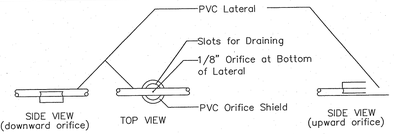



## COLD WEATHER ORIFICE DETAIL

NOT TO SCALE

## DESIGN CRITERIA

- PEAK FLOW = 2 BEDROOMS @ 115 GALLONS PER DAY / BEDROOM = 230 GPD
- CATEGORY 1 SYSTEM SOIL CAT 6 USE 2.3 GAL/SF/DAY LOADING RATE
- SIZE A BOTTOMLESS SAND FILTER:
  - 230 GPD / 2.3 GAL/SF/DAY = 100 S.F.
  - USE A 8' X 13' BOTTOMLESS SAND FILTER = 104 SF

### INVERT SCHEDULE

| | |
|---|---|
| OUT OF DWELLING | EL. 497.00 |
| DESIGN G.W.T. BSF/TANK | EL. 494/494 |
| SEPTIC TANK IN | EL. 496.71 |
| TOP OF SEPTIC TANK | EL. 497.14 |
| R.S.V. TO PUMP CHAMBER | EL. 496.30 |
| AX20 FILTER POD INLET | EL. 498.50 |
| TOP OF ADVANTEX FILTER | EL. 499.00 |
| PUMP CHAMBER INLET | EL. 492.50 |
| PUMP CHAMBER OUT | EL. 493.00 |
| BOTTOM OF SAND | EL. 496.00 |
| BOTTOM OF PEA GRAVEL | EL. 498.00 |
| FLUSHING VALVE | EL. 497.50 |
| BSF MANIFOLD | EL. 497.50 |
| TOP OF PEA GRAVEL | EL. 498.70 |

### PUMP CHAMBER

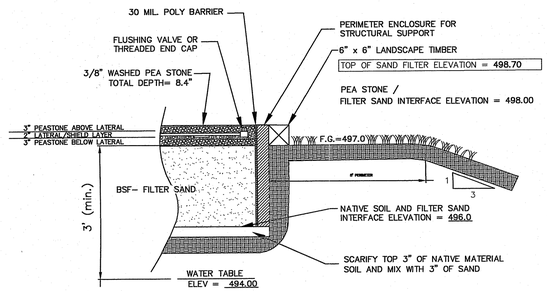
| | |
|---|---|
| BOTTOM OF CHAMBER | EL. 493.00 |
| REDUNDANT OFF | EL. 494.62 |
| PUMP ON | EL. 495.00 |
| HIGH WATER ALARM | EL. 495.50 |

### ADVANTEX AX20 SYSTEM FLOAT LEVELS

| | |
|---|---|
| HIGH WATER ALARM | EL. 496.30 |
| TOP OF RSV CAGE | EL. 496.20 |
| NORMAL LOW LIQUID LEVEL | EL. 495.73 |
| LOW WATER ALARM/REDUNDANT OFF | EL. 495.40 |

## OWTS NOTES

1. ALL DESIGN, CONSTRUCTION, AND MAINTENANCE REQUIREMENTS, WHETHER NOTED HEREON OR NOT, SHALL BE IN CONFORMANCE WITH RULES AND REGULATIONS ESTABLISHING MINIMUM STANDARDS RELATING TO LOCATION, DESIGN, CONSTRUCTION AND MAINTENANCE OF ONSITE WASTEWATER TREATMENT SYSTEMS", NOVEMBER 25, 2018 AND ALL AMENDMENTS, BY THE RHODE ISLAND DEPT. OF ENVIRONMENTAL MANAGEMENT.
2. ALL TREES, STUMPS, AND BRUSH SHALL BE REMOVED WITHIN 10 FEET OF THE SYSTEM.
3. THERE ARE NO KNOWN PRIVATE WELLS OR DRAINS EXIST. OR PROPOSED LOCATED WITHIN 200 FEET OF THE OWTS EXCEPT AS SHOWN AND NO KNOWN PUBLIC WELLS (EXIST. & PROP.) LOCATED WITHIN 500 FEET OF THE PROPOSED ISDS.
4. THERE ARE NO KNOWN SUBSURFACE DRAINS, EXISTING OR PROPOSED, WITHIN 50 FEET OF THE PROPOSED OWTS.
5. NO VEHICULAR TRAFFIC IS ALLOWED OVER THE LEACHFIELD.

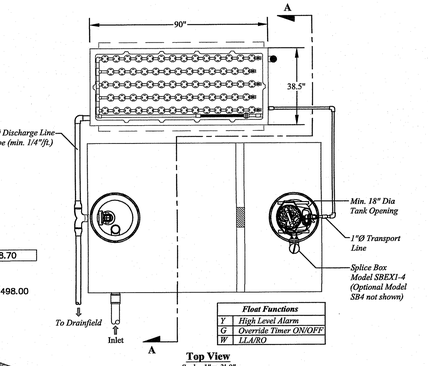



### BSF SAND MEDIA SPECIFICATIONS

All media within the enclosure and below the cover stone shall have an effective size (D10) of 0.33 mm (+/-) and uniformity coefficient (D60/D10) of 2.0 to 4.0. The maximum allowable percentage of fines passing through a Number 200 sieve shall be one percent (1%). Other than the gradation and fine content specified above, the sand media shall meet the other ASTM C- 33 sand specifications.

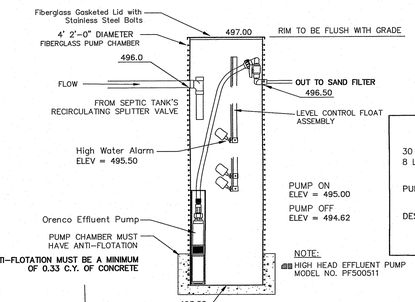
## BOTTOMLESS SAND FILTER DETAIL - SECTION

NOT TO SCALE



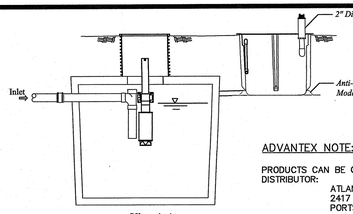

### Top View

Scale: 1"= 3'-0"




## PUMP CHAMBER DETAIL - 24" DIA.

NOT TO SCALE



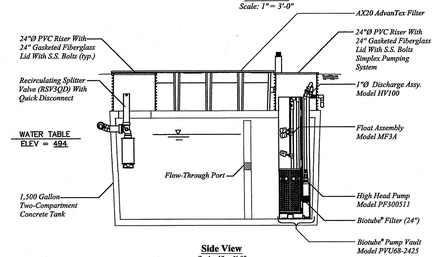

### View A-A

Scale: 1"= 3'-0"

### ADVANTEX NOTE:

PRODUCTS CAN BE OBTAINED FROM OSI PRODUCT DISTRIBUTOR:

ATLANTIC SOLUTIONS, LTD.
2417 EAST MAIN ROAD
PORTSMOUTH, RI 02871
PHONE (401) 293-0176
FAX (401) 293-0178




### Side View

Scale: 1"= 3'-0"

## ADVANTEX AX20 DETAILS (SHALLOW GWT)

NOT TO SCALE

### B.S.F. Demand Dosing

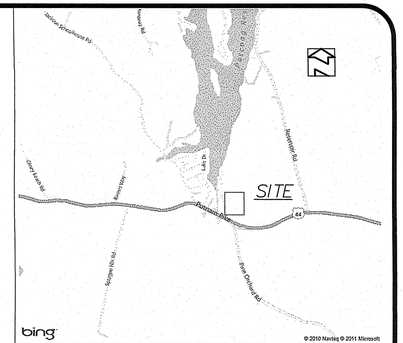
30 ORIFICE * 0.24 GAL PER ORIFICE = 7.2 GALLONS
8 LF 2" TRANSPORT LINE VOLUME = 1.8 GALLONS
TOTAL DOSED = 9.0 GALLONS PER DOSE

PUMP BASIN DRAWDOWN:
9.0 GAL PER DOSE / 2 GAL PER INCH = 4.5" = 0.38'

DESIGN CHECK:
230 GAL PER DAY / 9.0 GAL PER DOSE = 26 DOSE PER DAY

## GENERAL NOTES

1. THE OWTS INSTALLER SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL MEASURES DEPICTED ON THIS PLAN.
2. THE INSTALLER SHALL NOTIFY THIS DESIGNER 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
3. THE DESIGNER SHALL BE CONTACTED IF ANY DISCREPTANCIES ARE FOUND IN THE FIELD.
4. THE INSTALLER SHALL CONTACT THE DESIGNER AT LEAST 24 HOURS IN ADVANCE FOR BOTTOM AND COVER INSPECTIONS.
5. THE CONTRACTOR IS RESPONSIBLE FOR DEWATERING DURING EXCAVATION OF ALL COMPONENTS OF THE OWTS.

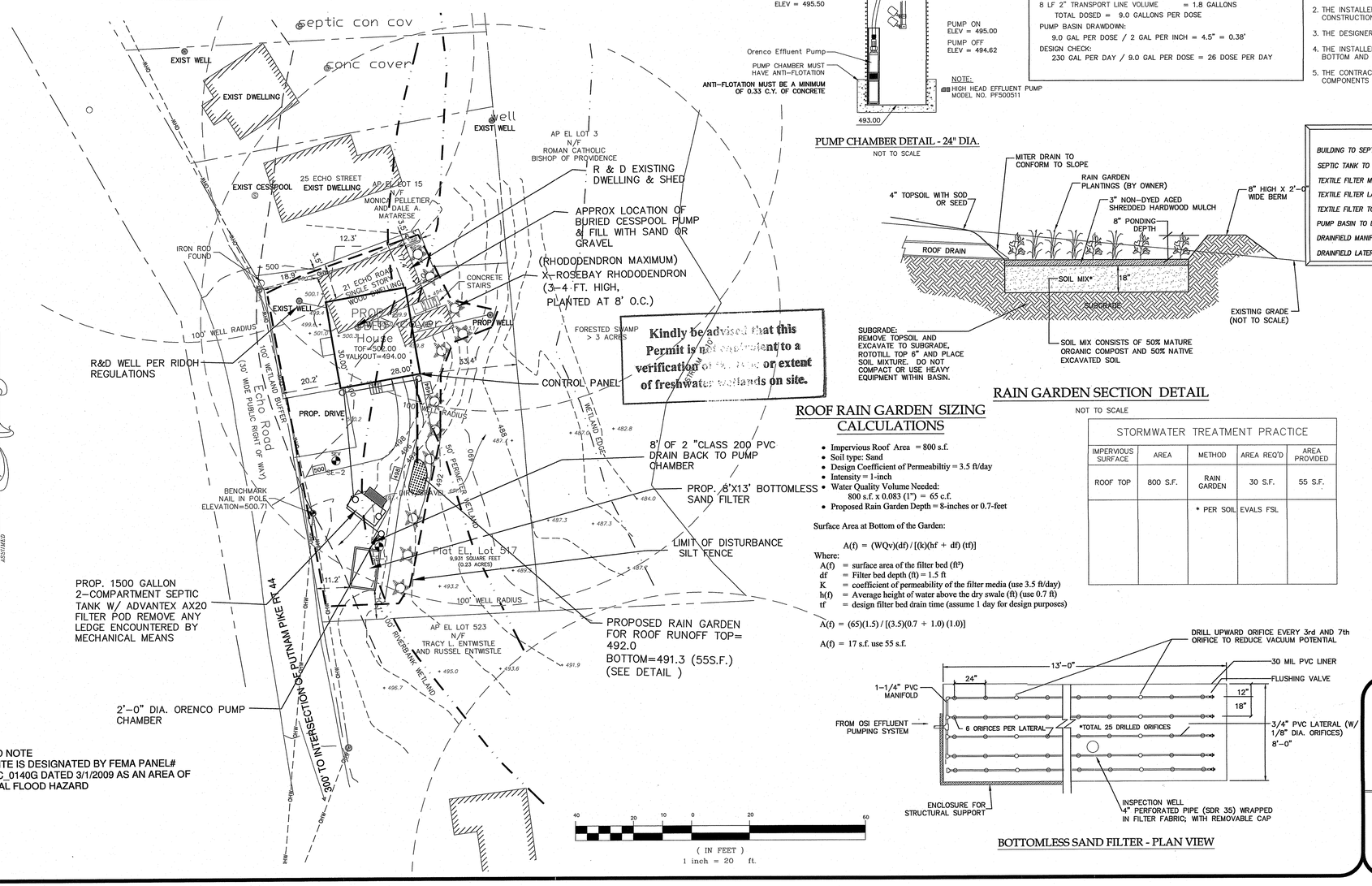



## LOCUS MAP

NOT TO SCALE

## BOTTOMLESS SAND FILTER (BSF) NOTES

1. THE PROPOSED BOTTOMLESS SAND FILTER (BSF) SHALL BE STAKED OUT AND PROTECTED PRIOR TO ANY SITE PREPARATION ACTIVITIES. OVER DIGGING THE SAND FILTER SHOULD BE AVOIDED; MINIMAL BACKFILLING ON BOTTOM AND SIDES PROVIDES A MORE STABLE ENCLOSURE.
2. SOD, VEGETATION AND DEAD OR DECAYING ORGANIC LITTER SHALL BE REMOVED FROM THE AREA PLANNED FOR THE BSF INSTALLATION. THREE (3) INCHES OF THE NATIVE SOIL SHALL BE SCARIFIED AND MIXED WITH 3 INCHES OF SAND MEDIA. PERIMETER STRIPPING AND EXCAVATION OF SOIL BENEATH THE NATIVE SOIL/FILTER SAND INTERFACE IS PROHIBITED.
3. A PERIMETER SUPPORT FRAME OF PLYWOOD AND 2x4 CONSTRUCTION IS USED TO HOLD THE LINER IN PLACE DURING INSTALLATION. TREATED WOOD IS NOT NECESSARY. DURING CONSTRUCTION OF THE SAND FILTER, IT IS IMPORTANT THAT SAND BE PLACED BETWEEN THE EXCAVATED SOIL AND THE SUPPORT FRAME. ALL NAILS OR STAPLES USED MUST HAVE THEIR SHARP ENDS POINTED AWAY FROM THE LINER.
4. A PERMANENT TOP FRAME STRUCTURE (SUCH AS DECAY RESISTANT LANDSCAPE TIMBERS) MUST BE PROVIDED ON ANY PORTION OF A BSF THAT IS INSTALLED ABOVE GRADE. BELOW GRADE USE OF TIMBERS IS PROHIBITED TO PREVENT SOIL SLUMPING AFTER TIMBERS HAVE ROTTED.
5. MAINTAIN 5 FOOT LEVEL PERIMETER AROUND BSF.
6. THE 30 MIL PVC LINER IS UNFOLDED FROM THE CENTER OF THE EXCAVATION AND DRAPED OVER THE TOP EDGES OF THE PERIMETER SUPPORT FRAME. CARE MUST BE TAKEN TO ENSURE THAT THE LINER IS IN FULL CONTACT WITH SIDES AND THAT NO BRIDGING OCCURS.
7. FILTER SAND IS PLACED AND COMPACTED WHILE IT IS DAMP. IF THE SAND IS NOT DAMP, IT WILL NOT COMPACT WELL AND SETTLEMENT MAY CAUSE DISLOCATION AND BREAKAGE OF THE DISTRIBUTION LATERALS. THE SAND SURFACE MUST BE FLAT. SEE THE APPROPRIATE SAND GRADATION GRAPH FOR SPECIFICATIONS.
8. THREE INCHES OF 3/8 INCH PEA STONE IS PLACED ON TOP OF THE COMPACTED SAND, DISTURBING THE SAND AS LITTLE AS POSSIBLE. SEE PEA STONE SPECS. AFTER THE LATERALS ARE INSTALLED AND PRESSURE TEST IS PERFORMED, PLACE PEA STONE OVER THE DISTRIBUTION LATERALS TO PROVIDE 3 INCHES DEPTH OF PEA STONE OVER ALL UPPER ORIFICE SHIELDS. NO FILTER FABRIC OF ANY KIND SHOULD BE PLACED BETWEEN THE SAND AND OVERLYING PEA STONE.
9. THE LINER'S PVC BOOT PERMITS A WATERTIGHT PENETRATION OF THE LINER FOR THE TRANSPORT PIPE DELIVERING EFFLUENT TO THE SAND FILTER'S DISTRIBUTION SYSTEM. IN THE EVENT THE GROUND WATER REACHES THAT ELEVATION, THE BOOT WILL PREVENT INFILTRATION. THE MANUFACTURER'S GUIDE MUST BE FOLLOWED EXACTLY WHEN INSTALLING THE PVC BOOTS.
10. THE 1/8 INCH DIAMETER ORIFICES SHOULD BE DRILLED WITH A DRILL PRESS OR DRILL GUIDE USING A NEW 1/8 INCH DRILL BIT AND SHOULD NOT HAVE ANY VISIBLE BURRS. ALL PVC JOINTS SHOULD BE GLUED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
11. ORIFICE SHIELDS ARE PLACED ON THE LATERALS TO PREVENT THE PEA GRAVEL FROM BLOCKING THE FLOW OUT OF THE ORIFICES AND TO OBTAIN BETTER EFFLUENT DISTRIBUTION OVER THE SAND. COLD WEATHER ORIFICE SHIELDS SHOULD BE USED IN COLD WEATHER CLIMATES TO PREVENT THE FREEZING OF THE LATERALS.
12. AS PART OF THE COLD WEATHER REQUIREMENT, TWO (2) OF THE ORIFICES IN EACH DISTRIBUTION LATERAL MUST BE DRILLED POINTING UPWARD AND THE REST ARE DRILLED POINTING DOWNWARD. UP-POINTING ORIFICES SHALL BE LOCATED AT POINTS APPROXIMATELY 1/3 AND 2/3 ALONG THE LENGTH OF EACH DISTRIBUTION LATERAL. INSTALL COLD WEATHER ORIFICE SHIELDS AT ALL ORIFICES (UPWARD AND DOWNWARD POINTING).
13. THE ELECTRICAL SPLICE BOX MUST BE UL OR CSA LISTED AND CORROSION-PROOF WITH THE PROPER NUMBER OF CORD GRIPS INSTALLED. HEAT SHRINK AND OR WATERTIGHT WIRE NUTS MUST BE USED ON THE INDIVIDUAL WIRE SPLICES. WITHIN THE BOX TO ENSURE THE INTEGRITY OF THE SPLICES IF THE BOX BECOMES FLOODED. SUFFICIENT LENGTH OF WIRES MUST BE PROVIDED IN THE BOX TO ALLOW FOR FUTURE REPAIRS.
14. THE CONDUIT SEAL MUST BE UL OR CSA LISTED AND MUST BE INSTALLED USING PROPER CONDUIT SEALANT AS RECOMMENDED BY THE MANUFACTURER. SILICONE IS NOT ALLOWED. THE SEAL PREVENTS WATER FROM DRAINING INTO THE SPLICE BOX AND GASES FROM ESCAPING THE TANK.
15. THE ELECTRICAL CONDUIT MUST BE UL OR CSA LISTED. THERE ARE ELECTRICAL CODE RULES RESTRICTING THE NUMBER OF BENDS BETWEEN PANELS AND JUNCTION BOXES. REFER TO NEC 1993 SECTION 347-14.
16. INSTALL LID INSULATION ON ALL LIDS TO PREVENT FREEZING.
17. THE CLASS 200 TRANSPORT PIPE SHALL BE ALLOWED TO DRAIN BACK COMPLETELY, TO PUMP CHAMBER. MAXIMIZE PITCH OF TRANSPORT PIPE TO ACHIEVE DRAINBACK AND PROVIDE FURTHER FREEZE PROTECTION AS CONDITIONS WARRANT.
18. IN AREAS WHERE THE BSF MAY BE ACCESSIBLE TO CHILDREN, THE PEA STONE SURFACE MAY BE COVERED WITH A BROAD WEAVE FILTER FABRIC AND AN ADDITIONAL LAYER OF PEA STONE OR LARGER WASHED STONE, NO GREATER THAN 2" IN THICKNESS. TO DISCOURAGE PHYSICAL DISTURBANCE TO OR CONTACT WITH THE TREATMENT ZONE.
19. PROVIDE A PERMANENT 10' MINIMUM BUFFER BETWEEN BSF AND ANY TREES OR SHRUBS.




40 20 10 0 20 60

( IN FEET )
1 inch = 20 ft.

## ROOF RAIN GARDEN SIZING CALCULATIONS

- Impervious Roof Area = 800 s.f.
- Soil type: Sand
- Design Coefficient of Permeabiltiy = 3.5 ft/day
- Intensity = 1-inch
- Water Quality Volume Needed:
  800 s.f. x 0.083 (1") = 65 c.f.
- Proposed Rain Garden Depth = 8-inches or 0.7-feet

Surface Area at Bottom of the Garden:

$$A(f) = (WQv)(df) / [(k)(hf + df)(tf)]$$

Where:
A(f) = surface area of the filter bed (ft²)
df = Filter bed depth (ft) = 1.5 ft
K = coefficient of permeability of the filter media (use 3.5 ft/day)
h(f) = Average height of water above the dry swale (ft) (use 0.7 ft)
tf = design filter bed drain time (assume 1 day for design purposes)

$$A(f) = (65)(1.5) / [(3.5)(0.7 + 1.0)(1.0)]$$

$$A(f) = 17 \text{ s.f. use } 55 \text{ s.f.}$$




## BOTTOMLESS SAND FILTER - PLAN VIEW

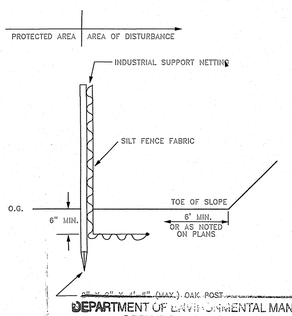



## RAIN GARDEN SECTION DETAIL

NOT TO SCALE

| STORMWATER TREATMENT PRACTICE | | | | |
|---|---|---|---|---|
| IMPERVIOUS SURFACE | AREA | METHOD | AREA REQ'D | AREA PROVIDED |
| ROOF TOP | 800 S.F. | RAIN GARDEN | 30 S.F. | 55 S.F. |
| | | * PER SOIL EVALS FSL | | |

| SCHEDULE OF PIPE SIZES | |
|---|---|
| BUILDING TO SEPTIC TANK | 4" SCH 35 OR GREATER |
| SEPTIC TANK TO TEXTILE FILTER | 1" CLASS 200 |
| TEXTILE FILTER MANIFOLD | 1" CLASS 200 |
| TEXTILE FILTER LATERALS | 3/4" CLASS 200 |
| TEXTILE FILTER TO PUMP BASIN | 2" SCH 35 OR GREATER |
| PUMP BASIN TO DRAINFIELD | 2" CLASS 200 |
| DRAINFIELD MANIFOLD | 1 1/4" CLASS 200 |
| DRAINFIELD LATERALS | 3/4" CLASS 200 |




### SILT FENCE DETAIL

NOT TO SCALE

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED 9/3/21 FILE # 21-0214
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE ON CONSTRUCTION SITE
Nancy A. Horbert

Environmental Management
AUG 02 2021
Office of Water Resources

OWTS SITE PLAN & DETAILS
OWTS DESIGN
A.P. EL LOT 517
21 ECHO ROAD GLOCESTER, RI

PREPARED FOR:
GEORGE MANDEVILLE
60 WOODHEAVEN BLVD NORTH PROVIDENCE, RI 02911

NICHOLAS J. PIAMPIANO
No. 6512
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
D 3059

| NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 5/2/21 | PER RIDEM |
| 2 | 7/28/21 | PER RIDEM |

DATE: JANUARY 23, 2021
SCALE: AS NOTED
DESIGN/CHECK BY: C.S.R.
SHEET NO. 1 OF 1

ADVANCED CIVIL DESIGN, INC.
CIVIL ENGINEERS
88 PEEPTOAD ROAD
SCITUATE, RI 02857
P1: (401) 644-8656
P2: (401) 473-4404

DEM COPY