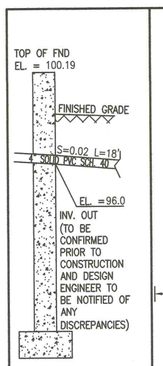
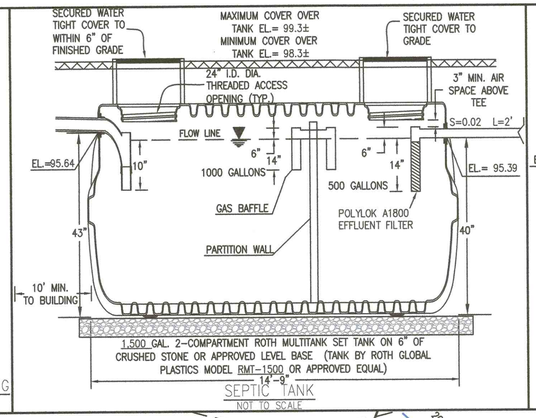
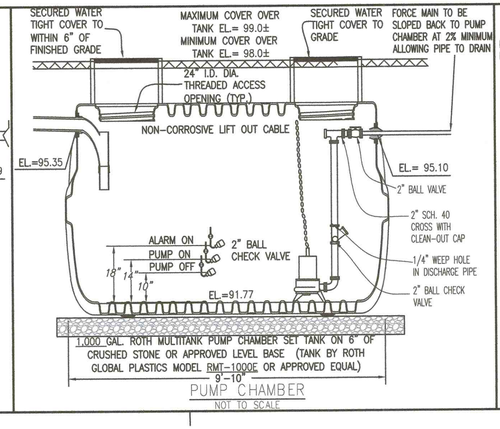


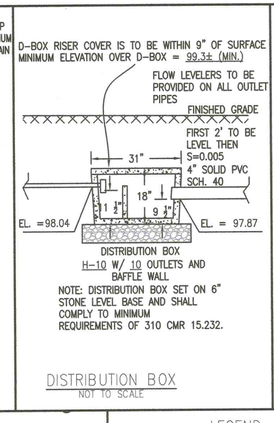
BUILDING PLUMBING
NOT TO SCALE



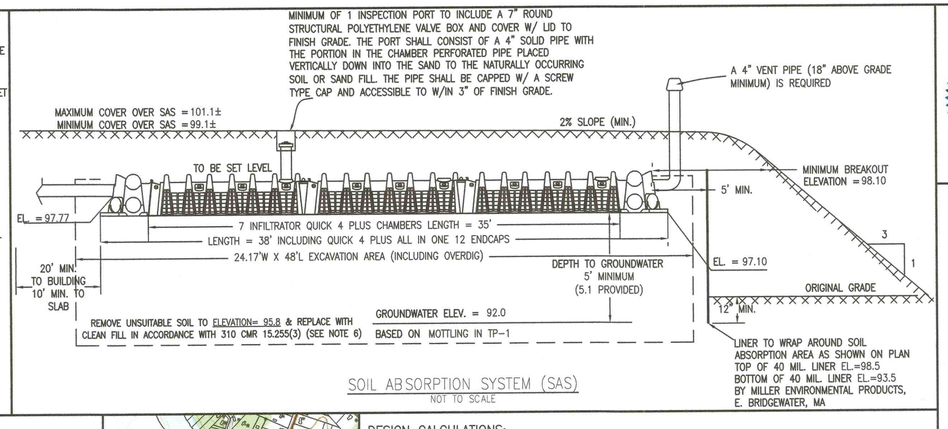
SEPTIC TANK
NOT TO SCALE



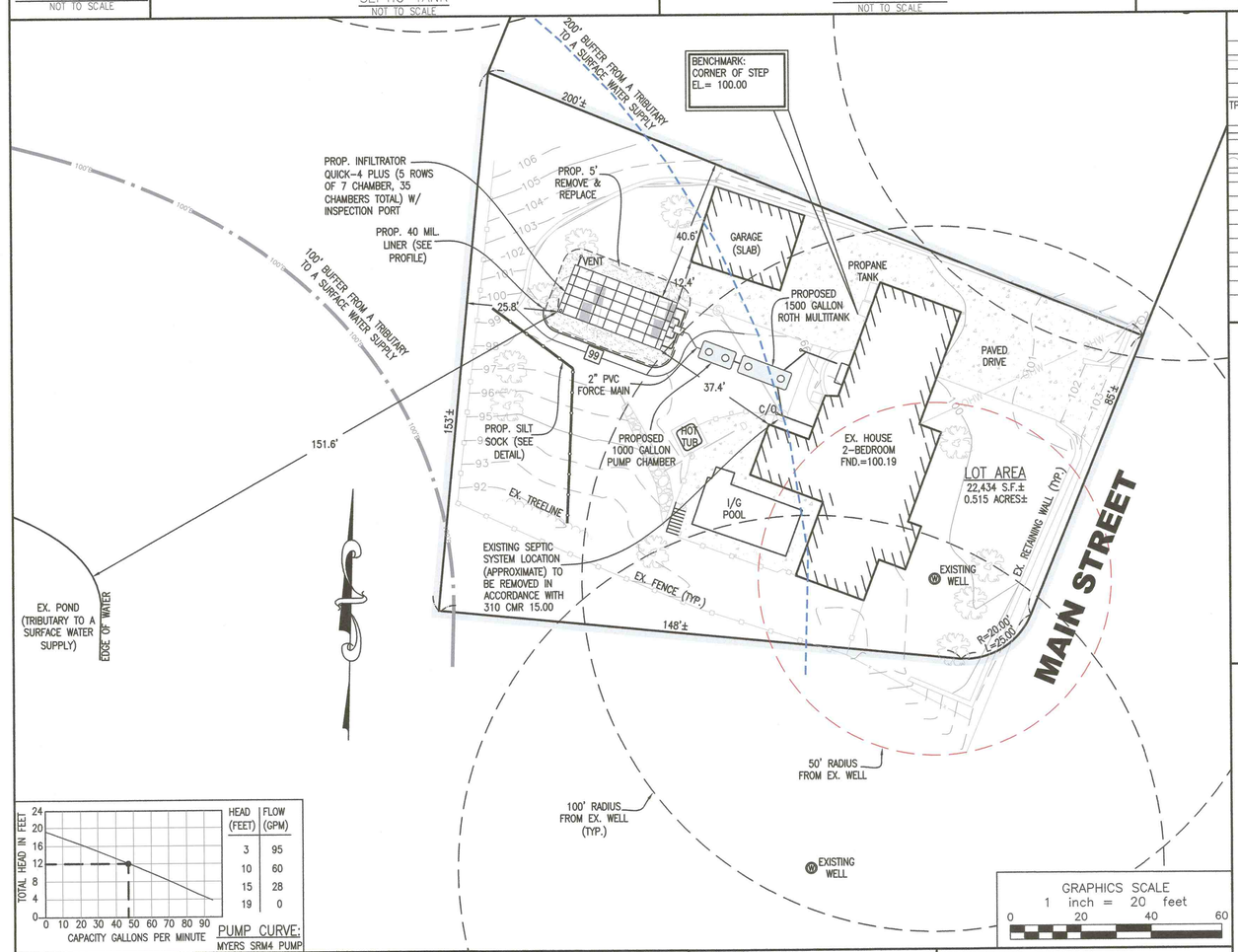
PUMP CHAMBER
NOT TO SCALE



DISTRIBUTION BOX
NOT TO SCALE



SOIL ABSORPTION SYSTEM (SAS)
NOT TO SCALE

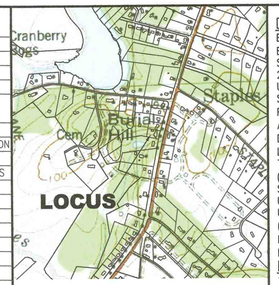


HEAD (FEET)	FLOW (GPM)
3	95
10	60
15	28
19	0

PUMP CURVE:
MYERS SRM4 PUMP

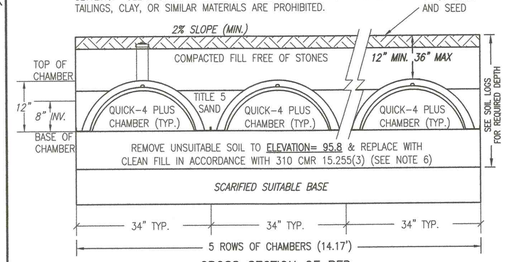
LEGEND

69	EXISTING CONTOURS
x98.5	EXISTING SPOT ELEVATION
TP #1	EXISTING TESTPIT
69	PROPOSED CONTOURS
100x2	PROPOSED SPOT ELEVATION
	EXISTING TREELINE
OHW	EXISTING OVERHEAD WIRES



LOCUS
NOT TO SCALE

THE SOIL PLACED AS BACKFILL OVER THE SYSTEM SHALL BE PLACED IN LIFTS AND SUFFICIENTLY COMPACTED TO PREVENT DEPRESSIONS DUE TO SETTLING. CLEAN BACKFILL SHALL BE FREE OF STONE >6" IN SIZE. TAILINGS, CLAY, OR SIMILAR MATERIALS ARE PROHIBITED.



CROSS SECTION OF BED
NOT TO SCALE

SOIL LOGS:

DATE: 7-20-2020
PERFORMED BY: NYLES ZAGER, ZENITH CONSULTING ENGINEERS, LLC.
WITNESSED BY: ED CULLEN, LAKEVILLE BOARD OF HEALTH

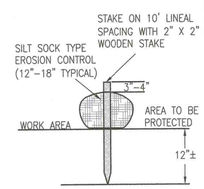
DEPTH (INCHES)	TP-1	ELEV. (FEET)
0		98.5
	A SANDY LOAM 10YR 2/2	
10		97.7
	B SANDY LOAM 10YR 5/6	
22		96.7
	C1 LOAMY SAND 2.5Y 5/6	
78		92.0
	C2 FINE SANDY LOAM 2.5Y 5/2	
116		88.8

MOTTLING @ 78"
WEEPING @ 98"
STANDING @ 116"
ESHW EL.= 92.0
PERC DEPTH: 26"-44"
PERC RATE: 2 MPI

DEPTH (INCHES)	TP-2	ELEV. (FEET)
0		98.5
	A SANDY LOAM 10YR 2/2	
12		97.5
	B SANDY LOAM 10YR 5/6	
32		95.8
	C1 LOAMY SAND 2.5Y 5/6	
82		91.7
	C2 FINE SANDY LOAM 2.5Y 5/2	
114		89.0

MOTTLING @ 82"
WEEPING @ NONE
STANDING @ 98"
ESHW EL.= 91.7
PERC DEPTH: NONE
PERC RATE: NONE

NOTE: THE A, B, & C1 LAYERS ARE TO BE REMOVED TO ELEVATION 95.8 BELOW THE SAS AND REPLACED WITH CLEAN FILL IN ACCORDANCE WITH 310 CMR 15.255(3). UNSUITABLE SOIL TO BE REMOVED TO A DISTANCE OF 5'-0" BEYOND THE LIMITS OF THE SOIL ABSORPTION SYSTEM.



SILT SOCK
NOT TO SCALE

DESIGN CALCULATIONS:

ESTIMATED DAILY FLOW:
EXISTING 2 BEDROOMS x 110 GPD/BEDROOM = 220 GPD (DEED RESTRICTION REQUIRED)
SEPTIC TANK REQUIREMENT:
220 GPD x 3.0 = 660 GALLONS
USE 1,500 GALLON 2-COMPARTMENT SEPTIC TANK PER LAKEVILLE BOARD OF HEALTH REQUIREMENTS
SOIL ABSORPTION SYSTEM REQUIREMENT:
PERCOLATION RATE – 2 MIN/INCH (CLASS I SOIL)
ALLOWED LOADING RATE = 0.74 GPD/SF
DESIGN LOADING RATE = 0.40 GPD/SF
LEACHING AREA REQ'D = (220 GPD) / (0.4 GPD/SF) = 550 SF
TRY INFILTRATOR QUICK-4 PLUS CHAMBERS IN BED CONFIGURATION
(550 S.F.) / (4.73 S.F. / FT.) = 117 FT OF CHAMBERS REQUIRED
SOIL ABSORPTION SYSTEM PROVIDED:
USE 35 INFILTRATOR QUICK-4 PLUS CHAMBERS
USE 5 ROWS OF 7 INFILTRATOR QUICK-4 PLUS CHAMBERS = 35 CHAMBERS
(35 CHAMBERS) X (4.00 FT./CHAMBER) = 140 FT.
LEACHING AREA PROVIDED: (4.73 S.F./FT.) X (140 FT.) = 662 S.F. > 550 S.F.
DAILY FLOW CAPACITY: 662 SF X 0.4 GPD/SF = 264 GPD > 220 GPD REQ'D

NOTES:

1. 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 LEACH FIELD EXCAVATION PRIOR TO PLACEMENT OF SAND
   B. AFTER PLACEMENT OF TANKS AND LEACHING CHAMBERS
   C. PRIOR TO BACKFILL, THE CONTRACTOR IS TO PROVIDE A CURRENT SIEVE ANALYSIS SHOWING THE SAND MEETS 310 CMR 15.255(3) SPECIFICATIONS IF REQUESTED BY THE DESIGN ENGINEER.
   D. DURING BACKFILLING OF LEACHING FIELD
   E. FINAL INSPECTION AFTER LOAM AND SEED HAVE BEEN PLACED
2. BENCHMARK: CORNER OF CONCRETE STEP, EL.=100.00 ASSUMED DATUM.
3. PER 310 CMR 15.246(2) HEAVY EQUIPMENT SHALL NOT BE ALLOWED TO OPERATE OVER THE LIMITS OF THE SEWAGE DISPOSAL FIELD DURING THE COURSE OF CONSTRUCTION OF THE SYSTEM.
4. NO FIELD MODIFICATIONS TO THE SEWAGE SYSTEM SHALL BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER AND THE LOCAL BOARD OF HEALTH.
5. UNLESS OTHERWISE NOTED ALL CONSTRUCTION AND SYSTEM COMPONENTS SHALL CONFORM WITH CURRENT TITLE V OF THE STATE ENVIRONMENTAL CODE AND ANY APPLICABLE LOCAL RULES.
6. 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%

   D. 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.
7. THE SEPTIC TANK AND PUMP CHAMBER SHALL BE MANUFACTURED BY ROTH GLOBAL PLASTICS, INC. OR APPROVED EQUAL AND SHALL WITHSTAND H-10 LOADING CRITERIA AS NOTED ON SEPTIC SYSTEM PROFILE. FOR INFORMATION ON THE ROTH MULTI TANK SEE GENERAL USE APPROVAL TRANSMITTAL NUMBER W054018 DATE OF ISSUANCE FEBRUARY 28, 2005, REVISED MARCH 20, 2015. THE D-BOX SHALL BE MANUFACTURED BY SHEA CONCRETE OR APPROVED EQUAL AND SHALL WITHSTAND H-10 LOADING CRITERIA AS NOTED ON SEPTIC SYSTEM PROFILE.
8. GROUT IS TO BE USED AT ALL POINTS WHERE PIPES ENTER OR LEAVE ALL CONCRETE STRUCTURES IN ORDER TO PROVIDE A WATERTIGHT SEAL.
9. THE FIRST TWO FEET OF EACH LINE EXITING THE DISTRIBUTION BOX SHALL BE LEVEL.
10. THIS SYSTEM IS NOT DESIGNED TO ACCOMMODATE A GARBAGE GRINDER.
11. OTHER THAN THOSE SHOWN, THERE ARE NO KNOWN WELLS WITHIN 100' OF THE PROPOSED SOIL ABSORPTION SYSTEM.
12. IN ACCORDANCE WITH 310 CMR 15.221, ALL SYSTEM COMPONENT SHALL BE MARKED WITH MAGNETIC MARKING TAPE.
13. THE CONTRACTOR SHALL RESTORE (LOAM & SEED) ALL AREAS DISTURBED DURING CONSTRUCTION.
14. INSTALLER SHALL BE TRAINED AND CERTIFIED BY INFILTRATOR WATER TECHNOLOGIES, LLC. FOR INFORMATION ON THE INFILTRATOR QUICK-4 CHAMBER SEE CERTIFICATION FOR GENERAL USE TRANSMITTAL NUMBER X259183 MODIFIED DATE JUNE 12, 2015. ALSO SEE STANDARD CONDITIONS FOR ALTERNATIVE SOIL ABSORPTION SYSTEMS WITH GENERAL USE CERTIFICATION AND/OR APPROVED FOR REMEDIAL USE REVISED: MARCH 5, 2018.
15. 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.
16. 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.
17. THE PROPERTY IS SERVICED BY A PRIVATE WATER SUPPLY WELL.
18. A MINIMUM OF 12" IS TO BE MAINTAINED BETWEEN THE INVERTS ON THE SEPTIC TANK AND HIGH GROUNDWATER. THE ELEVATION FOR HIGH GROUNDWATER WAS DETERMINED BY TEST PITS.
19. 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.
20. THE SEPTIC SYSTEM OWNER SHALL HAVE THE SEPTIC TANK AND OUTLET FILTER INSPECTED ANNUALLY AND CLEANED AND PUMPED AS NECESSARY.

SITE INFORMATION:

1. THE SITE IS SHOWN ON THE TOWN OF LAKEVILLE ASSESSORS MAP AS MAP 58 BLOCK 3 LOT 25
2. PROPERTY LINE INFORMATION WAS TAKEN FROM
   2.1. FOR TITLE REFERENCE TO THE SUBJECT PROPERTY REFER TO BOOK 15935, PAGE 342 IN THE PLYMOUTH COUNTY REGISTRY OF DEEDS.
   2.2. FOR PLAN REFERENCE TO THE SUBJECT PROPERTY REFER TO PLAN BOOK 7, PAGE 450 IN THE PLYMOUTH COUNTY REGISTRY OF DEEDS.
   2.3. THIS PLAN IS NOT THE RESULT OF A BOUNDARY SURVEY, PROPERTY LINES ARE TO BE CONSIDERED APPROXIMATE.
3. TOPOGRAPHY INFORMATION TAKEN FROM FIELD SURVEY BY ZENITH CONSULTING ENGINEERS, LLC. IN JULY 2020.
4. THE SUBJECT PROPERTY IS LOCATED IN ZONE X, AS SCALED FROM THE FLOOD INSURANCE RATE MAP (F.I.R.M.) OF PLYMOUTH COUNTY, MAP NUMBER 25023C0427K, EFFECTIVE DATE JULY 16, 2015.
5. THE SUBJECT PROPERTY IS NOT LOCATED IN A ZONE II OR IWPA (WELL HEAD PROTECTION AREA).
6. THE SYSTEM IS LOCATED WITHIN A ZONE A OF A SURFACE WATER SUPPLY PROTECTION AREA.
7. THE PROPERTY IS NOT LOCATED IN A PRIORITY HABITAT OR ESTIMATED HABITAT AS SHOWN ON THE MASSACHUSETTS NATURAL HERITAGE ATLAS 14TH EDITION EFFECTIVE DATE AUGUST 2017.
8. EDGE OF POND FIELD LOCATED BY ZENITH CONSULTING ENGINEERS, LLC IN JULY 2020.

BUOYANCY CALCULATIONS 1,500 GALLON ROTH MULTITANK

DOWNWARD FORCE:
TANK BY SHEA CONCRETE MODEL TK-M1500H
WEIGHT OF EMPTY 1,500 GAL.
TANK=640 LBS.
SOIL WEIGHT ABOVE TANK:
VOLUME OVER TANK=137.8 CF (137.8 CF X 110 LB/CF=15,158 LBS)
DOWNWARD FORCE:=15,158+640=15,798 LBS.
BUOYANT FORCE: (ASSUMES TANK FULLY SUBMERGED IN WATER)
VOLUME OF DISPLACED WATER = 237 CF
BUOYANT FORCE=237 CF X 62.4 LB/CF=14,789 LB
15,798 LB > 14,789 LB
(DOWNWARD FORCE > BUOYANT FORCE)

BUOYANCY CALCULATIONS 1,000 GALLON ROTH MULTITANK PUMP CHAMBER

DOWNWARD FORCE:
TANK BY SHEA CONCRETE MODEL M1000H
WEIGHT OF EMPTY 1,000 GAL.
TANK=450 LBS.
SOIL WEIGHT ABOVE TANK:
VOLUME OVER TANK=89 CF (89 CF X 110 LB/CF=9,790 LBS)
DOWNWARD FORCE:=9,790+450=10,240 LBS.
BUOYANT FORCE: (ASSUMES TANK FULLY SUBMERGED IN WATER)
VOLUME OF DISPLACED WATER = 154 CF
BUOYANT FORCE=154 CF X 62.4 LB/CF=9,610 LB
10,240 LB > 9,610 LB
(DOWNWARD FORCE > BUOYANT FORCE)

DOSE CALCULATION:

DESIGN DOSE = 220 GPD / 2 DOSE/DAY = 110 GALLONS
DRAIN BACK VOLUME = 1.14 GALLONS/DOSE
TOTAL DOSE = 110 + 1.14 = 111.14 GALLONS

PUMP DESIGN:
REQUIRED HEAD = FRICTION LOSS ± ALTITUDE CHANGE ± STATIC PRESSURE CHANGE
ALTITUDE CHANGE = 98.04 – 92.60 = 5.44'
FRICTION LOSS = 6.56'
STATIC PRESSURE CHANGE = 0
REQUIRED PUMP HEAD = 5.44' + 6.56' = 12.00'

LOCAL UPGRADE APPROVALS REQUESTED:
1. REDUCTION OF THE REQUIRED SETBACK BETWEEN THE PROPOSED SAS AND A TRIBUTARY TO A SURFACE WATER SUPPLY FROM 200' TO 150' PER 310 CMR 15.405(1)(g).
2. REDUCTION OF THE REQUIRED SETBACK BETWEEN THE PROPOSED SEPTIC TANK AND PUMP CHAMBER AND A TRIBUTARY TO A SURFACE WATER SUPPLY FROM 200' TO 180' PER 310 CMR 15.405(1)(g).

COMMONWEALTH OF MASSACHUSETTS NYLES C. ZAGER CIVIL No. 40717 REGISTERED PROFESSIONAL ENGINEER
P.E. STAMP

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

APP.	BY	DESCRIPTION	DATE	REV.

DATE: 7-20-20	PROJECT NUMBER 0610-01-01	DRAWING SCALE 1"=20'	SHEET ID SEPTIC DESIGN
DRAWN BY: WBC	DESIGNED BY: WBC	CHECKED BY: NCZ	APPROVED BY NCZ

SHEET NAME: SUBSURFACE SEWAGE DISPOSAL SYSTEM UPGRADE
PROJECT SITE: 141 MAIN STREET LAKEVILLE, MASSACHUSETTS
CLIENT INFO: BELA SARKOZY 141 MAIN STREET LAKEVILLE, MA 02347

S:\Civil Engineering Projects\Lakeville\Main Street\DWG\Septic Design – 141 Main St – Lakeville.dwg