WASTEWATER BASIS OF DESIGN

DESIGN FLOW
5-BEDROOM SFR: (140 GPD X 3) + (70 GPD X 2) = 560 GPD

SIMPLIFIED DESKTOP MOUNDING ANALSYS (LLR = (h)(f))

GROUND SLOPE: 6.8% SOIL TYPE: FINE SANDY LOAM LLR FACTOR (f): 10.5

USE 16" AS LIMITTING DEPTH TO SHWT (SEE TEST PIT LOG FOR TP-5, TP-6). DEPTH TO BEDROCK IS 26" (SEE TEST PIT LOG FOR TP-6).

TO LEAVE 6" UNSATURATED NATIVE SOIL, LLR = (h)(f)
h = 16"-6" = 10" OR 0.83'
MAXIMUM LLR = 0.83' x (10.5) = 8.75 GAL/LF/DAY
MINIMUM SYSTEM LENGTH: 560 GPD DIVIDED BY 8.75 GAL/LF = 64.0'

DESIGN SYSTEM LENGTH = 64.0 FT.
USE ONE ABSORPTION BED, 64' LONG BY 10' WIDE, ORIENTED PARALLEL TO LAND CONTOURS AS SHOWN ON PLAN
APPLICATION RATE: 1 GAL/SF/DAY BASED ON PERCOLATION RATE OF <60 MIN/IN.

MOUNDING BASED ON DESIGN
LLR = (h)(f)
8.75 GAL/LF/DAY = (h)(10.5)
h = 0.83' OR 10" ACTUAL MOUNDING

ACTUAL UNSATURATED NATIVE SOIL: 16" - 10" = 6"
36" IS REQUIRED BETWEEN INDUCED MOUNDING AND BOTTOM OF ABSORPTION TRENCH.
REQUIRED SAND DEPTH: 36" - 6" = 30"

DESIGN REQUIRES **30" MIN.** OF MOUND SAND BELOW MOUND BED TO MAINTAIN 36" SEPARATION TO MOUNDED GROUNDWATER.

EFFECTIVE BASAL AREA
REQUIRED EFFECTIVE BASAL: 560 GPD / 0.74 GPD/FT = 757 S.F.
DESIGN EFFECTIVE BASAL AREA: 23.5' X 64' = 1,540 S.F.

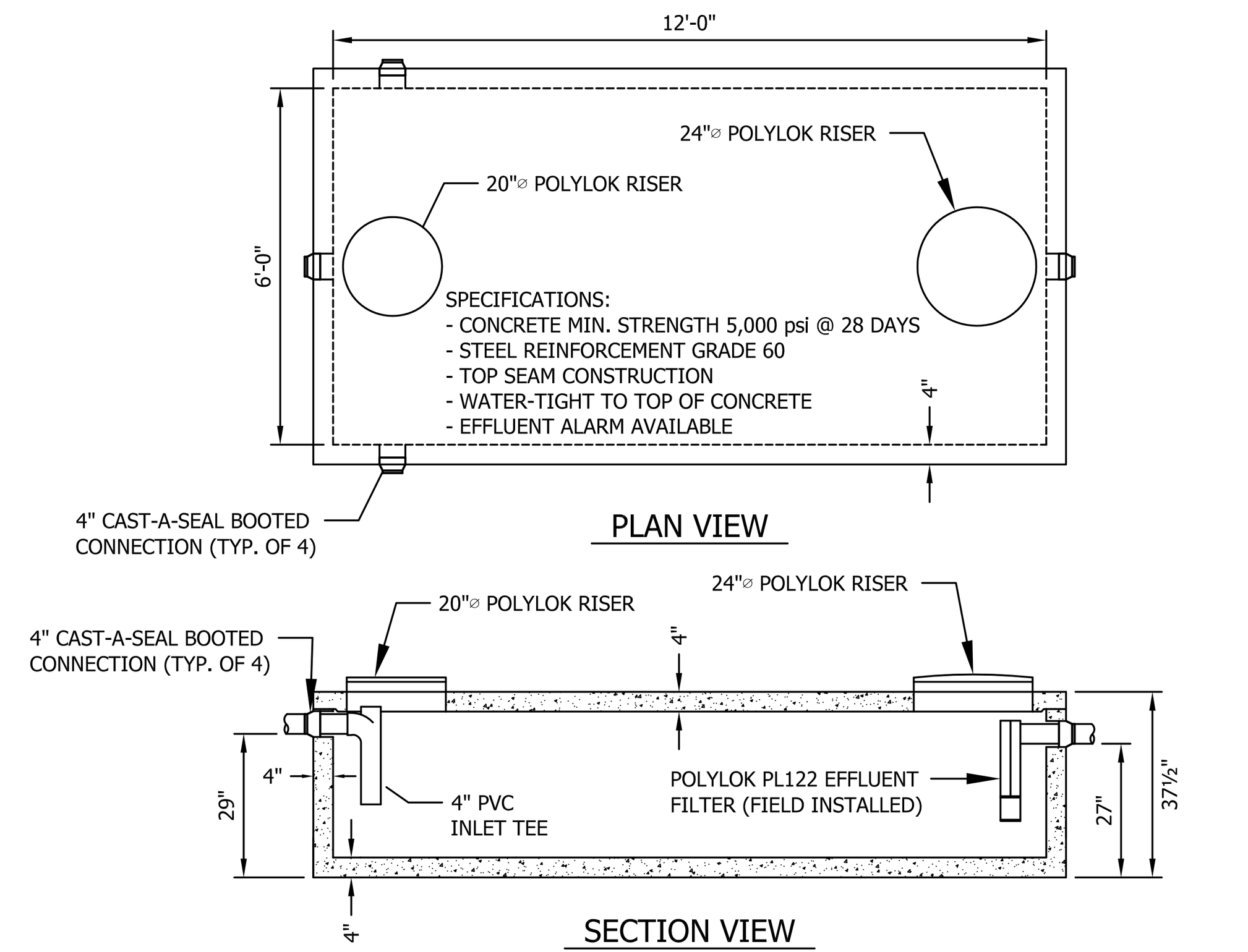
REPLACEMENT AREA
NO NEED FOR REPLACEMENT AREA FOR MOUND AS PER EPR CHAPTER 1, EFFECTIVE 9-29-07

POTABLE WATER BASIS OF DESIGN

AVERAGE DAY DEMAND	ADD	=	560 GPD
MAXIMUM DAY DEMAND	MDD	=	ADD/720 MIN = 0.78 gpm
INSTANTANEOUS PEAK DEMAND	IPD	=	5 GPM (PER SFR UNIT)

TO MEET DEMAND REQUIREMENTS, MINIMUM DRILLER'S YIELD OF WELL SHALL BE 1.6 GPM. IF DRILLER'S YIELD IS LESS THAN 1.6 GPM, ALERT DESIGNER AS YIELD TESTING MAY BE REQUIRED.

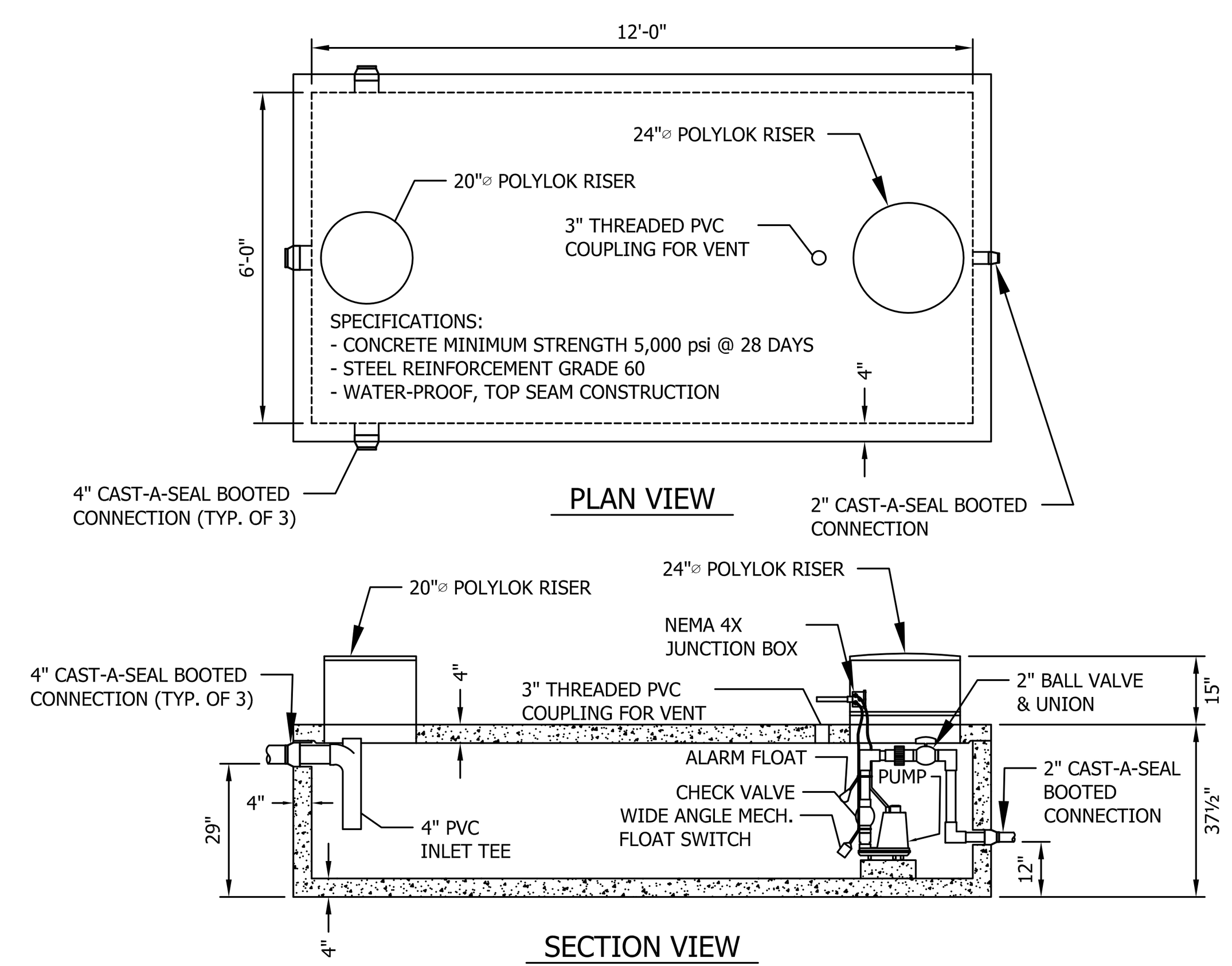
TO MEET STORAGE REQUIREMENTS, STORAGE SHALL EQUAL 55% OF ADD = 0.55 x 560 = 310 GALLONS. THIS IS EQUIVALENT TO 205 FT TOTAL AVAILALE HEAD IN A 6" DIAMETER WELL.



1,000 GALLON LEDGE SEPTIC TANK

(CONCRETE)
NOT TO SCALE

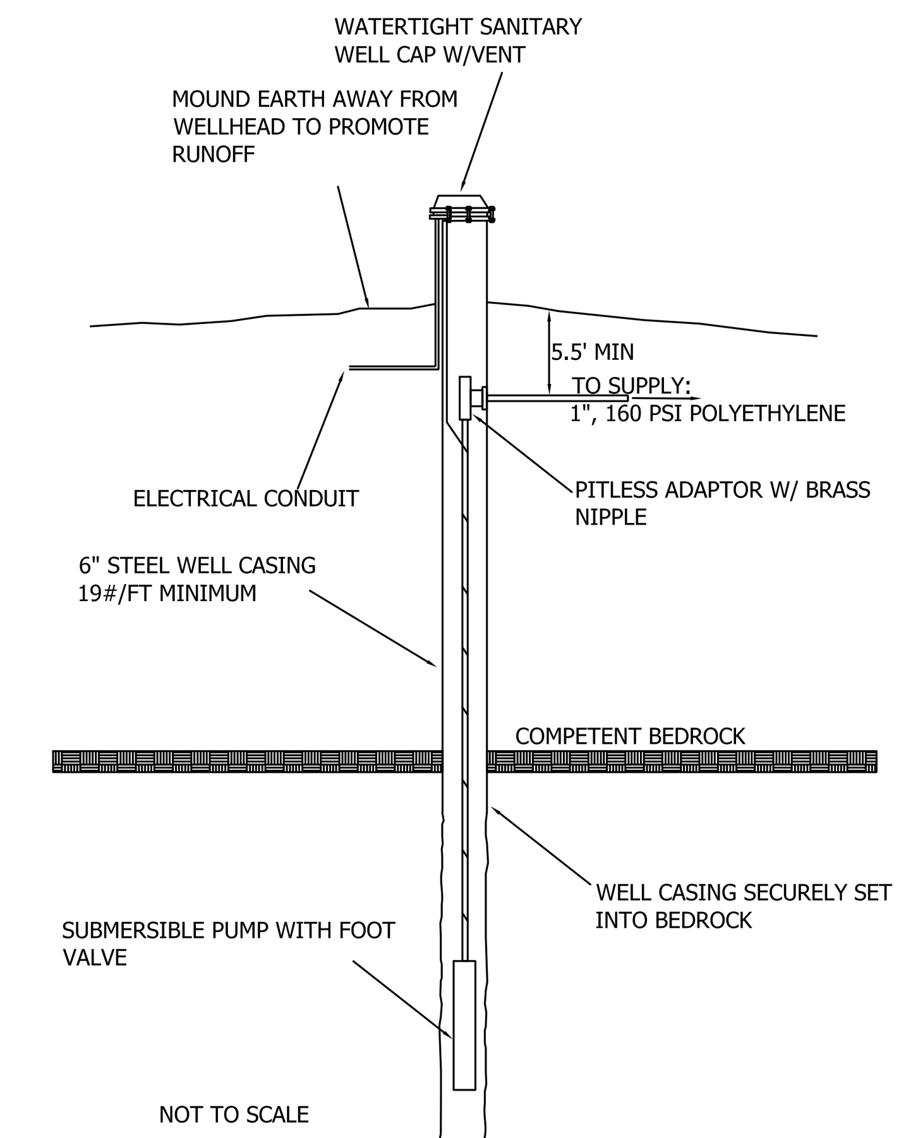
1. TANK SHALL BE A CAMP PRECAST 1,000 GALLON "LEDGE" SEPTIC TANK, OR APPROVED EQUIVALENT. (INSIDE DIM. 6'w X 12'L X 2'-1" TO INLET INVERT)
2. INSTALL IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. ALL TANKS SHALL BE WATER-TIGHT, STRUCTURALLY SOUND, AND CONSTRUCTED OF MATERIALS NOT SUBJECT TO EXTENSIVE CORROSION OR DECAY.
4. APPLY MIN 6-INCH BED OF CRUSHED STONE BENEATH TANK. SET LEVEL.
5. PROVIDE MIN. COVER OF 12 INCHES OVER TOP OF TANK, WITH SUFFICIENT RISER LENGTHS TO SLOPE FINAL GRADES AWAY FROM RISERS IN ALL DIRECTIONS.
6. NOT SUITABLE FOR TRAFFIC AREAS.



1,000 GALLON LEDGE PUMP STATION

(CONCRETE)
NOT TO SCALE

1. PUMP STATION SHALL BE A CAMP PRECAST 1,000 GALLON "LEDGE" PUMP STATION, OR APPROVED EQUIVALENT. (INSIDE DIM. 6'w X 12'L X 2'-1" TO INLET INVERT)
2. INSTALL IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. ALL TANKS SHALL BE WATER-TIGHT, STRUCTURALLY SOUND, AND CONSTRUCTED OF MATERIALS NOT SUBJECT TO EXTENSIVE CORROSION OR DECAY.
4. APPLY MIN 6-INCH BED OF CRUSHED STONE BENEATH TANK. SET LEVEL.
5. PROVIDE MIN. COVER OF 12 INCHES OVER TOP OF TANK, WITH SUFFICIENT RISER LENGTHS TO SLOPE FINAL GRADES AWAY FROM RISERS IN ALL DIRECTIONS.
6. TDH = 19.4' STATIC HEAD + 8.3' HEAD LOSS + 2.5' RESIDUAL HEAD = 30.2' (CONFIRM WITH DESIGNER AFTER PUMP STATION IS INSTALLED).
7. PROVIDE DISCHARGE PUMP WITH MINIMUM RATING OF Q=27.3 GPM AT TDH=17.9'. USE GOULDS MODEL WE0511B (½ HP) EFFLUENT PUMP OR EQUIVALENT (CHECK WITH DESIGNER AND SUBMIT PUMP CURVE FOR APPROVAL).
8. MAKE PROVISIONS IN PUMP STATION TO ALLOW FORCE MAIN TO DRAIN BACK AFTER EACH DOSING EVENT BY DRILLING A 3/16" HOLE IN FORCE MAIN.
9. USE MODEL DFD DOUBLE FLOAT PUMP SWITCH WITH PIGGY-BACK PLUG BY S.J. ELECTRODE.
10. VOLUME OF LATERALS = 12.1 GAL. VOLUME OF MAIN/MAINIFOLD = 50.5 GAL. MIN. DOSE VOLUME = (12.1 X 5) + 50.5 = 111 GAL. "PUMP OFF" FLOAT SETTING SHALL BE 6.0" ABOVE FLOOR OF TANK AND "PUMP ON" SETTING SHALL BE 9" ABOVE TANK FLOOR, PROVIDING 135 GALLONS PER DOSE.
11. USE MODEL 101 TANK ALERT BY S.J. ELECTRODE (OR EQUIVALENT). ALARM SHOULD BE INSTALLED ON A DEDICATED CIRCUIT.
12. ALARM FLOAT ON SHALL BE 12" ABOVE FLOOR OF TANK, ALLOWING 580 GAL. OF STORAGE.
13. NOT SUITABLE FOR TRAFFIC AREAS.



NEW BEDROCK WELL DETAIL

1. DRILLED BEDROCK WELL TO BE DRILLED, CONSTRUCTED, AND DISINFECTED IN ACCORDANCE WITH THE VERMONT WATER SUPPLY RULE - CHAPTER 21, APPENDIX A, PARTS 11 & 12.
2. THE REQUIREMENTS FOR WELL DRILLER LICENSING ARE AS PER THE WATER WELL DRILLER LICENSING RULES AND WELL CONSTRUCTION STANDARDS. THE WELL DRILLER MUST HAVE A CURRENT LICENSE IN VERMONT.
3. NOTIFY ENGINEER/DESIGNER PRIOR TO WELL DRILLING AND CONSTRUCTION.
4. INSTALL WELL PUMP MINIMUM OF 20 FT FROM BOTTOM OF WELL, WTH A LOW LEVEL CUTOFF AT 15 FT ABOVE PUMP INLET. IF ARTESIAN, PROVIDE A SEAL. WELL PUMP TO BE SPECIFIED AFTER WELL DRILLING IS COMPLETE.

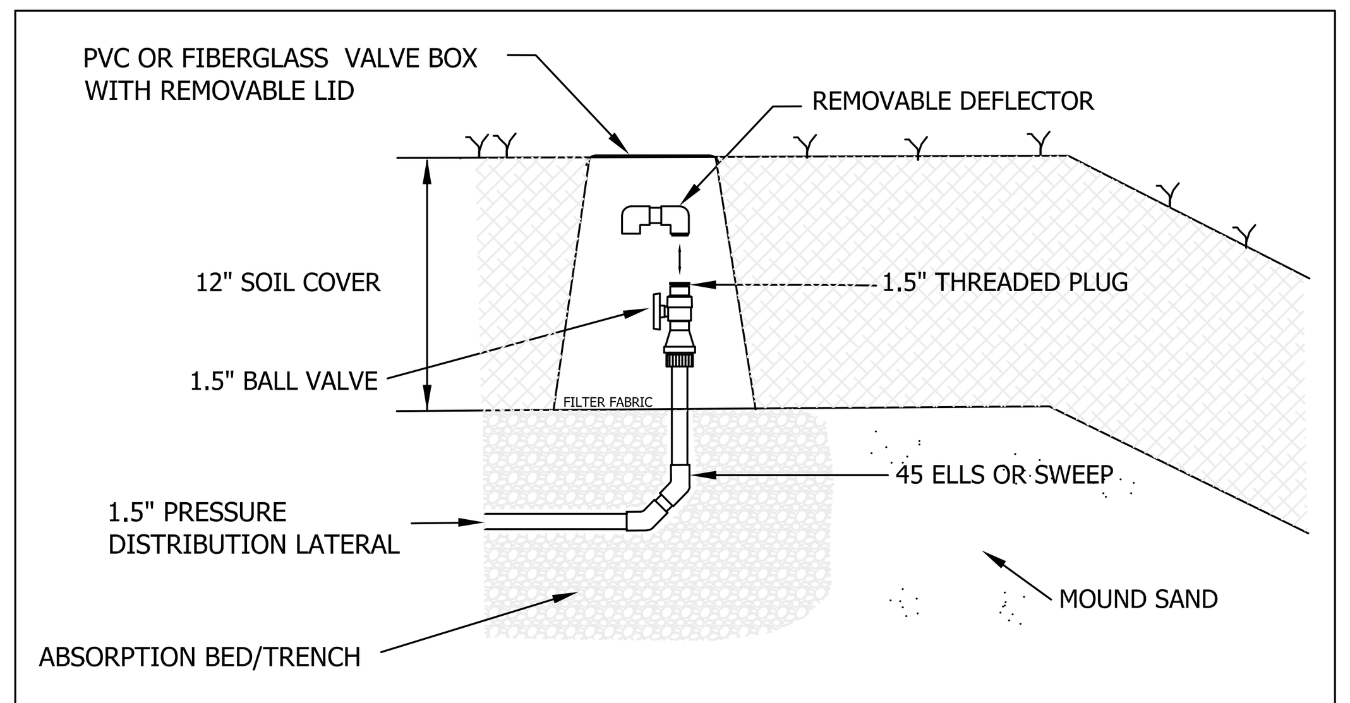
MOUND SAND REQUIREMENTS

MOUND SAND SHALL MEET ONE OF THE FOLLOWING GRADATIONS. PROVIDE DOCUMENTAION TO DESIGNER FOR CERTIFICATION.

SIEVE NUMBER	OPENING (MM)	PERCENT PASSING, BY WEIGHT
3/8	9.500	85-100
40	0.420	25-75
60	0.240	0-30
100	0.149	0-10
200	0.074	0-5

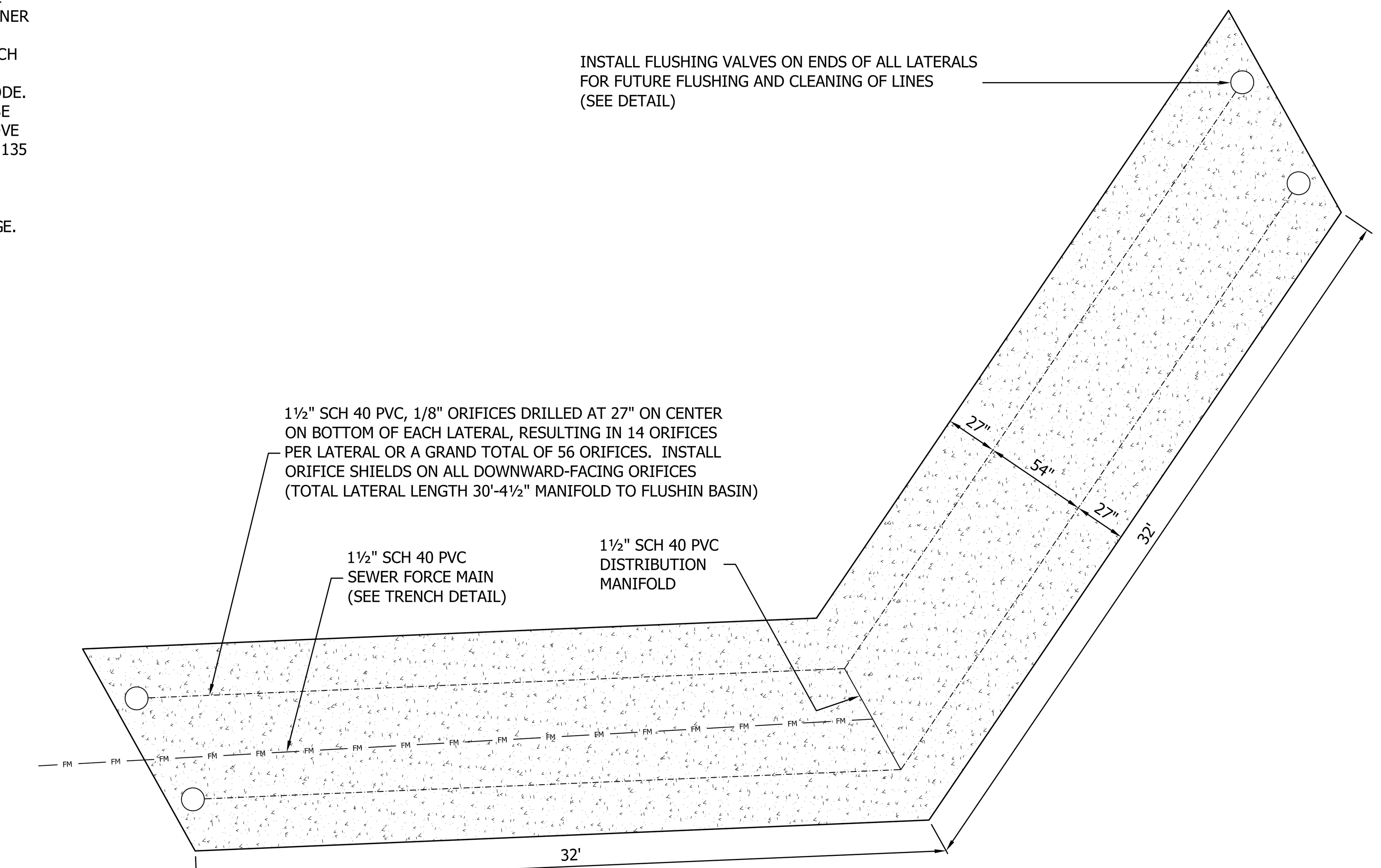
SIEVE NUMBER	OPENING (MM)	PERCENT PASSING, BY WEIGHT
4	4.750	95-100
8	2.380	80-100
16	1.190	50-85
30	0.590	25-60
50	0.297	10-30
100	0.149	2-10

SIEVE NUMBER	OPENING (MM)	PERCENT PASSING, BY WEIGHT
3/8	9.500	85-100
40	0.420	30-50
200	0.074	0-5



FLUSHING VALVE BOX

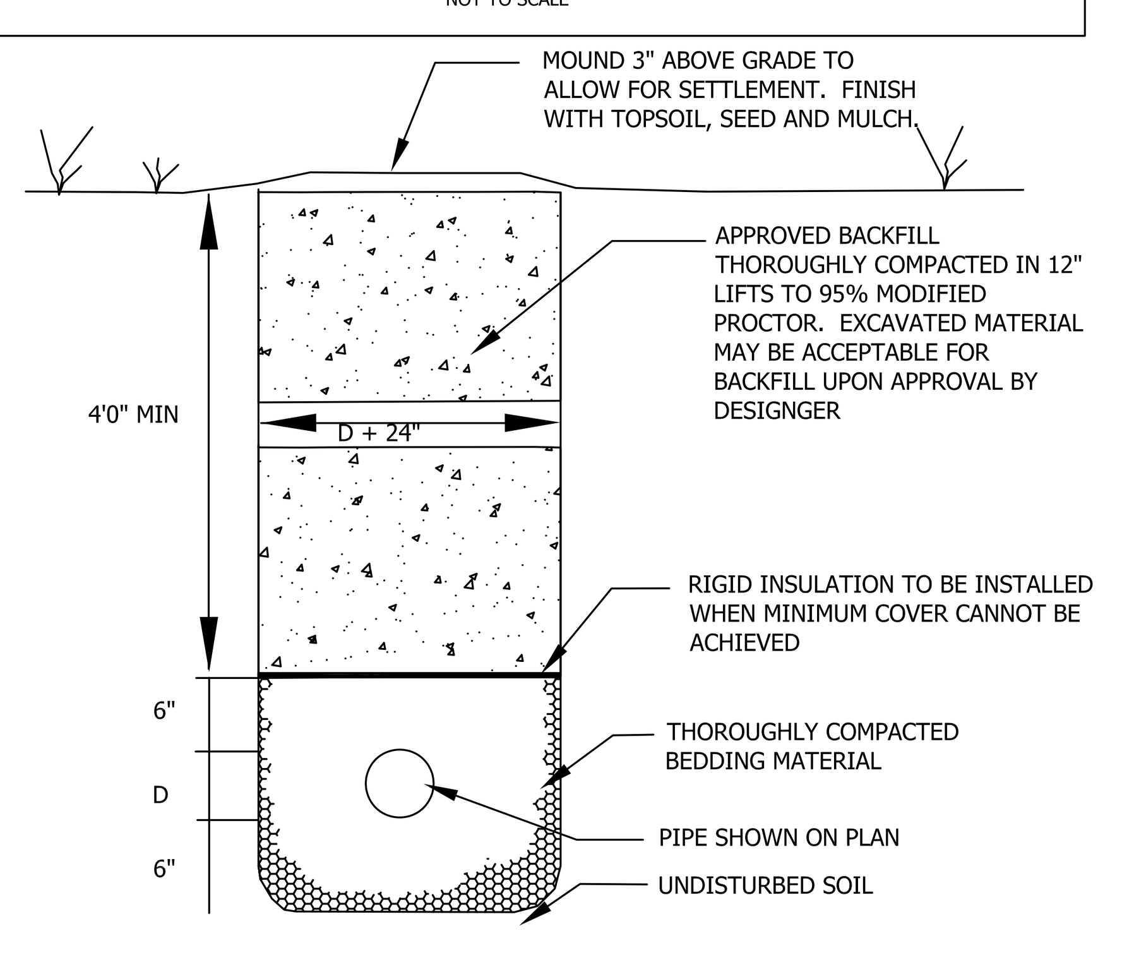
NOT TO SCALE



ABORPTION BED LAYOUT AND PRESSURE DISTRIBUTION DETAILS

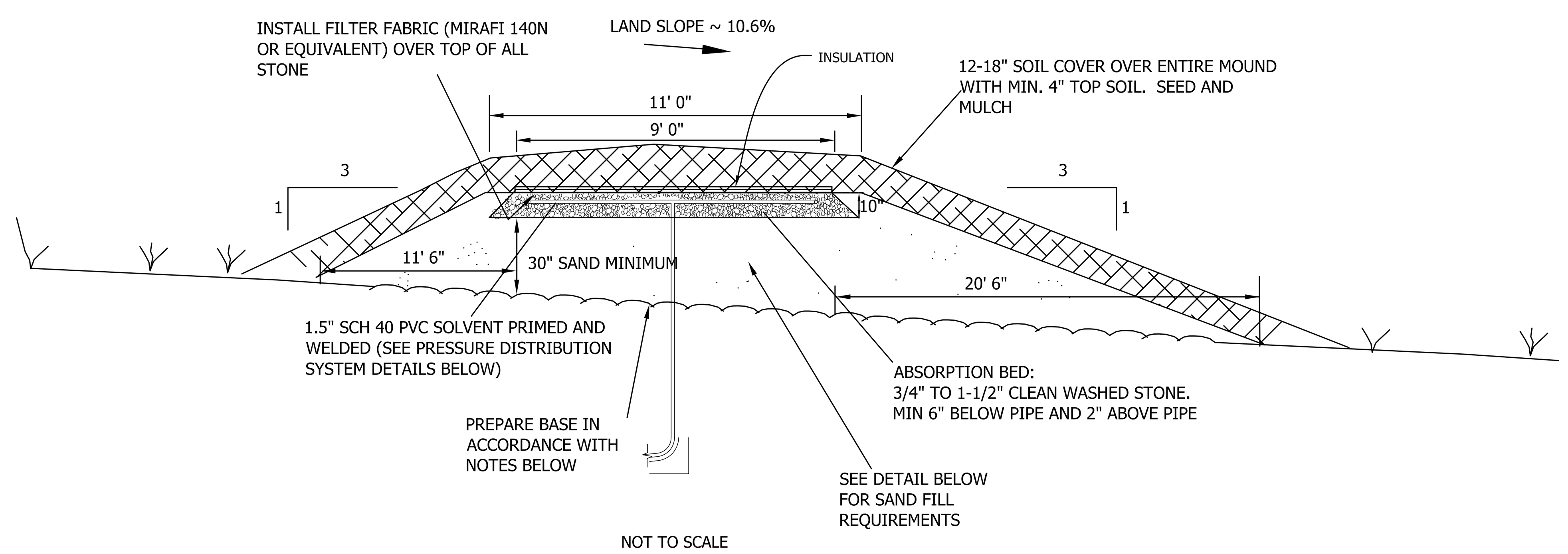
NOT TO SCALE

1. ALL JOINTS SHOULD BE SOLVENT PRIMED AND WELDED.
2. FORCE MAIN SHALL BE 1½" SCH 40 PVC FROM PUMP STATION TO MIDDLE OF LEACH BED, BURIED IN A TRENCH AT MINIMUM 4'6" DEPTH (SEE TRENCH DETAIL). AT END OF MAIN THERE SHALL BE A VERTICAL 1½" SCH 40 PVC RISER PIPE WITH A LENGTH OF 6.5' THAT CONNECTS DIRECTLY TO A TEE IN THE MIDDLE OF THE PRESSURE DISTRIBUTION MANIFOLD. MANIFOLD SHALL BE 1½" SCH 40 PVC WITH TWO TEES TO CONNECT TO THE LATERALS.
3. INSTALL DOUBLE LAYER 2" THICK POLYSTYRENE INSULATION IN A 2' X 10' AREA OVER THE MANIFOLD.
4. INSTALL FLUSHING VALVES ON ENDS OF EACH LINE TO ALLOW FUTURE CLEANING OR FLUSHING OF LINES.



NOTES:
1. BEDDING MATERIAL FOR WASTEWATER LINES SHALL CONSIST OF CRUSHED STONE OR GRAVEL WITH A MAXIMUM SIZE OF 3/4" (FOR WATER LINES BEDDING SHALL BE SAND)
2. BEDDING MATERIAL SHALL NOT BE PLACED ON FROZEN GROUND.
3. APPROVED BACKFILL SHALL NOT CONTAIN STONES GREATER THAN 6" DIAMETER, OR 2" DIAMETER WITHIN 2'0" OF PIPE.
4. TRENCH SHALL BE COMPLETELY DEWATERED PRIOR TO PLACING PIPE AND BEDDING MATERIAL.
5. MAINTAIN A MINIMUM OF 4'6" COVER ABOVE FORCE MAIN (5'6" ABOVE ALL WATER LINES). USE 2" INSULATION IF COVER IS 3'6"-4'6", AND USE 3" INSULATION IF COVER IS 2'6"-3'6".
6. THE SIDES OF TRENCHES 4' OR MORE IN DEPTH ENTERED BY PERSONNEL SHALL BE SHEETED OR SLOPED AS PER O.S.H.A.

FORCE MAIN TRENCH DETAIL



1. REFER TO PLAN FOR ALL ELEVATIONS
2. CLOSELY CUT AND REMOVE ALL ABOVEGROUND VEGETATION LEVEL WITH THE GROUND SURFACE FOR THE ENTIRE AREA OF SAND FILL. TREE STUMPS SHALL BE CUT FLUSH TO THE GROUND, WITH ROOTS LEFT UNDISTURBED. PRIOR TO PLOWING, INSTALL THE FORCE MAIN PIPE FROM THE POINT OF CONNECTION WITH THE MANIFOLD TO BEYOND THE MOUND CONSTRUCTION AREA. THIS WILL MINIMIZE DISTURBANCE ONCE PLOWING IS COMPLETE.
3. PLOWING AND CONSTRUCTION SHALL NOT BE CONDUCTED DURING WET WEATHER OR WHEN THE SOIL MOISTURE IS TOO HIGH.
4. PLOW THE SAND FILL AREA PARALLEL TO THE LAND CONTOUR TO A MAXIMUM DEPTH OF 8 INCHES, WITH THE PLOW THROWING THE FURROWS UPSLOPE.
5. ONCE PLOWING IS COMPLETE, NO VEHICLES OR EQUIPMENT SHALL BE ALLOWED ON THE PLOWED SURFACE TO PREVENT COMPACTION.
6. PLACE MOUND SAND FROM ABOVE OR AROUND EDGE OF PLOWED AREA IN 6" LIFTS BY DUMPING IT ON THE PLOWED AREA, BUT KEEP THE WHEELS OF THE DUMP TRUCK OFF THE PLOWED AREA. USE A DOZER OR EXCAVATOR BLAD TO MOVE SOUND INTO PLACE KEEPING AT LEAST 6" OF SAND UNDER TRACKS.
5. WITH EXCAVATOR OR BACKHOE, FORM THE BED OR TRENCHES ALONG ITS LENGTH. THE SAND WALLS WILL STAY SUFFICIENTLY STABLE. MAKE SURE THE BOTTOM OF THE BED OR TRENCHES ARE LEVEL. SOME HAND SHOVELING WILL BE NECESSARY.
6. USING AN EXAVATOR OR BACKHOE, DUMP THE STONE IN THE BED OR TRENCHES BY TRAVELING UP THE SIDE SLOPE. LEVEL THE STONE AT THE ELEVATION SHOWN ON THE APPROVED PLANS.
7. INSTALL THE DISTRIBUTION PIPING AS SHOWN ON THE ABORPTION BED LAYOUT DETAIL.
8. PLACE FILTER FABRIC ON TOP OF STONE AS SHOWN ON THE APPROVED PLANS.
9. CROWN THE ENTIRE MOUND WITH A COVER OF SOIL LESS PERMEABLE THAN THE MOUND SAND, COVERING WITH 12" ON THE SIDE SLOPES AND A MINIMUM OF 18" OVER THE CENTER OF TRHE MOUND. NATIVE SOIL FROM THE SITE MAY BE SUITABLE FOR COVER MATERIAL, THOUGH THE TOP 4" SHOULD BE TOPSOIL. SEED AND MULCH THE ENTIRE MOUND TO ENSURE STABILITY.

MOUND CROSS SECTION WITH PRESSURE DISTRIBUTION SYSTEM

I HEREBY CERTIFY THAT THE DESIGN-RELATED INFORMATION SUBMITTED WITH THIS APPLICATION IS TRUE AND CORRECT, AND THAT, IN THE EXERCISE OF MY REASONABLE PROFESSIONAL JUDGEMENT, THE DESIGN INCLUDED IN THE APPLICATION FOR PERMIT COMPLIES WITH THE VERMONT WASTEWATER SYSTEM AND POTABLE WATER SUPPLY RULES AND THE VERMONT WATER SUPPLY RULES.

STATE OF VERMONT – MILES E. WAITE NO. 464 – TYPE B – LICENSED DESIGNER

WASTEWATER & POTABLE WATER SYSTEM DETAILS

ALEXA J. LEWIS
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SCALE: NOTED	DATE: 8/1/2017
DRAWN BY: D.W.F.	PROJECT NO.: 2016-44
PROJECT MANAGER:	APPROVED BY: M.E.W.
LAYOUT: WW Details	☐ DRAFT ☒ FINAL
SHEET 2	OF 2