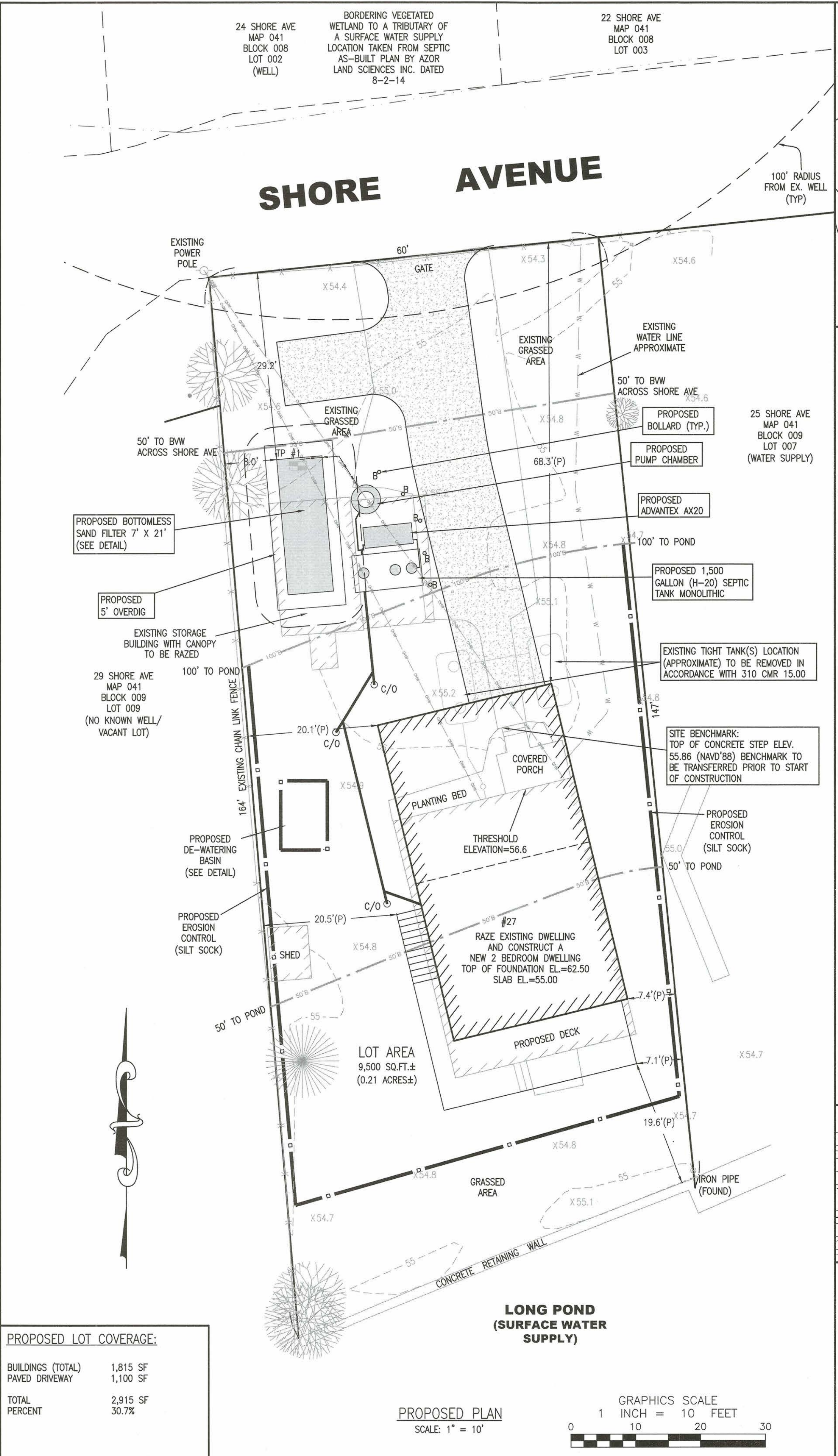
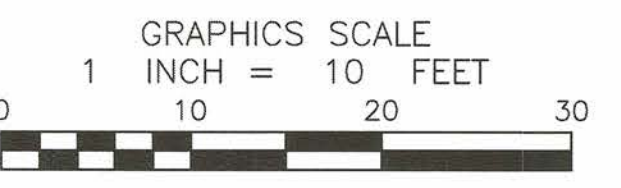


EXISTING LOT COVERAGE:

BUILDINGS (TOTAL)	1,838 SF
PAVED DRIVEWAY	1,194 SF
TOTAL	3,032 SF
PERCENT	31.9%

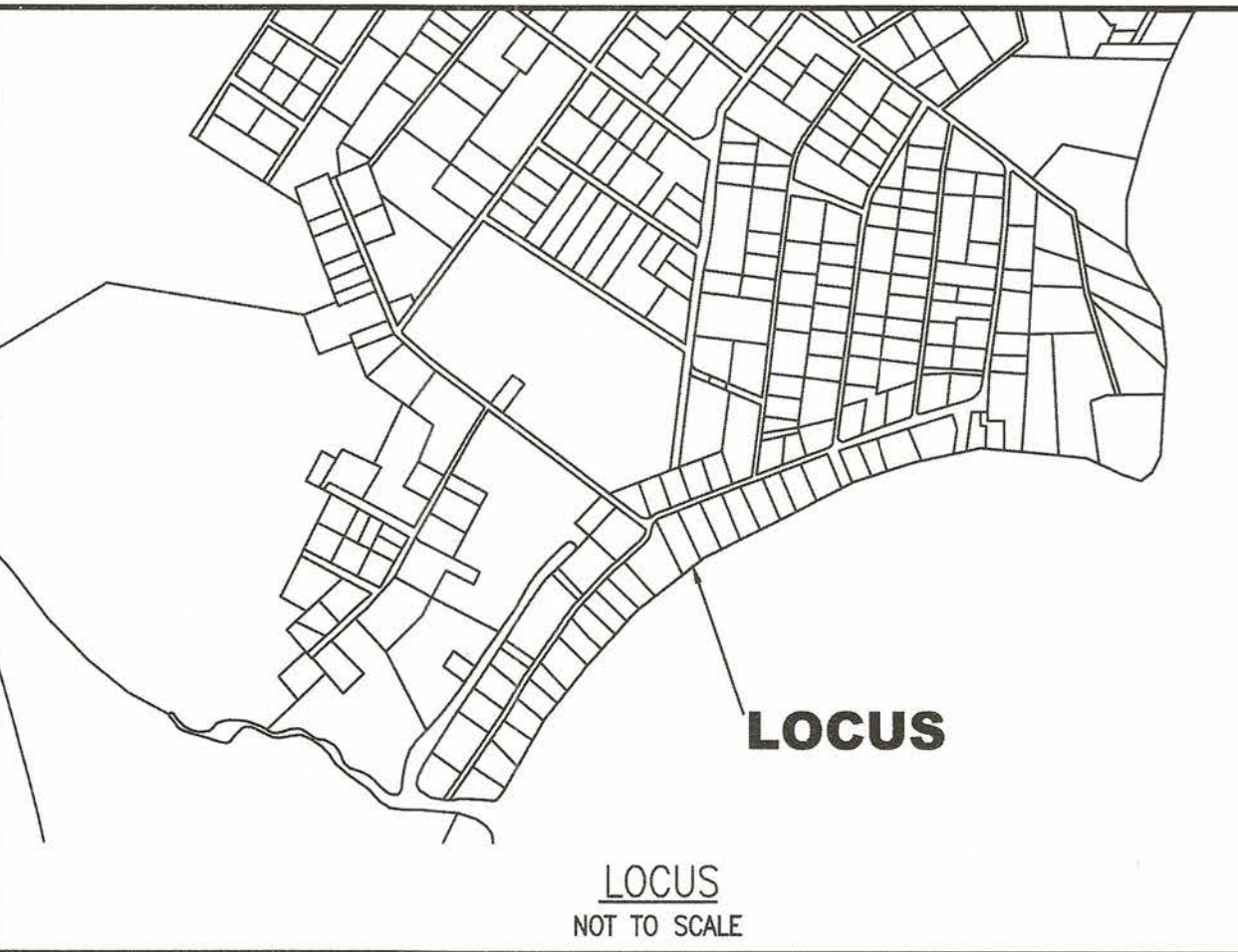
EXISTING CONDITIONS PLAN
SCALE: 1" = 10'



PROPOSED LOT COVERAGE:

BUILDINGS (TOTAL)	1,815 SF
PAVED DRIVEWAY	1,100 SF
TOTAL	2,915 SF
PERCENT	30.7%

PROPOSED PLAN
SCALE: 1" = 10'



SITE INFORMATION:

- THE SITE IS SHOWN ON THE TOWN OF LAKEVILLE ASSESSORS MAP AS MAP 43 BLOCK 9 LOTS 7.
- PROPERTY LINE INFORMATION WAS TAKEN FROM:
 - PROPERTY LINE AND TOPOGRAPHY WAS COMPLETED BY PRIME ENGINEERING INC.
 - DEED REFERENCE BOOK 50862 PAGE 259
- THE SUBJECT PROPERTY IS LOCATED IN ZONES AE, AS SCALED FROM THE FLOOD INSURANCE RATE MAP (F.I.R.M.) OF PLYMOUTH COUNTY, MAP NUMBER 2502300429K, EFFECTIVE DATE JULY 16, 2015. FLOOD ELEVATION = 57.2, NAVD 88.
- THE SUBJECT PROPERTY IS LOCATED IN A IWPA (WELL HEAD PROTECTION AREA).
- THE SYSTEM IS LOCATED WITHIN A ZONE A OF A SURFACE WATER SUPPLY PROTECTION AREA.
- THE SITE IS PARTIALLY LOCATED IN A PRIORITY HABITAT OR ESTIMATED HABITAT AS SHOWN ON THE MASSACHUSETTS NATURAL HERITAGE ATLAS 14TH EDITION EFFECTIVE DATE AUGUST 2017.

BUOYANCY CALCULATIONS SEPTIC TANK

DOWNWARD FORCE:
TANK BY SHEA CONCRETE MODEL TK-M1500C
WEIGHT OF EMPTY 1,500 GAL. MONOLITHIC TANK TANK = 21,612 LBS. (WITHOUT CONCRETE COVERS)
SOIL WEIGHT ABOVE TANK:
VOLUME OF SOIL OVER TANK = 114 CF
ASSUME FLOOD CONDITIONS
(110 LB/CF - 62.4 LB/CF) = 47.6 LB/CF
(114 CF X 47.6 LB/CF = 5,426 LBS)
DOWNWARD FORCE: 21,612 + 5,426 = 27,038 LBS.
BUOYANT FORCE: (ASSUMES TANK FULLY SUBMERGED IN WATER)
VOLUME OF DISPLACED WATER = 401.5 CF
BUOYANT FORCE = 401.5 CF X 62.4 LB/CF = 25,053 LB
27,038 LB > 25,053 LB (DOWNWARD FORCE > BUOYANT FORCE)

DESIGN CALCULATIONS:

ESTIMATED DAILY FLOW:
EXISTING 2-BEDROOM DWELLING
2 BEDROOMS X 110 GPD/BEDROOM = 220 GPD
SEPTIC TANK REQUIREMENT:
220 GPD X 2.0 = 440 GALLONS
USE 1,500 GALLON SEPTIC TANK WITH FLOW-THROUGH PORT IN BAFFLE WALL
SOIL ABSORPTION SYSTEM REQUIREMENT:
SOIL TEXTURE: LOAMY SAND = SOIL CATEGORY 1
TREATMENT: ADVANTECH AX20 = CATEGORY 1
BOTTOMLESS SAND FILTER
SYSTEM LOADING RATE: 2.3 GPD/SF
LEACHING CAPACITY PROVIDED: 7' X 21' = 147 SF

LEGEND

69	EXISTING CONTOURS
x 98.5	EXISTING SPOT ELEVATION
TP #1	EXISTING TESTPIT
69	PROPOSED CONTOURS
100x2	PROPOSED SPOT ELEVATION
OHW	EXISTING TREELINE
OHW	EXISTING OVERHEAD WIRES

SURVEY COMPANY OF RECORD:

PRIME ENGINEERING
CIVIL ENGINEERING • LAND SURVEYING • ENVIRONMENTAL ASSESSMENT
P.O. BOX 1088 • 350 BEEFORD STREET - LAKEVILLE, MASSACHUSETTS 02347
TEL: (508) 947-0050 FAX: (508) 947-3004

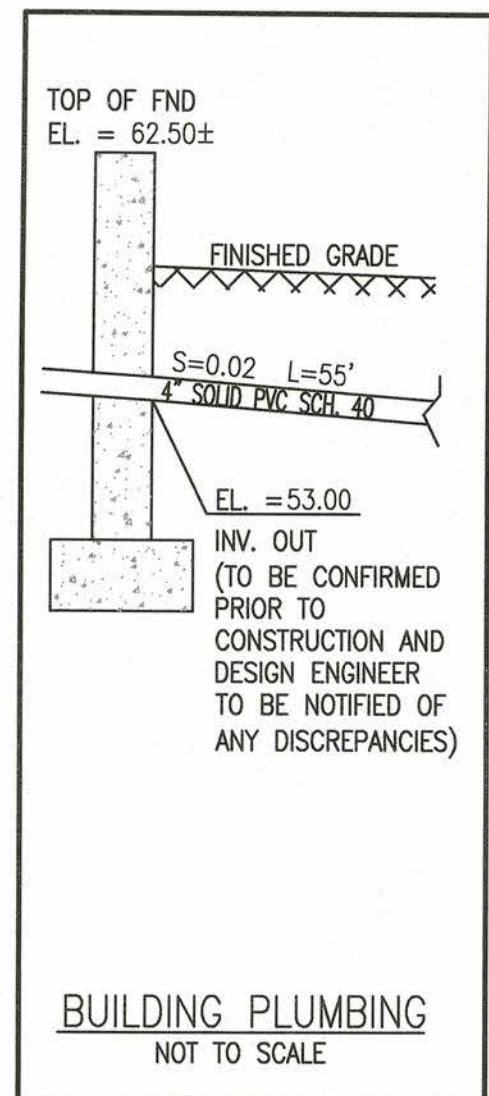
7-15-2020
P.E. STAMP
ZCE
ZENITH CONSULTING ENGINEERS, LLC
3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

DATE	REV.	DESCRIPTION	BY	APP.
6-17-2020				

DRAWN BY:	JLB	DATE:	6-17-2020
DESIGNED BY:	JLB	PROJECT NUMBER:	0445-01-01
CHECKED BY:	NZ	DRAWING SCALE:	1"=10'
APPROVED BY:	JLB	SHEET ID:	S1

SUBSURFACE SEWAGE DISPOSAL SYSTEM UPGRADE
PROJECT SITE: 27 SHORE AVE., LAKEVILLE, MASSACHUSETTS
CLIENT INFO: KEVIN & AICIA DAVID, 166 HARTFORD AVE., BELLINGHAM, MA 02019

SA Civil Engineering Projects\Lakeville\Shore Ave\27 Shore Ave\DWG\ESF.dwg



BUILDING PLUMBING
NOT TO SCALE

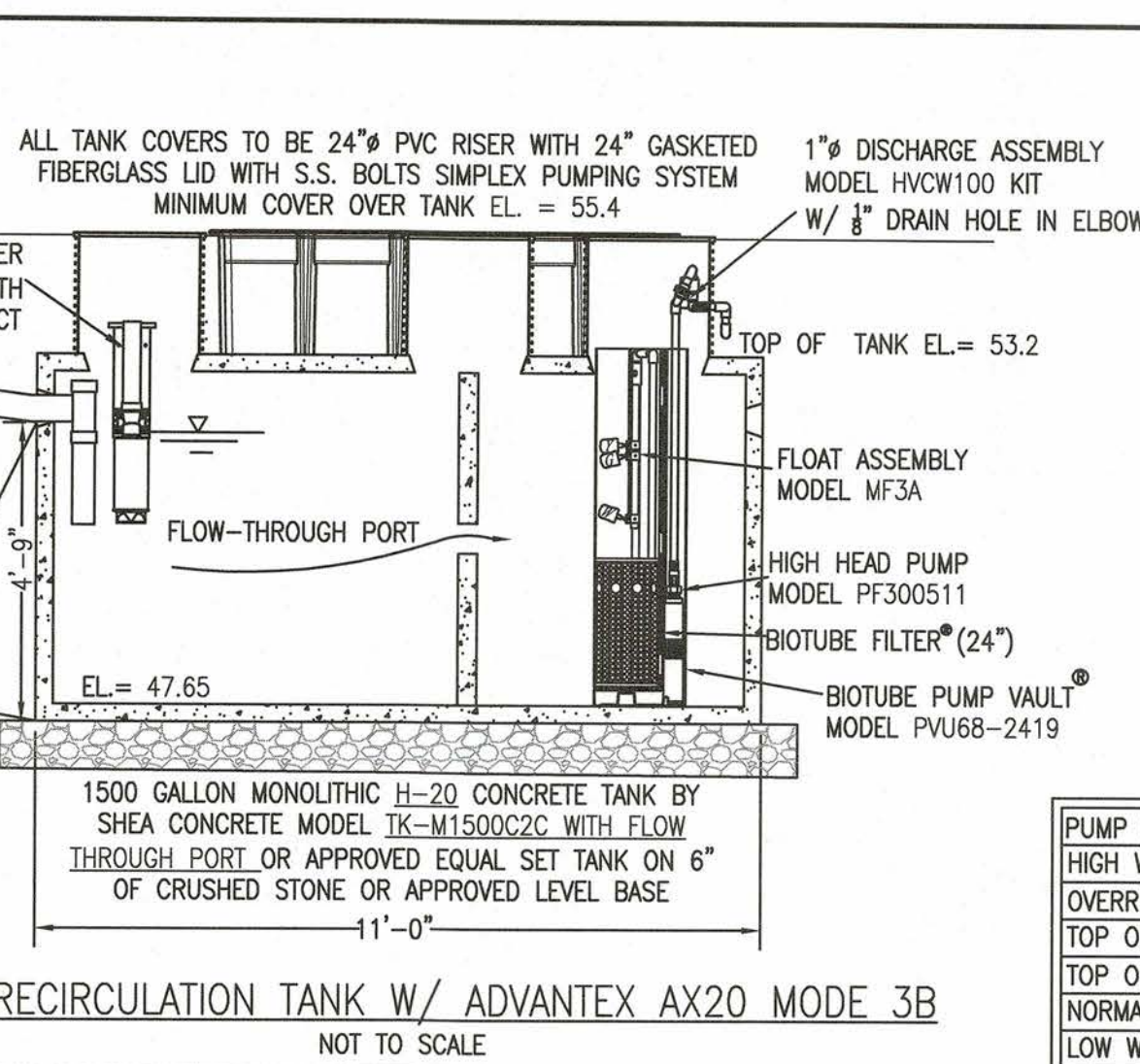
SOIL LOGS:
DATE: 8-29-19
PERFORMED BY: NYLES ZAGER
ZENITH CONSULTING ENGINEERS, LLC.
WITNESSED BY: KEVIN BERNARDO LAKEVILLE BOH

DEPTH (INCHES)	TP-1	ELEV. (FEET)
0	FILL	54.9
66	0 PEAT	49.4
152	C1 SILT LOAM 6/5PB	42.2
174	C2 LOAMY SAND 2.5f 5/2	40.4
198		38.4

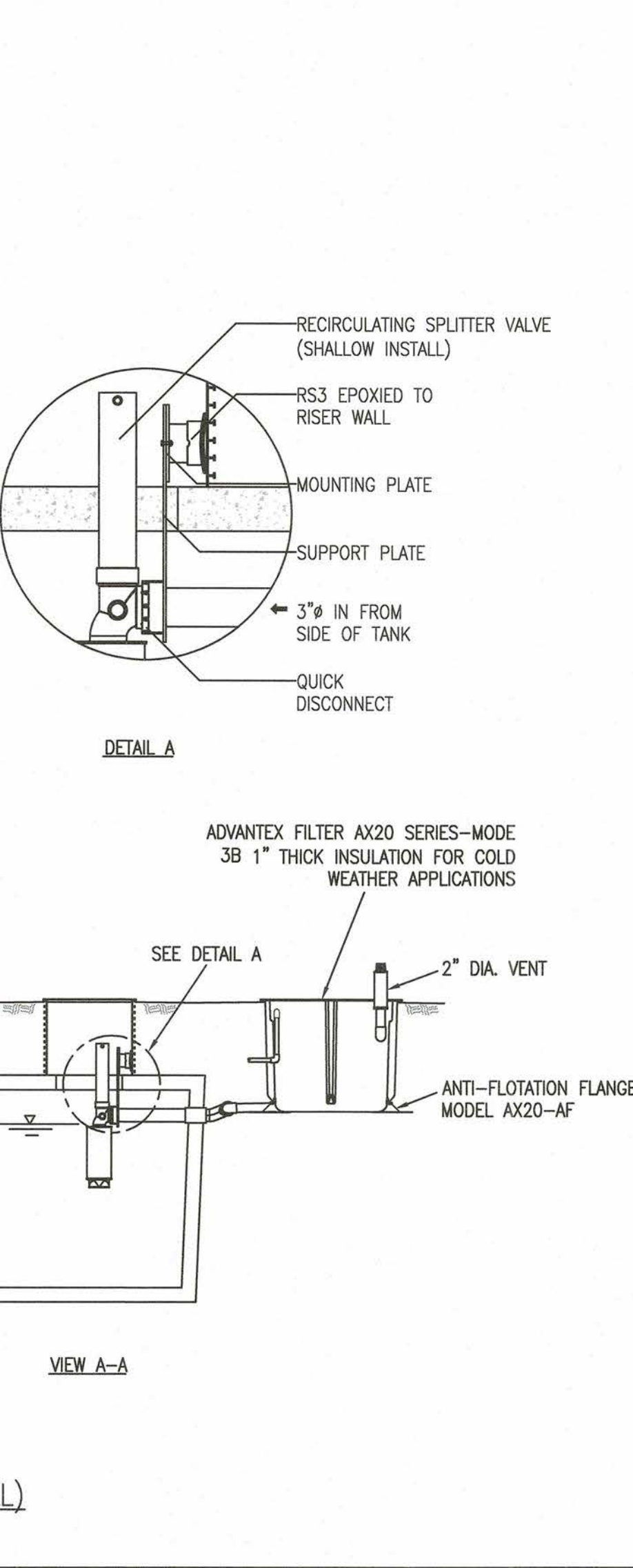
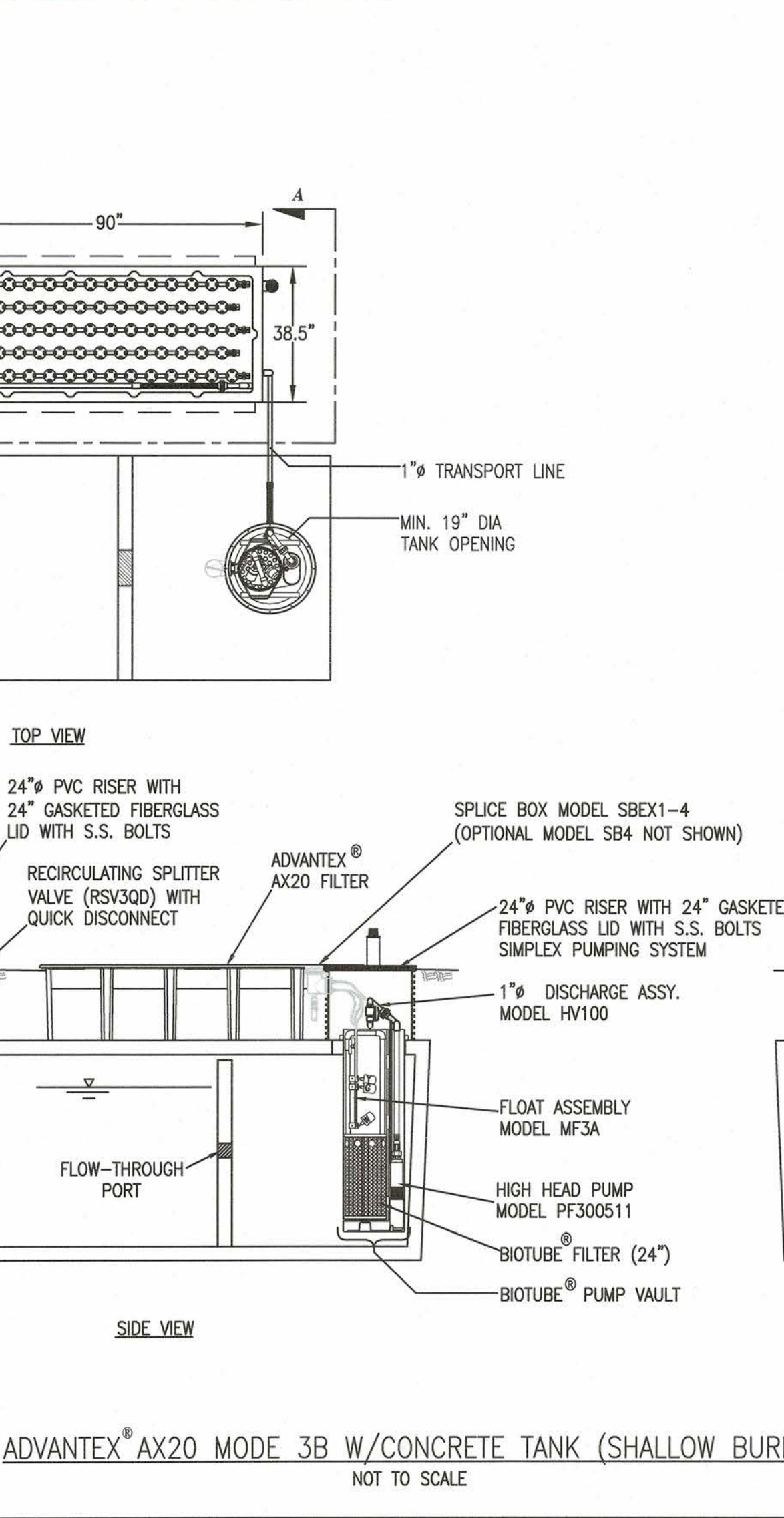
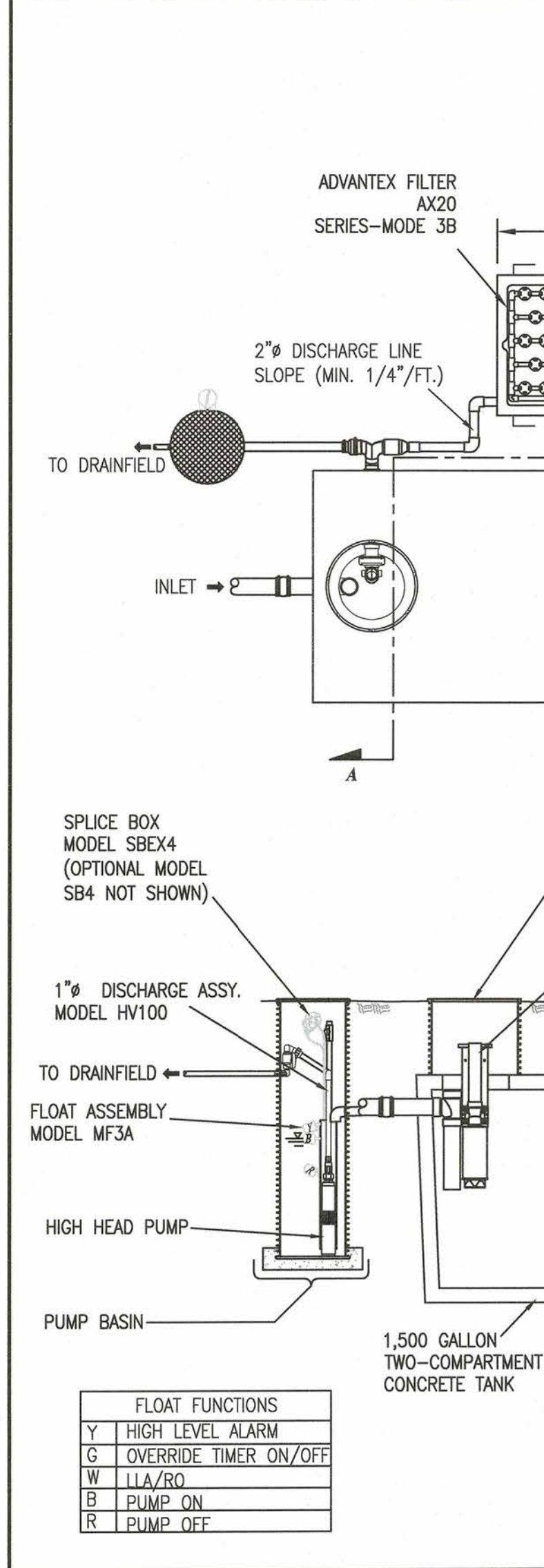
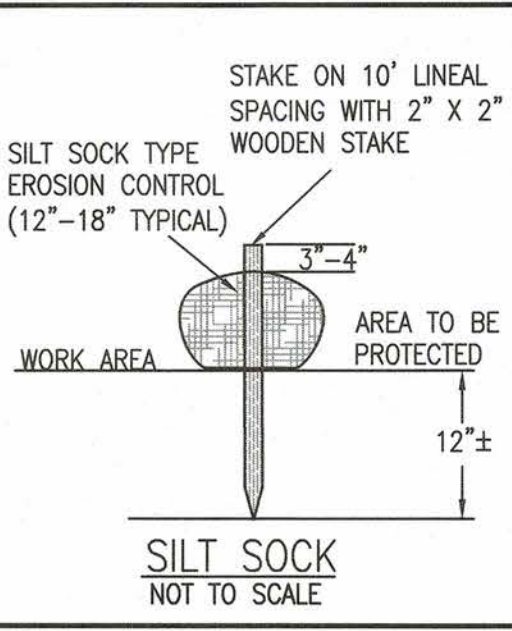
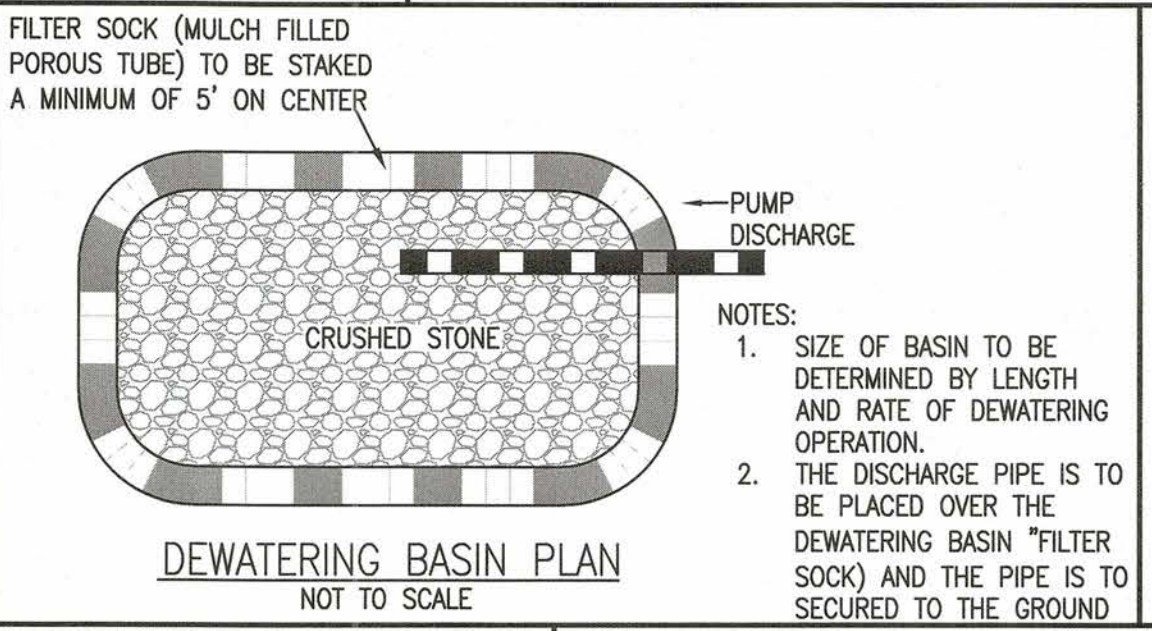
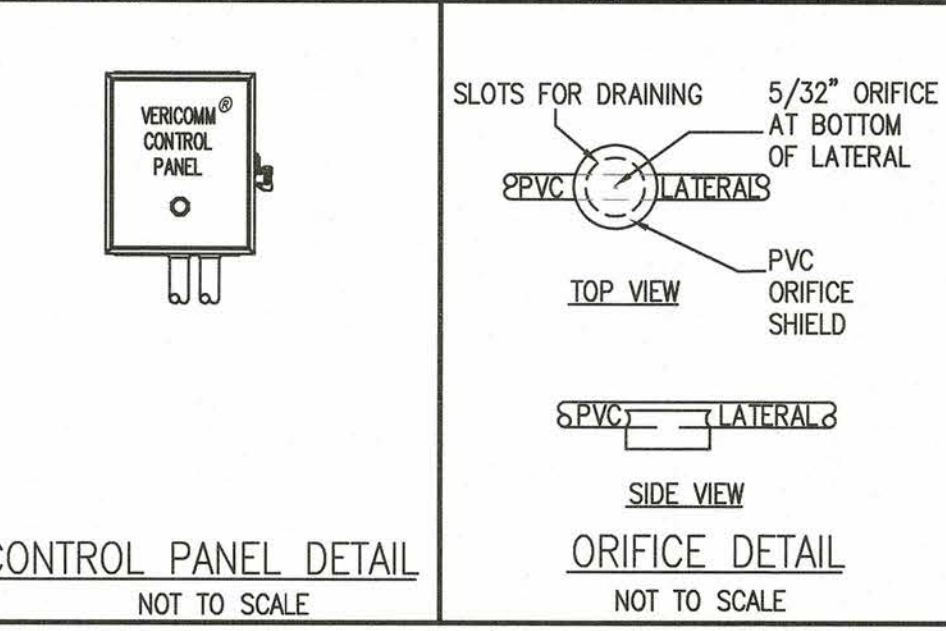
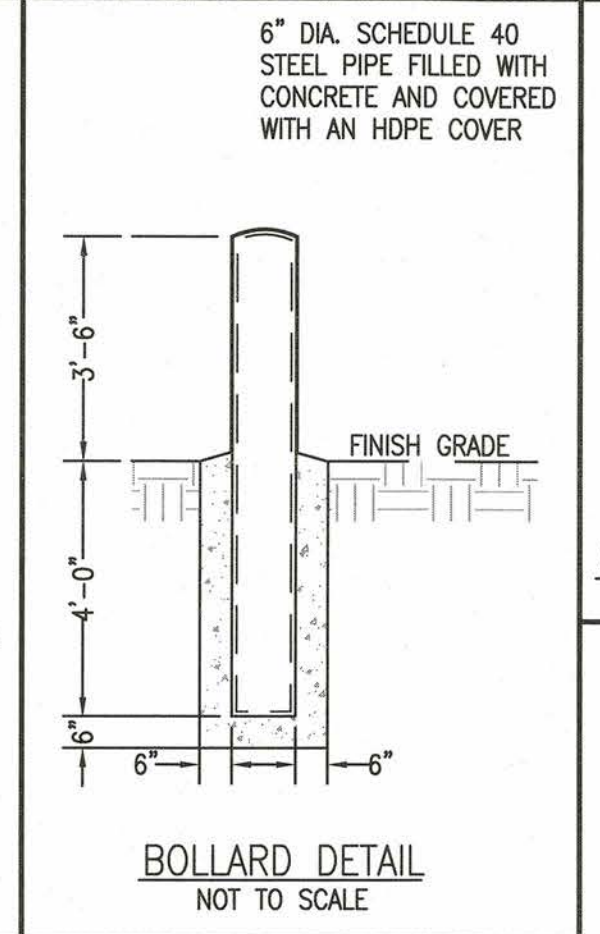
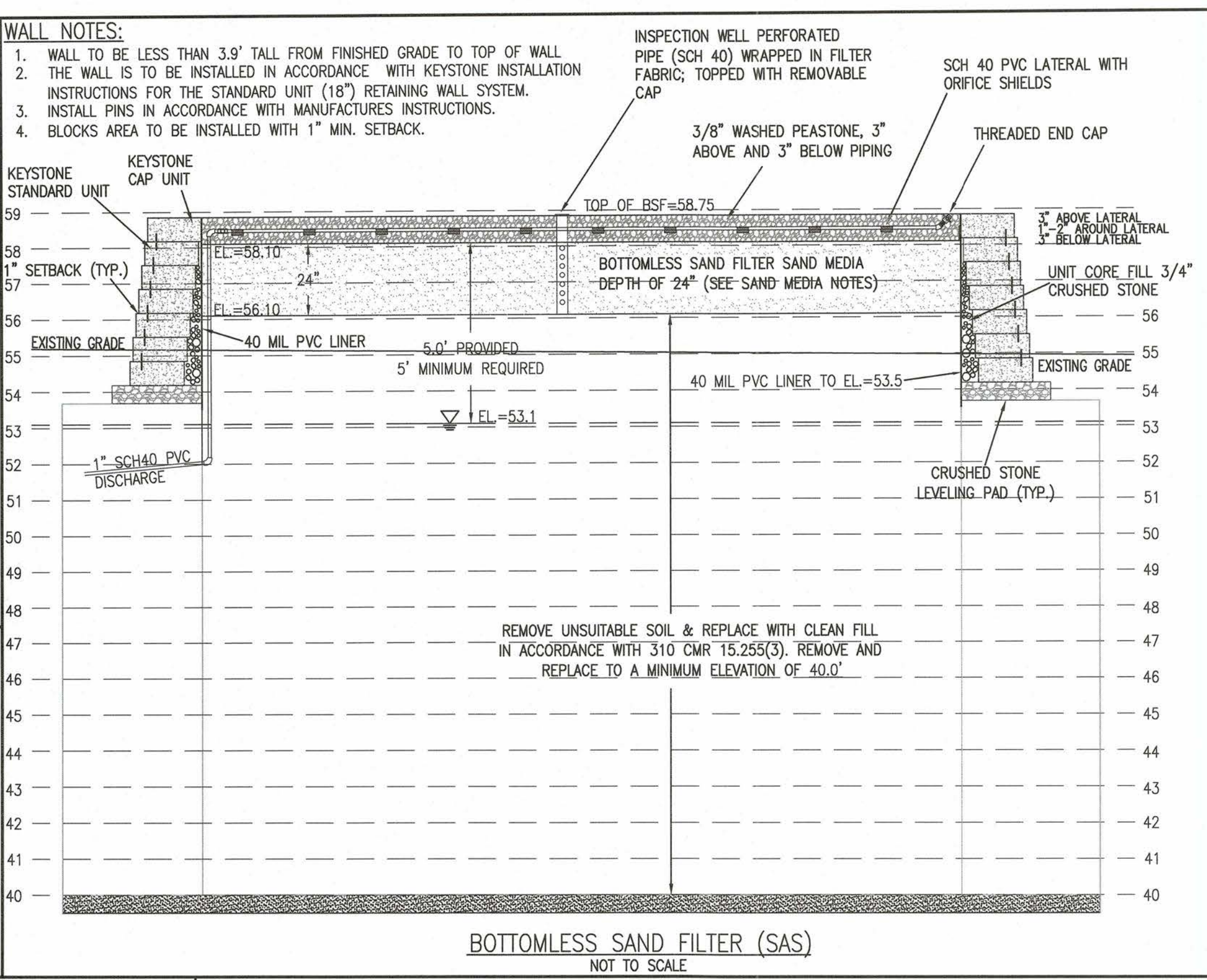
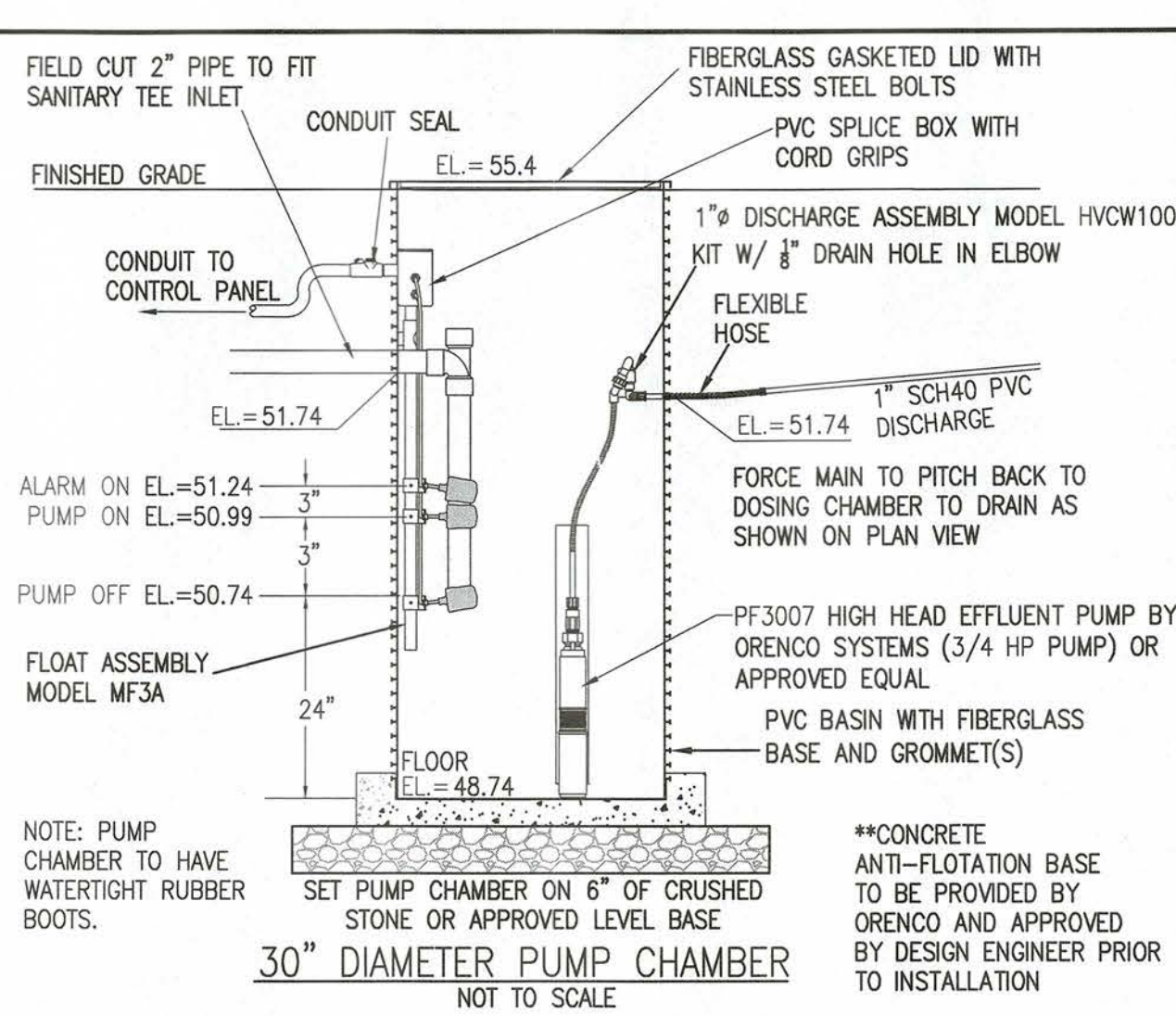
MOTTLING @ 22" STANDING @ 174" ESHW EL. = 53.1 PERC. DEPTH: SIEVE OF C2 PERC. RATE: SIEVE RESULTS

SIEVE RESULTS
SAND 88.90%
SILT 9.97%
CLAY 1.13%
SAND (CLASS I)

NOTE: THE FILL, C1 & C2 LAYERS ARE TO BE REMOVED TO ELEVATION 40.0' BELOW THE SAS AND REPLACED WITH CLEAN FILL IN ACCORDANCE WITH 310 CMR 15.255(3).

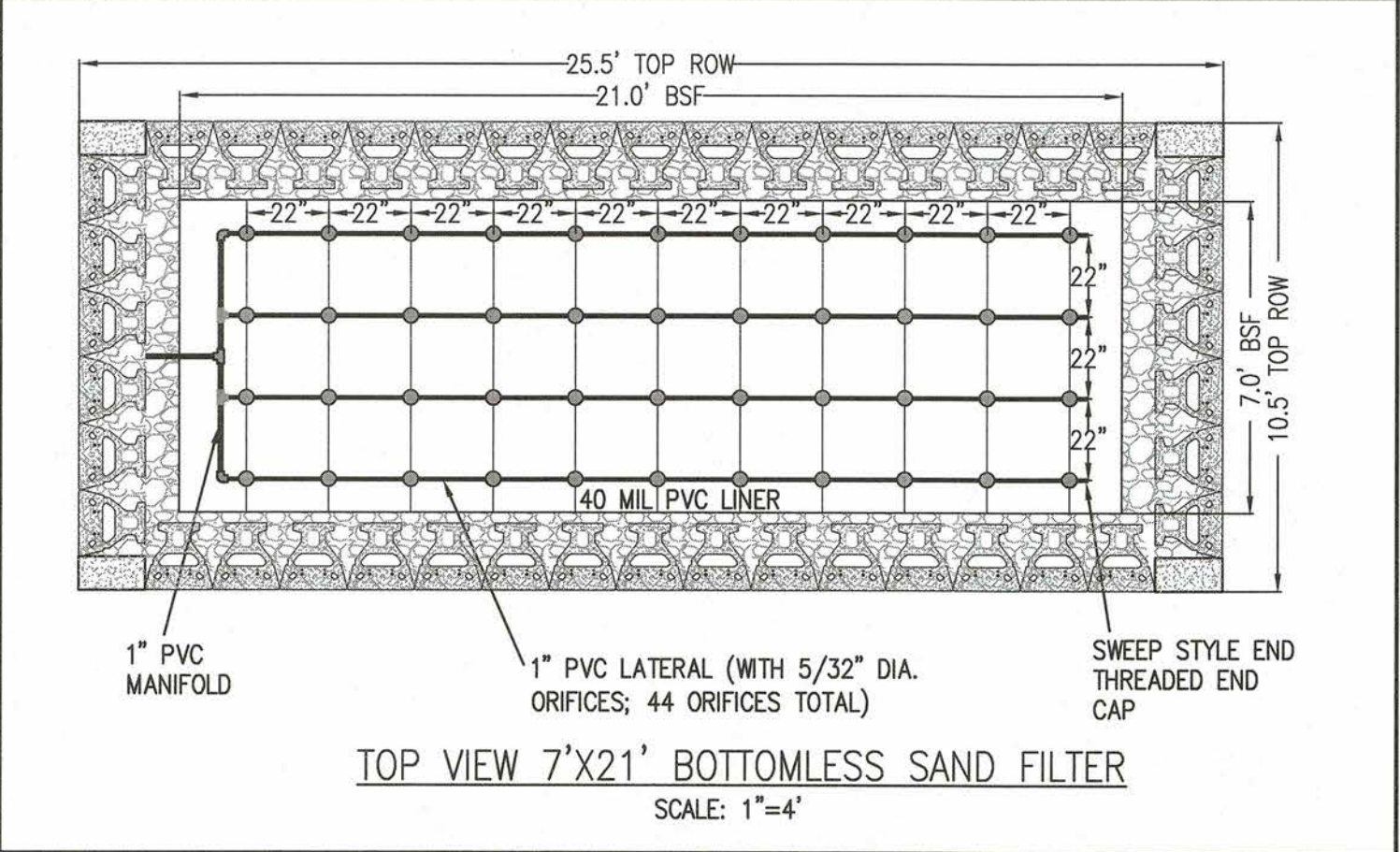


PUMP CHAMBER (BIOTUBE)	ELEVATION	DEPTH (FEET)
HIGH WATER ALARM (Y)	51.90	4.25
VERRIDE TIMER ON/OFF (G)	51.73	4.08
TOP OF R.S.V. CAGE	51.73	4.08
TOP OF FILTER CARTRIDGE	50.15	2.50
NORMAL LOW LIQUID LEVEL	51.31	3.66
LOW WATER ALARM /REDUNDANT OFF (W)	50.90	3.25



REQUESTED VARIANCES, LOCAL UPGRADE APPROVALS AND A LAKEVILLE BOARD OF HEALTH REGULATION VARIANCE:

- A LOCAL UPGRADE APPROVAL FROM SECTION 310 CMR 15.211 OF TITLE V WHICH REQUIRES THE SOIL ABSORPTION SYSTEM TO BE AT LEAST 10' FROM A PROPERTY LINE. A REDUCTION FROM 10' TO 8' IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(A).
- A LOCAL UPGRADE APPROVAL FROM SECTION 310 CMR 15.211 OF TITLE V WHICH REQUIRES THE SOIL ABSORPTION SYSTEM TO BE AT LEAST 400' FROM A SURFACE WATER SUPPLY OR TRIBUTARY THERETO. A REDUCTION FROM 400' TO 105' IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(G).
- A LOCAL UPGRADE APPROVAL FROM SECTION 310 CMR 15.211 OF TITLE V WHICH REQUIRES THE SEPTIC TANK TO BE AT LEAST 400' FROM A SURFACE WATER SUPPLY OR TRIBUTARY THERETO. A REDUCTION FROM 400' TO 100' IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(G).
- A LOCAL UPGRADE APPROVAL FROM SECTION 310 CMR 15.211 OF TITLE V WHICH REQUIRES THE PUMP CHAMBER TO BE AT LEAST 400' FROM A SURFACE WATER SUPPLY OR TRIBUTARY THERETO. A REDUCTION FROM 400' TO 100' IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(G).
- A LOCAL UPGRADE APPROVAL FROM SECTION 310 CMR 15.211 OF TITLE V WHICH REQUIRES THE TREATMENT UNIT TO BE AT LEAST 400' FROM A SURFACE WATER SUPPLY OR TRIBUTARY THERETO. A REDUCTION FROM 400' TO 100' IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(G).
- A LOCAL UPGRADE APPROVAL FROM SECTION 310 CMR 15.104 & 15.242 OF TITLE V WHICH REQUIRES A PERCOLATION TEST TO BE COMPLETED ON SITE. A SIEVE ANALYSIS IN PLACE OF THE PERCOLATION TEST IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(I).
- A LOCAL UPGRADE APPROVAL FROM SECTION 310 CMR 15.102 (2) OF TITLE V WHICH REQUIRES TWO DEEP HOLES PER DISPOSAL AREA BE COMPLETED ON SITE. A REDUCTION FROM 2 DEEP HOLES TO 1 DEEP HOLE IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(K).
- A VARIANCE FROM SECTION 310 CMR 15.211 OF TITLE V WHICH REQUIRES THE SOIL ABSORPTION SYSTEM TO BE AT LEAST 100' FROM A WETLAND BORDERING A SURFACE WATER SUPPLY OR TRIBUTARY THERETO. A REDUCTION FROM 100' TO 50' IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(G) AND 310 CMR 15.411.
- A VARIANCE FROM SECTION 310 CMR 15.211 OF TITLE V WHICH REQUIRES THE SEPTIC TANK TO BE AT LEAST 100' FROM A WETLAND BORDERING A SURFACE WATER SUPPLY OR TRIBUTARY THERETO. A REDUCTION FROM 100' TO 50' IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(G) AND 310 CMR 15.411.
- A VARIANCE FROM SECTION 310 CMR 15.211 OF TITLE V WHICH REQUIRES THE TREATMENT UNIT TO BE AT LEAST 100' FROM A WETLAND BORDERING A SURFACE WATER SUPPLY OR TRIBUTARY THERETO. A REDUCTION FROM 100' TO 50' IS REQUESTED IN ACCORDANCE 310 CMR 15.405 (1)(G) AND 310 CMR 15.411.
- A VARIANCE FROM SECTION 310 CMR 15.227 (5) OF TITLE V WHICH REQUIRES THAT THE SEPTIC TANK INLET AND OUTLET INVERT ELEVATIONS BE AT LEAST 12" ABOVE THE HIGH GROUND WATER ELEVATION. A REDUCTION FROM 12" ABOVE TO BELOW THE HIGH WATER TABLE IS REQUESTED IN ACCORDANCE 310 CMR 15.411.
- A VARIANCE FROM SECTION 310 CMR 15.227 (5) OF TITLE V WHICH REQUIRES THAT THE PUMP CHAMBER INLET AND OUTLET INVERT ELEVATIONS BE AT LEAST 12" ABOVE THE HIGH GROUND WATER ELEVATION. A REDUCTION FROM 12" ABOVE TO BELOW THE HIGH WATER TABLE IS REQUESTED IN ACCORDANCE 310 CMR 15.411.
- A VARIANCE FROM SECTION 15.240(1) THAT REQUIRES 4' OF NATURALLY OCCURRING PERVIOUS SOIL BELOW THE ENTIRE SOIL ABSORPTION AREA. A REDUCTION FROM 4' TO 2' IS REQUESTED IN ACCORDANCE 310 CMR 15.411.



- NOTES:**
- THE CONTRACTOR SHALL NOTIFY THE LOCAL BOARD OF HEALTH AND ZENITH CONSULTING ENGINEERS, LLC., AT LEAST 48 HOURS PRIOR TO REQUIRED INSPECTIONS. THE REQUIRED INSPECTIONS ARE AS FOLLOWS:
A. AFTER SAND FILTER EXCAVATION PRIOR TO PLACEMENT OF SAND
B. AFTER PLACEMENT OF TANKS AND PUMP CHAMBER
C. WATER TIGHTNESS TESTING OF ALL TANKS INCLUDING PUMP CHAMBER AND TREATMENT TANKS
D. PRIOR TO BACKFILL THE CONTRACTOR IS TO PROVIDE A CURRENT SIEVE ANALYSIS SHOWING THE SAND MEETS THE BSF GUIDELINES SEE NOTE 1.(K).
E. WHEN PUMPS ARE FULLY OPERATIONAL (TEST ALL ALARM AND PUMP FUNCTIONALITY).
F. DURING CONSTRUCTION OF RETAINING WALL, LINER AND BACKFILLING OF LINER AND SAND FILTER.
G. WHEN TREATMENT SYSTEM IS FULLY OPERATIONAL.
H. ZENITH CONSULTING ENGINEERS, LLC. AND THE HEALTH DEPARTMENT TO BE PRESENT FOR START-UP OF TREATMENT SYSTEM.
I. AFTER SYSTEM IS INSTALLED AND ALL MECHANICAL DEVICES ARE WORKING BUT PRIOR TO BACKFILL A TEST TO CONFIRM DISTILLED HEAD WILL BE PERFORMED.
J. FINAL INSPECTION AFTER PEA STONE, LOAM AND SEED HAVE BEEN PLACED
K. PRIOR TO THE ISSUANCE OF THE CERTIFICATE OF COMPLIANCE, THE DESIGN ENGINEER AND LOCAL APPROVING AUTHORITY SHALL RECEIVE A COPY OF THE CERTIFIED SOIL ANALYSIS CONDUCTED ON THE MEDIA IN ACCORDANCE WITH ASTM D0136 AND ASTM C-117 OR EQUIVALENT. THE SYSTEM SHALL MEET THE REQUIREMENTS OF ASTM- C33 SAND WITH AN EFFECTIVE SIZE OF 0.3 MM (D10) AND A UNIFORMITY COEFFICIENT OF 3.0 TO 4.0 (D60/D10). THE MAXIMUM ALLOWABLE PERCENTAGE OF FINES PASSING A NUMBER 200 SIEVE SHALL BE 1%. [RI DEM BSF GUIDELINE P. 13]
 - BENCHMARK: TOP OF CONCRETE STEP EL. = 55.86 (NAV D 88)
 - PER 310 CMR 15.246(2) HEAVY EQUIPMENT SHALL NOT BE ALLOWED TO OPERATE OVER THE LIMITS OF THE (BOTTOMLESS SAND FILTER) SEWAGE DISPOSAL FIELD DURING THE COURSE OF CONSTRUCTION OF THE SYSTEM.
 - NO FIELD MODIFICATIONS TO THE SEWAGE SYSTEM SHALL BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER AND THE LOCAL BOARD OF HEALTH.
 - UNLESS OTHERWISE NOTED ALL CONSTRUCTION AND SYSTEM COMPONENTS SHALL CONFORM WITH CURRENT TITLE V OF THE STATE ENVIRONMENTAL CODE AND ANY APPLICABLE LOCAL RULES.
 - IN AREAS SHOWN ON THE PLAN, ALL TOPSOIL, SUBSOIL AND OTHER IMPERVIOUS MATERIALS SHALL BE REMOVED AND REPLACED WITH A CLEAN GRANULAR SAND, FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES, GRADED AS FOLLOWS:
A. NO MATERIAL LARGER THAN 2 INCHES.
B. UP TO 45% BY WEIGHT MAY BE RETAINED ON A #4 SIEVE.
C. OF THE FRACTION PASSING THE #4 SIEVE, THE FOLLOWING CRITERIA APPLY:

SIEVE SIZE	EFFECTIVE PARTICLE SIZE	% THAT MUST PASS SIEVE
#4	4.75 mm	100%
#50	0.30 mm	10% - 100%
#100	0.15 mm	0% - 20%
#200	0.075 mm	0% - 5%
 - A SIEVE ANALYSIS OF THE MATERIAL SHALL BE PERFORMED TO DETERMINE THAT IT MEETS THE GRADATION REQUIREMENTS NOTED ABOVE. THE INSTALLER SHALL PROVIDE A COPY OF THE SIEVE ANALYSIS RESULTS TO THE DESIGN ENGINEER.
 - THE SEPTIC TANK SHALL BE MANUFACTURED BY SHEA PRECAST CONCRETE OR APPROVED EQUAL AND SHALL WITHSTAND H=20 LOADING CRITERIA.
 - THE AX20 SHALL BE MANUFACTURED BY ORENCO SYSTEM AND IS TO BE INSTALLED WITH ANTI-FLOTATION FLANGE MODEL AX20-AF.
 - THE PUMP CHAMBER SHALL BE MANUFACTURED BY ORENCO SYSTEM AND IS TO BE INSTALLED WITH A CONCRETE ANTI-FLOTATION BASE TO BE PROVIDED BY ORENCO AND APPROVED BY DESIGN ENGINEER PRIOR TO INSTALLATION.
 - WHERE PIPES ENTER THE TANK AND/OR PUMP CHAMBER, A RUBBER BOOT SYSTEM (OR APPROVED EQUAL) IS REQUIRED TO ENSURE WATER TIGHTNESS. MORTAR ALL INLETS AND OUTLETS NOT USED ON ALL CONCRETE STRUCTURES.
 - WITH THE EXCEPTION OF THE BOTTOMLESS SAND FILTER THE CONTRACTOR SHALL RESTORE (LOAM & SEED) ALL AREAS DISTURBED DURING CONSTRUCTION.
 - IMPERVIOUS BARRIER TO BE INSTALLED IN ACCORDANCE WITH DEP GUIDELINES DOCUMENT DATED MARCH 1, 2002 POLICY/SOP/GUIDELINE # BRP/DWM/WPeP/G02-1.
 - THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN A CERTIFICATE FROM THE TANK MANUFACTURER THAT ALL TANKS ARE WATER TIGHT.
 - ALL FORCE MAINS TO BE VACUUM TESTED PRIOR TO BACKFILLING.
 - CONTRACTOR IS TO VERIFY BENCH MARK, INVERTS, AND TOP OF FOUNDATION PRIOR TO ANY EXCAVATION AND REPORT ANY DISCREPANCIES TO THE DESIGN ENGINEER.
 - ALL COVERS TO GRADE ARE TO BE WATER TIGHT AND SECURABLE.
 - THE CONTRACTOR IS TO DECOMMISSION THE EXISTING SEPTIC SYSTEM IN ACCORDANCE WITH 310CMR 15.354.
 - THIS SYSTEM IS NOT DESIGNED TO ACCOMMODATE A GARBAGE GRINDER.
 - OTHER THAN THOSE SHOWN, THERE ARE NO KNOWN WELLS WITHIN 100' OF THE PROPOSED SOIL ABSORPTION SYSTEM.
 - IN ACCORDANCE WITH 310 CMR 15.221, ALL SYSTEM COMPONENT SHALL BE MARKED WITH MAGNETIC MARKING TAPE.
 - INSTALLER SHALL BE TRAINED AND CERTIFIED BY UNIVERSITY OF RHODE ISLAND TO INSTALL A BOTTOMLESS SAND FILTER IN ACCORDANCE WITH APPROVAL FOR REMEDIAL USE BOTTOMLESS SAND FILTER RESIDENTIAL DESIGN FLOWS 880 GALLONS PER DAY (GPD) OR LESS DATED JULY 17, 2015.
 - SEE "STANDARD CONDITIONS FOR SECONDARY TREATMENT UNITS APPROVED FOR REMEDIAL USE DATED MARCH 20, 2015 AND APPROVAL FOR REMEDIAL USE TRANSMITTAL NUMBER X254151 DATED APRIL 19, 2013.
 - LOCATION OF UTILITIES ARE CONSIDERED APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE ACTUAL LOCATION AND INVERTS OF UTILITIES IN THE FIELD PRIOR TO THE START OF CONSTRUCTION.
 - THE CONTRACTOR IS RESPONSIBLE UNDER MASSACHUSETTS STATE LAW TO NOTIFY DIGSAFE (1.888.DIG.SAFE) TO LOCATE UTILITIES IN THE PROJECT AREA A MINIMUM OF 72 HOURS PRIOR TO THE START OF EXCAVATION.
 - THE SITE IS SERVICED BY AN OFF SITE PUBLIC WATER SUPPLY WELL.
 - WATER PURIFICATION SYSTEM'S BACKWASH SHALL BE PROHIBITED FROM DISCHARGING INTO THE SEPTIC TANK AND SHALL DISCHARGE TO A DRYWELL OR TO THE GROUND IN ACCORDANCE WITH 310 CMR 15.004 (8). THE BACKWASH IS NOT TO BE DISCHARGED INTO OR IN THE DIRECTION OF THE SEPTIC SYSTEM.
 - THE SEPTIC SYSTEM OWNER SHALL HAVE THE SEPTIC TANK AND OUTLET FILTER INSPECTED ANNUALLY AND CLEANED AND PUMPED AS NECESSARY.

ZCE
ZENITH CONSULTING ENGINEERS, LLC
3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

DATE: 6-17-2020
PROJECT NUMBER: 0445-01-01
DRAWING SCALE: AS NOTED
SHEET ID: S2

DESIGNED BY: JLB
CHECKED BY: NCZ
APPROVED BY: JLB

SUBSURFACE SEWAGE DISPOSAL SYSTEM UPGRADE
27 SHORE AVE.
LAKEVILLE, MASSACHUSETTS
KEVIN & AIGIA DAVID
166 HARTFORD AVE
BELLINGHAM, MA 02019

PROJECT SITE:
CLIENT INFO:

Professional Engineer Seal: JAMES B. BISHOP, MA 47265