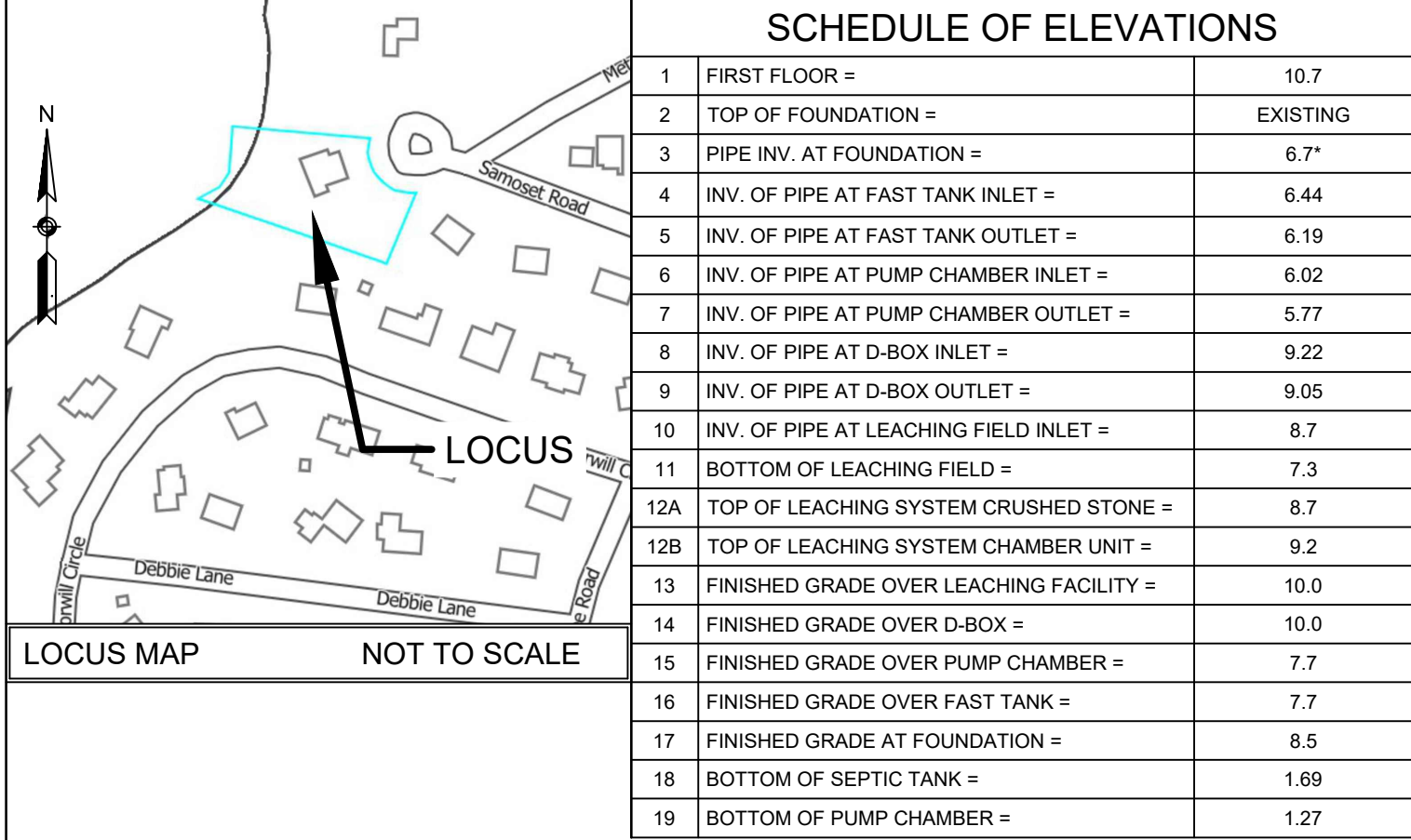




PUMP CHAMBER NOTES AND DOSING CALCULATIONS

PROPOSED PUMP DISCHARGE RATE = 35 GALLONS PER MINUTE (GPM) @ 11 TDH
PROPOSED DOSE PER CYCLE = 440 GALLONS / 6 = 73 GALLONS

PUMP CHAMBER SIZE: 1000 GALLON TANK: L = 6' - 8" x W = 5' - 0" x H = 5'
DEPTH OF DOSE = (73 GAL./7.48 GAL./CU.FT.) / (5' x 6' 8") = 0.29 FT. == USE 4 INCHES
DEPTH OF DAILY FLOW = (440 GAL./7.48 GAL./CU.FT.) / (5' x 6' 8") = 1.76 FT. == USE 22 INCHES

FRICITION LOSS CALCULATIONS:

- 1) VERTICAL HEAD LOSS:
EL. 9.22 (D-BOX INLET) - EL. 2.52 (PUMP CHAMBER BOTTOM) = 6.7 FT.
- 2) FRICTION HEAD LOSS:
61 FT OF 2" PVC PIPE x 3.99 FT./100 FT. @ 45 GAL./MIN = 2.43 FT.
- 3) MINOR HEAD LOSS FROM FITTINGS (EQUIVALENT LENGTH OF 43 FT.) =
41 FT OF 2" PVC PIPE x 3.99 FT./100 FT. @ 45 GAL./MIN = 1.64 FT.

TOTAL HEAD LOSS = 6.7 FT. + 2.43 FT. + 1.64 FT. = 10.77 FT. AT 35 GALLONS PER MINUTE

USE LIBERTY MODEL FL-30 SERIES 1/3 H.P. RATED AT 35 G.P.M. FOR 11 FT. OF HEAD (OR EQUAL)
ESTIMATED PUMP RUN TIME PER DOSE = 2.1 MINUTES

INSTALL THREE MERCURY FLOAT SWITCHES: OFF, ON AND ALARM.

ALARM ACTIVATION WILL INDICATE PUMP FAILURE.
A MINIMUM OF 24 HOUR RESERVE CAPACITY IS PROVIDED ABOVE ALARM ACTIVATION.
440 GALLONS OF RESERVE CAPACITY IS PROVIDED PER MINIMUM REQUIREMENTS.

ELECTRICIAN SHALL INSTALL A SIMPLEX CONTROL PANEL TO BE LOCATED IN AN ACCESSIBLE AREA.
AN ELECTRICAL PERMIT IS REQUIRED FOR ALARM AND PUMP INSTALLATION.

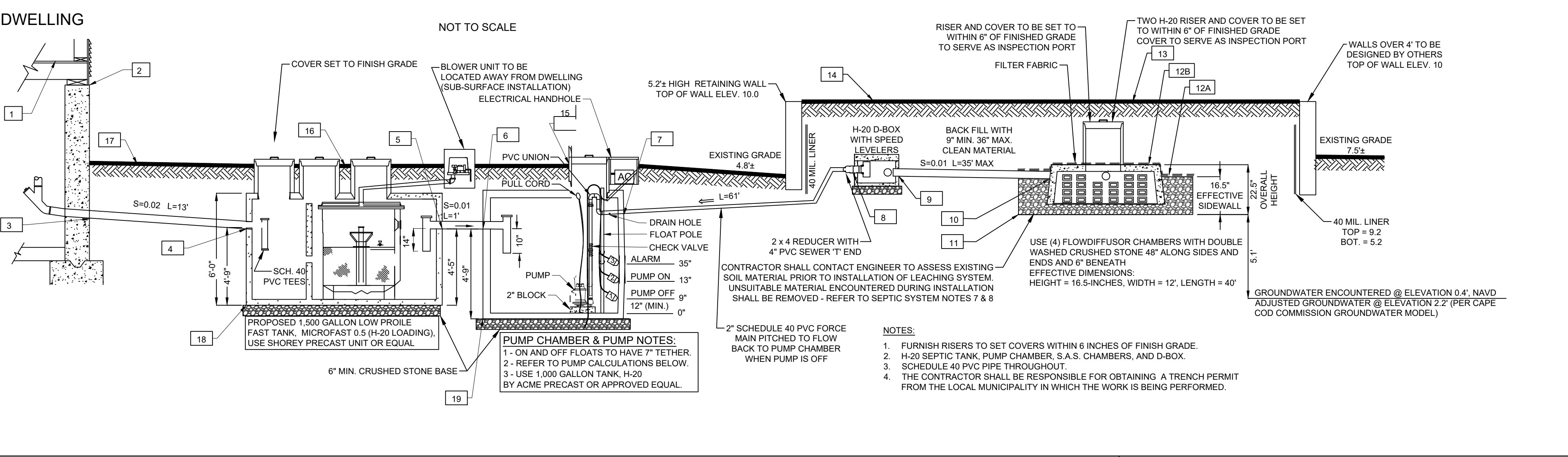
PRECAST STRUCTURE BUOYANCY CALCULATIONS

NOTE: THIS CALCULATION ANALYZE CONDITIONS UNDER COASTAL FLOODING CONDITIONS

FAST SEPTIC TANK: BOTTOM OF TANK EL.=1.69, ESTIMATED GW @ TANK EL.=2.2
BUOYANCY = (11.6 x 6.0) x (2.2 - 1.69) x (64 LBS/C.F.) = 2,271 LBS (UPWARD)

PUMP STATION STATION: BOTTOM OF TANK EL.=1.27, EST. GW @ TANK EL.=2.2
BUOYANCY = (9' X 5.25') x (2.2 - 1.27) X (64 LBS/C.F.) = 2,812 LBS (UPWARD)

UNIT	DEAD WEIGHT	BUOYANCY FORCE	SAFETY FACTOR
MICROFAST TANK (H-20 & L.P.)	25,000 LBS		
PRECAST RISERS/COVERS	450 LBS		
TOTAL	25,675 LBS	2,271 LBS	25,675 LBS/2,271 LBS = 11.3
PUMP CHAMBER	16,500 LBS		
PRECAST RISERS/COVERS	450 LBS		
TOTAL	16,950 LBS	2,812 LBS	16,950 LBS/2,812 LBS = 6.0



SEPTIC SYSTEM NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE STATE ENVIRONMENTAL CODE, TITLE 5 (310 CMR 15.00), AND THE LOCAL BOARD OF HEALTH.
2. THERE SHALL BE NO CHANGES MADE IN THIS PLAN WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER AND LOCAL BOARD OF HEALTH.
3. ALL ERRORS, OMISSIONS, AND CHANGE OF CONDITIONS AT THE SITE SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PERFORMING THE RELATED WORK.
4. ALL DISTURBED AREAS ARE TO BE LOAMED, SEEDED AND MAINTAINED TO PREVENT EROSION.
5. FOR PROPER PERFORMANCE, SEPTIC TANK SHOULD BE INSPECTED AT LEAST ONCE A YEAR AND WHEN THE TOTAL DEPTH OF SCUM AND SOLIDS EXCEEDS 1/3 THE LIQUID DEPTH OF THE TANK, THE TANK SHOULD BE PUMPED.
6. THIS SYSTEM HAS BEEN DESIGNED FROM DATA REVIEWED AND ACKNOWLEDGED BY THE MASS. D.E.P. AND THE LOCAL BOARD OF HEALTH; AND CONFORMS WITH THE REQUIREMENTS OF THE STATE ENVIRONMENTAL CODE, TITLE 5. NO GUARANTEE OF PERFORMANCE IS EXPRESSED OR IMPLIED.
7. TEST HOLE INFORMATION SHOWN HEREON IS LIMITED TO SOIL CONDITIONS FOUND AT THAT PARTICULAR TEST HOLE LOCATIONS AND IS NOT CONSIDERED AN IMPLIED OR EXPRESSED WARRANTY OF SOIL CONDITIONS BEYOND LIMITS OF SUCH TEST HOLES.
8. ALL ORGANIC AND UNSUITABLE MATERIAL MUST BE REMOVED FROM THE AREA DIRECTLY UNDER AND 5 FEET BEYOND THE PROPOSED LEACHING FACILITY. THIS AREA MUST BE BACKFILLED TO THE ELEVATIONS INDICATED ON THESE PLANS WITH SELECT ON-SITE OR IMPORTED SOIL MATERIAL, CONSISTING OF CLEAN GRANULAR SAND OR OTHER GRANULAR MATERIAL, FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES. MIXTURES AND LAYERS SHALL NOT BE USED. THE FILL MATERIAL SHALL CONFORM TO THE STATE ENVIRONMENTAL CODE, TITLE 5 - 310 CMR SECTION 15.25 (3) AND SHALL HAVE PERCOLATION RATE OF BETWEEN TWO AND FIVE MINUTES PER INCH, BEFORE AND AFTER PLACEMENT.
9. ALL STONE MUST BE DOUBLE WASHED AND FREE FROM FINES AND ANY ORGANIC MATERIAL AND MUST HAVE LESS THAN 0.2 PERCENT MATERIAL FINER THAN A NUMBER 200 SIEVE.
10. THE DESIGNER HAS NOT BEEN RETAINED BY THE CLIENT TO CONSTRUCT OR SUPERVISE THE CONSTRUCTION OF THE SYSTEM. THE CONTRACTOR IS RESPONSIBLE FOR MAKING ARRANGEMENTS FOR INSPECTION OF INSTALLATION OF THE SYSTEM WITH THE LOCAL BOARD OF HEALTH.
11. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL OF ALL SYSTEM COMPONENTS.
12. TIGHT JOINT PIPING MATERIAL TO CONSIST OF POLYVINYL CHLORIDE (P.V.C.) SCHEDULE 40, UNLESS OTHERWISE NOTED.
13. THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER FOR CONSTRUCTION INSPECTION AFTER EXCAVATION FOR THE LEACHING BED (PRIOR TO THE PLACEMENT OF STONE) AND ALSO AFTER PLACEMENT OF PIPE & STONE PRIOR TO BACKFILLING.
14. DESIGN ENGINEER SHALL CERTIFY CONSTRUCTION OF SYSTEM AND MATERIALS INSTALLED. THE CONTRACTOR SHALL PROVIDE A SIEVE ANALYSIS OF THE FILL MATERIAL REQUIRED. AN AS-BUILT PLAN SHALL BE SUBMITTED TO THE LOCAL BOARD OF HEALTH UPON COMPLETION.
15. NO RUBBER TIRE CONSTRUCTION MACHINERY SHALL DRIVE OVER THE PROPOSED SEPTIC BED EXCAVATION DURING CONSTRUCTION.
16. DIG-SAFE AND ALL OTHER NECESSARY AUTHORITIES SHALL BE NOTIFIED FOR THE PROPER LOCATION OF EXISTING UTILITIES PRIOR TO ANY EXCAVATION.
17. WATER SERVICE LINE SHALL BE LOCATED AND MARKED PRIOR TO ANY EXCAVATING AND 10' MIN. SETBACK DISTANCE FROM SAID SERVICE TO THE SEPTIC SYSTEM SHALL BE MAINTAINED.
18. ALL WATER LINES WITHIN 10' OF SEPTIC SYSTEM COMPONENTS SHALL BE SLEEVED WITHIN 4" PVC SCHEDULE 40 PIPE.

DESIGN DATA

1. TYPE OF ESTABLISHMENT: 3-BEDROOM SINGLE DWELLING & FUTURE 1-BEDROOM ADU
2. SEWAGE SYSTEM DESIGN FLOW: 110 GALLONS PER BEDROOM = 110 x 4 = 440 GPD
3. NOTE: THIS SEPTIC SYSTEM IS NOT DESIGNED FOR A GARBAGE GRINDER
4. SEPTIC TANK CAPACITY REQUIRED, MINIMUM OF 200% & 100% OF DESIGN FLOW
= 200% x 440 GALLON = 880 GALLON
= 100% x 440 GALLON = 440 GALLON (USE 1500 GALLON TWO-COMPARTMENT TANK)
5. DESIGN PERCOLATION RATE: ASSIGNED LESS THAN 5 MINUTES PER INCH
6. SOIL ABSORPTION SYSTEM TYPE: CHAMBER SYSTEM
7. LEACHING AREA REQUIRED: MINIMUM 440 GPD / (0.74 GPD/S.F., CLASS I SOIL) = 595 S.F.
8. LEACHING SYSTEM PROPOSED: 40' 0" LONG x 12' 0" WIDE x 1.375' HIGH SYSTEM
BOTTOM AREA PROPOSED = 40' 0" x 12' 0" = 480.0 S.F.
SIDE AREA PROPOSED = 2 x (40' 0" x 12' 0" x 1.375') = 143.0 S.F.
TOTAL AREA PROPOSED = 480.0 + 143.0 = 623.0 S.F.
9. LEACHING SYSTEM CAPACITY PROPOSED = 623.0 S.F. x 0.74 GPD/S.F. = 461 GPD

SOIL EVALUATOR'S LOG

Depth from surface in inches	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottles and Depth	Other Relative Factors
DEEP OBSERVATION HOLE TP#1 & TP#2, ELEVATION 5.6					
0 - 24"	A/E	SANDY LOAM	10 YR 3/2		
24" - 40"	Bw	LOAMY SAND	10 YR 4/6		
40" - 96"	C	COARSE SAND	10 YR 7/3	NO	SINGLE GRAIN
DEEP OBSERVATION HOLE TP#3 & TP#4, ELEVATION 7.1					
0 - 46"	FILL	SAND			
46" - 52"	A/E	SANDY LOAM	10 YR 3/2		
52" - 68"	Bw	LOAMY SAND	10 YR 4/6	NO	SINGLE GRAIN
68" - 108"	C	COARSE SAND	10 YR 7/3	NO	SINGLE GRAIN

PERCOLATION RATE = < X MINUTES / INCH IN B LAYER
DEPTH TO GROUNDWATER = 70" BELOW TH#1/2, 80" BELOW TH#3/4.
ADJUSTED HIGH GROUNDWATER = +1.8' (CAPE COD GROUNDWATER ADJUSTMENT) = 2.2'
OBSERVATIONS BY: CHUCK ROWLAND, P.E.
WITNESSED BY: ZACK SEABURY, R.S.
DATE TESTED: AUGUST 4, 2026

REQUESTED BOARD OF HEALTH VARIANCE

NO.	DESCRIPTION	REQUIRED	PROPOSED	VARIANCE REQUESTED
1	S.A.S. SETBACK TO WELL	150 FT.	90.7 FT.	59.3 FT.
2	RESERVE SETBACK TO WELL	150 FT.	110.1 FT.	39.9 FT.

GENERAL NOTES

LOCATIONS ARE BASED ON AN "ON THE GROUND" INSTRUMENT SURVEY AND ELEVATIONS BASED ON THE NAVD 1988 DATUM. COORDINATE SYSTEM USED IS THE MA-MAINLAND COORDINATE SYSTEM, DATUM: NAD 83, UNITS: U.S. SURVEY FEET.

DIMENSIONS OF EXISTING BUILDINGS AND BUILDING OFFSETS SHOWN HEREON ARE TO CORNER BOARDS OR SIDING EXTENTS AND ARE DISPLAYED IN ENGINEERING UNITS WITH A PRECISION OF ONE TENTH (0.1) OF A FOOT. LOT COVERAGE IS CALCULATED TO CORNER BORDS.

THE FINISHED FLOOR ELEVATION (FIN. FL. EL.) SHOWN HEREON IS BASED ON AN ASSUMED 1" LOWER THAN THE SURVEYED THRESHOLD ELEVATION. AN INTERIOR INSPECTION OF BUILDINGS WAS NOT PERFORMED.

ZONING DISTRICT: R3

THIS PROPERTY IS LOCATED WITHIN A ZONE DESIGNATION OF AE (EL.12), AE (EL.13) & VE (EL.13) BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ON FLOOD INSURANCE RATE MAP NO. 25001C0742J & 25001C0734J, WITH A MAP EFFECTIVE DATE OF JULY 16, 2014.
THIS LOT IS NOT LOCATED WITHIN A DEF. APPROVED ZONE II WELLHEAD PROTECTION AREA.
THIS LOT IS NOT MAPPED WITHIN A MESA NATURAL HERITAGE AND ENDANGERED SPECIES AREA.
WIND EXPOSURE CATEGORY: ZONE C

LOT COVERAGE:
LOT AREA TOTAL = 38,934 S.F. (LOT 64 & 65) = 2,854 S.F. (7.3%)
EXISTING LOT COVERAGE BY STRUCTURES:

LOT AREA ABOVE THE FLOOD ZONE1 = 38,934 S.F.
EXISTING LOT COVERAGE BY STRUCTURES: = 2,854 S.F. (7.3%)

1 THE AREA NOTED IN THE LOT COVERAGE CALCULATION IS THE AREA USED FOR THE PURPOSE OF REPORTING AND CALCULATING THE TOWN LOT COVERAGE IN ACCORDANCE TO REGULATION §174-31 LAND SPACE REQUIREMENT TABLE FOOTNOTE 16. THIS AREA REPRESENTS LAND ABOVE THE FLOOD ZONE.

A COMPREHENSIVE ZONING ANALYSIS HAS NOT BEEN PERFORMED BEYOND THE ITEMS LISTED ABOVE.

DEED REFERENCE: LAND COURT CERTIFICATE: #196742
PLAN REFERENCE: LAND COURT PLAN: #26502-D

OWNER: THE 22 SAMOSET ROAD NOMINEE TRUST
RICHARD M. & ESTELLE G. CUSHNER, TRUSTEES
22 SAMOSET ROAD
MASHPEE, MA 02649

DATE: _____ DESCRIPTION: _____ BY: _____ CHK: _____

PREPARED FOR: SUSAN ROTH
88 BRIMSTONE LANE
SUDBURY, MA 01776

PROJECT: 22 SAMOSET ROAD
MASHPEE, MASSACHUSETTS 02649

SHEET NO.: 1 OF 1 DATE: AUGUST 12, 2026
DRAWN BY: BMT CHECKED BY: MD

PREPARED BY: CAPE & ISLANDS ENGINEERING

SUMMERFIELD PARK
800 FALMOUTH ROAD SUITE 301C MASHPEE, MA 02649 508.477.7272 PHONE 508.477.9072 FAX www.CapeEng.com

DRAWING TITLE: SEPTIC PLAN

ASSESSORS INFORMATION: MAP 125-65-0