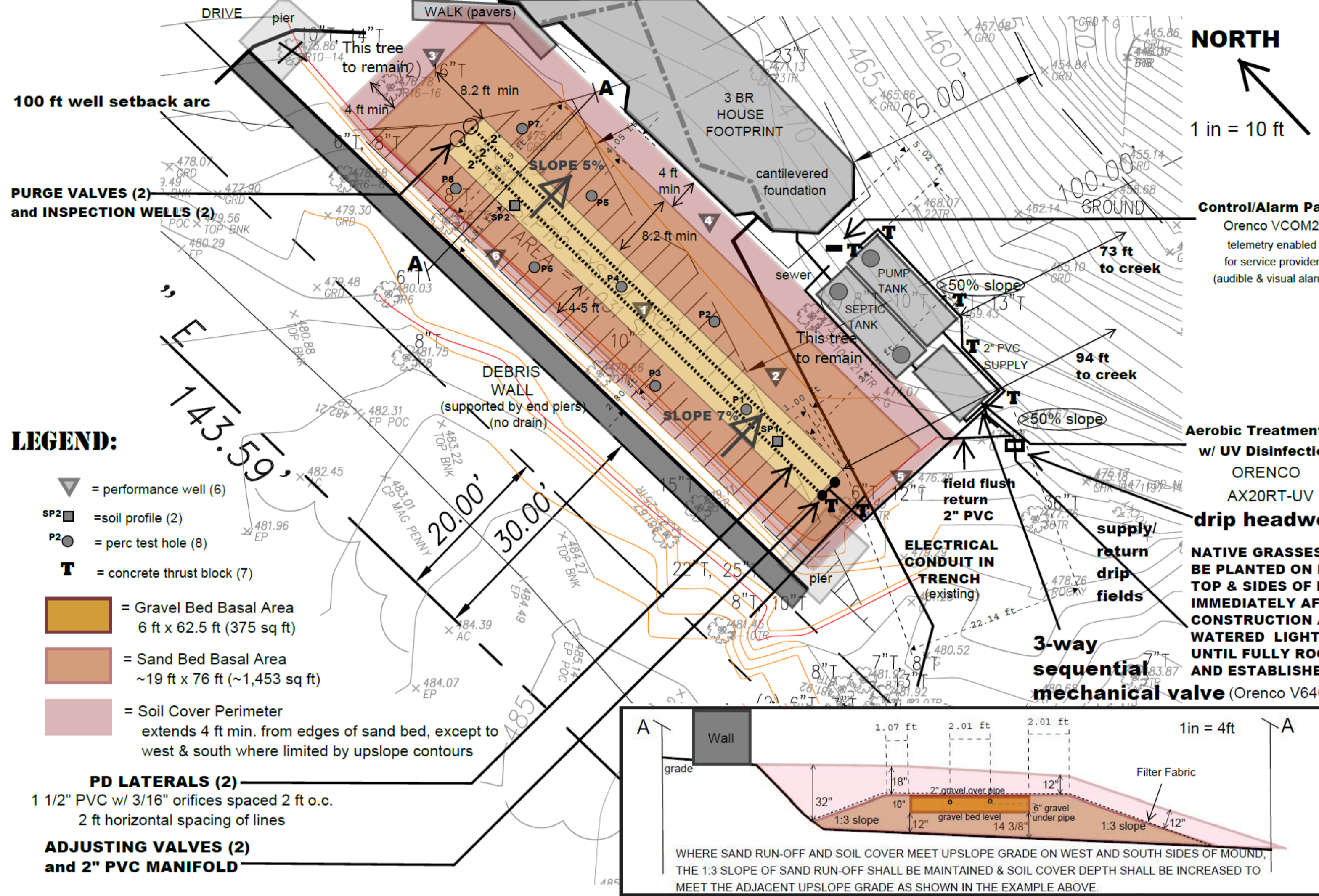


SITE PLAN:

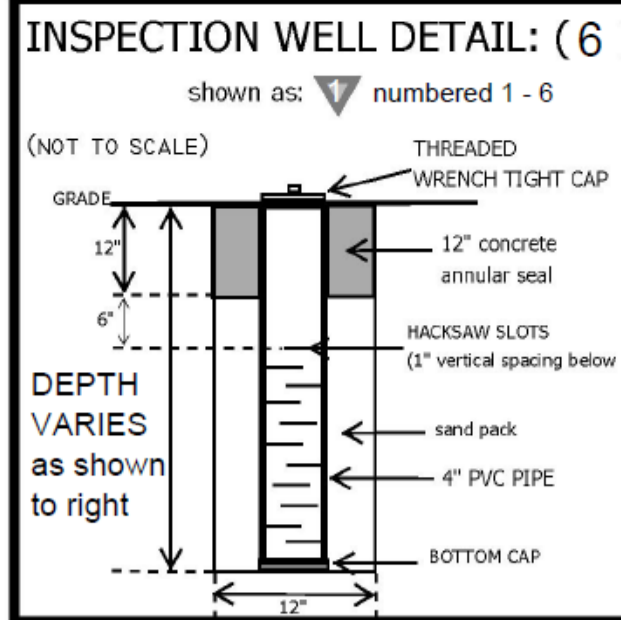


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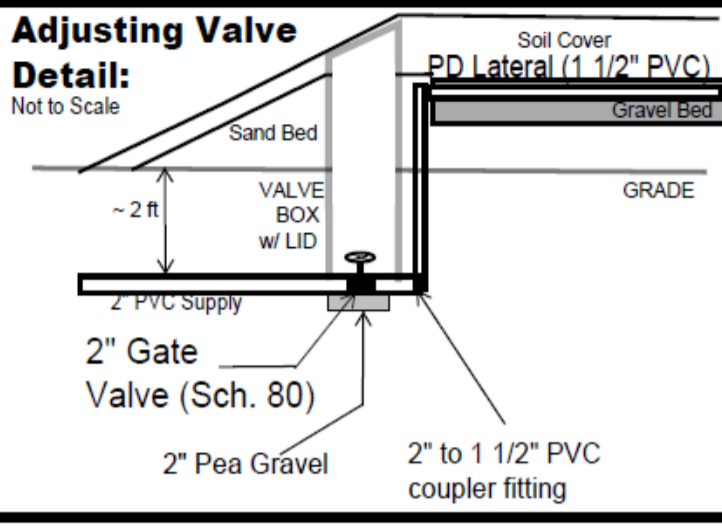
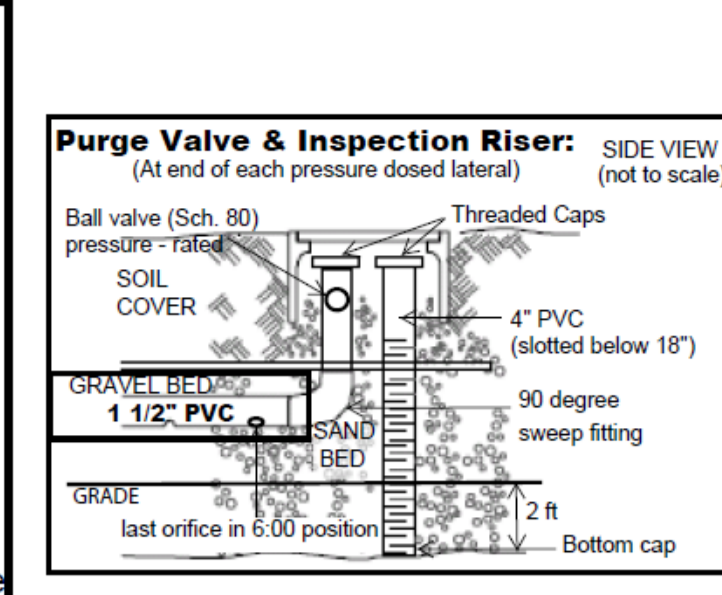
- ▽ = performance well (6)
- SP2 = soil profile (2)
- P2 = perc test hole (8)
- T = concrete thrust block (7)
- [Orange Box] = Gravel Bed Basal Area
6 ft x 62.5 ft (375 sq ft)
- [Light Orange Box] = Sand Bed Basal Area
~19 ft x 76 ft (~1,453 sq ft)
- [Pink Box] = Soil Cover Perimeter
extends 4 ft min. from edges of sand bed, except to west & south where limited by upslope contours

PD LATERALS (2)
1 1/2" PVC w/ 3/16" orifices spaced 2 ft o.c.
2 ft horizontal spacing of lines

**ADJUSTING VALVES (2)
and 2" PVC MANIFOLD**



INSPECTION WELL DEPTHS:
▽ = center of mound well to bottom of gravel bed
▽ = sand basal area well to 6" below grade
▽ = perimeter wells to 5' below grade



Sand Specifications. The sand media shall be a medium to coarse sand which meets the following gradation specifications:

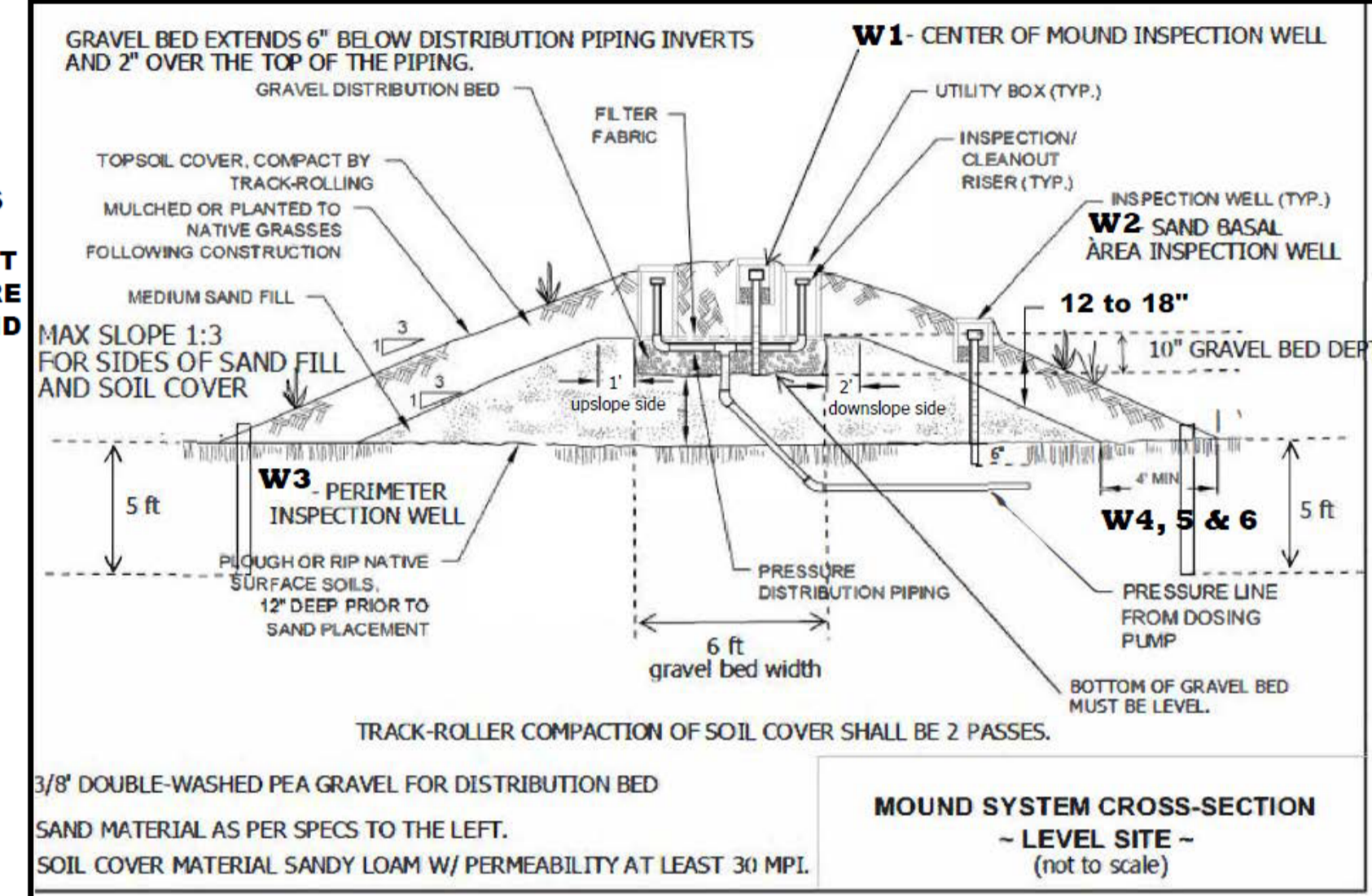
Sieve Size	Percent Passing
#3/8	100
#4	90-100
#10	62-100
#16	45-82
#30	25-55
#50	5-20
#60	0-10
#100	0-4
#200	0-2

Documentation of laboratory sieve analysis results for the proposed sand fill material shall be supplied to DEH to verify conformance with the above specifications.

Control/Alarm Panel
Orencia VCOM2 - DRIP
telemetry enabled for service provider (audible & visual alarms)

Aerobic Treatment Unit w/ UV Disinfection
ORENCO AX20RT-UV
drip headworks

NATIVE GRASSES MUST BE PLANTED ON ENTIRE TOP & SIDES OF MOUND IMMEDIATELY AFTER CONSTRUCTION AND WATERED LIGHTLY UNTIL FULLY ROOTED AND ESTABLISHED.



Project Scope & Rationale:
This hybrid mound and drip system septic design is to replace the system approved to serve the 3 BR home now in the final phase of its permitted construction. The system originally approved by DEH for the building permit is no longer feasible where proposed due to grading that removed the soil where perc testing & soil profiles had been done. The same dripfield layout/configuration that was originally approved by DEH is being proposed in a new area <100 ft to creek, where soil profiles showed nearly identical soil characteristics as where the system was originally proposed. The mound is proposed to further augment infiltrative area where the 100 ft setback to the creek from the basal gravel bed dispersal zone is largely satisfied. Perc testing in the mound area had a failing result > 120 MPI, but soil profiles showed an acceptable soil matrix of sandstone and clay to a depth of 4 ft. The mound design concept provides a permissible means of providing an artificial "fill" material for wastewater treatment and disposal. No signs of GW seen in soil profiles. The site is extremely constrained by setbacks to the creek, water well(s), road, drainage features, and structures including the large debris wall just upslope from the only area meeting setbacks. DOSING is proposed to alternate 3-ways from dripfield A to the dripfield B to mound, repeating that order in subsequent dosing sequences. The dual dripfields, sized for 3 BR, ensure sufficient infiltrative area while the mound provides for 1/3 of the aerobically filtered and UV disinfected effluent to be dispersed where the 100 ft creek setback is largely met.

INFILTRATIVE AREA CALCULATIONS & SPECIFICATIONS FOR MOUND SEPTIC SYSTEM

Wastewater Peak Flow Rate = 450 gallons per day (3-BR House)

Gravel Distrib. Bed Area: Required Infiltrative Area = 375 ft² (450 gpd/1.2 gpd/ft² for residential)
Max. Linear Loading Rate = 7 gpd/ft (Table M-2: 3-4 ft soil, 61-120 MPI, 1-10% slope)
Bed Area = 6' W x 62.5' L (375 ft²)
Linear Loading Rate = 4.8 gpd/ft (300 gpd for 3 BR / 62.5 ft GB length)

Basal Sand Bed Area: Average Percolation Rate > 120 MPI (Test Holes 1 - 8)
Application Rate = 0.1 gpd/ft² (Table M-1: SCC OWTs -interpolated)
Required Infiltrative Area = 4,500 sq ft (450 gpd/0.1 gpd/ft²)
Bed Area = 19' W x 76' L (1,453 ft²) - about 32% of area required

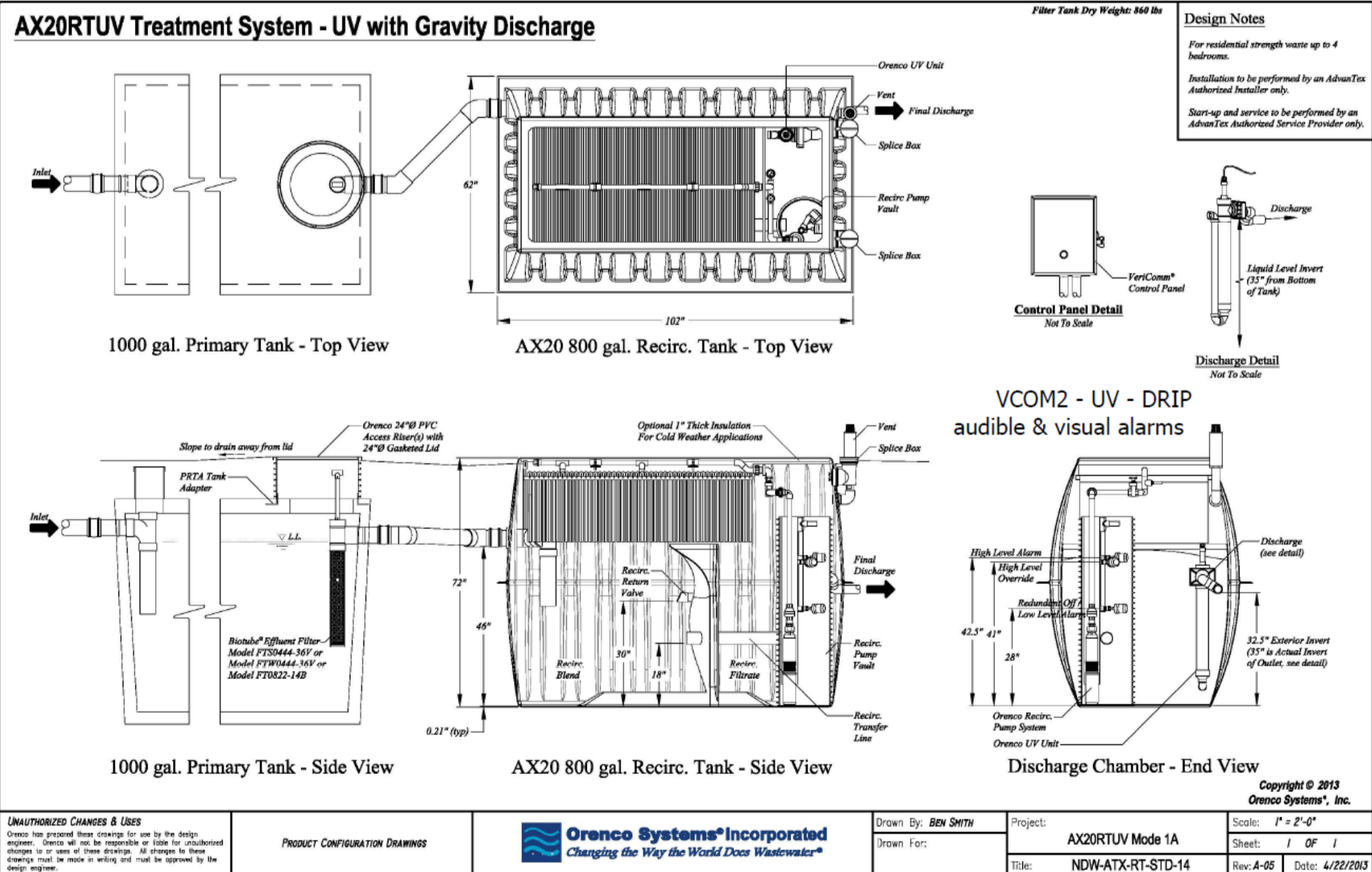
Slope in Mound Dispersal Areas: 7% (max) Depth to Groundwater: 4.0 ft (2 ft req.)
(SCC design requirement for sizing and dual mounds cannot be met - insufficient Area meeting slope & setback req.)

Percolation Test (3/5/21) & Soil Profile Data (3/3/21):
P1 - 4 MPI, P2 - 307 MPI, P3 - 73 MPI, P4 - 39 MPI, P5 - 105 MPI
P6 - 287 MPI, P7 - 102 MPI, P8 - 280 MPI Average Adjusted Rate = 150 MPI
SP1 & SP2 - 0 to 4 ft - Damp Decomposed Sandstone & Clay Matrix
Below 3 1/2 ft - Transition to More Consolidated Sandstone
TESTS WITNESSED by Darius Haghghi, R.E.H.S.

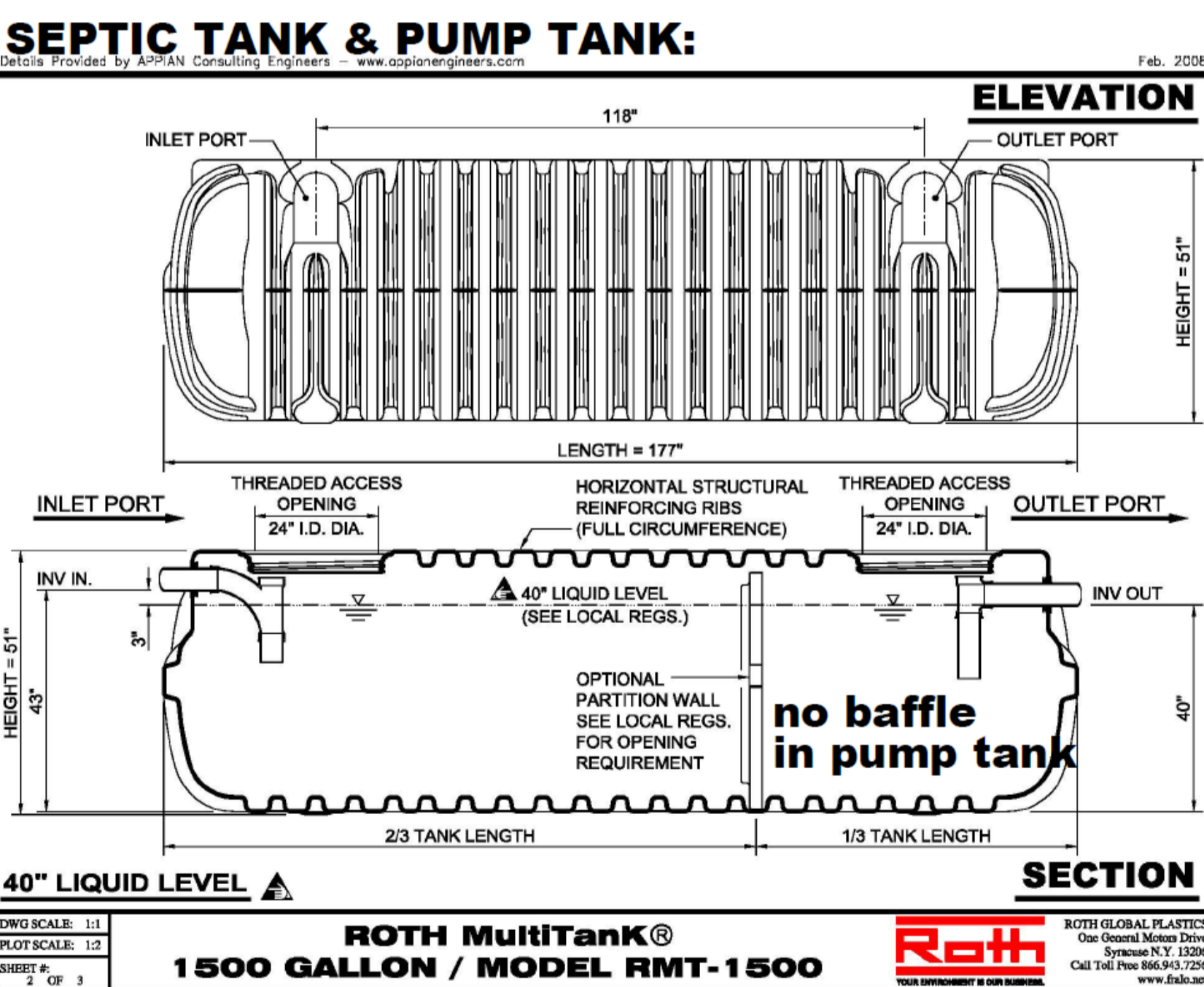
PRESSURE-DOSED LATERALS:

PRESSURE-DOSED LATERAL DETAIL:
Pipe: 1 1/2" Orifice Size: 3/16" Orifice Spacing: 24" o.c.
Orifice Orientation: 12 O'Clock, except last orifice on each line at 6 O'Clock
Note: ORIFICES MUST BE DE-BURRED AFTER THEY ARE DRILLED

Laterals (2) Length: 62.5 ft each, Orifices per Lateral: 30
Total Orifices/Lateral in 12:00 position: 29 (Last Orifice in 6:00 position)
Distance of 1st and Last Orifice from Lateral Pipe Ends: 2 1/4 ft
ORIFICE SHEILDS over ALL 12:00 POSITIONED ORIFICES (58)



- STEP BY STEP INSTALLATION PROCEDURES:**
- Stake out all components of system and mark setbacks lines.
 - Prepare gravel and sand bed area by removing brush and small shrubs and plowing/ripping the top 6 to 12 inches of soil.
 - Fence off gravel & sand bed area to prevent disturbance/compaction of soil.
 - Excavate tank & treatment pits. Install units & backfill per manufacturers guidance.
 - Install performance wells to proper elevations in mound area.
 - Excavate trenching for septic tight line pipes. Install piping.
 - Excavate trenching for electrical/signal wire conduit. Install wiring and panel.
 - Place gravel & sand, level gravel, place PD lateral pipes, gravel over pipes, filter fabric, and make connections to supply lines.
 - Cover with approved soil material extending to specified perimeter around beds. Compact with tract roller, 2 passes.
 - Backfill components, restore proper grading, cover w/ straw mulch & seed areas.



SEPTIC TANK & PUMP TANK:

ANNUAL SEPTIC & PUMP TANKS INSPECTION REQUIRED:

- Access risers & lids in good condition.
- Structural integrity - probe interior walls/baffles, inlet/outlet T-pipes.
- Check Biotube effluent filter and clean if needed.
- Septic tank liquid level - should be at outlet invert in tank.
- Pump tank electrical & signal wires in good condition.
- Pump tank proper operation of floats switches.

ON-SITE WATER TIGHTNESS TESTING (REQUIRED PRIOR TO SEPTIC TANK & PUMP TANK USE)

- FILL TANK TO WITHIN RISERS
- LET TANK SIT FOR 1 HOUR
- OBSERVE WATER LEVEL IN RISER BEFORE AND AFTER 1 HR PERIOD
- IF LEVEL HAS FALLEN, INSPECT FOR LEAKS
- REPAIR ANY LEAKS AND REPEAT TEST

CONSTRUCTION INSPECTIONS Required w/ Designer & DEH:

- Layout Inspection - All components staked or painted
- Open Trench & Bed Inspection - Components in & not covered
- Septic & Pump Tank Water Tightness Testing
- Pump Test - Pumps, hydraulics (siphon), and alarms operational. 150 psi inspection - all components covered.

ONGOING MONITORING & REPORTING REQUIREMENTS:

- Record wastewater flow based on water meter readings or other method
- Measurement and recording of water levels in inspection wells.
- Inspection of pump and valves operation, including siphon test.
- Inspection of mounds & adjacent areas for seepage, erosion, etc.

MONITORING REPORT SHALL BE SIGNED BY LICENSED PROFESSIONAL AND SUBMITTED TO DEH IN ACCORDANCE WITH THE SYSTEM OPERATING PERMIT.

PUMP SELECTION CALCULATIONS:

(note some elevations, lengths and flows are exaggerated for conservative hydraulic calculation)

FLOW RATE - The orifice discharge rate for 3/16" diameter at 5 ft residual head is 0.93 gpm (SOURCE: COWA PD Design Manual, p. 153)
Total flow for 60 orifices = 56 gpm
Flow per Lateral = 28 gpm

PRESSURE - Head loss calculations: Note: All PVC is Schedule 40. f = L(Q/K)^{1.85} & K = 284.5, 147.5 for 2", 1 1/2" pipe (SOURCE: COWA)

- Lift in pump tank from pump discharge to outlet: 5.0 ft
- Elevation lift to highest point in dispersal field: (483 - 472 ft) = 11.0 ft
- 2" Supply: 6 ft in-tank pipe + 19 ft check valve + 44 ft (18x90°) + 80 ft (2xT branch, 1 ball & 2 x gate valves) + 70 ft pipe length + 50 ft (2" - 1 1/2" fitting) = 269 ft x (56 gpm/284.5) 1.85 = 269 ft x 0.05 = 13.5 ft
- 1 1/2" Lateral: 100 ft pipe length + 2 ft (purge gate valve) + 6 ft (90 degree sweep) = 108 ft (31 gpm/147.5) 1.85 = 108 ft x 0.06 = 5.0 ft
- Residual Head

TOTAL: 40.5 ft

These design points (56 gpm @ 41 ft) are labeled on the pump performance curve (attached) for the selected pump:

Order No.	Model	GPM	HP	Volt	Wire	Wt.
94706020	60LE1S4-2W230	60	1	230	2	37

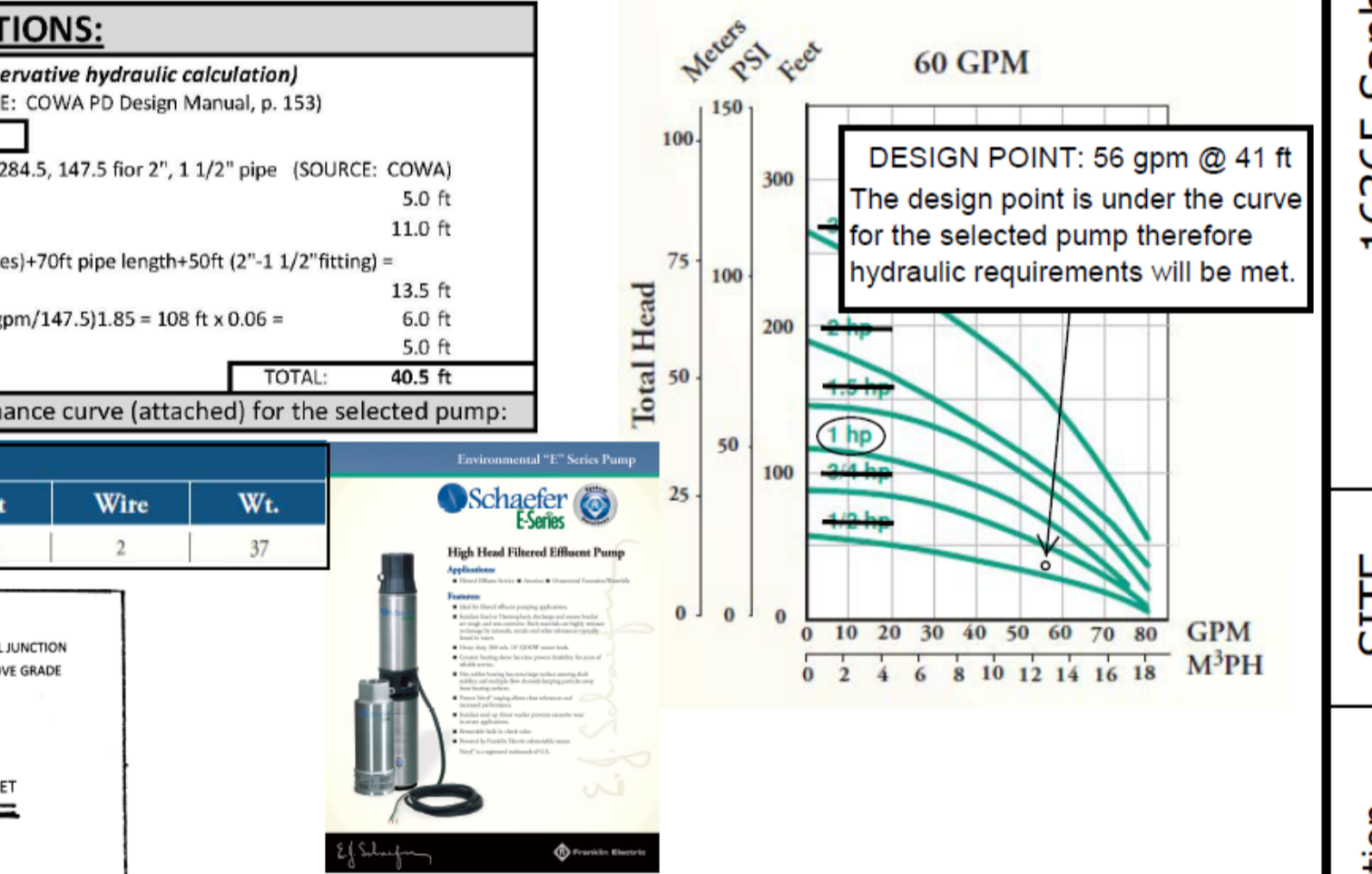
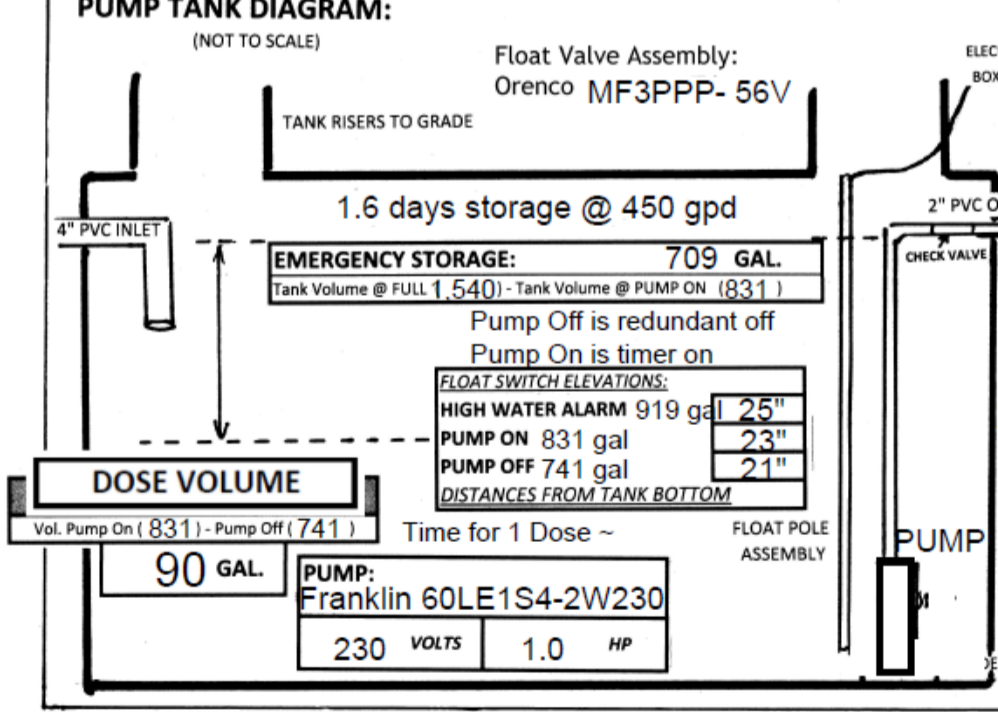
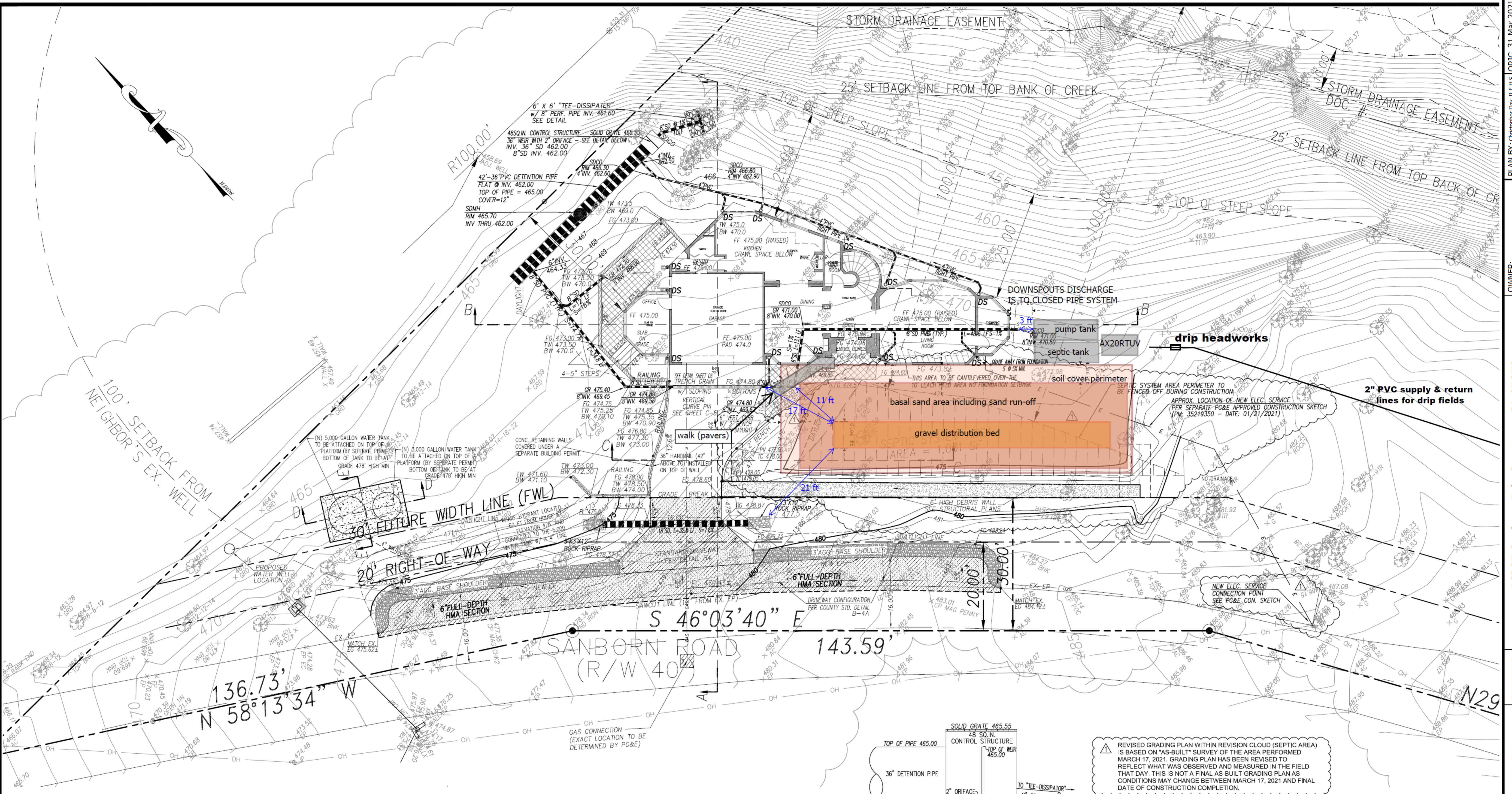
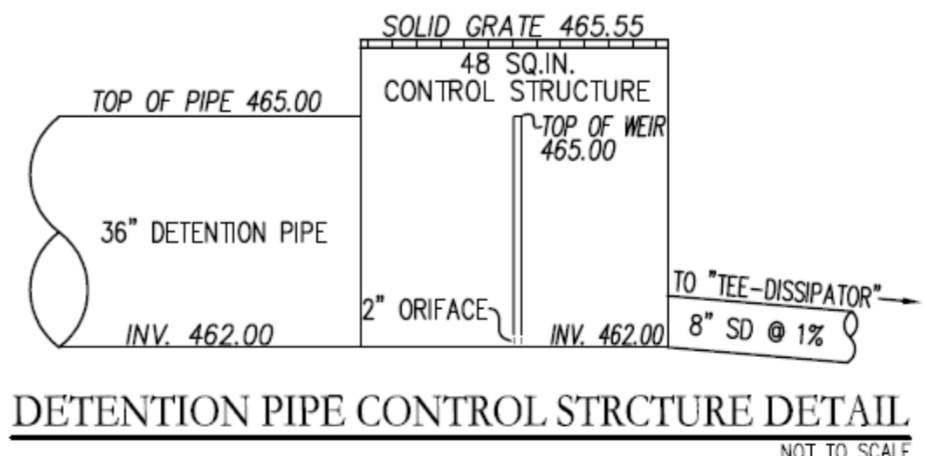


Table M-3. Mound System Management Requirements

Inspection	Work	Frequency
Inspection	<ul style="list-style-type: none"> Conduct routine visual observations of mound and downslope area and surroundings for wet areas, pipe leaks or damage, soil erosion, drainage issues, abnormal vegetation, gophers or other problems. Perform all inspections of pump and appurtenances (per O&M manual and Performance Evaluation Guidelines, Part 5 of this Manual). Record observations. 	<ul style="list-style-type: none"> Every 6 to 12 months.
Maintenance	<ul style="list-style-type: none"> Purge laterals, squirt and balance. Exercise valves to ensure functionality. Perform all maintenance work as recommended by equipment manufacturer for any special valves or other components. Maintain mound area landscape vegetation, as req'd Investigate and repair erosion, drainage or other disposal field problems, as needed. Investigate and perform distribution system corrective work, as req'd. Record work done. 	<ul style="list-style-type: none"> Distribution system maintenance annually. Other maintenance as required.
Water Monitoring & Sampling	<ul style="list-style-type: none"> Measure and record water levels in observation wells in distribution bed, sand fill and around mound perimeter. Obtain and analyze water samples from monitoring wells, as applicable, per permit requirements. 	<ul style="list-style-type: none"> Measure mound system water levels annually. Other monitoring according to permit conditions, as applicable.
Reporting	<ul style="list-style-type: none"> Report findings to DEH per permit requirements. Standard report to include dates, observation well and monitoring well readings and other data collected, work performed, corrective actions taken, and performance summary. Report public health/water quality emergency to DEH immediately. 	<ul style="list-style-type: none"> According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.



REVISOR'S NOTE: REVISED GRADING PLAN WITHIN REVISION CLOUD (SEPTIC AREA) IS BASED ON "AS-BUILT" SURVEY OF THE AREA PERFORMED MARCH 17, 2021. GRADING PLAN HAS BEEN REVISED TO REFLECT WHAT WAS OBSERVED AND MEASURED IN THE FIELD THAT DAY. THIS IS NOT A FINAL AS-BUILT GRADING PLAN AS CONDITIONS MAY CHANGE BETWEEN MARCH 17, 2021 AND FINAL DATE OF CONSTRUCTION COMPLETION.

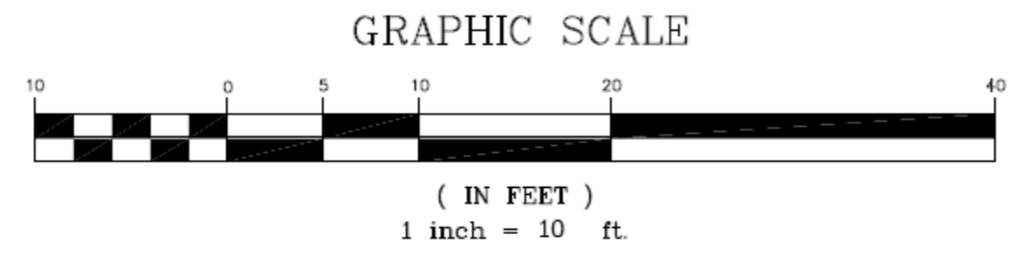


UTILITY CONNECTIONS: A SEPARATE ENCROACHMENT PERMIT SHALL BE REQUIRED BY THE PROPERTY OWNER OR THE UTILITY COMPANY. IF PROPANE TANKS ARE PROPOSED, IT MUST BE LOCATED OUTSIDE THE RIGHT-OF-WAY.

APPROVED FOR ISSUANCE REFER TO ENCROACHMENT AND/OR CONSTRUCTION PERMIT AND PLAN COVER SHEET FOR SPECIAL CONDITIONS AND PERMIT NUMBERING.

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DATE: FEB 07, 2020	DSK	03/26/21	REVISED GRADING BY DRIVEWAY AND SEPTIC AREA, ADDED PG&E SVC.
SCALE: AS SHOWN			
DRAWN: DSK			
DESIGNED: DSK			
ENGINEER: DSK			
MANAGER: DSK			
	NO.	BY	DATE
			REVISIONS
			CITY APPR

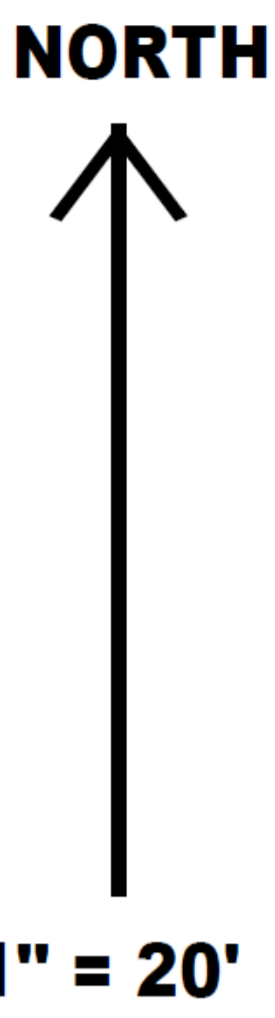
PREPARED BY:
STERLING CONSULTANTS
 46560 FREMONT BOULEVARD, UNIT NO. 205
 FREMONT, CA 94538
 1sterlingconsultants@gmail.com PHONE: 510.344.8956

PREPARED FOR:
 NAMIT GUPTA & SHIVI AGARWAL
 3084 CRATER LANE
 SAN JOSE, CA 95132

GRADING PERMIT / ENCROACHMENT PERMIT
 CONCURRENT REVIEW
GRADING, DRAINAGE & UTILITY PLAN
 CITY OF SARATOGA (UN-INCORPORATED) SANTA CLARA COUNTY CALIFORNIA

PLAN BY: Christopher Day, R.E.H.S. ORIG 31 Mar 2021
 P.O. Box 26, Redwood City, CA 94064 REV 1: 17 JUN 21
 Tel. 650-293-1045
 Email: christopherday@aol.com
 OWNER: Namit Gupta & Shivi Agarwal
 Tel. 408-650-2738
 Email: shiv6537@gmail.com
 16365 Sanborn Rd., Saratoga, CA 95070
 APN 517-33-015 (SR0857040)
 GRADING DRAINAGE
 Mound w/ Treatment & UV Disinfection Septic System Replacement Design Plan
 OWTS 2

FEASIBLE AREAS FOR NEW SEPTIC AREA LIMITED TO THE UHSHADED AREAS TO THE WEST OF THE CREEK:



well setback circles

NEIGHBORS WATER WELL

WATER WELL

A BRIDGE ACROSS THE CREEK IS NOT FEASIBLE DUE TO MINIMUM SPAN OF 66 FT AND HEIGHT OF BRIDGE ABOVE CREEK NEEDED OVER 50 FT.

NOTE THAT SOIL CHARACTERISTICS FOR SOIL IN ORIGINAL DRIPFIELD LOCATION ARE NEARLY IDENTICAL TO CHARACTERISTICS IN THE NEW PROPOSED AREA. THIS INDICATES THAT ABSORPTION RATES ARE VERY LIKELY ALSO THE SAME.

STEEP BANKS height ~ 50 ft

STEEP BANKS h ~ 10 ft

HOUSE

CLOSEST SPAN ~ 66 ft

right of way easement

only area of property meeting all required septic setbacks (area proposed for mound)

proposed additional area for drip dispersal fields within 100 ft setback to creek bed. The dripfield design that was previously approved is moved to this location.

○ = enormous rocks greater than 5 feet in diameter. If removed would result in disturbance of the soil from equipment and from removal of integral component of existing topography.

APPROXIMATE 100 FT SETBACK TO CREEK BANK

APPROXIMATE 100 FT SETBACK TO CREEK BANK

Soil Analysis Test Data
 APN 517-33-015 (SR0857040)
 Sanborn Rd., Saratoga, CA
 Owner: Namit Gupta & Shivi Agarwal
 REVISED REPORT SUBMITTED 6/10/2018
 Test Conducted on 4/25/2018
 By Chris Day, R.E.H.S. Tel. 650-293-1045
 Witnessed by Darius Haghighi, R.E.H.S.

Soil Profile Test Hole #1	Depth: 5 ft.	Shown as SP1, SP2
0 to 24"	Sandy Loam Roots Coarse & Common Pores Coarse & Common Weak Subangular Structure Less Than 15% Rock Dry Condition of Soil Color Brown No Mottling	Not Restrictive
24 to 48"	Clay Sand Roots None Pores Coarse & Common Weak Subangular Structure More Than 50% Rock Moist Condition of Soil Color Tan No Mottling	Not Restrictive
48 to 60"	Fractured Sandstone Large Cobbles	RESTRICTIVE due to presence of sandstone (no soil)

Soil Profile Test Hole #2	Depth: 6 ft.	
0 to 18"	Same Characteristic as Horizon 1 (SP1)	Not Restrictive
18 to 36"	Same Characteristic as Horizon 2 (SP1)	Not Restrictive
36 to 72"	Same Characteristic as Horizon 3 (SP1)	RESTRICTIVE

Soil Analysis Test Data
 APN 517-33-015 (SR0857040)
 Sanborn Rd., Saratoga, CA
 Owner: Namit Gupta & Shivi Agarwal
 Test Conducted on 5/25/2021
 By Chris Day, R.E.H.S. Tel. 650-293-1045
 Witnessed by Darius Haghighi, R.E.H.S.

Soil Profile Test Hole #1	Depth: 5 ft.	
0 to 24"	Sandy Loam Roots Medium & Common Pores Coarse & Common Weak Subangular Structure Less Than 15% Rock Dry Condition of Soil Color Black No Mottling	Not Restrictive
24 to 48"	Clay Sand (Fractured Sandstone) Roots Medium & Medium Pores Medium & Common Weak Subangular Structure About 50% Rock Dry Condition of Soil Color Tan No Mottling	Not Restrictive

Soil Profile Test Hole #2	Depth: 6 ft.	
0 to 24"	Same Characteristic as Horizon 1 (SP1)	Not Restrictive
24 to 48"	Same Characteristic as Horizon 2 (SP1)	Not Restrictive

DRIPFIELDS, DRIPLINE & HEADWORKS: Geoflow Fittings:

Worksheet 1- Field Flow - DRIPFIELD A

Total field	
Total Quantity of effluent to be disposed per day	450 gallons / day
Hydraulic loading rate	1.2 gallons / sq ft / day
Minimum Dispersal Field Area	375 square ft
Total Dispersal Field Area	376 square ft

Flow per zone	
Number of Zones	1 zone(s)
Dispersal area per zone	376 square ft
Choose line spacing between WASTEFLOW lines	2 ft
Choose emitter spacing between WASTEFLOW emitters	2 ft
Total linear ft per zone (minimum required)	188 ft. per zone
Total number of emitters per zone	95 emitters per zone
Select Wasteflow dripline (16mm)	Wasteflow PC - 1/2gph dripline
Pressure at the beginning of the dripline	30 psi
Feet of Head at the beginning of the dripline	89.3 ft
What is the flow rate per emitter in gph?	0.53 gph
Dose flow per zone	0.84 gpm
If required, choose flush velocity	0.5 ft/sec
How many lines of WASTEFLOW per zone?	5 lines
Fill in the actual length of longest dripline lateral	70 ft
Flush flow required at the end of each dripline	0.37 gpm
Total Flow required to achieve flushing velocity	1.85 gpm
Total Flow per zone - worst case scenario	2.79 gpm

Select Filters and zone valves	
Select Filter Type	BIODISC FILTER
Recommended Filter (item no.)	BioDisc Filter-150 1.5in < 30 gpm
Select Zone Valve Type	Electric Solenoid
Recommended Zone Valve (item no.)	0

Dosing	
Number of doses per day / zone	9 doses
Timer ON Pump run time per dose/zone	53.24 mins.secs
Timer OFF Pump off time between doses	1.46 hrs.mins
Per Zone - Pump run time per day/zone	8.00 hrs.mins
All Zones - Number of doses per day / all zones	9 doses / day
Allow time for field to pressurize	0:00.30 hrs.mins.secs
Filter flush timer	0:00.20 hrs.mins.secs
Drain timer	0:05.00 hrs.mins.secs
Field flush timer	0:04.00 hrs.mins.secs
Field flush counter	3 cycles
Time required to complete all functions per day	9:29 hrs.mins
Dose volume per zone	50 gallons per dose

Worksheet 1- Field Flow - DRIPFIELD B

Total field	
Total Quantity of effluent to be disposed per day	450 gallons / day
Hydraulic loading rate	1.2 gallons / sq ft / day
Minimum Dispersal Field Area	375 square ft
Total Dispersal Field Area	375 square ft

Flow per zone	
Number of Zones	1 zone(s)
Dispersal area per zone	375 square ft
Choose line spacing between WASTEFLOW lines	2 ft
Choose emitter spacing between WASTEFLOW emitters	2 ft
Total linear ft per zone (minimum required)	188 ft. per zone
Total number of emitters per zone	95 emitters per zone
Select Wasteflow dripline (16mm)	Wasteflow PC - 1/2gph dripline
Pressure at the beginning of the dripline	30 psi
Feet of Head at the beginning of the dripline	89.3 ft
What is the flow rate per emitter in gph?	0.53 gph
Dose flow per zone	0.84 gpm
If required, choose flush velocity	0.5 ft/sec
How many lines of WASTEFLOW per zone?	5 lines
Fill in the actual length of longest dripline lateral	62 ft
Flush flow required at the end of each dripline	0.37 gpm
Total Flow required to achieve flushing velocity	1.85 gpm
Total Flow per zone - worst case scenario	2.69 gpm

Select Filters and zone valves	
Select Filter Type	BIODISC FILTER
Recommended Filter (item no.)	BioDisc Filter-150 1.5in < 30 gpm
Select Zone Valve Type	Electric Solenoid
Recommended Zone Valve (item no.)	0

Dosing	
Number of doses per day / zone	9 doses
Timer ON Pump run time per dose/zone	59.35 mins.secs
Timer OFF Pump off time between doses	1.40 hrs.mins
Per Zone - Pump run time per day/zone	8.56 hrs.mins
All Zones - Number of doses per day / all zones	9 doses / day
Allow time for field to pressurize	0:00.30 hrs.mins.secs
Filter flush timer	0:00.20 hrs.mins.secs
Drain timer	0:05.00 hrs.mins.secs
Field flush timer	0:04.00 hrs.mins.secs
Field flush counter	3 cycles
Time required to complete all functions per day	10:24 hrs.mins
Dose volume per zone	50 gallons per dose

Worksheet 1- Field Flow - DRIPFIELD B

Total field	
Total Quantity of effluent to be disposed per day	450 gallons / day
Hydraulic loading rate	1.2 gallons / sq ft / day
Minimum Dispersal Field Area	375 square ft
Total Dispersal Field Area	375 square ft

Flow per zone	
Number of Zones	1 zone(s)
Dispersal area per zone	375 square ft
Choose line spacing between WASTEFLOW lines	2 ft
Choose emitter spacing between WASTEFLOW emitters	2 ft
Total linear ft per zone (minimum required)	188 ft. per zone
Total number of emitters per zone	95 emitters per zone
Select Wasteflow dripline (16mm)	Wasteflow PC - 1/2gph dripline
Pressure at the beginning of the dripline	30 psi
Feet of Head at the beginning of the dripline	89.3 ft
What is the flow rate per emitter in gph?	0.53 gph
Dose flow per zone	0.84 gpm
If required, choose flush velocity	0.5 ft/sec
How many lines of WASTEFLOW per zone?	5 lines
Fill in the actual length of longest dripline lateral	62 ft
Flush flow required at the end of each dripline	0.37 gpm
Total Flow required to achieve flushing velocity	1.85 gpm
Total Flow per zone - worst case scenario	2.69 gpm

FLOW WORKSHEET for FIELD A on OWTS 2

Note: the longest lateral length includes additional 7 ft to account for supply/return connections and equivalent lengths of fittings (see above and to right).

Worksheet - Pump Sizing

Section 1 - Summary from Worksheet 1	
Flow required to dose field	0.84 gpm
Flow required to flush field	1.85 gpm
Flow required to dose & flush field	2.69 gpm
Filter	BioDisc Filter-150
No. of Zones	1 zone(s)
Dripline	Wasteflow PC - 1/2gph
Dripline longest lateral	62.00 ft

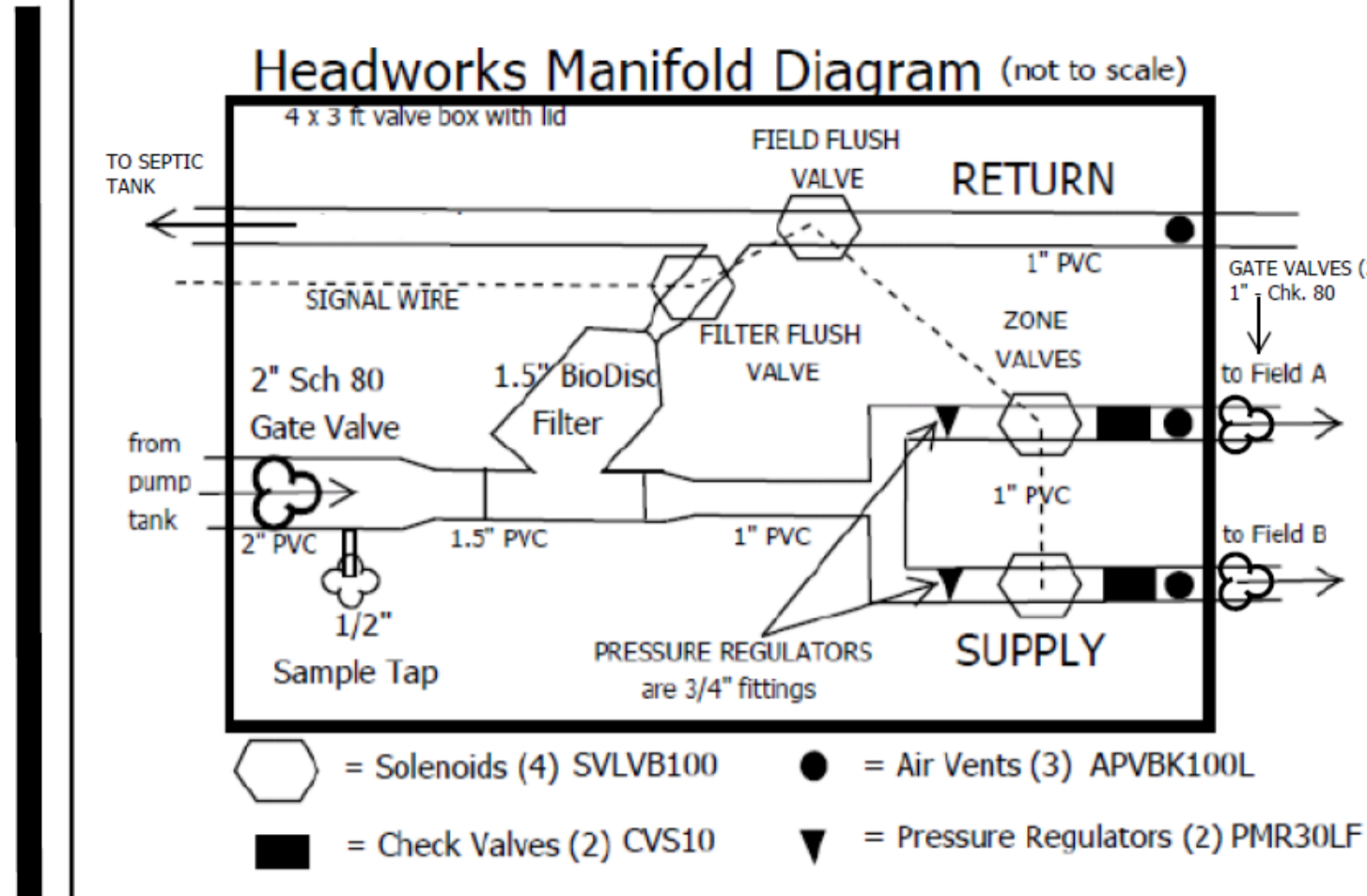
Section 2		ft of head	Pressure
A. Flush line - Losses through return line			
Select Pipe from dropdown menu	PVC schedule 40		
Select Flush Line Diameter	1" inch		
Length of return line	140 ft.		
Equivalent length of fittings	50 ft.		
Elevation change (if downhill enter 0)	7 ft.		
Pressure loss in 100 ft. of pipe	0.28 ft.	0.12 psi	
Total pressure loss from end of dripline to return tank	7.6 ft.	3.27 psi	

B. Dripline - Losses through Wasteflow dripline			
Length of dripline lateral	62 ft.		
Minimum dosing pressure required at end of dripline	23.10 ft.	10.00 psi	
Loss through dripline during flushing	1.13 ft.	0.40 psi	
Total minimum required dripline pressure	24.23 ft.	10.40 psi	

A+B. Minimum Pressure required at beginning of dripline			
CALCULATED pressure required at beginning of drip	31.79 ft.	13.76 psi	
SPECIFIED pressure at beginning of dripline (from manufacturer)	69.3 ft.	30.00 psi	
Greater SPECIFIED Pressure is greater than CALCULATED Pressure requirement. Go to next step.			

C. Drip components - Losses through headworks			
Filter	11.6 ft.	5.00 psi	
Zone valve pressure loss (not in diagram)	- ft.	- psi	
Flow meter pressure loss (not in diagram)	- ft.	- psi	
Other pressure losses	0.30 ft.	0.13 psi	
Total loss through drip components	11.85 ft.	5.13 psi	

D. Supply line - Minimum Pressure head required to get from pump tank to top of dripline			
Select Pipe from dropdown menu	PVC schedule 40		
Select Supply line diameter	1" inch		
Length of supply line	123 ft.		
Equivalent length of fittings	505 ft.		
Height from pump to tank outlet	5 ft.		
Elevation change (if downhill enter 0)	2 ft.		
Pressure loss/gain in 100 ft. of pipe	0.55 ft.	0.24 psi	
Total gain or loss from pump to field	10.5 ft.	4.54 psi	
Total dynamic head	91.6 ft.	39.67 psi	
Pump capacity - Field Flush Flow	2.7 gpm	39.67 psi	
- Filter Dose Flow	0.8 gpm	- psi	
- Filter Flush Flow	- gpm	- psi	
Pump Model Number	Franklin 60LE1S4-2W230		
Voltz / Hp / phase	230 V / 2 HP / 1 PH		



NOTE REGARDING GEOFLOW WORKSHEETS: The worksheet would need to 2xflow or 1/2xthe application rate entered in order to perform calculations for a DUAL DRIP SYSTEM as required by DEH. The dual system will be operated with alternating doses between the two fields, similar to dosing zones. However, the spreadsheet is not capable of providing calculations for these two "zones" because each zone in the dual system is required to be designed for 100% of the flow and zones typically receive a fraction of the total flow. For this design the pump select worksheet was completed for Field B because the difference (2.7 vs. 2.8 gpm) in flow rate is negligible and the design flow (3.0 gpm) is greater than specified for either field while the pipe run to field B is significant longer than to field A. Calculations for the longer run will ensure the shorter run hydraulic requirement are met due to higher pressure required for longer run.

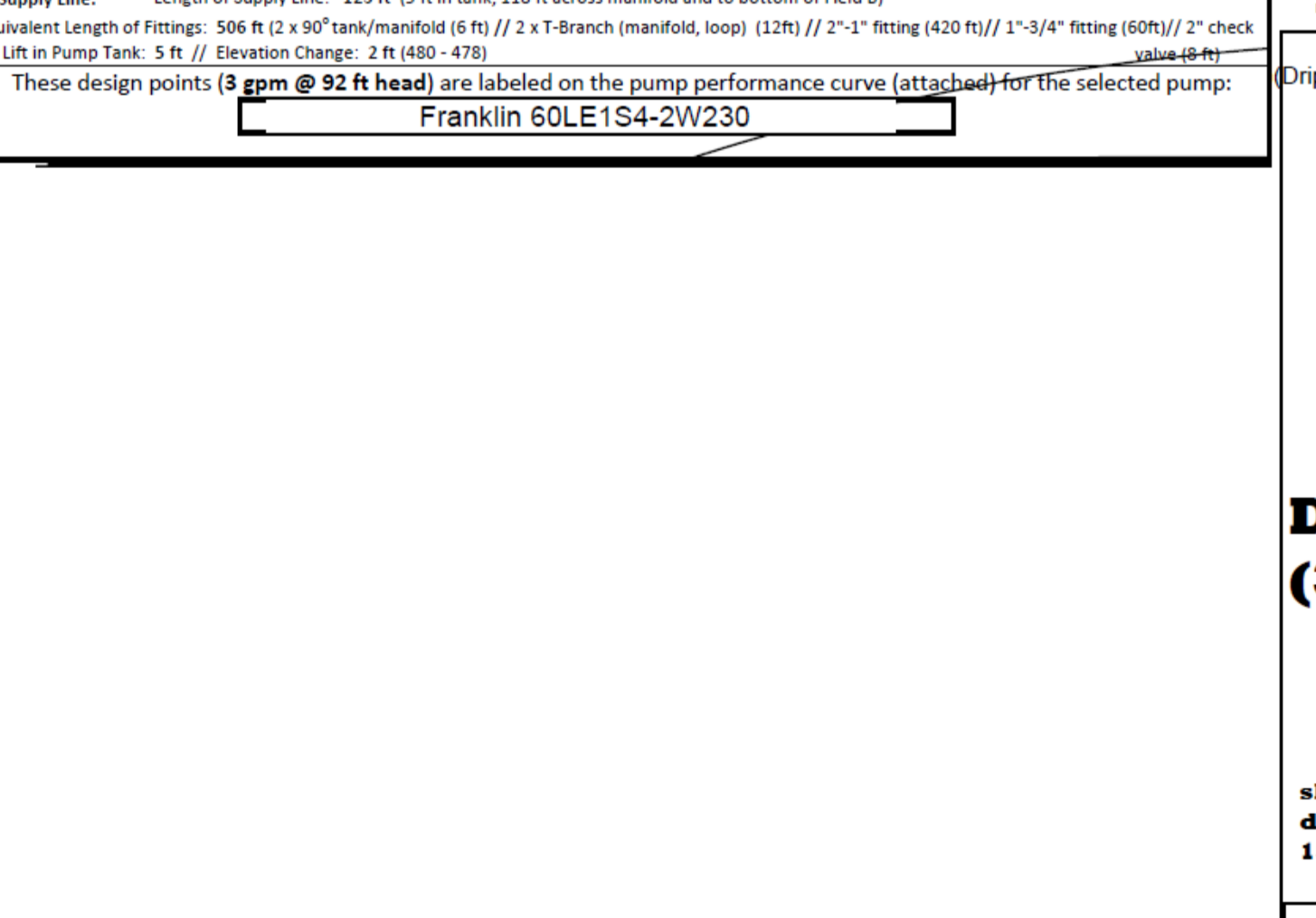
DRIPLINE SPECIFICATIONS:
Emitter Spacing: 24"
Line Spacing: 24"
WASTEFLOW PC 1/2 gph



Flow Rate vs. Pressure		
Pressure	Head	Flow Rate
7-60 psi	16-139 ft.	1/2 gph PC dripline
		0.53 gph

PUMP SELECTION CALCULATIONS & GEOFLOW WORKSHEET INPUTS:

LOW RATE - From Geoflow Worksheet **2.3 gpm** (Includes Dosing & Field Flushing)
RESSURE - From Worksheet & Calc. Below **92 ft**
Note: all PVC is Schedule 40. $H = L(Q/K)^2$ (SOURCE: COWI Manual, p. 154)
ump Meeting Flow & Pressure Requirement for Dripline B will also be sufficient to serve Dripline A due to calculations for longer pipe run
Flush Line: Equivalent Length of Fittings = 59 ft 1" Solenoid in Headworks = 0.2 ft 6 90° + 2 x 45° (1" PVC) = 6 x 2.7 ft + 2 x 1.3 ft = 19 ft
Return Line: 140 ft Check Valve (2) = 16 ft T-Branch Runs (1) = 1 x 6 ft + 6 ft
Elevation Change: 7 ft (480 - 473 ft) T-Thru Runs (4) = 4 x 2 ft = 8 ft 1 x 3/4" to 1" pipe expansion = 1 x 10 ft = 10 ft
Dripline Length of Longest Lateral (62 ft) 55 ft emitter line + 3 ft PVC to supply/return + 4 ft Equiv. Length 90° 3/4" PVC (2).
Drip Components: BioDisc Filter 0.3 ft (From Geoflow spreadsheet)
Equivalent Length Headworks Fittings = 1 ft (Gate Valve) + 8 ft (Check Valve) + 6 ft (T-Branch) + 3 ft (90 Elbow) + 0.2 ft (Solenoid) = 18 ft
eadioss due to Equivalent Length of Fittings = 18 ft(2.4 gpm/98.3)² = 18 ft x 0.001 = 0.0 ft
Supply Line: Length of Supply Line: 123 ft (5 ft in tank, 118 ft across manifold and to bottom of Field B)
Equivalent Length of Fittings: 506 ft (2 x 90° tank/manifold (6 ft) // 2 x T-Branch (manifold, loop) (12ft) // 2" - 1" fitting (420 ft) // 1" - 3/4" fitting (60ft) // 2" check Lift in Pump Tank: 5 ft // Elevation Change: 2 ft (480 - 478)
These design points (3 gpm @ 92 ft head) are labeled on the pump performance curve (attached) for the selected pump:
Franklin 60LE1S4-2W230



Air Vents: (5)

3 in Headworks
1 on Return Line
1 on field flush line to septic tank

Part No. APVBK75L APVBK100L
Inlet 3/4" 1"
Max Pressure 80 psi/185 ft. 80 psi/185 ft.
Max Temp 140° F 140° F
Height 5" 5.5"
Weight 1 oz. 1.2 oz.

Pressure Regulators: (2)

2 in Headworks

Item No.	Outlet Pressure	Flow Range	Max. Inlet Pressure	Inlet / Outlet
PMR-20-LF	20 psi	1/8-8 gpm	150 psi / 347ft	1/2" / 1/2" ftg
PMR-20-MF	20 psi	2-20 gpm	150 psi / 347ft	1" / 1" ftg
PMR-20-HF	20 psi	10-32 gpm	100 psi / 231ft	1.25" / 1" ftg
PMR-30-LF	30 psi	1/8-8 gpm	150 psi / 347 ft	1/2" / 1/2" ftg
PMR-30-MF	30 psi	2-20 gpm	150 psi / 347 ft	1" / 1" ftg
PMR-30-HF	30 psi	10-32 gpm	100 psi / 231 ft	1.25" / 1" ftg
PMR-40-LF	40 psi	1/8-8 gpm	150 psi / 347 ft	1/2" / 1/2" ftg
PMR-40-MF	40 psi	2-20 gpm	150 psi / 347 ft	1" / 1" ftg
PMR-40-HF	40 psi	10-32 gpm	100 psi / 231 ft	1.25" / 1" ftg
PMR-40-XF	40 psi	20-90 gpm	125 psi / 289 ft	3" / 3" ID dip.
PMR-50-MF	50 psi	2-20 gpm	150 psi / 347 ft	1" / 1" ftg
PMR-50-HF	50 psi	10-32 gpm	100 psi / 231 ft	1.25" / 1" ftg
PMR-50-XF	50 psi	20-90 gpm	125 psi / 289 ft	3" / 3" ID dip.

Solenoid Valves: (4)

4 in Headworks

Part No.	BioDisc-150MF	BioDisc-200MF
Inlet/Outlet	1.5 in. MPT	2 in. MPT
Flush port	0.75 in. MPT	3 in. MPT
Max. Flow Rate	30 gpm	40 gpm
Max. Rec. Daily Flow Rate	600 gpd	1,500 gpd
Max. Temp.	140 oF	160 oF
Max. Pressure	116 psi/270 ft.	85 psi/335 ft.
Dimensions	10.5" x 13.5" x 12.2"	16" x 12.2" x 12.2"
Filteration	150 mesh (100 micron)	150 mesh (100 micron)

Check Valves: (5)

1 on return line between fields
1 on field flush line to septic tank

Model No.	Inlet/Outlet (FPT or socket)	Length (inches)	Height (inches)	Max Temp (F)
CV-S-05	1/2"	4.13"	3.92"	140°
CV-S-10	1.0"	5.25"	2.88"	140°
CV-S-15	1.5"	6.36"	3.89"	140°
CV-S-20	2.0"	7.0"	4.29"	140°

Biodisc Filter: (1)

EMITTERS:

DRIPFIELD A:
L1 = 16
L2 = 28
L3 = 29
L4 = 29
L5 = 4
TOTAL EMITTERS = 106
EMITTERS REQUIRED: 375 sq ft / 4 sq. ft per emitter = 94

DRIPFIELD B:
L5 = 13
L7 = 23
L8 = 19
L9 = 12
L10 = 4
TOTAL EMITTERS = 95
EMITTERS REQUIRED: 375 sq ft / 4 sq. ft per emitter = 94

Dripfield A:

NOTE: Loop lengths specified for total tubing not including 3 ft to supply and return lines on each loop. Lengths of emitter portion of loops are shown as (e.g. 57 ft) where blank tubing is included in loop.

DRIPLINE TRENCH

Cross Section View: (not to scale)

Dripfield B:

NOTE: Inspection wells to be located at approximate center of each field.

INFILTRATIVE AREA:

Disregard Topography Shown in Background

INFILTRATIVE AREA CALCULATIONS & SPECIFICATIONS

TYPE OF SEPTIC SYSTEM:	Dual Drip Dispersal with Secondary Treatment
DESIGN CALCULATIONS:	DRIP DISPERSAL SYSTEM A:
Average Percolation Rate: 6 MPI	Dripline / Emitter Spacing: 2 ft / 2 ft
Design Application Rate: 1.2 gal/sq. ft./day	Dripfield Dimensions: 3 loops each 56 ft, 1 loop 39 ft
Wastewater Flow: 450 gpd (3.88)	Number of Emitters: 107
Required Infiltrative Area: 375 ft ² (450 gpd / 1.2 gpd/ft ²)	Slope in Dispersal Area: 16 - 34%
DRIP DISPERSAL SYSTEM B:	DRIP DISPERSAL SYSTEM B:
Infiltrative Area per Emitter: 4 sq. ft.	Dripline / Emitter Spacing: 2 ft / 2 ft
Number of Emitters Required: 94 (68 sq. ft./ft ²)	Dripfield Dimensions: 1 loop 56 ft, 46 ft, 37 ft, and 35 ft
	Number of Emitters: 101
	Slope in Dispersal Area: 20 - 25%

Normal operation of the system will alternate dispersal dosing between Fields A & B.

NO EMITTERS PERMITTED OUTSIDE DRIPFIELD BOUNDARIES. (only blank tubing is allowed)

APPLICATION RATE FOR DESIGN IS BASED ON PERCOLATION TEST RESULTS IN ORIGINAL AREA WHERE THE DRIPFIELDS WERE PROPOSED BEFORE SOIL WAS GRADED AWAY.

THE NEARLY IDENTICAL SOIL PROFILES IN THE ORIGINAL AREA AND THE NEW PROPOSED AREA ARE THE BASIS FOR USING THE PERC RESULTS FROM THE ORIGINAL AREA FOR THE NEW AREA DESIGN PARAMETER.