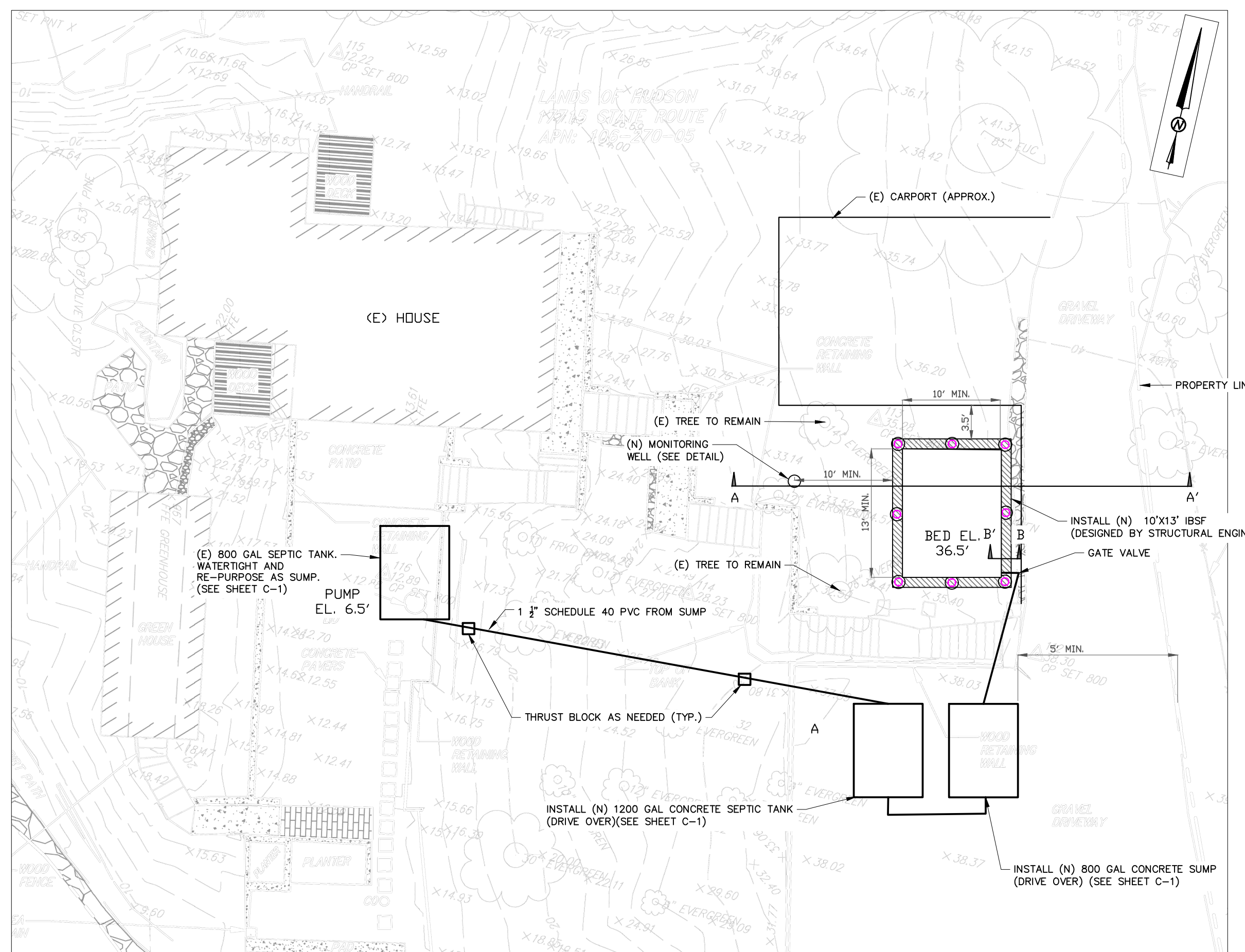


PARCEL LOCATION
SCALE: N/A



VICINITY MAP
SCALE: 1"=1000'



SITE PLAN
SCALE: 1"=10'

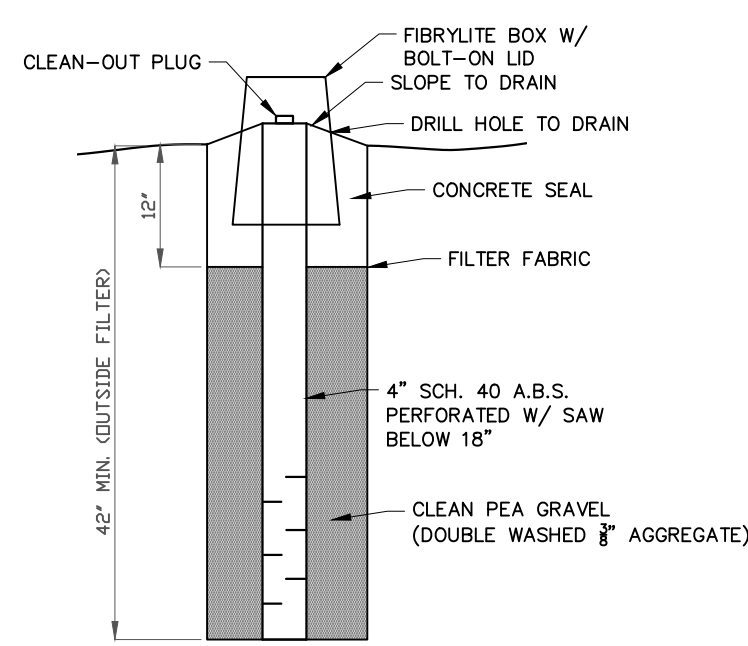
DESIGN ANALYSIS:

- APPLICATION RATE = 1.2 GAL/FT²
- WASTEWATER LOAD = 1 BEDROOM = 150 GAL/DAY
- BASAL AREA REQUIRED = 130 FT²
- BASAL AREA PROVIDED = 130 FT²

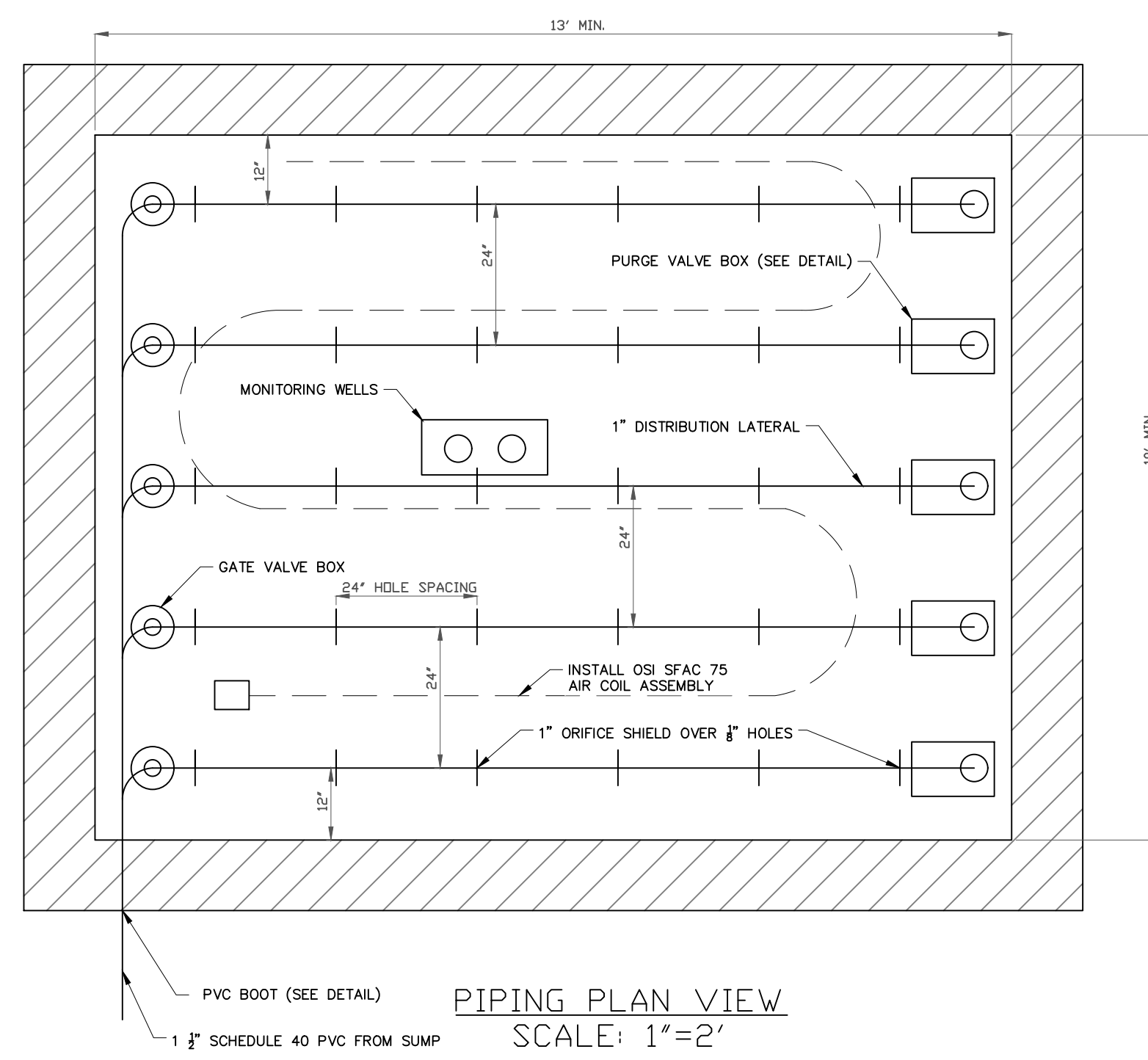
SEE FULL CALCULATIONS

NOTES:

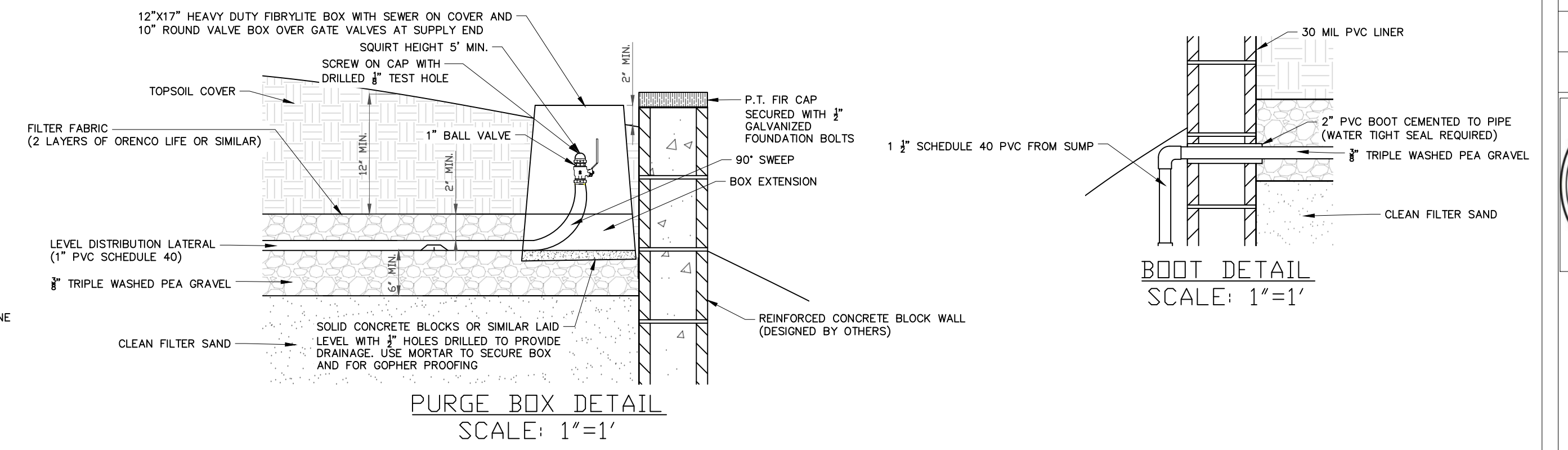
- INSTALLATION MUST BE MADE BY A LICENSED CONTRACTOR WITH EXPERIENCE IN SAND FILTER DESIGN AND INSTALLATIONS.
- THIS SYSTEM MAY ONLY BE INSTALLED WHEN THE SOIL IS DRY.
- CALL AGNEW CIVIL ENGINEERING AT LEAST 3 DAYS PRIOR TO CONSTRUCTION.
- SEE SHEET C-2 FOR INSPECTION SCHEDULE AND CONSTRUCTION GUIDELINES.



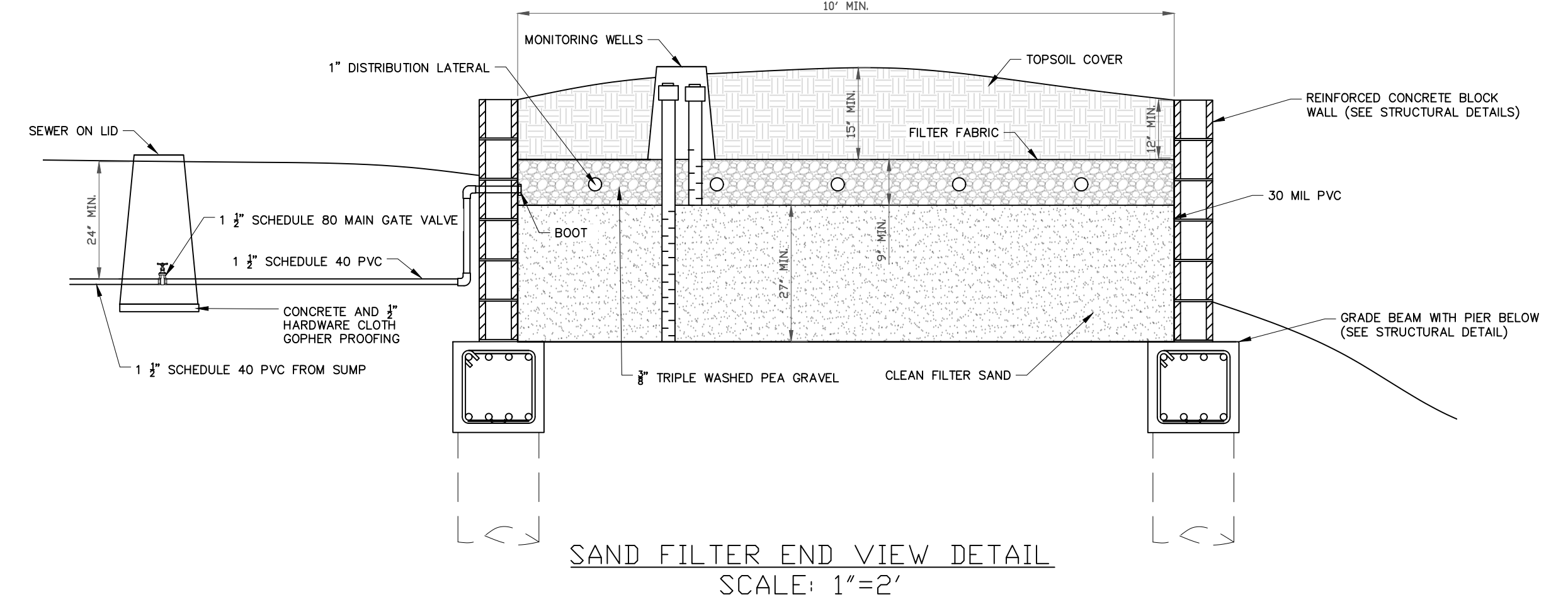
MONITORING WELL DETAIL (TYP.)
SCALE: AS SHOWN



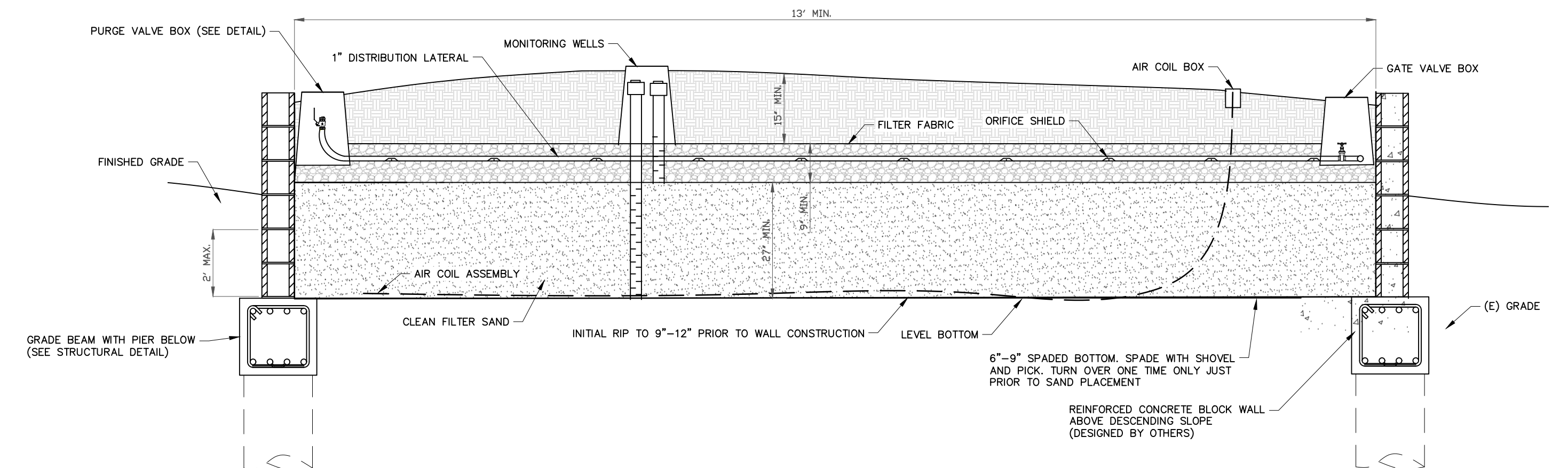
PIPING PLAN VIEW
SCALE: 1"=2'



PURGE BOX DETAIL
SCALE: 1"=1'



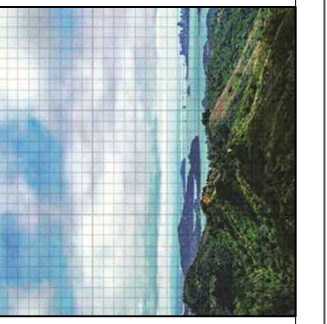
SAND FILTER END VIEW DETAIL
SCALE: 1"=2'



SAND FILTER SIDE VIEW DETAIL
SCALE: 1"=2'

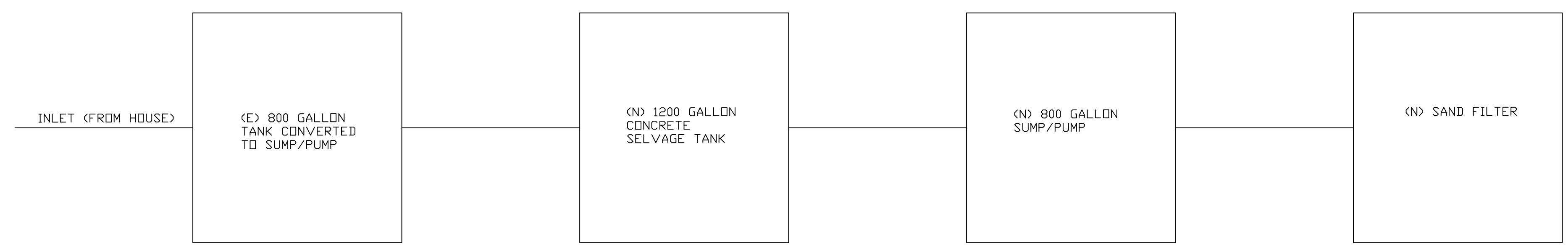
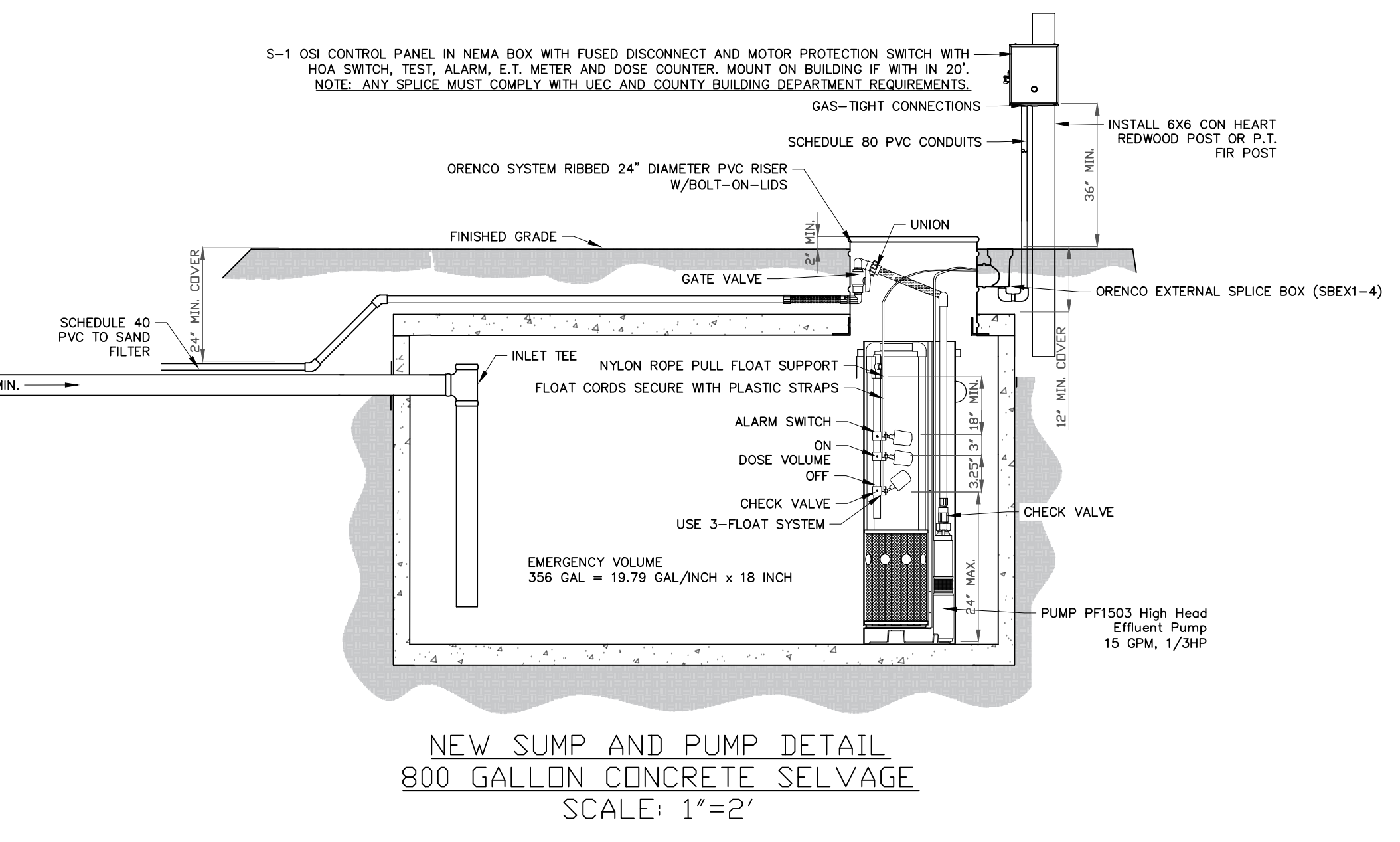
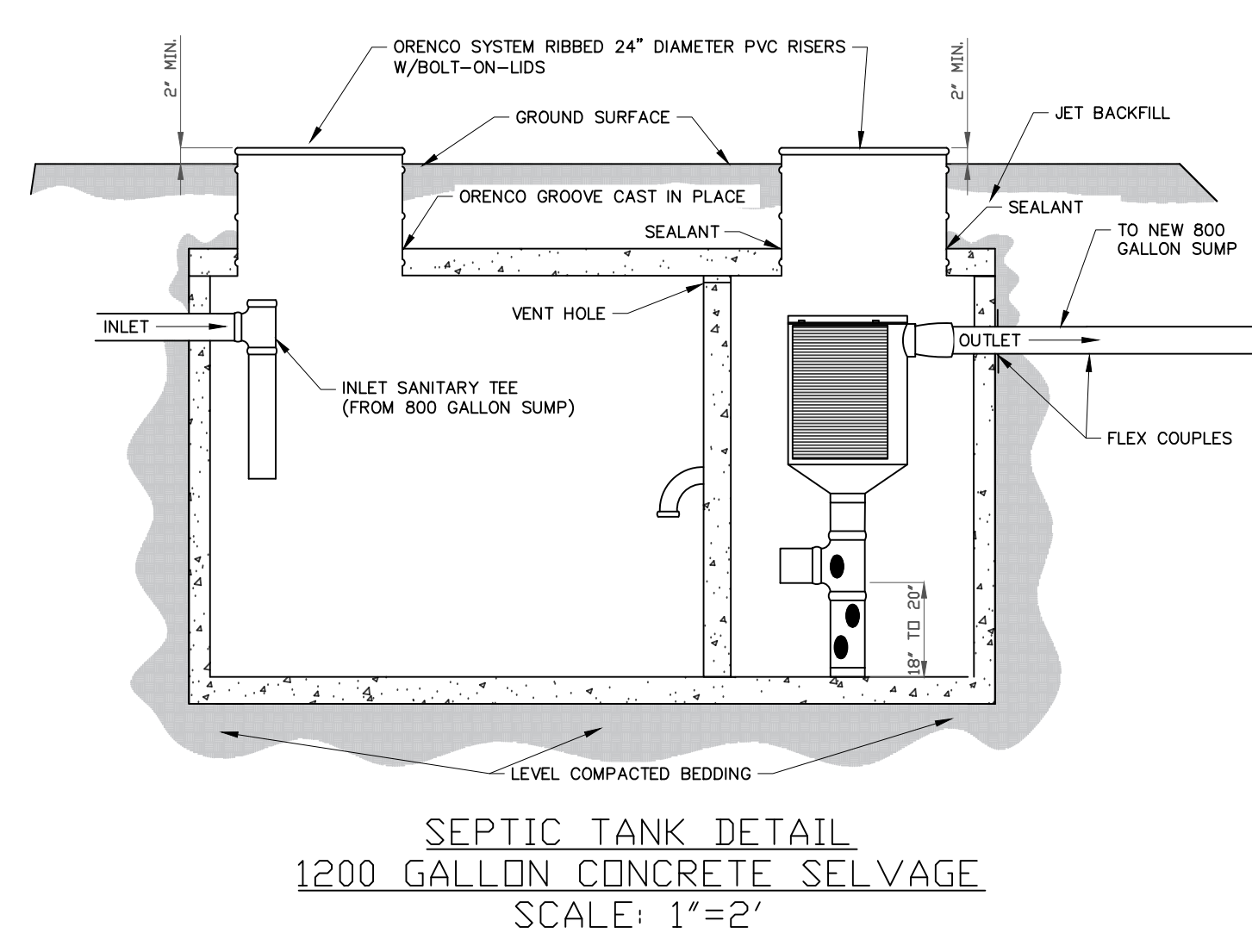
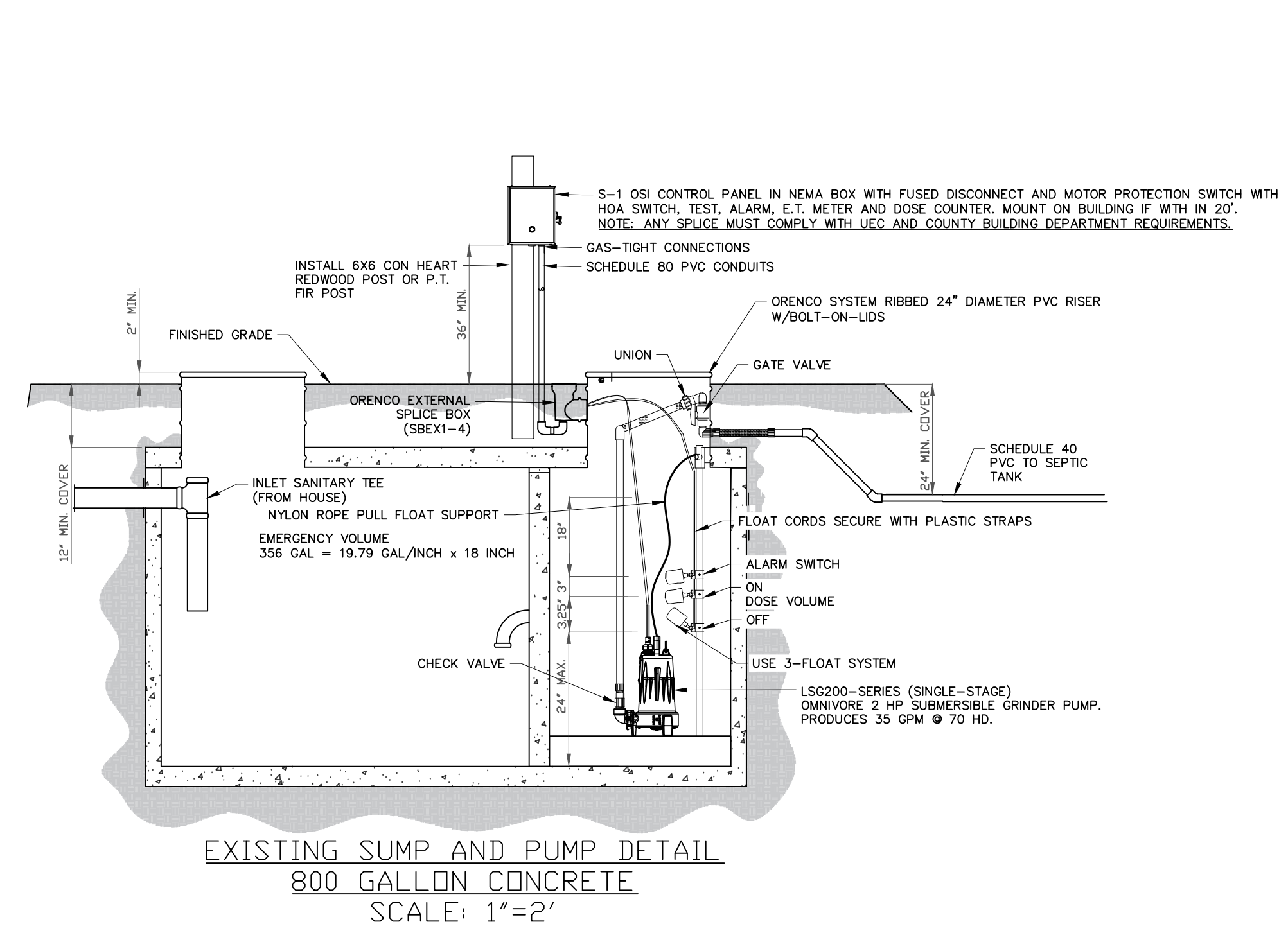
#	REVISIONS	BY
1	9/20/19	OA
2	10/2/19	OA
3	12/5/19	OA

AGNEW CIVIL ENGINEERING
CIVIL AND GEOTECHNICAL CONSULTANTS
454 LAS GALINAS AVE SUITE 1047 SAN RAFAEL, CA 94903
415 868 5532 OFFICE/FAX



NEW ON-SITE WASTEWATER TREATMENT SYSTEM
BOTTOMLESS INTERMITTENT SAND FILTER
BETTY LOU HUDSON
17715 CA-1, MARSHALL, CA 94959

DATE	9/1/19
SCALE	AS SHOWN
DRAWN	OWA
JOB	88-1
SHEET	C-0



BOTTOMLESS SAND FILTER CALCULATIONS

LOADING RATE: 1.2 GAL/FT²

MAXIMUM USE: 1 BEDROOM = 150 GAL/DAY

PROVIDE: (150 GAL/DAY)/(1.2 GAL/FT²) = 125 FT²

USE 13FT x 10FT = 130 FT²

Calculations

Minimum Flow Rate per Orifice	0.43	gpm
Number of Orifices per Zone	30	
Total Flow Rate per Zone	12.9	gpm
Number of Laterals per Zone	5	
% Flow Differential 1st/Last Orifice	0.1	%
Transport Velocity	1.2	fps

PumpData

PF1503 High Head Effluent Pump
15 GPM, 1/3HP

Parameters

Discharge Assembly Size	2.00	inches
Transport Length	15	feet
Transport Pipe Class	40	
Transport Line Size	2.00	inches
Distributing Valve Model	None	
Max Elevation Lift	10	feet
Manifold Length	10	feet
Manifold Pipe Class	40	
Manifold Pipe Size	1.25	inches
Number of Laterals per Cell	5	
Lateral Length	11	feet
Lateral Pipe Class	40	
Lateral Pipe Size	1.00	inches
Orifice Size	1/8	inches
Orifice Spacing	2	feet
Residual Head	5	feet
Flow Meter	None	inches
*Add-on Friction Losses	0	feet

Frictional Head Losses

Loss through Discharge	0.3	feet
Loss in Transport	0.0	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.1	feet
Loss in Laterals	0.0	feet
Loss through Flowmeter	0.0	feet
*Add-on Friction Losses	0.0	feet

Pipe Volumes

Vol of Transport Line	2.6	gals
Vol of Manifold	0.8	gals
Vol of Laterals per Zone	2.5	gals
Total Volume	5.9	gals

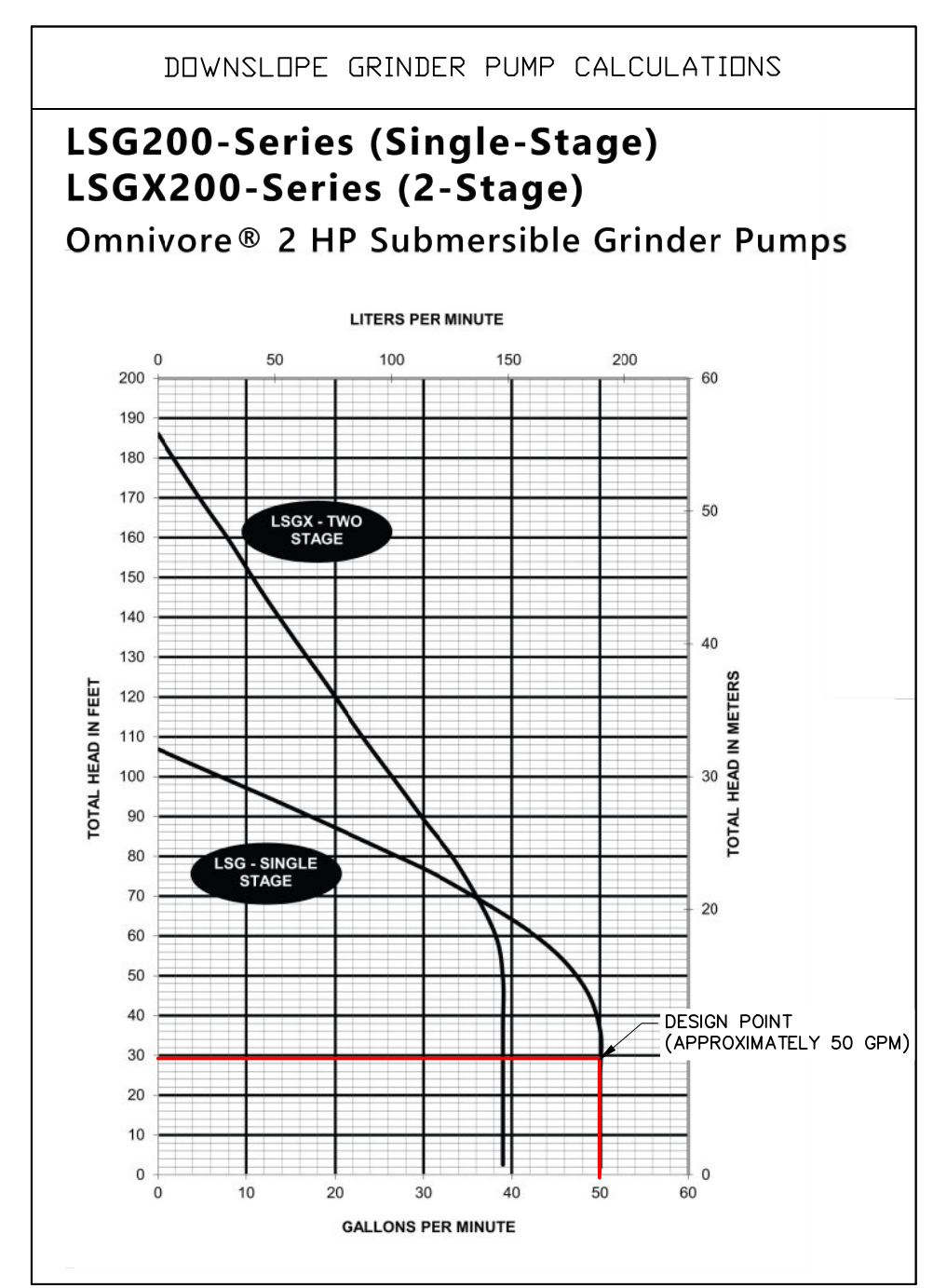
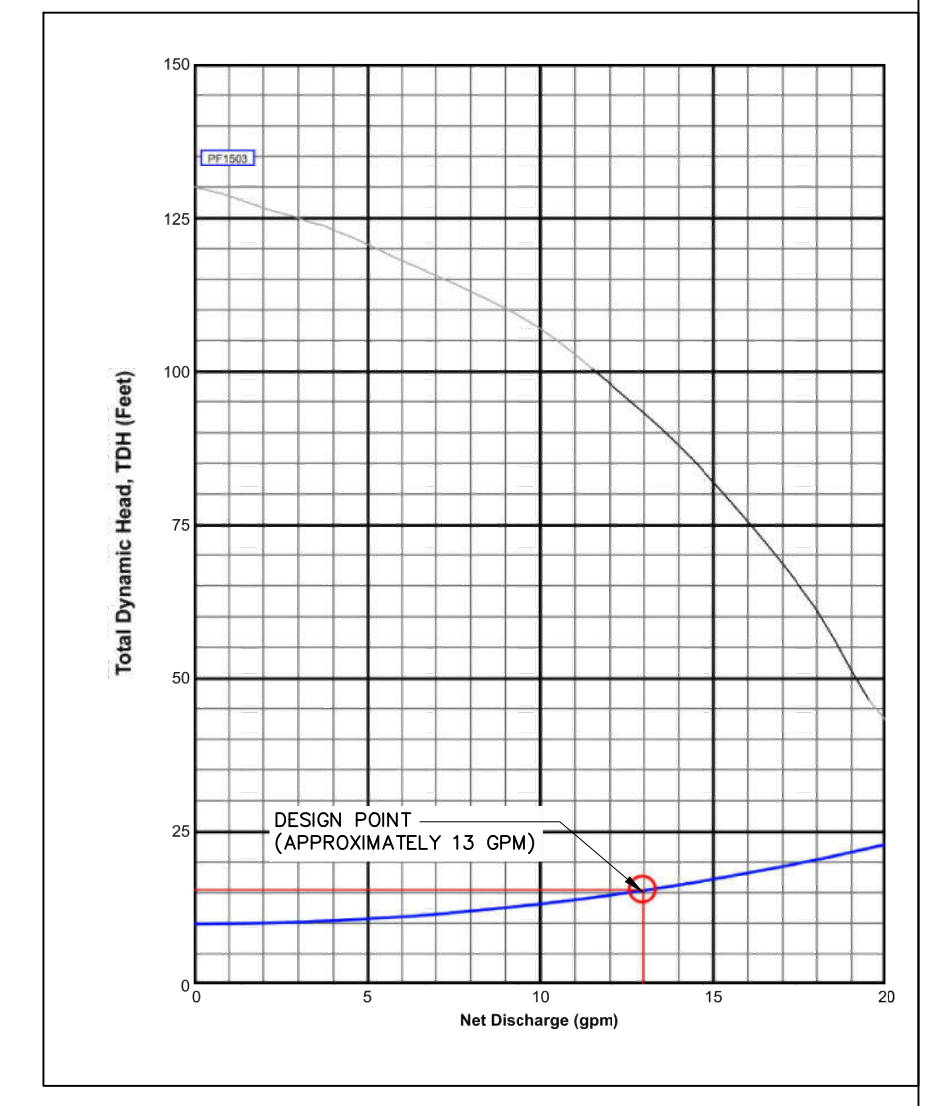
Minimum Pump Requirements

Design Flow Rate	12.9	gpm
Total Dynamic Head	15.5	feet

ACCEPTABLE FILTER SAND

SIEVE SIZE	% PASSING
3/8"	100
#4	95-100
#8	80-100
#16	50-85
#30	25-60
#50	5-30
#100	0-10
#200	0-3

CONTRACTOR TO PROVIDE SIEVE ANALYSIS AND OBTAIN APPROVAL PRIOR TO PLACEMENT



GENERAL

1. ALL WORK TO COMPLY WITH THE REQUIREMENTS OF THE MARIN COUNTY ENVIRONMENTAL HEALTH, UNIFORM PLUMBING CODE, THE 2019 CBC AND OTHER APPLICABLE STATE AND LOCAL BUILDING AND SAFETY REGULATIONS, INCLUDING THE LATEST VERSION OF CAL-OSHA AND ANY SPECIAL CONDITIONS OF APPROVAL FROM THE COUNTY OF MARIN, INCLUDING ALL APPLICABLE MARIN COUNTY STORM WATER POLLUTION PREVENTION PROGRAM (MCSSTOPPP) SPECIFICATIONS AND GUIDELINES.
2. NOTIFY ENVIRONMENTAL HEALTH AND DESIGN ENGINEER A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION AND PRIOR TO COVERING.
3. ANY ALTERATION TO THE APPROVED DESIGN MUST BE APPROVED PRIOR TO INSTALLATION.
4. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THESE PLANS AND SPECIFICATIONS SHOULD BE CLOSELY FOLLOWED UNLESS SPECIFICALLY MODIFIED IN THE FIELD BY THE DESIGN ENGINEER AT THE TIME OF CONSTRUCTION.
5. CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL EXCAVATION PROCEDURES INCLUDING ANY SHORING THAT IS REQUIRED TO COMPLETE THE WORK AND FOR PROTECTION OF ALL NEARBY STRUCTURES, UTILITIES OR IMPROVEMENTS.
6. CONTRACTOR TO LOCATE AND PROTECT ALL EXISTING UTILITIES, DRAIN LINES, ELECTRICAL CONDUITS AND OTHER UNDERGROUND FACILITIES THAT COULD BE PRESENT IN OR ADJACENT TO THE WORK AREA. PARTICULAR ATTENTION SHOULD BE PAID TO LOCATING AND PROTECTING EXISTING SEWER LINES AND TANKS OR OTHER UTILITIES IN THE WORK AREA PRIOR TO EXCAVATION.
7. CONTRACTOR TO VERIFY ALL FIELD DIMENSIONS AND CONDITIONS. HORIZONTAL AND VERTICAL CONTROLS BASED ON ROUGH FIELD MEASUREMENTS AND EXISTING SURVEY INFORMATION. MINOR "BEST-FIT" MODIFICATIONS BY THE CONTRACTOR ARE ACCEPTABLE. CHANGES IN FIELD CONDITIONS OR DIMENSIONS SHOULD BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER FOR ANY APPROPRIATE MODIFICATIONS TO THE WORK.
8. ANY EXISTING LANDSCAPING TO REMAIN THAT BECOMES DAMAGED OR DESTROYED BY THE CONTRACTOR'S OPERATIONS SHOULD BE RESTORED TO THE SATISFACTION OF THE OWNER WITH LIKE KIND AND QUALITY MATERIALS.
9. ALL DISTURBED AREAS TO BE RESTORED AND LEFT WITH SUITABLE EROSION CONTROL MEASURES AS DIRECTED BY THE ENGINEER UPON COMPLETION OF THE WORK.
10. EXISTING 800 GALLON SEPTIC TANK SHALL BE REMOVED AND REPLACED WITH 1200 GALLON SEPTIC TANK FROM SELVAGE CONCRETE PRODUCTS, INC. OR SIMILAR, AS SPECIFIED BELOW. THE SEPTIC TANK SHALL BE SET LEVEL IN THE EXCAVATION, COVERED WITH A MINIMUM OF 12 INCHES OF SOIL, AND FITTED WITH RISERS. OTHER PIPING OR IMPROVEMENTS THAT ARE DESTROYED OR DAMAGED AS PART OF THE NEW CONSTRUCTION SHOULD BE REPLACED WITH LIKE KIND AND QUALITY MATERIALS PER OWNER'S REQUIREMENTS.
11. NEW 1200 GALLON SEPTIC TANK TO BE CONNECTED TO EXISTING INLET PIPE AND OUTLET PIPE. ALL INLET AND OUTLET TEE'S SHOULD BE REPLACED AND/OR INSPECTED. OUTLET PIPE TO BE CONNECT TO NEW SUMP TANK WITH SUITABLE CONNECTION TYPES. CONNECTION BETWEEN BUILDING AND SEPTIC TANK AND SUMP SHALL BE 3" OR 4" SCH. 40 A.B.S., WITH A MIN. SLOPE OF 2%. ALL JOINTS BETWEEN BUILDING AND DRAIN FIELD ARE TO BE WATERTIGHT. CONNECTION BETWEEN PIPE AND SEPTIC TANK SHALL BE SEALED WITH NON-SHRINK GROUT.

REQUIRED ELECTRICAL FEATURES

- A. ALL MATERIALS, CONNECTIONS, AND SPECIFICATIONS SHALL MEET THE MARIN COUNTY/NATIONAL ELECTRICAL CODE:
1. IN ALL CASES IN WHICH A SUMP WITH A PUMP IS USED FOR A SEWAGE DISPOSAL SYSTEM, THE CONTRACTOR/OWNER SHALL OBTAIN AN ELECTRICAL PERMIT FROM THE MARIN COUNTY BLDG. DEPT.
 2. THE BUILDING OFFICIAL SHALL BE RESPONSIBLE FOR INSPECTION AND APPROVAL OF ALL ELECTRICAL FEATURES OF ALL PUMP AND ELECTRICAL PARTS.
 3. A DISCONNECTING MEANS SHALL BE LOCATED IN SIGHT FROM THE PUMP LOCATION PER THE COUNTY ADOPTED ELECTRICAL CODE.
- B. A "WIDE ANGLE" MERCURY/MECHANICAL, C.S.H. INC., OR SJ ELECTRO SYSTEMS SUPER SINGLE OR EQUAL, FLOAT SWITCH SHALL BE USED TO ACTIVATE THE PUMP. THE ALARM/CONTROL BOX SHALL BE EQUIPPED WITH A MOTOR CONTRACTOR FOR THE PUMP AND A MOMENTARY CONTACT "PUMP TEST" SWITCH TO MANUALLY RUN THE PUMP BYPASSING THE CONTROL PANEL AUTOMATIC MODE
- C. ELECTRICAL SERVICE TO THE ALARM/CONTROL PANEL SHALL BE EQUIPPED WITH A BREAKER OR FUSE AT THE POWER SOURCE WHICH IS LARGER THAN THE CIRCUIT BREAKER FOR THE PUMP IN THE ALARM/CONTROL PANEL.
1. THE ALARM/CONTROL PANEL SHALL BE EQUIPPED INTERNALLY WITH SEPARATE CIRCUIT PROTECTION FOR THE CONTROL AND PUMP CIRCUITRY.
 2. PUMP PROTECTION SHALL BE PROVIDED BY A THERMAL MAGNETIC CIRCUIT BREAKER FOR OVERLOAD AND SHORT CIRCUIT PROTECTION.
 3. THE PUMP POWER LEAD AND THE FLOAT SWITCH CONTROL WIRES SHALL NOT BE RUN IN A COMMON CONDUIT.
 4. ALL WIRES GOING INTO THE SUMP SHALL BE INDIVIDUALLY SEALED WITH PVC GAS TIGHT FITTINGS IN EITHER THE JUNCTION BOX OR ALARM/CONTROL PANEL AS APPROPRIATE.
 5. METALLIC GAS TIGHT FITTINGS ARE NOT ALLOWED.
- D. A NON-RE-SETTABLE DOSE COUNTER SHALL BE INSTALLED IN CONTROL BOXES UTILIZED FOR MOUND, SHALLOW TRENCH PRESSURE DISTRIBUTION, AND OTHER NON-STANDARD, SYSTEMS.
- NOTE: CONTROL BOXES THAT MUST BE OPENED TO VIEW THE DOSE COUNTER SHALL BE EQUIPPED WITH A CLEAR PLASTIC OR PYREX SAFETY SHIELD INSIDE THE CONTROL BOX. THE CONTROL BOX SHALL HAVE A LABEL PLACED ON IT STATING "CAUTION - ELECTRICAL HAZARD".
- E. ALARM/CONTROL PANEL ENCLOSURE SHALL BE NEMA TYPE 4. A REMOTE ALARM WITH AN ADDITIONAL LIGHT AND HORN SHALL BE PROVIDED WITHIN THE STRUCTURE SERVED.
1. ENCLOSURE FOR THE REMOTE AND AUDIO/VISUAL ALARM SHALL BE NEMA TYPE I, IF MOUNTED INDOORS.
 2. EMERGENCY DISCONNECT FOR THE ALARM/CONTROL PANEL IS PROVIDED FOR BY THE INTERNAL FUSED DISCONNECT AND PUMP CIRCUIT BREAKER.

USE THE CHECKLIST BELOW TO VERIFY COMPLETION OF ALL THE PHASE OF THE INSTALLATION

- STAKE OUT INSPECTION
 - DISPOSAL SYSTEM LOCATIONS (SETBACKS, PROPERTY LINE, SEPTIC TANK SUMPS, INTERCEPT TRENCH, SAND FILTERS)
 - DISPOSAL FIELD DIMENSIONS (LENGTH, TRENCH SPACING)
 - FILL MEDIA (SIEVE ANALYSIS)
 - DISPOSAL FIELD DEPTH
 - TRENCH SIDEWALLS SCARIFIED
 - SAND FILTER LINER INSPECTION AND DEPTH MARKED FOR SAND, GRAVEL, AND TOPSOIL
 - BUILDING PERMIT FOR SAND FILTER RETAINING WALL IF NECESSARY
 - DRAIN ROCK (CLEAN AND SPECIFIED SIZE)
 - PLACEMENT OF SEPTIC TANK
 - PLACEMENT OF DOSING CHAMBERS
 - PLOWING OF GROUND SURFACE PRIOR TO PLACEMENT OF SAND AND SOIL
 - INSPECT INTERCEPT TRENCH IF APPLICABLE
 - FILL COVER COMPACTION PRIOR TO EXCAVATION OF TRENCHES
 - PLACEMENT OF DRAIN ROCK AND DR SAND FILL
 - PLACEMENT OF PERFORATED PIPE (ALL CONNECT, PROPERLY GLUED)
 - PRESSURE DISTRIBUTION PIPING (DIAMETER, HOLE SIZE AND SPACING)
 - PRESSURE DISTRIBUTION PIPING PLACEMENT
 - INSTALLATION OF GATE VALVES
 - FORCE MAIN PLACEMENT (EFFLUENT TRANSPORT LINE)
 - PLACEMENT OF THRUST BLOCKS
 - ALL JOINTS PROPERLY GLUED OR MORTARED
 - PLACEMENT OF INSPECTION WELLS
 - PLACEMENT OF DISTRIBUTION VALVE
 - PLACEMENT OF SILT BARRIER
 - PLACEMENT OF MONITORING WELLS
 - SEPTIC TANK LEAK TEST (RISERS AND FLEXIBLE JOINTS OR CONNECTIONS)
 - DOSING CHAMBER LEAK TEST
 - PLACEMENT OF PUMP AND CONTROLS (PUMP TYPE, MAKE MODEL#)
 - PLACEMENT OF ALARM SYSTEM
 - CONTROL PANEL
 - HYDRAULIC LOAD TEST (MEETS MINIMUM DISCHARGE HEAD SPECS)
 - DISCHARGE HEAD SPECIFICATIONS
 - APPROVAL OF ENGINEER OF FILL COVER PRIOR TO PLACEMENT OF COVER
 - FILTER SCREEN
 - FINAL GRADING AND AREA CLEAN-UP (SEEDING, EROSION MITIGATION MEASURES)
 - INSTALLATION OF LOW FLOW PLUMBING FIXTURES
 - CONCRETE SEAL AROUND MONITORING WELLS
 - SEPTIC ABANDONMENT
 - ELECTRICAL PERMIT APPROVAL (SEPARATE CIRCUIT FOR PUMP ALARM OR LARGE AMP CIRCUIT IN MAIN PANEL)
- OTHER:
- CERTIFICATION LETTER FROM ENGINEER
 - SYSTEM FINALED

SEPTIC TANK STRUCTURAL

1. ALL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSION STRENGTH OF 4000 PSI AT 28 DAYS OR SOONER, CONCRETE SHALL HAVE A MAXIMUM WATER RATIO OF 0.45.
2. CEMENT TO BE PORTLAND CONFORMING TO ASTM C150. REINFORCING STEEL SHALL BE INTERMEDIATE GRADE, DEFORMED, CONFORMING TO ASTM A-516 GRADE 40.
3. REINFORCING BARS SHALL BE IN LENGTHS AS LONG AS POSSIBLE AND SHALL BE LAPPED A MINIMUM OF 15 INCHES, OR 40 BARS DIAMETERS.
4. WELDED WIRE SHALL CONFORM TO ASTM DESIGNATION A 185, LAP FABRIC AT SLICES A MINIMUM OF 6 INCHES.
5. ALL TANKS SHALL BE COATED ON THE INTERIOR EXTENDING TO A MINIMUM OF FOUR (4) INCHES BELOW THE WATER LINE, AND SHALL COVER ALL THE INTERNAL AREA ABOVE THAT POINT WITH AN APPROVED DAMP-PROOF AND WATERPROOF COMPOUND COMPLYING WITH ASTM D 41-78 OR BETTER. COATINGS SHALL BE APPLIED PER THE MANUFACTURER'S RECOMMENDATIONS AND SHALL BE ENVIRONMENTAL FRIENDLY AS PER EPA REGULATION 40CFR261.4.
6. TANK SHALL BARE ON UNDISTURBED SOIL A MINIMUM OF 18 INCHES BELOW ORIGINAL GRADE ON A SOLID BED AND TO BE INSTALLED LEVEL.
7. SOIL BEARING CAPACITY SHALL BE A MINIMUM OF 1000 PSI.
8. FILL TANK WITH WATER AFTER IT HAS BEEN SET IN-PLACED AND BACK-FILLED AS PER MANUFACTURE'S RECOMMENDATION.
9. DO NOT INSTALL NON H2O RATED TANKS IN TRAFFIC AREA.
10. THE DESIGN OF THIS TANK IS BASED ON AN EQUIVALENT FLUID PRESSURE OF 30 PSI.
11. DESIGN CAPACITY: 1500 GALLONS.

CONSTRUCTION INSPECTION SCHEDULE

- AN AUTHORIZED REPRESENTATIVE OF AGNEW CIVIL ENGINEERING SHALL MAKE INSPECTIONS OF THE SEWAGE DISPOSAL SYSTEM AT THE FOLLOWING TIMES DURING CONSTRUCTION:
1. AFTER THE SYSTEM HAS BEEN LAID OUT IN THE FIELD BEFORE EXCAVATION BEGINS.
 2. INSPECTION AND APPROVAL OF SAND AND GRAVEL PRIOR TO PLACEMENT INTO THE FILTER.
 3. INSPECTION OF SPADED FILTER BOTTOM PRIOR TO SAND PLACEMENT.
 4. AFTER THE SAND AND GRAVEL BED IS IN PLACE, TANKS, PIPING AND PUMP HAVE BEEN INSTALLED AND PRIOR TO COVERING. AT THIS POINT HYDRAULIC TESTING OF THE SYSTEM WILL BE CONDUCTED AND MAIN VALVE SET.
 5. AFTER FINISH GRADING, MONITORING WELLS ARE PLACED, RE-SEEDING IS COMPLETED, AND LOW-FLOW TOILETS HAVE BEEN INSTALLED

BOTTOMLESS SAND FILTER CONSTRUCTION GUIDELINES WITH REINFORCED CONCRETE BLOCK WALLS

1. USING AN EXCAVATOR, OR, BY HAND, EXCAVATE A BED FOR THE SAND FILTER AS SHOWN ON THE PLAN STOCKPILE TOPSOIL FOR USE AS COVER SOIL LATER. NOW RIP THE BOTTOM, FOLLOWING THE CONTOUR.
2. EXCAVATE FOOTINGS OR DEEP FOUNDATION (SEE SHEET S-1).
3. INSTALL REBAR-CALL FOR INSPECTION OF REBAR
4. POUR CONCRETE. ALLOW OVERNIGHT SET.
5. CONSTRUCT WALLS.
6. HAND SPADE BOTTOM OF FILTER THAT HAS BEEN COMPACTED BY WALL CONSTRUCTION.
7. SPREAD 2" LAYERS OF SAND ON BOTTOM AS SHOWN.
8. COVER INSIDE OF WALLS WITH 30 MIL PVC LINER. HANG EXCESS OVER TOP ATTACH TO 2X8 PRESSURE TREATED DOUGLAS FIR CAP.
9. INSTALL AIR COIL ASSEMBLY.
10. PLACE SAND. WETTING AND ROLLING WITH A HAND ROLLER TO INSURE COMPACTION.
11. PLACE 6" OF GRAVEL ON SAND. INSTALL DISTRIBUTION PIPES AND LATERALS, AND CAPS AND CONNECT 2" SUPPLY AND BOOT, IF NEEDED
12. INSPECTION FOR DISTAL PRESSURE AT THIS POINT BY DESIGNER AND COUNTY PERSONNEL.
13. PRESSURE TEST ONE MORE TIME. OPENING ENDS TO PURGE. INSTALL DRIFICE SHIELDS.
14. COVER WITH GRAVEL. THEN FILTER FABRIC OVER THE GRAVEL
15. PLACE SUITABLE TOPSOIL OVER THE FILTER FABRIC, COMPACTING AND MAKING SURE CENTER IS 6" HIGHER THAN SIDES TO ALLOW RUN-OFF. CLAY SOILS ARE NOT SUITABLE.
16. INSTALL MONITORING WELLS.
17. SEED WITH ANNUAL AND PERENNIAL RYE GRASS AND RAKE SURFACE TO PARTIALLY COVER SEED. COVER WITH STRAW AND SAND TO HOLD STRAW IN PLACE.
18. FINISH GRADE- AS SHOWN ON PLAN.

OPERATIONS AND MAINTENANCE

- THIS SAND FILTER SYSTEM IS DESIGNED TO BE AS MAINTENANCE FREE AS POSSIBLE. HOWEVER, THE FOLLOWING SHOULD BE NOTED BY THE HOMEOWNER:
1. NEVER FLUSH HAZARDOUS WASTE, DRUGS, PAINT OR LARGE OBJECTS LIKE SANITARY NAPKINS OR DISPOSABLE DIAPERS DOWN THE TOILET
 2. BE CONSERVATIVE USING WATER. THE LESS WATER USED, THE EASIER IT IS FOR THE DISPOSAL SYSTEM TO OPERATE
 3. BE AWARE OF THE LOCATION OF ALL THE COMPONENTS OF THE SYSTEM. THEY ARE MARKED BY PLASTIC OR CONCRETE RISERS. INSPECTION WELLS ARE SELF EVIDENT - SEE PLAN FOR DETAILS A1L5.
 4. ABOUT EVERY 3 YEARS DEPENDING ON VOLUME OF USE, THE SEPTIC TANK SHOULD BE PUMPED AND CLEANED TO REMOVE SOLIDS BUILD-UP, AND THE EFFLUENT FILTER BACK- WASHED CLEAN.
 5. MONITORING THE WATER LEVEL IN THE INSPECTION WELLS WILL GIVE A CLUE THAT SOMETHING MAY BE WRONG BEFORE IT BECOMES A MAJOR PROBLEM. MAKE THIS A ROUTINE.
 6. THE ENDS OF THE DISTRIBUTION LATERALS ARE FITTED WITH PURGE BOXES BY REMOVING THE LIDS AND ADJUSTING THE VALVES. EACH ONE CAN BE SEPARATELY PURGED TO REMOVE ANY SOLIDS BUILD-UP. THIS SHOULD BE DONE ONCE AFTER THE FIRST YEAR OF USE AND THEN AT TWO YEAR INTERVALS. CARE MUST BE TAKEN TO RETURN THE MAIN VALVE TO THE SAME POSITION, AND ALL OTHER VALES MUST BE RETURNED TO THEIR OPEN POSITION.
 7. THE PUMP IS EQUIPPED WITH AN AUDIO AND VISUAL AL ARM SYSTEM WHICH WILL INDICATE THE NEED TO CHECK THE PUMP.
 8. DURING PERIODS OF PROLONGED POWER FAILURE, REDUCE WATER USE AS THERE IS ONLY ABOUT TWO DAYS OF ADDITIONAL STORAGE PROVIDED IN THE SUMP.
 9. MAINTAIN A GOOD GROWTH OF VEGETATION OVER THE FILTER AREA. THE RYE GRASS SEEDED AFTER CONSTRUCTION WILL HELP RETARD EROSION INITIALLY, BUT A GOOD GROUND COVER WILL ALSO PROVIDE TRANSPIRATION THAT WILL HELP THE SYSTEM OPERATE PROPERLY

CONTINGENCY FOR REPAIR OR REPLACEMENT OF SYSTEM

1. IN CASE OF PUMP FAILURE, CONTACT THE CONTRACTOR OR INSTALLER OF THE PUMP FOR REPAIR OR REPLACEMENT AND TO DETERMINE CAUSE OF FAILURE.
2. IN CASE OF SURFACING SEWAGE CONTACT THE INSTALLER AND DESIGNER AS WELL AS MARIN COUNTY ENVIRONMENTAL HEALTH SERVICES FOR EVALUATION AND RECOMMENDED CORRECTIVE ACTION, WHICH MAY INCLUDE ADDING PRE-TREATMENT, IF ALL ELSE FAILS, PARTIAL OR TOTAL CONVERSION TO A PUMPING AND HAULING SYSTEM.

GEOTECHNICAL

1. GEOTECHNICAL OBSERVATIONS AND INSPECTIONS REQUIRED DURING THE FOLLOWING OPERATIONS: PIT EXCAVATION, PLACEMENT AND COMPACTION OF TANK SUBGRADE AND BACKFILL AND EROSION CONTROL. GEOTECHNICAL SERVICES TO BE PROVIDED UNDER SEPARATE CONTRACT AT OWNER'S EXPENSE. CONTRACTOR TO PROVIDE AT LEAST 24-HOUR NOTICE PRIOR TO BEGINNING ANY OF THE ABOVE OPERATIONS.
2. ANY GROUNDWATER OR SEEPAGE IN EXCAVATION TO BE DISPLACED BY THE TREMIE METHOD OR PUMPED OUT IMMEDIATELY PRIOR TO THE PLACEMENT OF STEEL AND CONCRETE. CAVING OR OTHER PROBLEMS WITH THE EXCAVATION TO BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER FOR ANY APPROPRIATE REMEDIAL RECOMMENDATIONS THAT MAY BE NEEDED.
3. CUTTINGS SHOULD GENERALLY BE REMOVED FROM THE SITE OR PLACED AND COMPACTED AS BACKFILL OR LANDSCAPING FILL IN SUITABLE AREAS AND BLENDED INTO THE ADJACENT CONTOURS AT TRANSITION AREAS.
4. FOR ALL WORK AFTER OCTOBER 15TH, TEMPORARY EROSION CONTROL MEASURES SHOULD BE PROVIDED PRIOR TO THE WORK IN THE FORM OF A FIBER ROLL PLACED ABOVE THE ENTIRE REACH OF THE WORK AREA.

CONSTRUCTION MANAGEMENT

1. ALL APPLICABLE BMP'S FOR GOOD HOUSEKEEPING PRACTICES SHOULD ALSO BE FOLLOWED DURING THE WORK, INCLUDING CONCRETE WASHOUT AREA (AS SHOWN), STOCKPILE MANAGEMENT, HAZARDOUS MATERIAL MANAGEMENT, SANITARY WASTE MANAGEMENT, EQUIPMENT AND VEHICLE MAINTENANCE, AS WELL AS LITTER AND GARBAGE MANAGEMENT.

#	REVISIONS	BY
1	9/20/19	OA



AGNEW CIVIL ENGINEERING
 CIVIL AND GEOTECHNICAL CONSULTANTS
 454 LAS GALINAS AVE SUITE 1047 SAN RAFAEL, CA
 415 868 5532 OFFICE/FAX



NEW ON-SITE WASTEWATER TREATMENT SYSTEM
 BOTTOMLESS INTERMITTENT SAND FILTER
 BETTY LOU HUDSON
 17715 CA-1, MARSHALL, CA

DATE	9/1/19
SCALE	AS SHOWN
DRAWN	OWA
JOB	88-1
SHEET	C-2

C-2

STANDARD HOOK LENGTHS & BEND RADII

BAR SIZE	MAIN REINFORCEMENT			STIRRUPS & TIES		
	90° HOOK LENGTH "L"	INSIDE DIA. "D1"	180° HOOK LENGTH "L"	90° HOOK LENGTH "L"	INSIDE DIA. "D2"	135° HOOK LENGTH "L"
#3	4 1/2"	2 1/4"	2 1/2"	3"	1 1/2"	3"
#4	6"	3"	2 1/2"	3"	2"	3"
#5	7 1/2"	3 3/4"	2 1/2"	3 3/4"	2 1/2"	3 3/4"
#6	9"	4 1/2"	3"	9"	4 1/2"	4 1/2"
#7	10 1/2"	5 1/4"	3 1/2"	10 1/2"	5 1/4"	5 1/4"
#8	1'-0"	6"	4"	1'-0"	6"	6"
#9	1'-1 1/2"	9 1/2"	4 1/2"	-	-	-
#10	1'-3 1/4"	10 3/4"	5 1/4"	-	-	-
#11	1'-5"	1'-0"	5 3/4"	-	-	-

DRILLED PIER NOTES

- SEE GENERAL NOTES.
- ALL PIERS SHALL BE DRILLED, CAST IN PLACE CONCRETE PIERS.
- CONCRETE FOR DRILLED PIERS SHALL ATTAIN A MINIMUM ULTIMATE STRENGTH OF 3000 PSI AT 28 DAYS.
- PIER EMBEDMENT DEPTHS HAVE BEEN ESTABLISHED ON THE BASIS OF PIER SKIN FRICTION AND PASSIVE PRESSURE FROM REPORT BY AGNEW CIVIL ENGINEERING, DATED MAY 7, 2019. BEDROCK MATERIAL IS CAPABLE OF SUPPORTING A SKIN FRICTION OF 1000 PSF WITH 33% INCREASE FOR WIND AND SEISMIC CONDITIONS. END BEARING SHALL BE NEGLECTED. LATERAL LOADS ACTING ON THE PIERS WILL BE RESISTED BY PASSIVE PRESSURE OF THE ROCK ASSUMING AN EQUIVALENT FLUID PRESSURE OF 300 PCF UP TO A MAXIMUM OF 3000 PSF ACTING ON 1.5 TIMES THE PROJECTED AREA OF THE PIER. AS DRILLING PROGRESSES, SUBSURFACE CONDITIONS MAY BE ENCOUNTERED WHICH WILL REQUIRE CHANGES IN THESE ELEVATIONS AND/OR PIERS. SUCH CHANGES SHALL BE MADE ONLY AS DIRECTED BY THE CIVIL ENGINEER AND SHALL BE ACCOUNTED FOR IN ACCORDANCE TO CONTRACT DOCUMENTS.
- FOR EXCAVATION AND INSTALLATION OF DRILL PIERS, SEE GEOTECHNICAL REPORT.

GENERAL NOTES

- GENERAL NOTES
- THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY.
 - IF THE DESIGN DETAILS ARE IN CONFLICT WITH THESE GENERAL NOTES THE ENGINEER SHALL BE NOTIFIED.
 - THE DESIGN, ADEQUACY, AND SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS, ETC., IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND HAS NOT BEEN CONSIDERED BY THE PROJECT ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR STABILITY OF THE STRUCTURE PRIOR TO THE APPLICATION OF ALL SHEAR WALLS, RDOF AND FLOOR DIAPHRAGMS, AND FINISH MATERIALS. HE SHALL PROVIDE THE NECESSARY BRACING TO PROVIDE STABILITY PRIOR TO THE APPLICATION OF THE AFOREMENTIONED MATERIALS. OBSERVATION VISITS TO THE SITE BY THE PROJECT ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.
 - ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE GOVERNING BUILDING CODE.
 - SEE APPENDIX-A FOR COMPLETE STRUCTURAL CALCULATIONS.

FOUNDATIONS

- FOUNDATION DESIGN IS BASED ON SOILS INVESTIGATION BY AGNEW CIVIL ENGINEERING, DATED MAY 7, 2019.
- ALL RECOMMENDATIONS CONTAINED IN THE SOILS INVESTIGATION SHALL BE CLOSELY FOLLOWED BY THE CONTRACTOR.

CONCRETE

- ALL REINFORCED CONCRETE SHALL OBTAIN A COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
- ALL CEMENT SHALL CONFORM TO ASTM C-150, TYPE I.
- AGGREGATE SHALL CONFORM TO ASTM C-33.
- PIPES MAY PASS THROUGH STRUCTURAL CONCRETE IN SLEEVES, BUT MAY NOT BE EMBEDDED THEREIN.

REINFORCING STEEL

- ALL #5 AND LARGER REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60. ALL #4 AND SMALLER REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 40.
- NO. 5 OR LARGER REINFORCING BARS SHALL NOT BE RE-BENT WITHOUT APPROVAL BY THE PROJECT ENGINEER.
- ALL REINFORCING, ANCHOR BOLTS AND OTHER INSERTS SHALL BE SECURED IN PLACE PRIOR TO PLACING CONCRETE OR GROUTING MASONRY.

- PROVIDE THE FOLLOWING MINIMUM PROTECTIVE COVERING OF CONCRETE:
BELOW GRADE: (UNFORMED) 3' CLEAR
BELOW GRADE: (FORMED) 2' CLEAR.

5. WELDING OF REBAR IS NOT PERMITTED UNLESS PROCEDURE APPROVED BY THE PROJECT ENGINEER.

SPECIAL INSPECTIONS

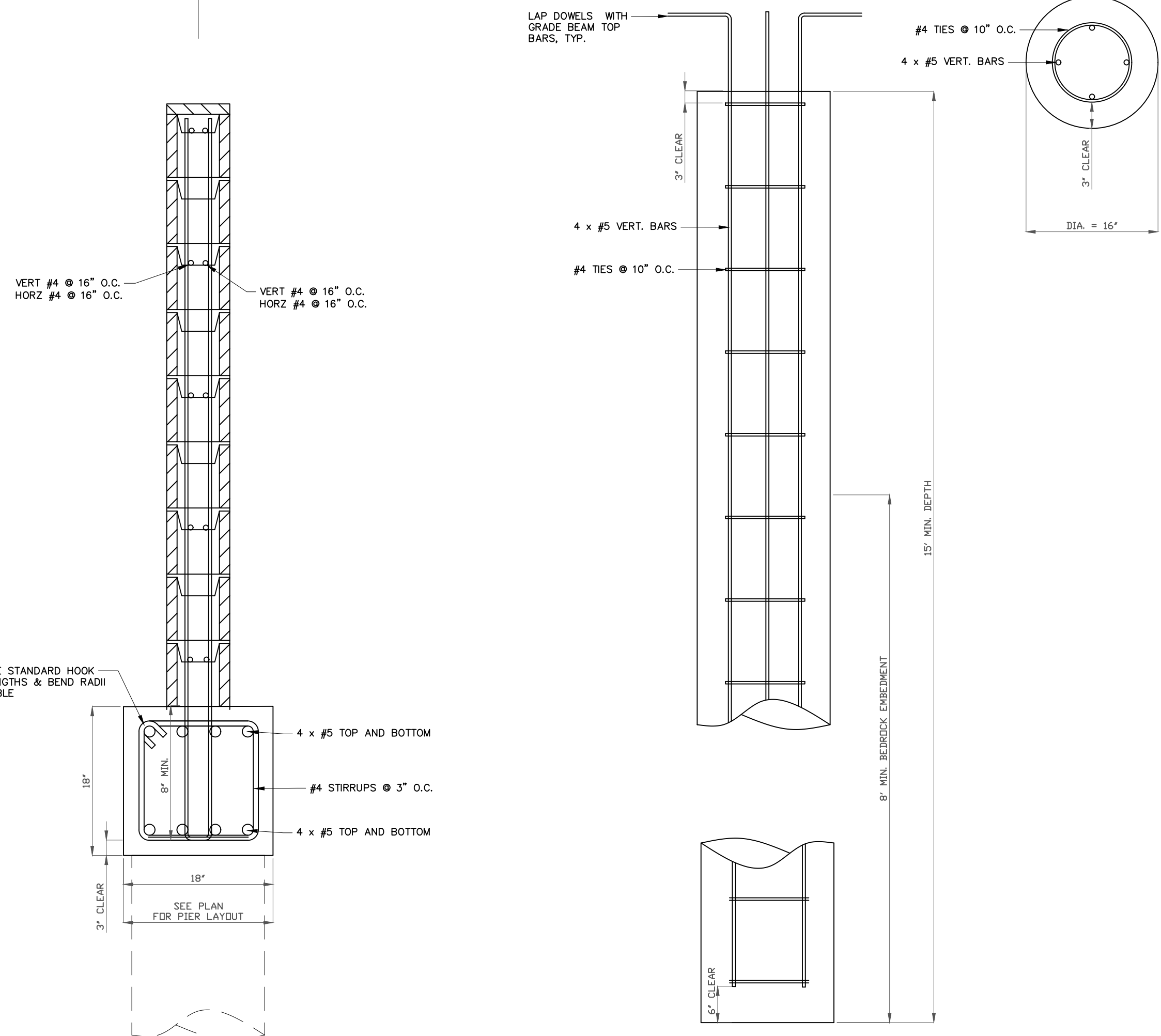
THE FOLLOWING ITEMS REQUIRE SPECIAL INSPECTION:

- DRILLING AND EXCAVATION
- REINFORCING BAR PLACEMENT

REBAR OFFSET AND LAP SPLICE

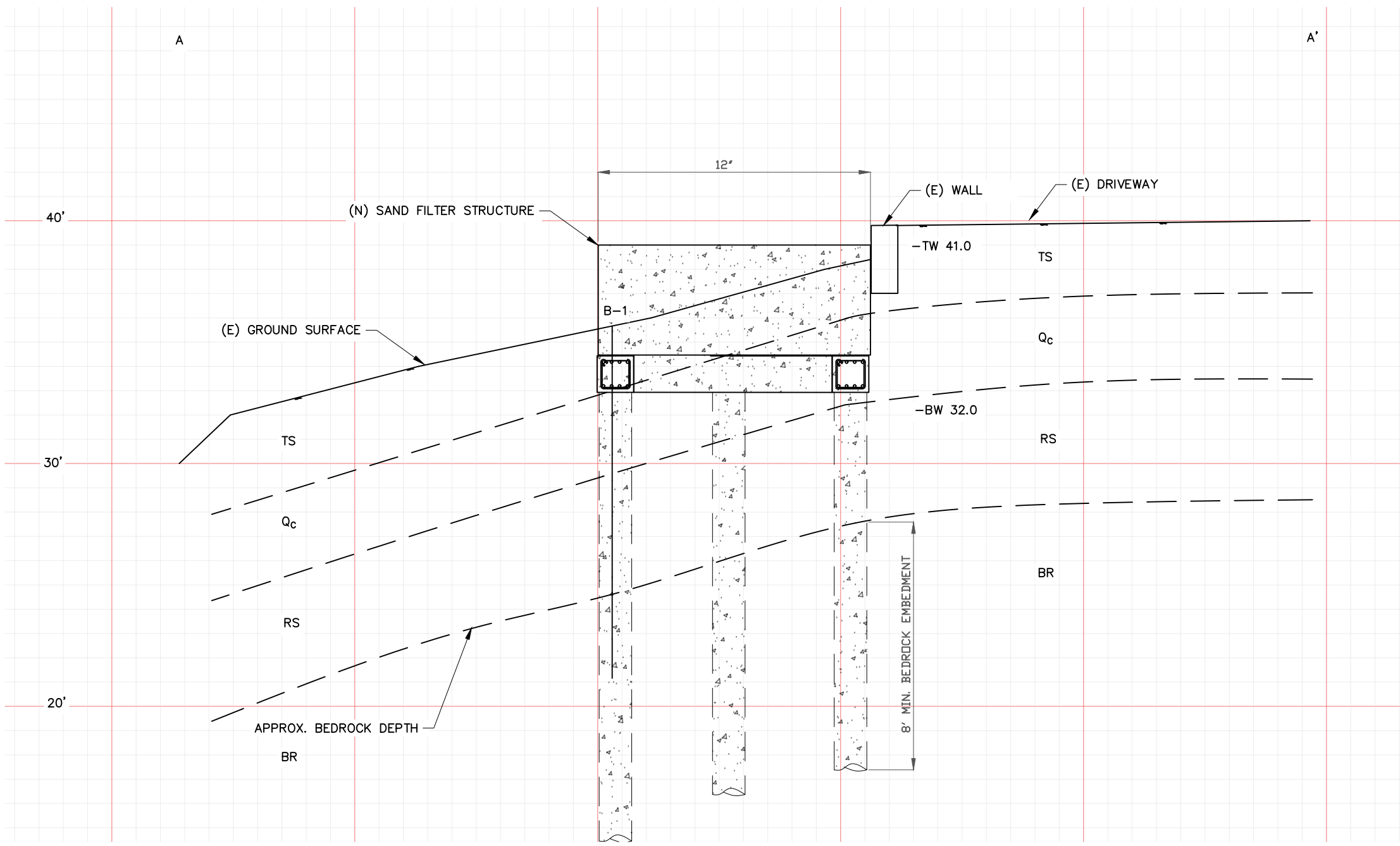
CONCRETE STRENGTH	F'c = 3000 PSI				F'c = 4000 PSI			
	CLASS 'A'		CLASS 'B'		CLASS 'A'		CLASS 'B'	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	1'-4"	1'-1"	1-9"	1'-4"	1'-2"	1'-0"	1-6"	1'-4"
#4	1'-10"	1'-5"	2'-4"	1'-10"	1'-7"	1'-3"	2'-0"	1'-7"
#5	2'-3"	1'-9"	2'-11"	2'-3"	1'-11"	1'-6"	2'-6"	1'-11"
#6	2'-11"	2'-3"	3'-10"	2'-11"	2'-7"	2'-0"	3'-4"	2'-7"
#7	4'-0"	3'-1"	5'-3"	4'-0"	3'-6"	2'-8"	4'-6"	3'-6"
#8	5'-3"	4'-1"	6'-10"	5'-3"	4'-7"	3'-6"	5'-11"	4'-7"
#9	6'-8"	5'-2"	8'-8"	6'-8"	5'-9"	5'-9"	7'-6"	5'-9"

- NOTES:
- UNLESS INDICATED OTHERWISE, USE THE CLASS 'B' LAP SPLICE LENGTHS. (CRSI CATEGORY 3), MULTIPLIED BY THE APPLICABLE FACTORS LISTED BELOW.
 - WHERE CLEAR SPACE BETWEEN BARS LAP SPLICED AT ANY SECTION IS LESS THAN EQUAL TO THE BAR DIAMETER, INCREASE THE LAP LENGTH BY 40% (CRSI CATEGORY 1).
 - WHERE ONE-HALF OR LESS OF BARS IN ANY LAYER ARE SPLICED AT ANY SECTION, A CLASS 'A' SPLICE MAY BE USED.
 - WHERE LIGHTWEIGHT AGGREGATE CONCRETE IS USED, INCREASE LAP SPLICE LENGTH BY 30%.
 - TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BARS.
 - SPLICES OF HORIZONTAL REINFORCEMENT IN WALLS SHALL BE STAGGERED.
 - SPLICES IN WALLS CONTAINING TWO CURTAINS OF REINFORCEMENT SHALL NOT OCCUR IN THE SAME LOCATION.
 - IN SHOTCRETE WALLS SPLICES IN REINFORCING BARS SHALL BE BY THE NON-CONTACT LAP SPLICE METHOD WITH AT LEAST 2 INCHES CLEARANCE BETWEEN BARS. THE BUILDING OFFICIAL MAY PERMIT THE USE OF CONTACT LAP SPLICES WHEN NECESSARY FOR THE SUPPORT OF THE REINFORCING PROVIDED IT CAN BE DEMONSTRATED BY MEANS OF PRE-CONSTRUCTION TESTING, THAT ADEQUATE ENCASEMENT OF THE BARS AT THE SPLICE CAN BE ACHIEVED, AND PROVIDED THAT THE SPLICES ARE PLACED SO THAT A LINE THROUGH THE CENTER OF THE TWO SPLICED BARS IS PERPENDICULAR TO THE SURFACE OF THE SHOTCRETE WORK.



SECTION B-B'
GRADE BEAM AND STEM DETAIL
SCALE: 1"=1'

TYPICAL DRILLED PIER
SCALE: 1"=1'

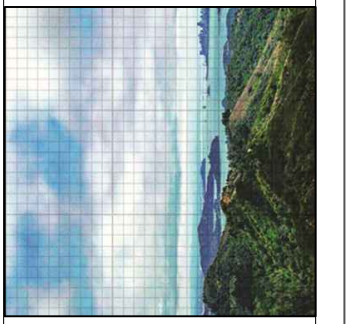


SECTION A-A'
SCALE: 1"=5'

#	REVISIONS	BY
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AGNEW CIVIL ENGINEERING
CIVIL AND GEOTECHNICAL CONSULTANTS
454 LAS GALINAS AVE SUITE 1047 SAS RAFAEL, CA
415 868 5532 OFFICE/FAX



NEW ON-SITE WASTEWATER TREATMENT SYSTEM
BOTTOMLESS INTERMITTENT SAND FILTER
BETTY LOU HUDSON
17715 CA-1, MARSHALL, CA

DATE 12/5/19
SCALE AS SHOWN
DRAWN OWA
JOB 88-1
SHEET
S-1