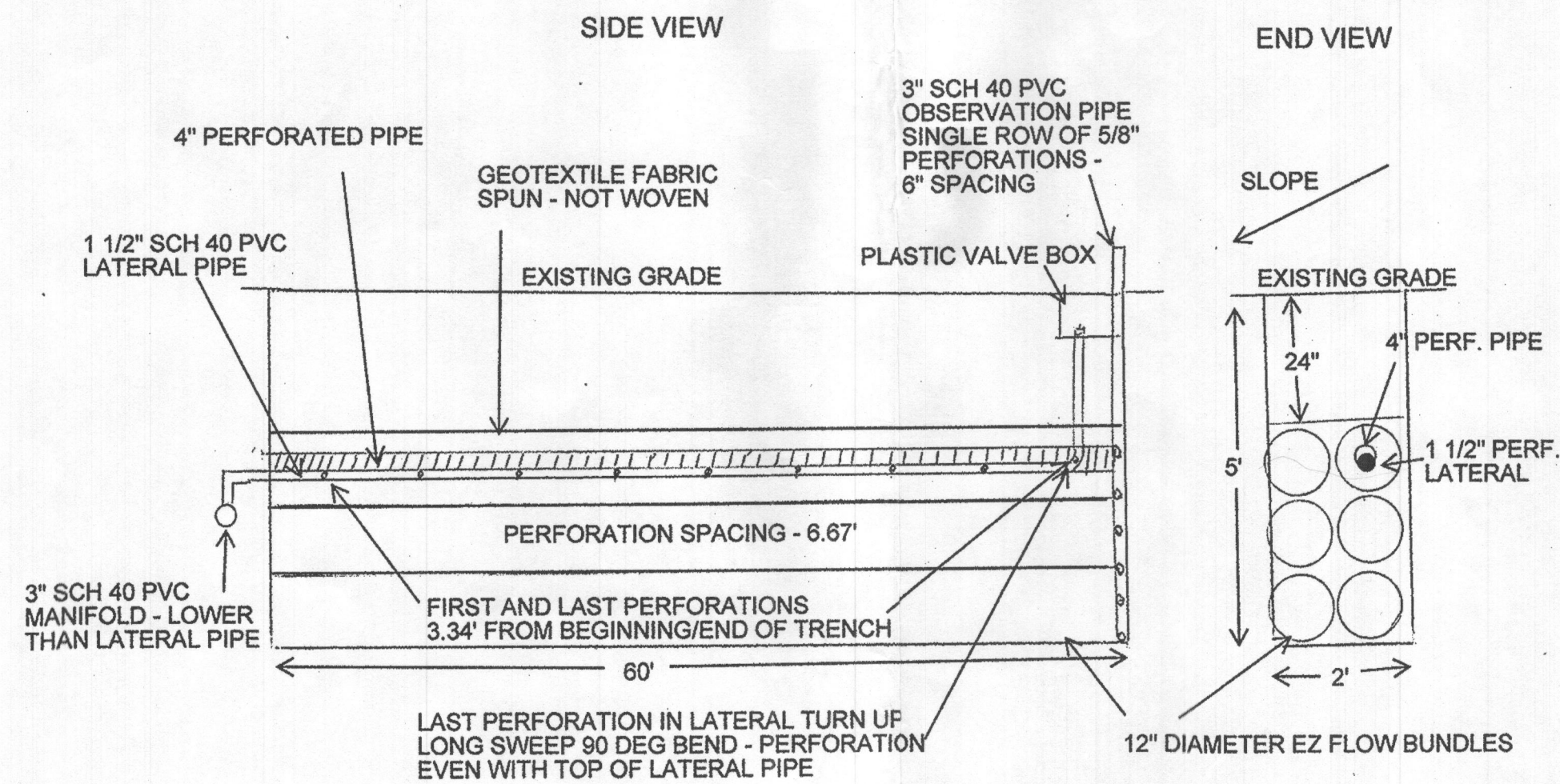


TRENCH 1 CROSS SECTIONS

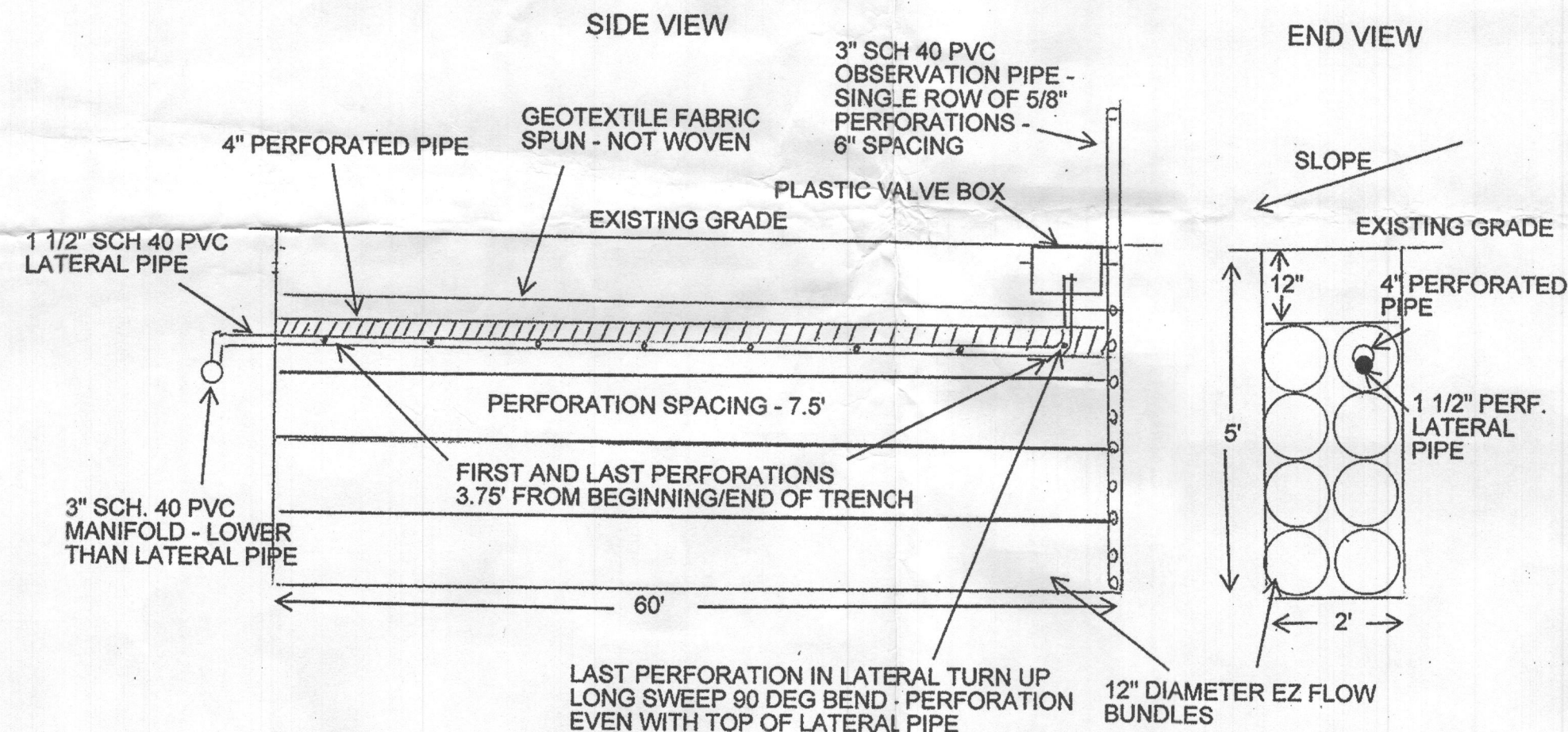
PLAN NTS



NOTE: ALL PERFORATIONS (WITH EXCEPTION OF LAST PERFORATION IN LATERAL TURN UP) WILL BE FACING UP

TRENCH 2 CROSS SECTIONS

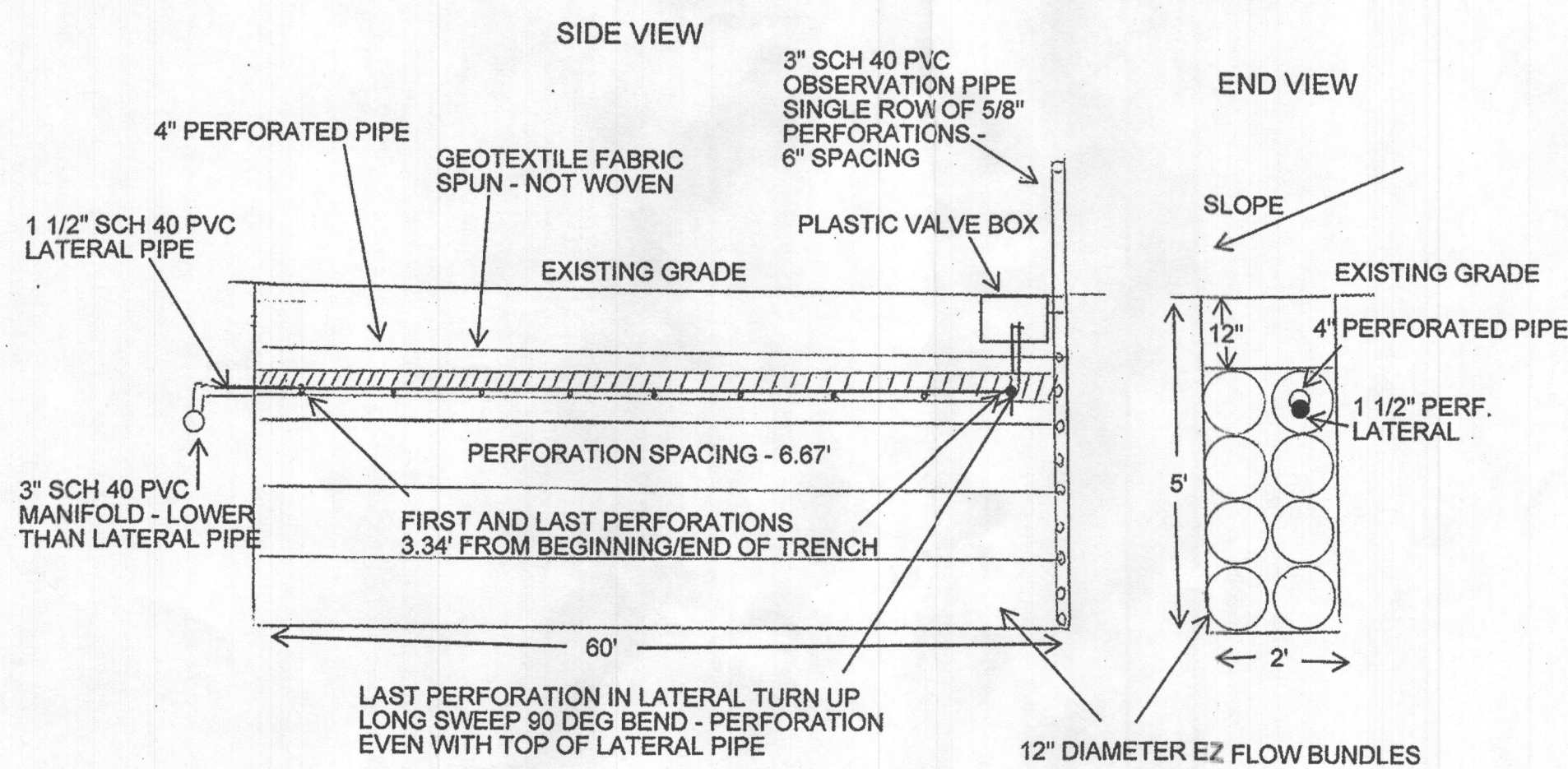
PLAN NTS



NOTE: ALL PERFORATIONS (WITH EXCEPTION OF LAST PERFORATION IN LATERAL TURN UP) WILL BE FACING UP

TRENCH 3 CROSS SECTIONS

PLAN NTS



NOTE: ALL PERFORATIONS (WITH EXCEPTION OF LAST PERFORATION IN LATERAL TURN UP) WILL BE FACING UP

VARIABLE HEAD LPD and TRENCH SPECIFICATIONS

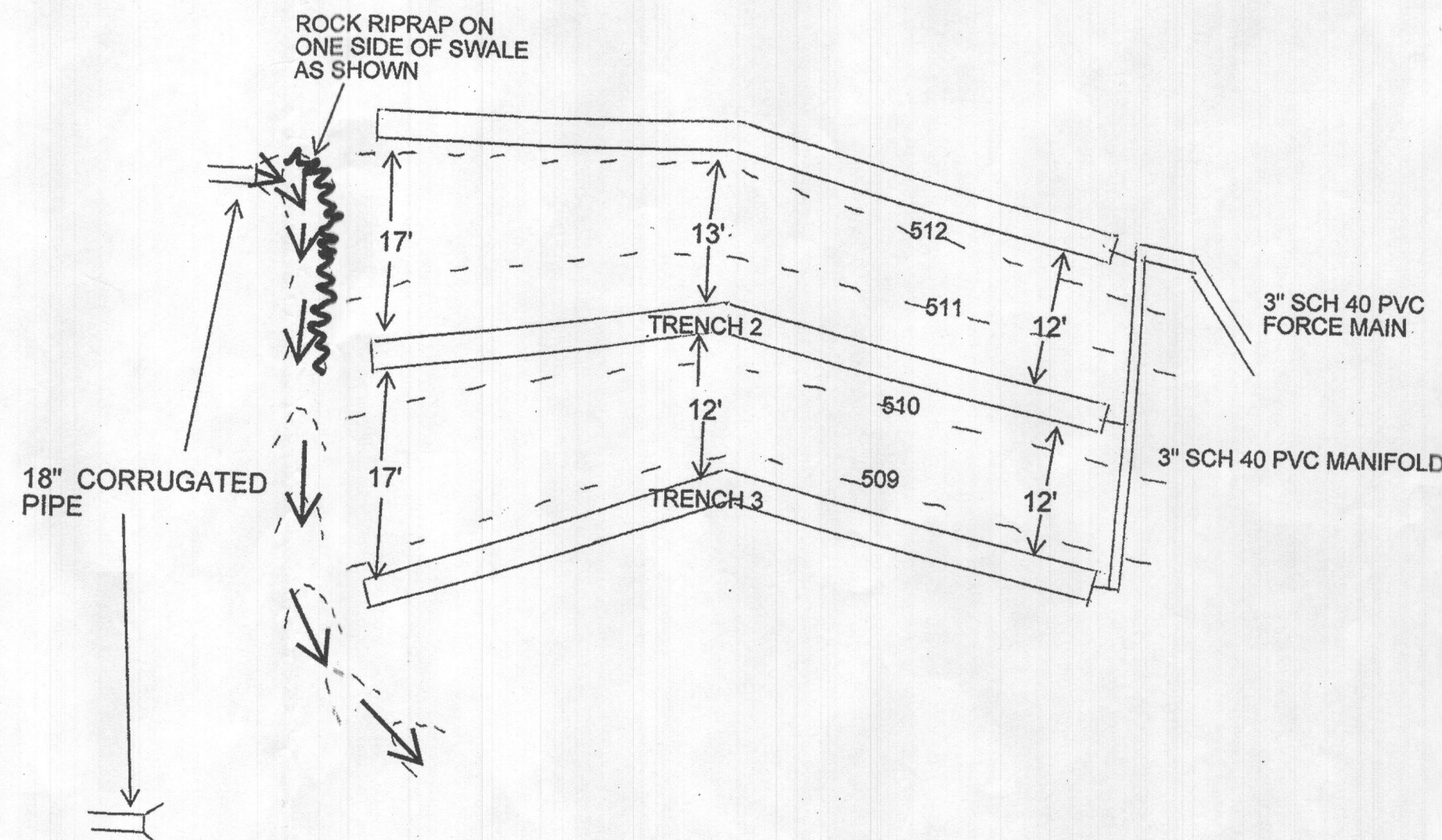
- TRENCH 1 - UPPER TRENCH - total trench length - 60'
  - Perforation diameter - 5/16"
  - 9 perforations, end feed
  - Perforation spacing - 6.67' (6' 8")
  - Lateral diameter - 1 1/2", Sch. 40 pvc pipe
  - Distance from start of trench to first perforation - 3.34' (3' 4")
  - Distance from the last perforation (at lateral turn-up) to end of trench - 3.34' (3' 4")
  - Length of lateral pipe in trench - 56.66' (56' 8")
- TRENCH 2 - total trench length - 60'
  - Perforation diameter - 5/16"
  - 8 perforations, end feed
  - Perforation spacing - 7.5' (7' 6")
  - Lateral diameter - 1 1/2", Sch. 40 pvc pipe
  - Distance from start of trench to first perforation - 3.75' (3' 9")
  - Distance from the last perforation (at lateral turn-up) to end of trench - 3.75' (3' 9")
  - Length of lateral pipe in stone trench - 56.25' (56' 3")
- TRENCH 3 - total trench length - 60'
  - Perforation diameter - 1/4"
  - 9 perforations, end feed
  - Perforation spacing - 6.67' (6' 9")
  - Lateral diameter - 1 1/2", Sch. 40 pvc pipe
  - Distance from start of trench to first perforation - 3.34' (3' 4")
  - Distance from the last perforation (at lateral turn-up) to end of trench - 3.34' (3' 4")
  - Length of lateral pipe in stone trench - 56.66' (56' 8")

PRESSURE DISTRIBUTION ON SLOPING SITES

TRENCH	LATERAL PIPE ELEV. AT INLET	GROUND SURFACE ELEV. AT INLET	COVER ON LATERAL PIPE AT INLET	HEAD PRESSURE	PERF. DIAMETER	GPM PER PERF.	PERF. SPACING	# OF PERF.	FLOW PER TRENCH
Trench 1	509.53	512.2	2.67'	2.00'	5/16"	1.63	6.67'	9	14.67
Trench 2	508.7	510.37	1.67'	2.83'	5/16"	1.94	7.5'	8	15.52
Trench 3	507.17	508.84	1.67'	4.36'	1/4"	1.54	6.67'	9	13.86
								TOTAL	44.05

TRENCH LAYOUT - PLAN VIEW

SCALE 1" = 10'



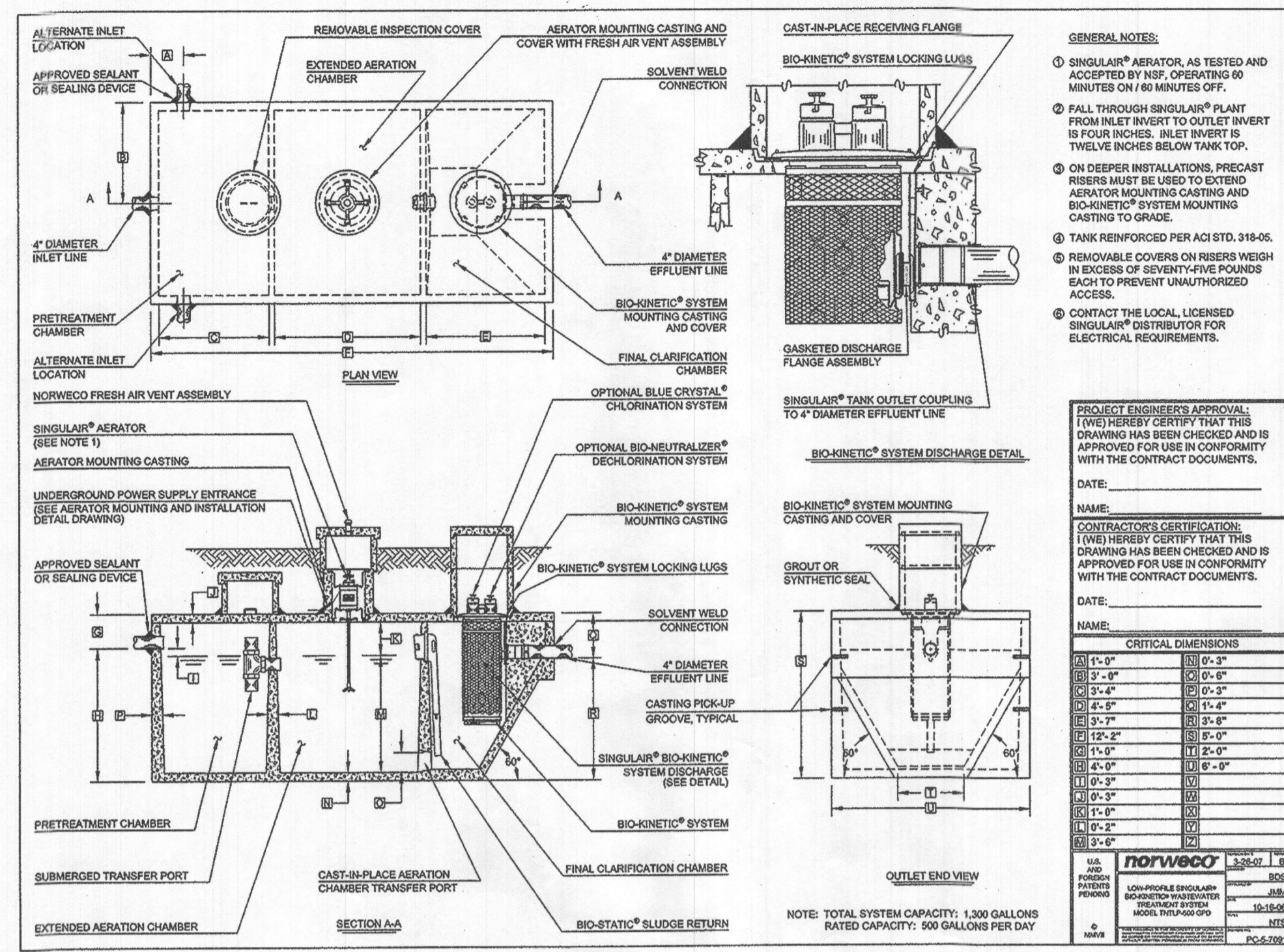
LOW PRESSURE DOSING - DEEP TRENCH SEWAGE DISPOSAL SYSTEM REPAIR

1425 MARRIOTTVILLE ROAD  
MARRIOTTVILLE, MARYLAND 21104  
TAX MAP 0010 PARCEL 0130

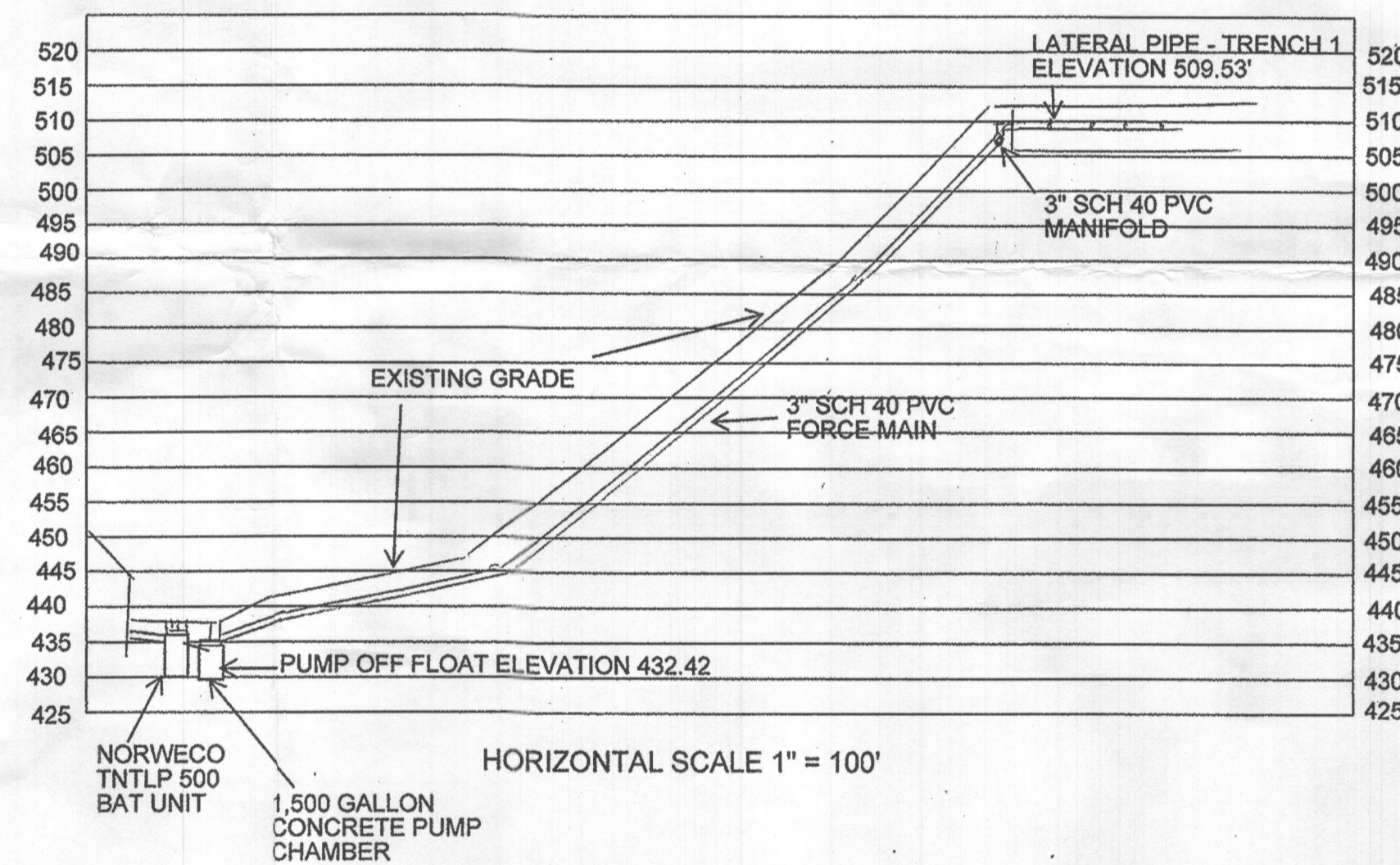
TAX ACCOUNT # 03 - 280829

OWNERS - CHRISTA CAREY, MICHAEL SACK  
1425 MARRIOTTVILLE ROAD  
MARRIOTTVILLE, MARYLAND 21104

DESIGN CONSULTANT - JAMES R. POWELL  
421 ROCKWAY ROAD  
CATONSVILLE, MARYLAND 21228  
ROBPOWELL781@VERIZON.NET  
443-900-3169

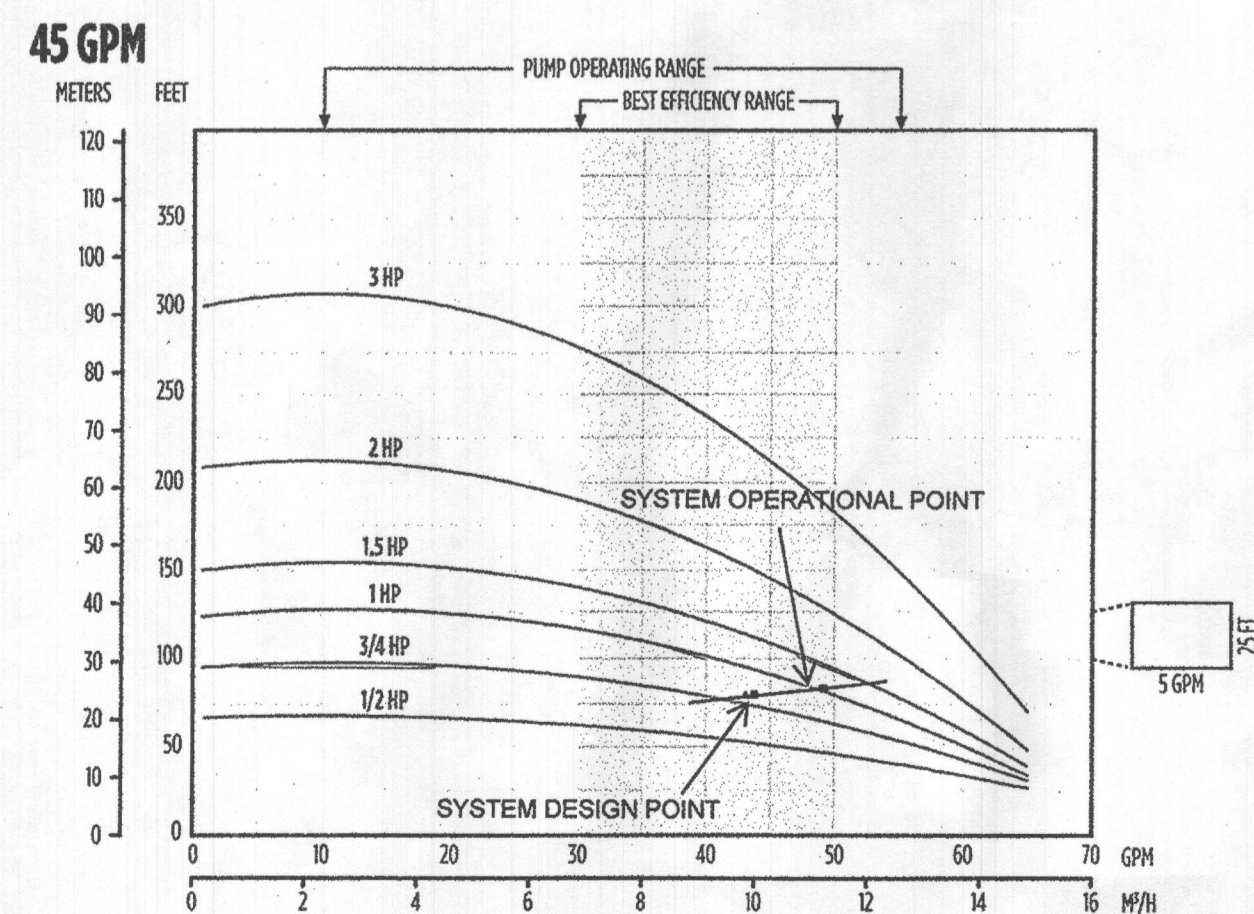


**HYDRAULIC PROFILE**



**PUMP PERFORMANCE CURVE**

FRANKLIN FPS, E SERIES - 45 GPM SUBMERSIBLE EFFLUENT PUMP 1 Hp, 230 V, SINGLE PHASE

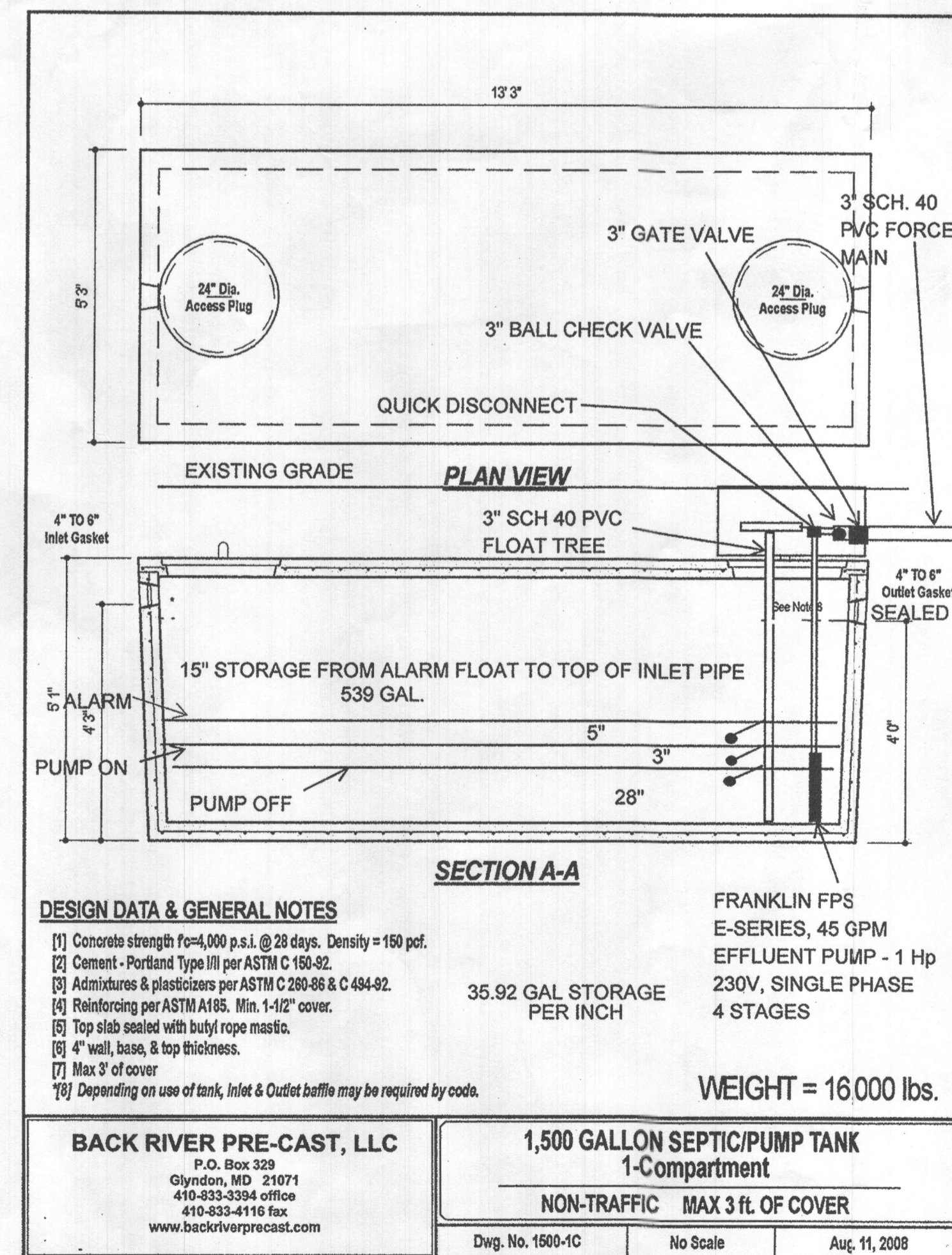


**CONTROL PANEL INFORMATION AND DOSE CALCULATIONS**

- Control panel will be a Simplex Non-Clog, single phase, demand dose control panel manufactured by Franklin Electric. The panel will include the options for an event counter and an elapsed time meter for the pump run. The panel must be compatible with a Franklin FPS E-Series submersible effluent pump 45 gpm Model 1 Hp, single phase, 230 volts.
- A high-water alarm will be required and must be on a separate electrical circuit.
- Hydraulic profile is also attached.
- Dose
  - Dose = volume of 3" force main (520') + volume of 3" manifold (24') + 5x volume of laterals (1 1/2" diam.)
  - Given the length of the force main and static head (77.11'), the force main will be equipped with a ball check valve, to be located in the pump chamber manhole riser
  - $(24' + 100') \times 38.4 \text{ gal}/100' + 5 \times (169.57' + 100) \times (10.6 \text{ gal}/100') = 9.22 + 89.88 = 99.1 \text{ gal. minimum dose}$
  - Peak flows from three-bedroom dwelling - 450 gpd
  - 1/5 of peak flow = 75 gal.
  - Elect to use a dose flow of 108 gal.
- Storage capacity above high-water alarm float in pump chamber
  - PUMP CHAMBER
    - Inside measurements in pump chamber = 12.58' wide x 4.58' long = 57.62 sq. ft.
    - 57.62 sq. ft. x 7.48 gal./cubic ft. = 431 gal./cu. Ft. // 431 gal. cu. Ft. ÷ 12" /ft. = 35.92 gal./inch.
    - Set the Pump On/Off float to deliver a 3" dose, which equals 108 gallons.
    - Set the High Water Alarm Float to be 5" above the Pump On Float. This setting leaves 11" between the High Water Alarm float and inlet invert = 395 gal. storage capacity
    - Additional four inches to top of inlet pipe yields an additional 144 gal. storage
  - Total storage capacity above high-water alarm float in pump chamber is 359 gal. + 144 gal. = 539 gal. This allows for additional storage capacity in the pump chamber in the event that the check valve fails (200 gallon capacity in force main)

**TOTAL DYNAMIC HEAD CALCULATIONS**

- Inlet invert elevation at proposed Norweco Singular Tntlp - 500 will be 435.13'. Existing grade at that location is 437.63'. It is anticipated that the soil cover on top of the proposed unit will be 1.5'. Outlet elevation will be 434.8'.
- Existing grade at the pump chamber inlet is 437.42' and 435.13' at the outlet. The inlet invert into the pump chamber will be 434.00'. It is anticipated that the soil cover on top of the proposed pump chamber at the inlet will be 2.59' and 0.3' at the outlet. 12" of soil will be added at the outlet end of the tank to provide adequate soil cover.
- The Pump Off float will be 28" above the bottom of the pump chamber and 19" below the inlet invert. Consequently, the pump off float elevation is 432.42'.
- Existing grade at the highest trench (Trench 1) is 512.2' (as measured at the end of the trench). The lateral pipe for Trench 1 will be 2.67' below grade; consequently, the distribution lateral will be at elevation 509.53'.
- Consequently, the static head is 77.11'.
- Design head at the distal end of Lateral 1 will be 2'.
- Friction loss
  - Length of force main is 520' and is 3" diameter Sch. 40 pvc pipe.
  - Equivalent length of fittings (3" Sch. 40 pvc pipe)
    - 2 ea. 90° ells - 10' ea. - 20' (3" Sch. 40 pvc)
    - 6 ea. .45° ells - 6' ea. - 36' (3" Sch. 40 pvc)
    - 1 tee - 15' - (3" Sch. 40 pvc)
    - 2 gate valves - 2' ea. - 4' (3" Sch. 40 pvc)
    - 1 ea. 3" Sch. 40 pvc ball check valve - 100'
  - Total Equivalent pipe length - 175'
  - Total length of pipe - 695'
  - Friction loss for 3" schedule 40 plastic pipe with a flow of 44.05 gpm is 0.48"/100' length of pipe. Consequently, friction loss is 3.34'
- Total Dynamic Head is therefore  $3.34' + 2' + 77.11' = 82.45'$
- Pump must be able to deliver a minimum of 44.05 gpm at a TDH of 82.45'
- Selected Franklin FPS - E Series, 1 Hp, 230 V, Single Phase, 45 gpm submersible effluent pump.
- System operational curve
  - At 3" operating head at distal end of top lateral (Lateral 1) - 49.77 gpm @ 84.28' TDH
  - System operational point is approximately 48.5 gpm @ 84' TDH



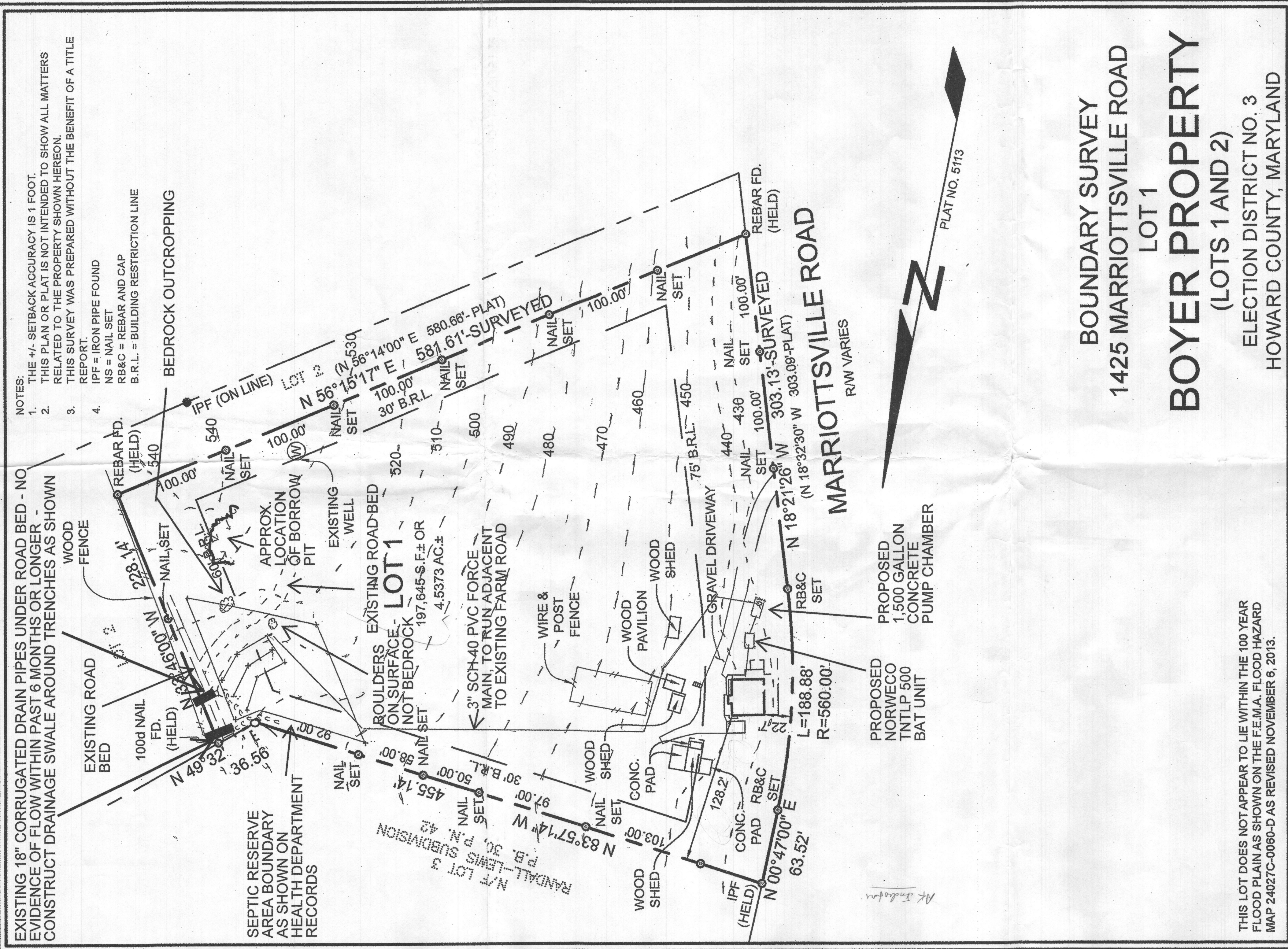
**LOW PRESSURE DOSING - DEEP TRENCH SEWAGE DISPOSAL SYSTEM REPAIR**

1425 MARRIOTTVILLE ROAD  
MARRIOTTVILLE, MARYLAND 21104  
TAX MAP 0010 PARCEL 0130

TAX ACCOUNT # 03 - 280829

OWNERS - CHRISTA CAREY, MICHAEL SACK  
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MARRIOTTVILLE, MARYLAND 21104

DESIGN CONSULTANT - JAMES R. POWELL  
421 ROCKWAY ROAD  
CATONSVILLE, MARYLAND 21228  
ROBPOWELL781@VERIZON.NET  
443-900-3169



- NOTES:  
 1. THE +/- SETBACK ACCURACY IS 1 FOOT.  
 2. THIS PLAN OR PLAT IS NOT INTENDED TO SHOW ALL MATTERS RELATED TO THE PROPERTY SHOWN HEREON.  
 3. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT.  
 4. IPF = IRON PIPE FOUND  
 NS = NAIL SET  
 RB&C = REBAR AND CAP  
 B.R.L. = BUILDING RESTRICTION LINE

REFERENCE:	PLAT NO. 5113
DATE:	MAY 1, 2023
SCALE:	1" = 50'
FILE NO.:	23-072

**Adcock & Associates · LLC**  
 Engineers · Surveyors · Planners  
 5389 Enterprise Street Suites E-C  
 Sykesville, Maryland 21784  
 Phone: 443.325.7682  
 Email: mike@adcocksurveying.com

**SURVEYOR'S CERTIFICATION**  
 I HEREBY CERTIFY THAT I WAS IN RESPONSIBLE CHARGE OVER THE PREPARATION OF THIS BOUNDARY SURVEY AND THE SURVEY WORK REFLECTED IN IT, IN COMPLIANCE WITH REQUIREMENTS SET FORTH IN REGULATION .12 OF CHAPTER 08 OF THE MINIMUM STANDARDS OF PRACTICE (COMAR, SECTION 0.9), AND THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF IS CORRECT.

MICHAEL D. ADCOCK  
 PROFESSIONAL LAND SURVEYOR  
 NO. 21257, EXPIRATION DATE: 06-16-2023

THIS LOT DOES NOT APPEAR TO LIE WITHIN THE 100 YEAR FLOOD PLAIN AS SHOWN ON THE F.E.M.A. FLOOD HAZARD MAP 24027C-0060-D AS REVISED NOVEMBER 6, 2013.

- This repair system is designed to accommodate a three-bedroom dwelling with a peak design flow of 450 gal./day using a soil loading rate of 0.8 gal./sq. ft./day. The dwelling is served by a drilled well which is in good condition and is shown on the site plan.
- The system will incorporate a series of three deep absorption trenches that will be pressure dosed. The dosing will incorporate demand dosing and the pump chamber and float system are set to deliver a dose of 108 gallons. The pump will be Franklin FPS, E-Series - 45 gpm effluent pump, 1hp, single phase, 230v. Storage capacity in the pump chamber is 539 gal., as measured between the High-Water Alarm float and the top of the inlet pipe into the chamber. The larger pump chamber was selected to provide additional capacity in case of the ball check valve failure on the force main as the storage capacity in the force main is 200 gallons.
- The control panel will be a Simplex non-Clog control panel manufactured by Franklin Electric. The panel will be designed to accommodate a simplex pump, demand dose and a Franklin FPS, E-Series - 45 gpm effluent pump, 1 Hp, single phase, 230 V. The control panel will be equipped with an event counter and elapsed time meter.
- The alarm float will be wired on a separate electrical circuit.
- The trench system will be located on the hill behind the house at the rear property line as shown on the plan. The backhoe/excavator can gain access to this area, however, due to the steepness of the slope, gravel cannot be transported to the location of the trenches. Consequently, the trench excavations will be filled with EZ FLOW SEPTIC SYSTEM bundles as shown on the attached diagrams. The bundles will be 12" in diameter and are manufactured by Infiltrator Water Technologies. The bundles will be placed side by side as shown with the bundle containing the 4" diameter perforated pipe being located on the upper side of the trench excavation as shown. The EZ FLOW trench bundles will be in 5' lengths. The manufacturer recommends a minimum soil cover of 12" and a maximum soil cover of 96". The top trench will have 1.67' of cover over the bundles and the lower two trenches will have 12" of cover over the bundles.
- The field system will consist of three deep absorption trenches. The trenches will be 60' long, 2' wide, 5' deep. Separation between the trenches will be 10' minimum, measured edge to edge. The separation between trenches will be greater on some trenches in order to maintain level grade. A Norweco BAT sewage pre-treatment unit will be installed, followed by a 1,500-gallon concrete pump chamber; manufactured by Back River Pre-Cast, LLC.
- The Franklin FPS E-Series pump will direct the waste to the manifold via a 3" Sch. 40 force main. A 3" ball check valve will be installed on the force main as well as a 3" gate valve installed on the discharge side of the check valve as shown. The gate valve is required to facilitate maintenance/replacement of the ball check valve if needed. Both the ball check valve and gate valve will be installed in the manhole riser for the pump chamber as shown. Low-pressure dosing is included in the design of the lateral piping and perforation spacing in the manifold as shown. A gate valve will be installed on the force main immediately prior to connection with the manifold as shown. The gate valve will be enclosed in a plastic valve box that is accessible from grade. NOTE: IF SUFFICIENT DEPTH CANNOT BE ATTAINED DURING INSTALLATION OF THE FORCE MAIN, ADDITIONAL SOIL COVER MAY NEED TO BE INSTALLED OVER THE FORCE MAIN TO KEEP LINE FROM FREEZING DURING COLD WEATHER.
- THE LOCATION OF THE UNDERGROUND WATER SERVICE LINE WHERE IT CROSSES THE PROPOSED 3" SCH 40 PVC FORCE MAIN IS UNKNOWN. CONTRACTOR WILL TEST PIT TO VERIFY LOCATION OF SAID WATER LINE. THE PROPOSED FORCE MAIN WILL BE INSTALLED AT A DEPTH OF AT LEAST 12" BELOW THE WATER SERVICE LINE AND BE SLEEVED WITH A LARGER DIAMETER SCH. 40 PVC PIPE FOR A DISTANCE OF 20' ON EITHER SIDE OF THE FORCE MAIN/WATER SERVICE LINE CROSSING. BOTH ENDS OF THE LARGER SLEEVING PIPE WILL BE SEALED WITH BENTONITE CLAY.
- The manifold will be 3" Sch. 40 pvc pipe and the lateral piping will be 1 1/2" Sch. 40 pvc and the perforation diameters shall be as shown on these plans. THE MANIFOLD MUST BE PLACED LOWER THAN THE LATERAL PIPING IN THE TRENCHES. Observation pipes, and lateral turn-ups with 90 deg sweeps will be installed as shown on the plan details. The lateral turn-up will be installed by cutting the mesh bundle and the top of the perforated pipe, installing the connection to the 1 1/2" Sch 40 pvc perforated lateral pipe (fed from the inlet end of the pipe) and placing spun geotextile fabric over the top of the 4" pipe, replacing the Geosynthetic Aggregate (styrofoam "popcorn") and stitching the cut mesh with additional spun geotextile fabric using plastic zip ties. The lateral turn up will be installed in a plastic valve box that is accessible from grade. The observation pipes will be installed with a threaded cap and be extended to a minimum of 12" above grade.
- Two 18" corrugated plastic drainage pipes were observed running underneath the road bed surface as shown. Based on the amount of leaf debris in the pipe, it is evident there has been minimal flow (if any at all) within the last 6 months. Nevertheless, the installer will excavate a drainage swale at the discharge end of both pipes and construct the swale to direct the flow (if any) away from the trench system. Stone may be needed to line the swale for the drainage pipe closest to the top trench so that the swale does not blow out during a heavy rainfall event.
- Pump and/or abandon/fill existing septic tank and field system.
- Inspect the sewer pipe running from the dwelling to the new BAT unit and replace as necessary.
- Seed and straw all disturbed areas upon completion.
- Any change in the locations, or specifications on the approved site plan or within OSDS design package must be approved by Howard County Environmental Health Department.
- All electrical work must be inspected and approved under a separate electrical permit.

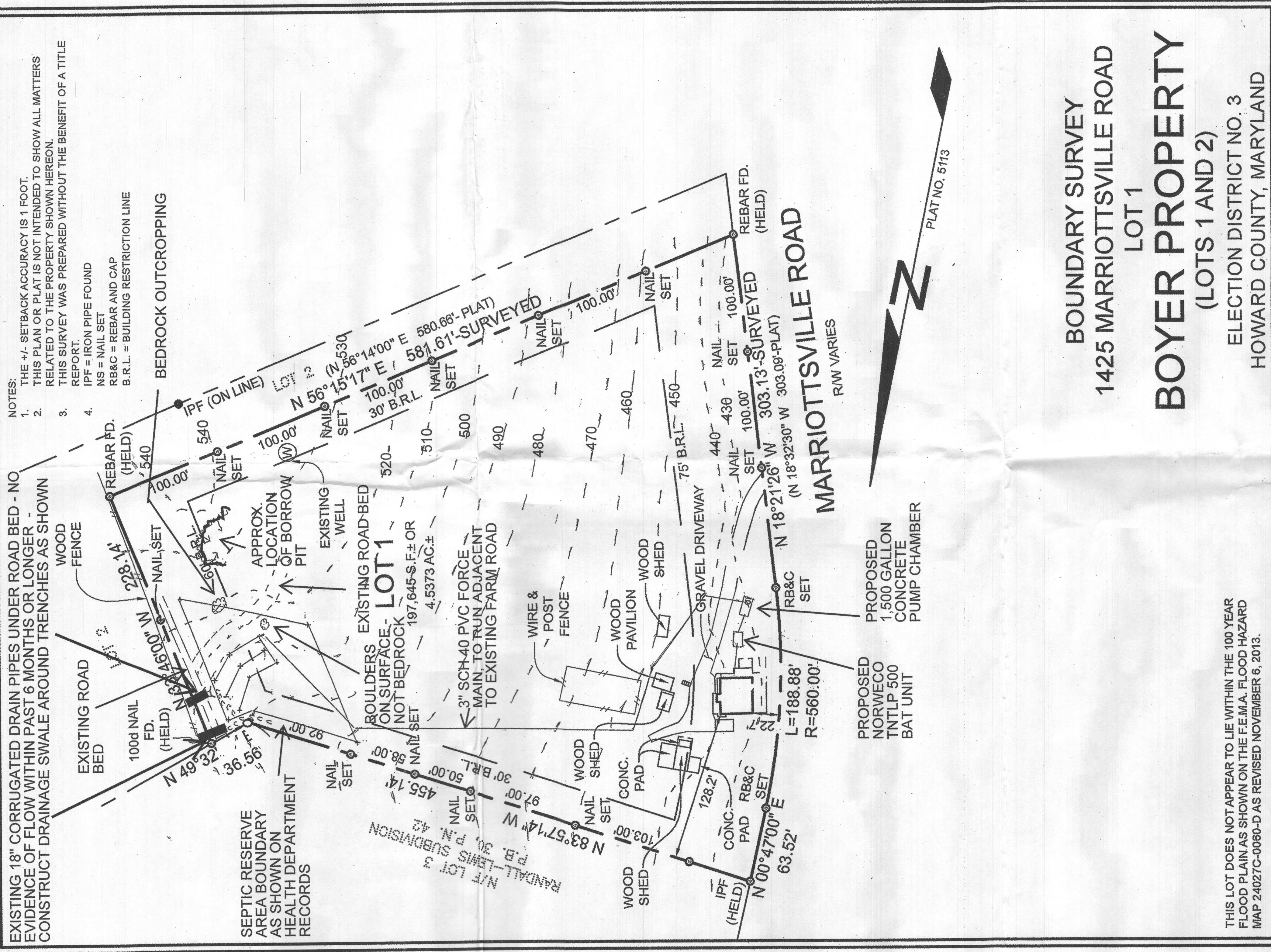
LOW PRESSURE DOSING - DEEP TRENCH  
 SEWAGE DISPOSAL SYSTEM REPAIR

Approved Septic System Plan  
 Howard County Health Department  
 Signature: [Signature] Date: 10/13/2023

1425 MARRIOTTSVILLE ROAD  
 MARRIOTTSVILLE, MARYLAND 21104  
 TAX MAP 0010 PARCEL 0130  
 TAX ACCOUNT # 03 - 280829

OWNERS - CHRISTA CAREY, MICHAEL SACK  
 1425 MARRIOTTSVILLE ROAD  
 MARRIOTTSVILLE, MARYLAND 21104

DESIGN CONSULTANT - JAMES R. POWELL  
 421 ROCKWAY ROAD  
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- NOTES:
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MICHAEL D. ADCOCK  
PROFESSIONAL LAND SURVEYOR  
NO. 21257, EXPIRATION DATE: 06-16-2023

BOUNDARY SURVEY  
1425 MARRIOTTSVILLE ROAD  
LOT 1  
**BOYER PROPERTY**  
(LOTS 1 AND 2)  
ELECTION DISTRICT NO. 3  
HOWARD COUNTY, MARYLAND

REFERENCE:	PLAT NO. 5113
DATE:	MAY 1, 2023
SCALE:	1" = 50'
FILE NO.:	23-072

**Adcock & Associates · LLC**  
Engineers · Surveyors · Planners  
5389 Enterprise Street Suites B-C  
Sykesville, Maryland 21784  
Phone: 443.325.7682  
Email: mike@adcocksurveying.com

REVISED TO ADD SPOT SHOTS: AUGUST 23, 2023

- This repair system is designed to accommodate a three-bedroom dwelling with a peak design flow of 450 gal./day using a soil loading rate of 0.8 gal./sq. ft./day. The dwelling is served by a drilled well which is in good condition and is shown on the site plan.
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- All electrical work must be inspected and approved under a separate electrical permit.

Approved Septic System Plan  
Howard County Health Department  
*[Signature]* 6/13/2023  
Date

LOW PRESSURE DOSING - DEEP TRENCH  
SEWAGE DISPOSAL SYSTEM REPAIR

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TAX MAP 0010 PARCEL 0130  
TAX ACCOUNT # 03 - 280829

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PLAN DATE - SEPTEMBER 12, 2023  
SHEET 1 OF 3