH. 40 PVC BUILDING SEWER
- 42 L.F. 4" SCH. 40 PVC BUILDING SEWER
- EXISTING TANK (TBA)
- NORWECO SINGULAIR MODEL TNT 750 GPD AEROBIC TANK
- 4" PVC CAP TO GRADE

LONGITUDINAL SECTION
NTS

15'-0"

5'-0" 1'-6" 3'-0" 3'-0" 3'-0" 3'-0" 1'-6" 5'-0"

89.38 EX. GRADE
89.58 FINISHED GRADE

EX. GRADE

88.58 TOP OF AGGREGATE ELEV.
87.83 EXCAVATION ELEV.

MIN. 48" ISOLATION DISTANCE

3/4" TO 2" WASHED RIVER GRAVEL FREE OF FINES
MIN. 6" UNDER PIPE - 2" OVER PIPE 10" TOTAL DEPTH

CENTERLINE 1 1/2" PVC
LATERALS

90.33 EX. GRADE ELEV.

SPUN GEOTEXTILE FABRIC

88.58 TOP OF AGGREGATE ELEV.
87.83 EXCAVATION ELEV.
MAINTAIN A MIN. OF 1 FOOT
COVER OVER AGGREGATE

CLEANOUT SLEEVE
NTS

1 1/2" PVC CAP
4" SCH40 PVC AS SLEEVE
1 1/2" SCH40 PVC
LATERAL END CLEANOUT

SPUN GEOTEXTILE FABRIC

DOGHOUSE OPENING FOR
LATERAL PASS THROUGH

LAST PERFORATION IN
LATERAL

FINAL GRADE
30.00' EXC
EXISTING EL.

SLOPE - 7.13%

15.0'

1.875'
3.75' + 3.75' = 7.5'

EXISTING ELEV. - 89.26
17.16' EXCAVATION DEPTH
FINAL GRADE ELEV. - 89.58

Liberty Pumps

CROSS SECTION — ABSORPTION AREA

NTS

Flow (GPM)	Flow (Liters Per Minute)	Head (Feet)
0	0	68
10	38	65
20	76	60
30	114	52
40	151	42
50	189	32
60	227	22
70	265	12
80	303	5
90	341	0
100	379	0

4" PERFORATED SCH.40 PVC PIPE W/ REMOVABLE CAP (TYP.)

GEOTEXTILE SLEEVE OVER PIPE (TYP.)

NEW VEGETATION

TOPSOIL COVER

SPUN GEOTEXTILE FABRIC

ORIGINAL GRADE

3/4" TO 2" WASHED RIVER GRAVEL FREE OF FINES

AGGREGATE/SOIL INTERFACE

BOTTOM OF TRENCH

EXISTING SUBSURFACE SOIL

OBSERVATION PORT

NTS

7.5

SJE RHOMBUS EZ SERIES TIVISUAL AND AUDIBLE ALARM COUNTER & ELAPSED TIME METER A MINIMUM OF 36 INCHES ABOVE GRADE

42 L.F. 4"Ø SCH. 40 PVC PIPE @ 0.0207 FT/FT

CLEANOUT TO BE PROVIDED (EITHER LOCATION)

TOP OF TANK EL. 93.75

LAST 10' OF BUILDING SEWER PIPE TREATMENT TANK SHALL NOT EXCEED (0.0208FT./FT.) PER FOOT FALL

93.27 INV. AT BUILDING

INV. IN TANK

SITE TESTING DATA				DESIGN PARAMETERS			
TEST PIT NUMBER	LIMITING ZONE	TYPE		BED DEPTHS	6		
				PERCOLATION RATE	N/A	MPI	
**SOIL EVALUATIONS CONDUCTED VIA HAND TURNED				PEAK GALLONS PER DAY	600	GAL.	
AUGER BORINGS AS OBSERVED BY THE HCHD AND MDE.				AREA REQUIRED PER GALLON	1.67	SQ. FT.	
				SOIL LOADING RATE	0.6	GAL./SQ.FT.	
				MIN. ABSORPTION AREA	1500	SQ. FT.	
				ABSORPTION AREA WIDTH	15	FEET	
				ABSORPTION AREA LENGTH	105	FEET	
				ABSORPTION AREA PROVIDED	1575	SQ. FT.	
M=MOTTILING, R=ROCK, ISFV=INSUFFICIENT FINES TO FILL THE VOIDS, S-SKEPS							
CONSTRUCTION DATA							
CORNER ELEVATIONS	EXCAV. DEPTH			BED ELEVATIONS			
90.33	30	INCHES		BOTTOM OF BED	87.83	ELEV	
90.33	30	INCHES		MAXIMUM DEPTH OF CUT	30.00	INCHES	
89.26	17.16	INCHES		LATERAL INV. ELEVATION	88.33	ELEV	
89.38	18.6	INCHES		TOP OF AGGREGATE	88.58	ELEV	
				MIN. TOP OF BED ELEVATION	89.58	ELEV	
SYSTEM COMPONENTS							
TREATMENT CAPACITY REQ'D	750	GPD		MIN. AVAIL. DOSE CAPACITY	600.00	GAL.	
TREATMENT PROVIDED	750	GPD		PUMP TANK PROVIDED	2000	GAL.	
TREATMENT TANK TYPE	BAT-AEROBIC			DOSE TANK PER IN. CAPACITY	45.00	GAL.	
BAT MANUFACTURER	NORWECO			AVERAGE SEWAGE FLOW	600.00	GPD	
BAT MODEL	SINGULAR MODEL TNT750			PROPOSED DOSE VOLUME	186.28	GAL.	
				DOSE CYCLES PER DAY	3.22	QUAN.	
				PUMP RUN TIME PER CYCLE	2.60	MIN.	
				DAILY RUN TIME (TOTAL)	8.37	MIN.	
				PUMP REST TIME PER CYCLE	444.60	MIN.	
				DAILY REST TIME (TOTAL)	1431.63	MIN.	
HYDRAULIC CALCULATIONS							
SYSTEM CAPACITY				HEAD LOSSES			
DELIVERY LINE DIA.	1.5	INCHES		FRICTION LOSSES			
TOTAL DELIVERY LINE LENGTH	23.92	FEET		DELIVERY LINE LENGTH		23.92	FT.
*TOTAL DELIVERY LINE INCLUDES PUMP TO OUTLET LENGTH				90 DEGREE EL	4	18.92	FT.
DELIVERY LINE CAPACITY	2.19	GAL.		45 DEGREE EL	0	0.00	FT.
MANIFOLD DIAMETER	1.50	INCHES		COUPLING	0	0.00	FT.
MANIFOLD LENGTH	11.25	FEET		TEE	1	8.62	FT.
MANIFOLD CAPACITY	1.03	GAL.		QUICK DISCONNECT	1	1.05	FT.
LATERAL DIAMETER	1.50	INCHES		CHECK VALVE	0	0.00	FT.
TOTAL LATERAL LENGTH	390.00	FEET		FITTINGS EQUIVALENT LENGTH		28.59	FT.
LATERAL CAPACITY	35.78	GAL.		TOTAL EQUIVALENT LENGTH		52.51	FT.
TOTAL CAPACITY	39.01	GAL.					
MINIMUM DOSE	186.26	GAL.		DESIGN FLOW	71.65	GPM	
DISCHARGE HOLE DIA.	1/4	INCH		FRICTION LOSS	26.191	FT./100 FT.	
DISCHARGE HOLES PER LAT.	7.00	QUAN.		FRICTION LOSS	0.2619	PER FT.	
TOTAL DISCHARGE HOLES	56.00	QUAN.		STATIC HEAD	4.42	FT.	
DISCHARGE PER HOLE	1.28	GPM		HEAD TO BE MAINTAINED	3	FT.	
TOTAL DISCHARGE	71.65	GAL.		TOTAL SYSTEM HEAD	21.17	FT.	
PUMP SPECIFIED							
DELIVERS	71.65	GPM	@	21.17 FT.			
MANUFACTURER	LIBERTY	MODEL	#	FL60 (6/10 H.P.)			

GENERAL INSTALLATION NOTES:

1. VEGETATION OR ORGANIC LITTER SHALL BE RAKED AND REMOVED FROM THE ABSORPTION AND BERM AREAS.
2. BEFORE AND AFTER INSTALLATION, EQUIPMENT AND VEHICLES SHALL BE KEPT OFF THE PROPOSED ABSORPTION AREA, INCLUDING THE DOWNSLOPE AREA, TO PREVENT UNDUE COMPACTION OF THE SOIL. CARE SHALL BE EXERCISED DURING CONSTRUCTION TO PREVENT UNDUE COMPACTION AND THE SOIL SURFACE SHALL BE PROTECTED. ALL EXCAVATION SHALL BE DONE FROM OUTSIDE THE ABSORPTION AREA OR DONE USING A ULTRA LOW IMPACT ROLLBACK MACHINE.
3. SOIL MOISTURE LEVELS DURING CONSTRUCTION OF THE ABSORPTION AREA SHALL BE SUCH THAT A SAMPLE OF NATURAL MINERAL SOIL TAKEN FROM THE LEVEL OF THE PROPOSED INSTALLATION WILL CRUMBLE IF COMPRESSED INTO A BALL.
4. IMMEDIATELY AFTER EXCAVATING, AGGREGATE SHALL BE PLACED OVER THE EXPOSED SURFACE TO A TOTAL DEPTH OF 40 INCHES (MIN. 6 INCHES BELOW 1 1/2 INCH PIPE AND 2 INCHES ABOVE). STONE SHALL BE PLACED FROM OUTSIDE OF THE BED USING ONLY LIGHTWEIGHT EQUIPMENT.
5. COARSE AGGREGATE USED IN THE DISTRIBUTION SYSTEM SHALL 3/4" TO 2" WASHED RIVER GRAVEL FRAGMENTS AND SHALL BE OF TYPE B QUALITY REQUIREMENTS. LIMESTONE AGGREGATE IS NOT ACCEPTABLE.
6. THE ABSORPTION AREA BOTTOM EXCAVATION AND AGGREGATE SHALL BE LEVEL TO A TOLERANCE OF 42 INCHES PER 100 FEET.
7. THE ABSORPTION AREA SHALL BE COVERED BY A MINIMUM OF ONE FOOT OF MINERAL SOIL AND BY A BERM EXTENDING AT LEAST FIVE FEET BEYOND THE EDGE OF THE ABSORPTION AND CONSISTING OF MINERAL SOIL CONTAINING LESS THAN 50% COARSE FRAGMENTS WITH NO COARSE FRAGMENTS MORE THAN 4 INCHES IN DIAMETER, MORE STABLE AND LESS PERMEABLE THAN THE SAND, AND LIGHTLY COMPACTED DUE TO THE WEIGHT OF GRAVITY AND TO CONTAIN AND PROTECT THE SYSTEM INTERIOR. THE WIDTH OF THIS BERM SHALL BE A MINIMUM OF 5 FEET AT THE TOP OF THE AGGREGATE.
8. UPON COMPLETION, THE OUTSIDE SLOPE OF THE BERM MAY BE NO GREATER THAN 50% AND SHALL BE SEEDDED TO ASSURE THE STABILITY OF THE BERM. THE COVER OVER THE AGGREGATE SHALL BE A MINIMUM OF 1 FOOT OF SOIL SUITABLE FOR THE GROWTH OF VEGETATION.
9. NO EQUIPMENT MAY BE PERMITTED ON THE DOWNSLOPE SIDE OF THE SYSTEM WITH THE EXCEPTED CASE OF LIGHTWEIGHT EQUIPMENT THAT IS USED TO FORM THE DOWNSLOPE BERM. TO THE GREATEST EXTENT POSSIBLE, AGGREGATE AND COVER MATERIAL SHALL BE PLACED FROM THE UPSLOPE SIDE OF THE SYSTEM OR ENDS OF THE TRENCHES.
10. THE AREA SURROUNDING THE SYSTEM AND THE COVER SOIL SHALL BE GRADED TO PROVIDE FOR DIVERSSION OF SURFACE RUNOFF WATERS.

11. CONTRACTOR IS TO CONTACT SANITARIAN FOR A PRE-CONSTRUCTION MEETING ON SITE BEFORE ANY EXCAVATION. THE DESIGNER MUST ALSO BE PRESENT FOR THIS MEETING. A TEST PIT IS TO BE DUG AT THE LOCATION OF THE PUMP TANK. IF EVIDENCE OF A SEASONAL HIGH WATER TABLE EXISTS THAT COULD RESULT IN SATURATION OF THE COVER MATERIAL (OR THE TANKS), A DRAINAGE SYSTEM WILL BE REQUIRED IN ORDER TO DIVERGATE GROUNDWATER FROM TANKS.

12. ALL CONTRACTORS PROVIDING CONSTRUCTION SERVICES AT THIS SITE (OR SITE RELATED CONSTRUCTION SHALL BE CERTIFIED BY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT IN TREATMENT PLANTS AND WASTEWATER TREATMENT PLANTS) SHALL BE RESPONSIBLE FOR CONFORMANCE WITH APPLICABLE OSHA (OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION) STANDARDS AND PENN'S TRAIL ENVIRONMENTAL, LLC. WILL NOT BE RESPONSIBLE FOR ANY DAMAGES OR LIABILITY ARISING FROM THE FAILURE OF ANY PARTY TO CONFORM TO APPLICABLE OSHA STANDARDS AND REGULATIONS.

13. THE INFORMATION SHOWN ON THIS PLAN IS THE RESULT OF A PROFESSIONAL SERVICE RENDERED BY PENN'S TRAIL ENVIRONMENTAL, LLC. THIS PLAN IS PREPARED SPECIFICALLY FOR THE CLIENT AND PARTICULARLY DESIGNATED HEREIN. MODIFICATION, REVISION, DUPLICATION OR USE WITHOUT THE WRITTEN CONSENT OF PENN'S TRAIL ENVIRONMENTAL, LLC IS PROHIBITED. COPYRIGHT 2017 PENN'S TRAIL ENVIRONMENTAL, LLC. ALL RIGHTS RESERVED.

14. ANY VARIATIONS FOUND DURING INSTALLATION WHICH DIFFER FROM THE INFORMATION REPRESENTED HEREON, SHALL BE REPORTED TO PENN'S TRAIL ENVIRONMENTAL, LLC SO OUR RECOMMENDATIONS CAN BE REVIEWED AND REVISED IF REQUIRED.

15. THIS DESIGN INCORPORATES BY REFERENCE ALL APPLICABLE RULES, REGULATIONS AND REQUIREMENTS OF THE TOWNSHIP, COUNTY AND LOCAL AGENCIES WITH JURISDICTION, INSPECTION AND OVERSIGHT OF THE PROJECT FOR ASSURING COMPLIANCE, BEFORE DURING AND AFTER CONSTRUCTION OF THE SYSTEM.

16. ALL MANUFACTURERS MANUALS AND SPECIFICATIONS ARE INCORPORATED HEREBY BY REFERENCE. IN THE EVENT SUBSTITUTION IS MADE CONTRACTOR AND OWNER SHALL ASSURE THAT THE REPLACEMENT EQUIPMENT MEETS OR EXCEEDS THE ORIGINALLY SPECIFIED MATERIALS.

17. NOTHING CONTAINED ON THIS PLAN SET OR ACCOMPANYING DOCUMENTATION SHALL BE

CONSIDERED AS A GUARANTEE OF FUNCTIONALITY OF THE SYSTEM. ALL DESIGN REQUIREMENTS HAVE BEEN MET AS REQUIRED BY THE PERMITTING AGENCY AS ARE IN EFFECT AT THE TIME OF PERMITTING.

18. THE NORWECO BAT COMPONENT AND THE ON-SITE DISPOSAL FIELD
REQUIRE A SERVICE CONTRACT TO BE MAINTAINED BETWEEN THE
PROPERTY OWNER AND A CERTIFIED MAINTENANCE PROVIDER FOR
THE LIFE OF THE SYSTEM.

FINAL GRADE ELEV. - 90.33
 30.00" EXCAVATION DEPTH
 EXISTING ELEV. - 90.33

LAST HOLE IN ELBOW

SLOPE - 0.33%

EXISTING ELEV. - 89.38
 18.60" EXCAVATION DEPTH
 FINAL GRADE ELEV. - 89.58

7.5' 7.5' 7.5' 3.75'

2

CONCRETE DOSE TANK

TO BE FITTED WITH WATERTIGHT
 SEALS TO A MINIMUM OF 6 INCHES
 WHILE MAINTAINING POSITIVE
 PRESSURE (AWAY FROM TANK)

20 L.F. - 1 1/2" Ø SCH. 40 PVC PIPE
 DELIVERY LINE SHALL
 BACKDRAIN TO DOSING TANK

FLOAT BAR

QUICK DISCONNECT

GATE VALVE

GRND. ELEV. - 92.00

GRND. ELEV. - 92.00

1/4" Ø WEEP HOLE

INV. OUT. ELEV. - 87.83

TIMER OVERRIDE ELEV. - 86.96

ALARM ON ELEV. - 85.91

TIMER ENABLE ELEV. - 84.91

REDUNDANT OFF ELEV. - 84.91

PUMP INTAKE ELEV. - 83.91

5" CONC. BLOCK

TANK AS MANUFACTURED BY
 PRECAST CONCRETE OR EQUIVALENT

[illegible]

LONGITUDINAL SECTION

NTS

15'-0"

5'-0" 1'-6" 3'-0" 3'-0" 3'-0" 3'-0" 1'-6" 5'-0"

89.38 EX. GRADE
89.58 FINISHED GRADE

EX. GRADE

88.58 TOP OF AGGREGATE ELEV.
87.83 EXCAVATION ELEV.

CENTERLINE 1 1/2" PVC LATERALS
90.33 EX. GRADE ELEV.
SPUN GEOTEXTILE FABRIC

88.58 TOP OF AGGREGATE ELEV.
87.83 EXCAVATION ELEV.
MAINTAIN A MIN. OF 1 FOOT COVER OVER AGGREGATE

3/4" TO 2" WASHED RIVER GRAVEL FREE OF FINES
MIN. 6" UNDER PIPE - 2" OVER PIPE 10" TOTAL DEPTH

MIN. 48" ISOLATION DISTANCE

LIMITING ZONE

CLEANOUT SLEEVE

NTS

SLOPE = 71.3%

15'-0"

1'-8 7/8"
3'-7 1/2"

EXISTING ELEV. - 89.26
EXCAVATION DEPTH 17.16"
FINAL GRADE ELEV. - 89.58

Liberty Pumps

Flow (Liters Per Minute)

Head (Feet)

Head (Meters)

Flow (GPM)

Flow (GPM)	Flow (LPM)	Head (Feet)	Head (Meters)
0	0	70	21
10	38	68	20
20	76	65	19
30	114	60	17
40	151	55	16
50	189	48	14
60	227	40	12
70	265	30	9
80	303	20	6
90	341	10	3
100	379	0	0

CROSS SECTION - ABSORPTION AREA

NTS

4" PERFORATED SCH.40 PVC PIPE W/ REMOVABLE CAP (TYP.)

GEOTEXTILE SLEEVE OVER PIPE (TYP.)

NEW VEGETATION

TOPSOIL COVER

SPUN GEOTEXTILE FABRIC

ORIGINAL GRADE

3/4" TO 2" WASHED RIVER GRAVEL FREE OF FINES

AGGREGATE/SOIL INTERFACE

BOTTOM OF TRENCH

EXISTING SUBSURFACE SOIL

OBSERVATION PORT

NTS

SJE RHOMBUS EZ SERIES TITANIUM VISUAL AND AUDIBLE ALARM COUNTER & ELAPSED TIME METER WITH A MINIMUM OF 36 INCHES ABOVE GRADE

42 L.F. 4" SCH. 40 PVC PIPE @ 0.0207 FT/FT

CLEANOUT TO BE PROVIDED (EITHER LOCATION)

TOP OF TANK ELEVATION

LAST 10' OF BUILDING SEWER PIPE TREATMENT TANK SHALL NOT EXCEED (0.0208 FT./FT.) PER FOOT FALL

93.27 INV. AT BUILDING

SITE TESTING DATA			DESIGN PARAMETERS		
TEST PIT NUMBER	LIMITING ZONE	TYPE	BEDROOMS	6	
			PERCOLATION RATE	N/A	MPi
**SOIL EVALUATIONS CONDUCTED VIA HAND TURNED			PEAK GALLONS PER DAY	900	GAL.
AUGER BORINGS AS OBSERVED BY THE HCHD AND MDE.			AREA REQUIRED PER GALLON	1.67	SQ. FT.
			SOIL LOADING RATE	0.6	GAL./SQ.FT.
			MIN. ABSORPTION AREA	1500	SQ. FT.
			ABSORPTION AREA WIDTH	15	FEET
			ABSORPTION AREA LENGTH	105	FEET
			ABSORPTION AREA PROVIDED	1575	SQ. FT.
M=MOTTILING, R=ROCK, ISFV=INSUFFICIENT FINES TO FILL THE VOIDS, S=SEEPS					
CONSTRUCTION DATA					
CORNER ELEVATIONS	EXCAV. DEPTH		BED ELEVATIONS		
90.33	30	INCHES	BOTTOM OF BED	87.83	ELEV
90.33	30	INCHES	MAXIMUM DEPTH OF CUT	30.00	INCHES
89.26	17.16	INCHES	LATERAL INV. ELEVATION	88.33	ELEV
89.38	18.6	INCHES	TOP OF AGGREGATE	88.58	ELEV
			MIN. TOP OF BED ELEVATION	89.58	ELEV
SYSTEM COMPONENTS					
TREATMENT CAPACITY REQ'D	750	GPD	MIN. AVAIL. DOSE CAPACITY	600.00	GAL.
TREATMENT PROVIDED	750	GPD	PUMP TANK PROVIDED	2000	GAL.
TREATMENT/TANK TYPE	BAT-AEROBIC		DOSE/TANK PER IN. CAPACITY	45.00	GAL.
BAT MANUFACTURER	NORWECO		AVERAGE SEWAGE FLOW	6000.00	GPD
BAT MODEL	SINGLAIR MODEL TNT 750		PROPOSED DOSE VOLUME	186.28	GAL.
			DOSE CYCLES PER DAY	3.22	QUAN.
			PUMP RUN TIME PER CYCLE	2.60	MIN.
			DAILY RUN TIME (TOTAL)	8.37	MIN.
			PUMP REST TIME PER CYCLE	444.60	MIN.
			DAILY REST TIME (TOTAL)	1431.63	MIN.
HYDRAULIC CALCULATIONS					
SYSTEM CAPACITY			HEAD LOSSES		
DELIVERY LINE DIA.	1.5	INCHES	FRICTION LOSSES		
TOTAL DELIVERY LINE LENGTH	23.92	FEET	DELIVERY LINE LENGTH		
*TOTAL DELIVERY LINE INCLUDES PUMP TO OUTLET LENGTH			90 DEGREE EL	4	18.92 FT.
DELIVERY LINE CAPACITY	2.19	GAL.	45 DEGREE EL	0	0.00 FT.
MANIFOLD DIAMETER	1.50	INCHES	COUPLING	0	0.00 FT.
MANIFOLD LENGTH	11.25	FEET	TEE	1	8.62 FT.
MANIFOLD CAPACITY	1.03	GAL.	QUICK DISCONNECT	1	1.05 FT.
LATERAL DIAMETER	1.50	INCHES	CHECK VALVE	0	0.00 FT.
TOTAL LATERAL LENGTH	390.00	FEET	FITTINGS EQUIVALENT LENGTH		28.59 FT.
LATERAL CAPACITY	35.78	GAL.	TOTAL EQUIVALENT LENGTH		52.51 FT.
TOTAL CAPACITY	39.01	GAL.			
MINIMUM DOSE	386.26	GAL.	DESIGN FLOW	71.65	GPM
DISCHARGE HOLE DIA.	1/4	INCH	FRICTION LOSS	26.191	FT./100 FT.
DISCHARGE HOLES PER LAT.	7.00	QUAN.	FRICTION LOSS	0.2619	PER FT.
TOTAL DISCHARGE HOLES	56.00	QUAN.	STATIC HEAD	4.42	FT.
DISCHARGE PER HOLE	1.28	GPM	HEAD TO BE MAINTAINED	3	FT.
TOTAL DISCHARGE	71.65	GAL.	TOTAL SYSTEM HEAD	21.17	FT.
PUMP SPECIFIED					
DELIVERS	71.65	GPM	@	21.17 FT.	
MANUFACTURER	LIBERTY	MODEL	#	FL60 (6/10 H.P.)	

ELEV.—90.33
 ELEVATION DEPTH
 V.—90.33

1/4" Ø DISCHARGE HOLE (TYP.)

1 1/2" SCH. 40 PVC MANIFOLD

SCH. 40 PVC DELIVERY LINE

O.P.#1

1 1/2" SCH. 40 PVC LATERAL

7.5' 7.5' 7.5' 7.5' 7.5' 7.5' 7.5' 7.5'

DOSE PANEL
WITH EVENT
TER) MOUNTED
OVE GRADE.

1

NORWECO SINGULAR MODEL TNT WASTEWATER
TREATMENT SYSTEM - 750 GALLON PER DAY

(ALL OPENINGS ARE TO BE FITTED WITH WATERTIGHT
MANHOLE ACCESS RISERS TO A MINIMUM OF 6 INCHES
ABOVE GRADE WHILE MAINTAINING POSITIVE
DRAINAGE AWAY FROM TANK)

95.00
EX. GRADE ELEV.
95.00
FINISHED GRADE ELEV.

TOP OF RISER ELEV. (TYP.)
95.48

118 LF. 4" SCH. 40 PVC PIPE
@ 0.0381 FT/FT
(CLEANOUTS EVERY 100 FT. MIN.)

TOP OF MANHOLE
ELEV - 291.82

TOP OF TANK
ELEV. 289.32

ELEC. CONDUIT

45.0 GAL./INCH

UNIT IS 81 INCHES WIDE
(OUTER DIMENSION)

NET GAS BETWEEN
TIMED OVERSIDE & ALARM

540 GAL. BETWEEN
ALARM AND TANK DRAINAGE

540 GAL. BETWEEN TANK
DRAINAGE & TANK

766.0 GAL. BELOW OFF

2000 GAL. PUMP
BACK RIVER PREC

NORWECO SINGULAR MODEL TNT 750 GPD PLANT
AS MANUFACTURED BY
BACK RIVER PRECAST OR EQUIVALENT

TANK BOTTOM ELEV.
83.16

92.07
INV. OUT ELEV.

87.58
INV. IN ELEV.

2000 GAL. PUMP
BACK RIVER PREC

PLAN VIEW - ABSORPTION AREA

SCALE=1"=8'

HYDRAULIC PROFILE

NTS

GENERAL INSTALLATION NOTES:

1. VEGETATION OR ORGANIC LITTER SHALL BE RAKED AND REMOVED FROM THE ABSORPTION AND BERM AREAS.
2. BEFORE AND AFTER INSTALLATION, EQUIPMENT AND VEHICLES SHALL BE KEPT OFF THE PROPOSED ABSORPTION AREA, INCLUDING THE DOWNSLOPE AREA, TO PREVENT UNDUE COMPACTION OF THE SOIL. CARE SHALL BE EXERCISED DURING CONSTRUCTION TO PREVENT UNDUE COMPACTION AND TO PREVENT THE SURFACE OF THE DOWNSLOPE AREA. EXCAVATION SHALL BE DONE FROM OUTSIDE THE ABSORPTION AREA OR DONE USING A ULTRA LOW IMPACT RUBBER-TRACK MACHINE.
3. SOIL MOISTURE LEVELS DURING CONSTRUCTION OF THE ABSORPTION AREA SHALL BE SUCH THAT A SAMPLE OF NATURAL MINERAL SOIL TAKEN FROM THE LEVEL OF THE PROPOSED INSTALLATION WILL CRUMBLE IF COMPRESSED INTO A BALL.
4. IMMEDIATELY AFTER EXCAVATING, AGGREGATE SHALL BE PLACED OVER THE EXPOSED SURFACE TO A TOTAL DEPTH OF 10 INCHES (MIN. 6 INCHES BELOW 1 1/2 INCH PIPE AND 2 INCHES ABOVE). STONE SHALL BE PLACED FROM OUTSIDE OF THE BED USING ONLY LIGHTWEIGHT EQUIPMENT.
5. COARSE AGGREGATE USED IN THE DISTRIBUTION SYSTEM SHALL 3/4" TO 2" WASHED RIVER GRAVEL FRAGMENTS AND SHALL BE OF TYPE B QUALITY REQUIREMENTS. LIMESTONE AGGREGATE IS NOT ACCEPTABLE.
6. THE ABSORPTION AREA BOTTOM EXCAVATION AND AGGREGATE SHALL BE LEVEL TO A TOLERANCE OF ±2 INCHES PER 100 FEET.
7. THE ABSORPTION AREA BERM SHALL BE COVERED BY A MINIMUM OF ONE FOOT OF MINERAL SOIL AND BY A BERM EXTENDING AT LEAST FIVE FEET BEYOND THE EDGE OF THE ABSORPTION AND CONSISTING OF MINERAL SOIL CONTAINING LESS THAN 50% COARSE FRAGMENTS WITH NO COARSE FRAGMENTS EXCEEDING MORE THAN 4 INCHES IN LENGTH. MORE STABLE AND LESS PERMEABLE THAN THE SAND, AND LIGHTLY COMPACTED DURING CONSTRUCTION TO CONTAIN AND PROTECT THE SYSTEM INTERIOR. THE WIDTH OF THIS BERM SHALL BE A MINIMUM OF 5 FEET AT THE TOP OF THE AGGREGATE.
8. UPON COMPLETION, THE OUTSIDE SLOPE OF THE BERM MAY BE NO GREATER THAN 50% AND SHALL BE SEEDDED TO ASSURE THE STABILITY OF THE BERM. THE COVER OVER THE AGGREGATE SHALL BE A MINIMUM OF 1 FOOT OF SOIL SUITABLE FOR THE GROWTH OF VEGETATION.
9. NO EQUIPMENT MAY BE PERMITTED ON THE DOWNSLOPE SIDE OF THE SYSTEM WITH THE EXCEPT OF THE LICKING OF THE COVER THAT IS USED TO FORM THE DOWNSLOPE BERM. TO THE GREATEST EXTENT POSSIBLE, AGGREGATE AND THE COVER MATERIAL SHALL BE PLACED FROM THE UPSLOPE SIDE OF THE SYSTEM OR ENDS OF THE TRENCHES.
10. THE AREA SURROUNDING THE SYSTEM AND THE COVER SOIL SHALL BE GRADED TO PROVIDE FOR DIVERSION OF SURFACE RUNOFF WATERS.
11. CONTRACTOR IS TO CONTACT SANTARIAN FOR A PRE-CONSTRUCTION MEETING ON SITE BEFORE ANY EXCAVATION. THE DESIGNER MUST ALSO BE PRESENT FOR THIS MEETING. A TEST PIT IS TO BE EXCAVATED AT THE SITE AT THE TIME OF THE MEETING. THE CONTRACTOR SHALL DETERMINE IF THERE EXISTS THAT COULD RESULT IN INFILTRATION OF GROUNDWATER INTO THE TANKS). A DRAINAGE SYSTEM WILL BE REQUIRED IN ORDER TO DIVERGATE GROUNDWATER FROM TANKS.
12. ALL CONTRACTORS PROVIDING CONSTRUCTION SERVICES AT THIS SITE (OR SITE RELATED CONSTRUCTION) SHALL BE CERTIFIED BY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT IN THE FIELD OF CONSTRUCTION SITE SPECIFIC SEAGE DISPOSAL SYSTEMS AND THE INSTALLATION OF AN AEROBIC TREATMENT PLANT. CONTRACTOR MUST ALSO BE RESPONSIBLE FOR CONFORMANCE WITH APPLICABLE OSHA (OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION) STANDARDS AND REGULATIONS. PENNS TANKS, PENNS TANKS, PENNS TANKS, PENNS TANKS, PENNS TANKS, PENNS TANKS OR LIABILITY ARISING FROM THE FAILURE OF ANY PARTY TO CONFORM TO APPLICABLE OSHA STANDARDS AND REGULATIONS.
13. THE INFORMATION SHOWN ON THIS PLAN IS THE RESULT OF A PROFESSIONAL SERVICE RENDERED BY PENNS TANK ENVIRONMENTAL, LLC. THIS PLAN IS PREPARED SPECIFICALLY FOR THE CLIENT AND THE BEST DESIGN AVAILABLE AT THE TIME OF THE DESIGN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE WRITTEN CONSENT OF PENNS TANK ENVIRONMENTAL, LLC IS PROHIBITED. COPYRIGHT 2017 PENNS TANK ENVIRONMENTAL, LLC. ALL RIGHTS RESERVED.
14. ANY VARIATIONS FOUND DURING INSTALLATION WHICH DIFFER FROM THE INFORMATION REPRESENTED HEREON, SHALL BE REPORTED TO PENNS TANK ENVIRONMENTAL, LLC SO OUR RECOMMENDATIONS CAN BE REVIEWED AND REVISED IF REQUIRED.
15. THIS DESIGN INCORPORATES BY REFERENCE ALL APPLICABLE RULES, REGULATIONS AND REQUIREMENTS OF THE TOWNSHIP AND LOCAL AGENCIES WITH JURISDICTION. THE CONTRACTOR, INSTALLER AND OWNER ARE RESPONSIBLE FOR ASSUMING COMPLIANCE, BEFORE DURING AND AFTER CONSTRUCTION OF THE SYSTEM.
16. ALL MANUFACTURES MANUALS AND SPECIFICATIONS ARE INCORPORATED HEREIN BY REFERENCE. IN THE EVENT SUBSTITUTION IS MADE CONTRACTOR AND OWNER SHALL ASSURE THAT THE REPLACEMENT EQUIPMENT MEETS OR EXCEEDS THE ORIGINALLY SPECIFIED MATERIALS.
17. NOTHING CONTAINED ON THIS PLAN SET OR ACCOMPANYING DOCUMENTATION SHALL BE

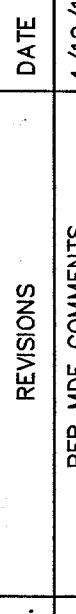
18. THE NORWECO BAT COMPONENT AND THE ON-SITE DISPOSAL FIELD REQUIRE A SERVICE CONTRACT TO BE MAINTAINED BETWEEN THE PROPERTY OWNER AND A CERTIFIED MAINTENANCE PROVIDER FOR THE LIFE OF THE SYSTEM.

FINAL GRADE ELEV.—90.33
30.00" EXCAVATION DEPTH
EXISTING ELEV.—90.33

LAST HOLE IN ELBOW

SLOPE 6:33

EXISTING ELEV.—89.38
18.60" EXCAVATION DEPTH
FINAL GRADE ELEV.—89.58

	INGROUND PRESSURE-DOSED BED SYSTEM DESIGN PLAN		PENN'S TRAIL ENVIRONMENTAL, LLC		CALL BEFORE YOU DIG! 1-800-257-7777 PROTECTION LAW THE UNDERGROUND UTILITY LINE CONTRACTORS MUST VERIFY LOCATIONS OF UNDERGROUND UTILITIES OR STRUCTURES PRIOR TO ANY EXCAVATION. PENN'S TRAIL ENVIRONMENTAL, LLC SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND UTILITIES HEREON HAVE BEEN OBTAINED FROM THE UTILITY COMPANY RECORDS AND 1-800-257-7777. PENN'S TRAIL ENVIRONMENTAL, LLC DOES NOT GUARANTEE THE ACCURACY OF OWNERS THROUGH THE MISS UTILITY SYSTEM COMPLETENESS OR ACCURACY INFORMATION. PENN'S TRAIL ENVIRONMENTAL, LLC DOES NOT GUARANTEE EXCAVATION OR COLLUSION WORK.
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	DATE: FEBRUARY 28, 2017 SCALE: AS NOTED				
PTE#2803 SHEET 1 OF 1					