LAYOUT 10/22/07 INSP 4 10/29/07

INSP 2 10/23/07 INSP 5 10/30/07

INSP 3 10/24/07 INSP 6 1/23/08

ISSUE DATE: 9/14/07

APPROVAL DATE: 1/25/08

PERMIT

Logged Into Permit Manager

TAX ID # 05-413095

P 527349

A 526294

ON-SITE SEWAGE DISPOSAL SYSTEM
HOWARD COUNTY HEALTH DEPARTMENT
BUREAU OF ENVIRONMENTAL HEALTH

Hatfields Equipment IS PERMITTED TO INSTALL ☒ ALTER ☐

ADDRESS: P.O. Box 519 Annapolis Junction PHONE NUMBER: 301-854-6172

SUBDIVISION: Highland Oaks LOT NUMBER: 3

ADDRESS: 6851 Santa Maria Ave PROPERTY OWNER: Joseph & Sandra Lucado

SEPTIC TANK CAPACITY (GALLONS): 1500 OUTLET BAFFLE FILTER REQUIRED ☐

PUMP CHAMBER CAPACITY (GALLONS): 1500 COMPARTMENTED TANK REQUIRED ☒

NUMBER OF BEDROOMS: 4

SQUARE FEET PER BEDROOM:

LINEAR FEET OF TRENCH REQUIRED: 292

TRENCHES:	Trench to be 3.0 feet wide. Inlet feet below original grade. Bottom maximum depth feet below original grade. Effective area begins at feet below original grade. 0.5 feet of stone below distribution pipe.
LOCATION:	Per Plan issued to contractor, inlet depth and trench bottom depth vary by line. Inlet depth and trench bottom depth to be verified at layout inspection.
NOTES:	Pump system, dual forced main, (alternating). Specs by Perc Cert issued to contractor. Call for layout inspection.

PLANS APPROVED: Robert Bricker DATE: 9/14/07

NOTE: PERMIT VOID AFTER 2 YEARS
NOTE: CONTRACTOR RESPONSIBLE FOR SCHEDULING A PRE-CONSTRUCTION INSPECTION FOR ALL INSTALLATIONS
NOTE: WATERTIGHT SEPTIC TANKS REQUIRED
NOTE: ALL PARTS OF SEPTIC SYSTEM SHALL BE 100 FEET FROM ANY WATER WELL
NOTE: MANHOLE RISERS REQUIRED ON ALL SEPTIC TANKS AND PUMP CHAMBERS UNLESS SPECIFICALLY AUTHORIZED

NEITHER THE HOWARD COUNTY COUNCIL NOR THE HEALTH DEPARTMENT IS RESPONSIBLE FOR THE SUCCESSFUL OPERATION OF ANY SYSTEM
PERMITTEE RESPONSIBLE FOR OBTAINING FINAL APPROVAL ON THIS PERMIT
CALL 410-313-1771 FOR INSPECTION OF SEPTIC SYSTEM

NOT TO SCALE

See Separate Sheet for As-Built Drawing

1/25/08 - FAST unit working and unit inspected by Treemire. (BB)

ROAD

TRENCH/DRAINFIELD DATA

WIDTH	INLET	BOTTOM
3'	1.75'	2.25'

NUMBER OF TRENCHES 9
TOTAL LENGTH 296'
ABSORPTION AREA 888
DISTRIBUTION BOX LEVEL N/A
DISTRIBUTION BOX BAFFLE N/A
DISTRIBUTION BOX PORT N/A

SEPTIC TANK DATA

SEPTIC TANK 1 LEVEL Yes
CAPACITY 1500 GAL
SEAM LOC Top
Baby/on TANK LID DEPTH 0.5'-2'
BAFFLES Yes
Fast BAFFLE FILTER No
Tank MANHOLE LOC Front
6" PORT LOC
WATERTIGHT TEST No

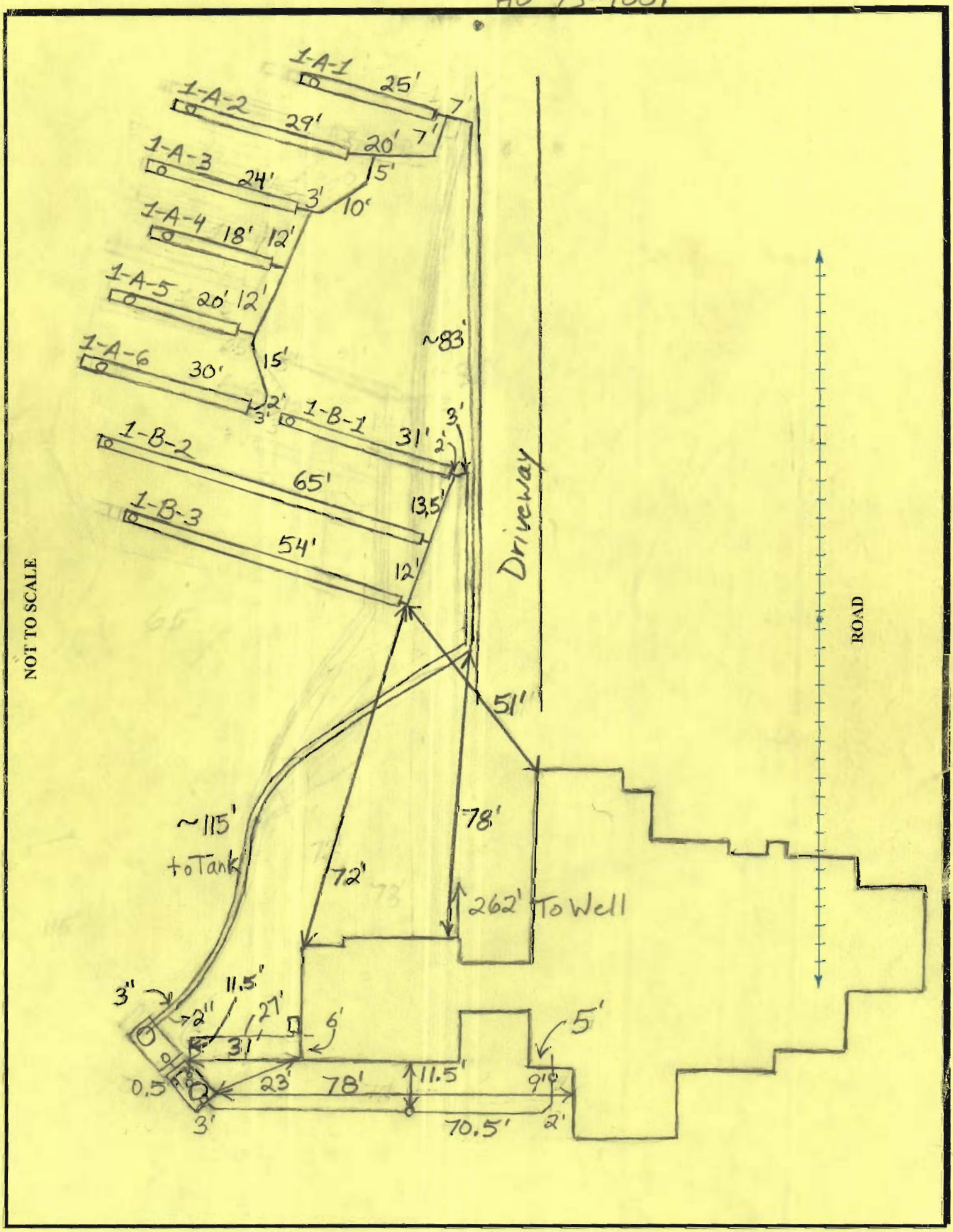
SEPTIC TANK 2 LEVEL Yes
CAPACITY 1500 GAL
Baby/on SEAM LOC Top
TANK LID DEPTH 1'-2.5'
BAFFLES Front
BAFFLE FILTER No
MANHOLE LOC Rear
6" PORT LOC Front
WATERTIGHT TEST No

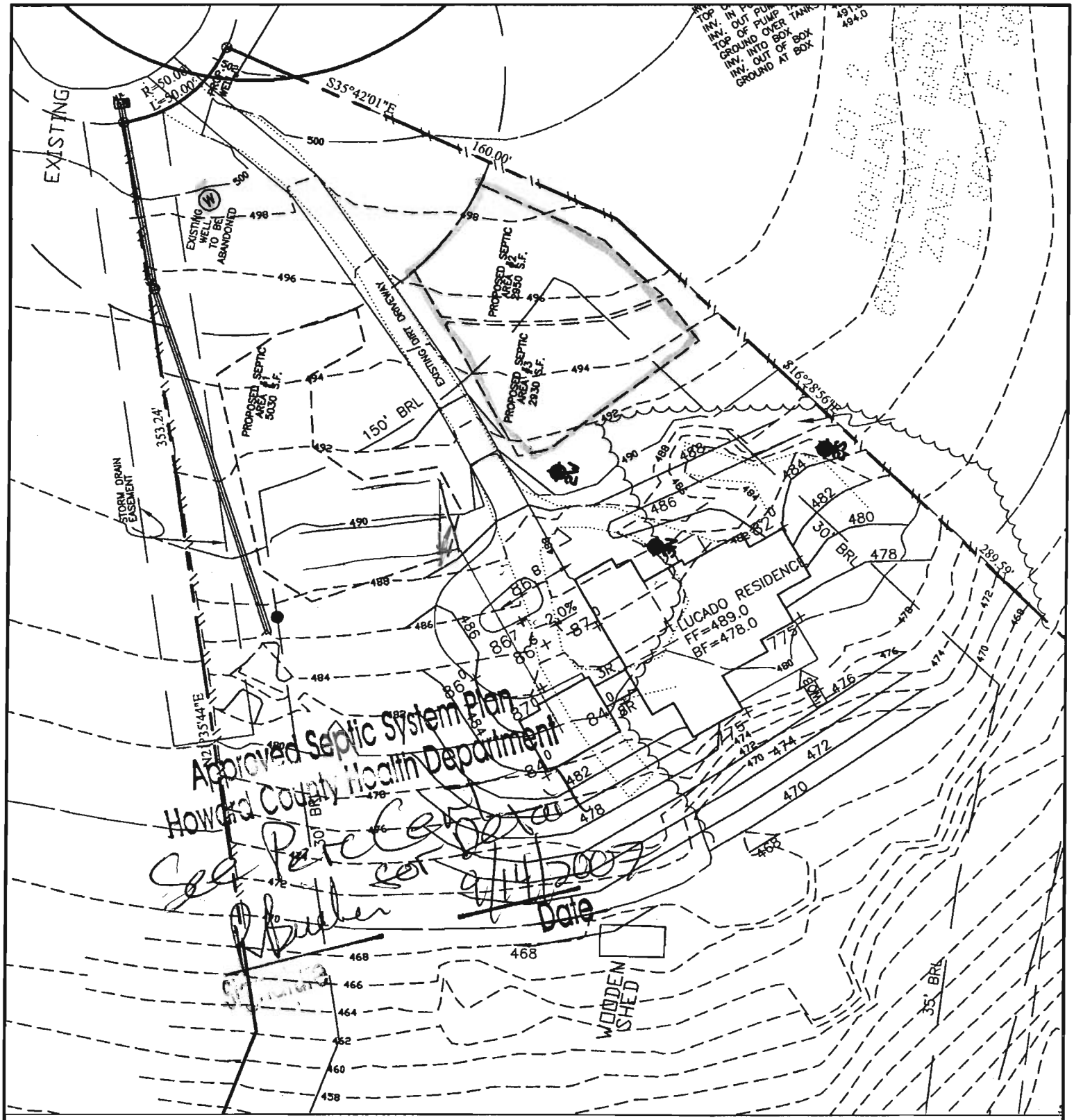
PRE-CONSTRUCTION 10/22/07 Trenches not staked but O.K. to start on tanks, house connection and force main. To
INSTALLATION use foundation elevation from wall check as a reference when setting pump chamber. (BB) 10/23/07 Tanks set. (BB) 10/24/07 House connection made. (BB) 10/29/07 Two inch force main installed. Started on top trenches. Trenches staked out. (BB) 10/30/07 Force mains and trenches done. Need to install blower and pumps. Must do pump and alarm test. Check blower and alarm and make sure FAST unit is working properly. (BB)

FINAL INSPECTOR B. Baker DATE OF APPROVAL 1/25/08

1/23/08 Everything working but can't check FAST unit because there's not enough water in tank. (BB)

HO-95-1001


1-A-1
25'
7'
1-A-2
29'
20'
7'
1-A-3
24'
5'
3'
10'
1-A-4
18'
12'
1-A-5
20'
12'
15'
1-A-6
30'
3'
2'
1-B-1
31'
3'
2'
1-B-2
65'
13.5'
1-B-3
54'
12'
~83'
Driveway
ROAD
NOT TO SCALE
51'
~115'
to Tank
78'
72'
262'
To Well
3"
11.5'
2"
27'
6'
5'
31'
0.5'
23'
78'
11.5'
9'
3'
70.5'
2'



HIGHLAND OAKS
LOT 3

BENCHMARK
ENGINEERS • LAND SURVEYORS • PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE • SUITE 418 • ELLICOTT CITY, MD 21043
PHONE: 410-465-6105 FAX: 410-465-6644

FIFTH ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
SCALE: 1" = 50' DATE: 2/23/07

P:\2005\dwg\1000.dwg, Lot, 2/23/2007 3:00:25 PM, jmc, PDFCreator

GENERAL NOTES

1. PROPERTY DATA
   - LEGAL REFERENCE: LOT 3 OF HIGHLAND OAKS
   - PARCEL AREA: 10.1306 ACRES
   - TAX MAP: 40 GRID 3
   - ZONING: RRDEO
   - WATERSHEDS: ROCKY GORGE DAM
   - ADC MAP: 14-A12
   - WATER AND SEWER CATEGORIES: PRIVATE WELL & SEPTIC
   - FLOOD PLAIN: NONE PER FEMA MAP 240044 378; DATE: DECEMBER 4, 1986
2. EXISTING SITE DATA
   - PROPERTY LINES SHOWN HEREON WERE TAKEN FROM FIELD OBSERVATIONS AND AVAILABLE RECORDS.
   - THIS PLAN HAS BEEN PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION.
   - HORIZONTAL DATUM SHOWN HEREON IS: MARYLAND STATE PLANE NAD 83/91
   - TOPOGRAPHY AND EXISTING FEATURES SHOWN HEREON HAVE BEEN COMPILED FROM FIELD OBSERVATIONS AND AVAILABLE HOWARD COUNTY RECORDS.
   - VERTICAL DATUM SHOWN HEREON IS: MARYLAND STATE PLANE NAVD 88
   - THE CONTRACTOR SHALL FIELD-VERIFY GRADES PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITIES. IF DISCREPENCIES ARE NOTED BETWEEN THE EXISTING CONDITIONS AND PLANS, CONTRACTOR SHALL INFORM ENGINEER IMMEDIATELY SO THAT APPROPRIATE MODIFICATIONS CAN BE MADE. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE WITHIN ANY DRAINAGE STRUCTURE.
3. UTILITIES DATA
   UTILITIES LOCATIONS SHOWN HEREON ARE TAKEN FROM AVAILABLE PLANS AND FIELD OBSERVATIONS WHERE SURFACE INDICATIONS EXIST.
   a) THE CONTRACTOR SHALL HAND DIG TEST PITS AT ALL UTILITY CROSSINGS TO DETERMINE THE EXACT LOCATION AND DEPTH WELL IN ADVANCE OF CONSTRUCTION.
   b) FOR MARKING LOCATIONS OF FACILITIES, PLEASE CONTACT "MISS UTILITY" AT 1-800-257-7777 48 HOURS PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
   c) THE CONTRACTOR SHALL FIELD-VERIFY ACTUAL GAS LINE LOCATIONS.
4. SOILS DATA
   DATA SHOWN HEREON WAS OBTAINED FROM THE SOIL CONSERVATION SERVICE SOILS SURVEY FOR HOWARD COUNTY, MARYLAND, MAP 28.

SEWAGE NOTES:

1. THE PURPOSE OF THIS PLAN IS TO REVISE THE PREVIOUSLY APPROVED SEPTIC EASEMENT FOR LOT 3 OF HIGHLAND OAKS
2. THIS AREA [- - - - - -] DESIGNATES A PRIVATE SEWAGE DISPOSAL EASEMENT OF AT LEAST 10,000 SQUARE FEET AS REQUIRED BY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT FOR INDIVIDUAL SEWAGE DISPOSAL. IMPROVEMENTS OF ANY NATURE IN THIS AREA ARE RESTRICTED. THESE EASEMENTS SHALL BECOME NULL AND VOID UPON CONNECTION TO A PUBLIC SEWERAGE SYSTEM. THE COUNTY HEALTH OFFICER SHALL HAVE THE AUTHORITY TO GRANT ADJUSTMENTS TO THE PRIVATE SEWAGE EASEMENT. RECORDATION OF A REVISED SEWAGE EASEMENT SHALL NOT BE NECESSARY.
3. PERC HOLES SHOWN HEREON PER AVAILABLE COUNTY RECORDS AND FIELD TESTING.
4. WELLS AND SEPTIC SYSTEMS WITHIN 100 FEET OF THE PROPERTY BOUNDARY HAVE BEEN SHOWN TO THE BEST OF OUR KNOWLEDGE AND INFORMATION FROM AVAILABLE COUNTY RECORDS.
5. THE LOTS SHOWN HEREON COMPLY WITH THE MINIMUM OWNERSHIP WIDTH AND LOT AREA AS REQUIRED BY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT AND HOWARD COUNTY.
6. 2' INTERVAL CONTOUR TOPOGRAPHY SHOWN IS FIELD RUN BY O'CONNELL & LAWRENCE, INC.
7. PERCOLATION TEST FEE RECEIPT NUMBER : A43923 & A43924

SOILS LEGEND

SOIL	NAME	CLASS
Ba	BAILE SILT LOAM	D
G1B2	GLENELG LOAM, 3-8 % SLOPES, MODERATELY ERODED	B
G1C2	GLENELG LOAM, 8-15 % SLOPES, MODERATELY ERODED	B
GnB2	GLENVILLE SILT LOAM, 3-8 % SLOPES, MODERATELY ERODED	C
M1C2	MANOR LOAM, 8-15 % SLOPES, MODERATELY ERODED	B
M1D3	MANOR LOAM, 15-25 % SLOPES, SEVERELY ERODED	B

SEPTIC SYSTEM ELEVATION SUMMARY TABLE

DESCRIPTION	ELEVATION
F.F. ELEV.	485.0 FT.
INVERT OUT OF HOUSE	477.2 FT.
INVERT INTO AEROBIC TREATMENT	476.0 FT.
INVERT OUT OF AEROBIC TREATMENT	475.70 FT.
INVERT INTO PUMP CHAMBER	475.5 FT.
PUMP OFF WATER ELEVATION	472.5 FT.
ELEV. INTO 1A	493.3 FT.
ELEV. INTO 1B	488.7FT.

SEPTIC FIELD SUMMARY TABLE

SYSTEM	AREA (SF)	TYPE	INITIAL TRENCH LENGTH REQUIRED	INITIAL TRENCH LENGTH PROVIDED
#1	5,030	LOW DOSING PRESSURE SYSTEM	282' *	292'
#2	2,950	LOW DOSING PRESSURE SYSTEM	282' *	283'
#3	2,930	LOW DOSING PRESSURE SYSTEM	282' *	288'
TOTAL	10,910			

* INITAL TRENCH LENGTH FOR SEPTIC FIELDS BASED ON AN APPLICATION RATE OF 0.71 GALS/S.F. FOR A 4 BR HOUSE USING 6" DEPTH OF STONE WITH 3' WIDE TRENCHES

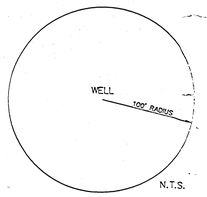
WELL NOTES:
1. EX. WELL TO BE FIELD LOCATED, ABANDONED, AND SEALED BY A LICENSED WELL DRILLER.
2. ALL WELLS TO BE DRILLED PRIOR TO BUILDING PERMIT APPROVAL. IT IS THE DEVELOPER'S RESPONIBILITY TO SCHEDULE THE WELL DRILLING PRIOR TO BUILDING PERMIT SUBMISSION. IT WILL NOT BE CONSIDERED "GOVERNMENT DELAY" IF THE WELL DRILLING HOLDS-UP THE HEALTH DEPARTMENT SIGNATURE OF THE PERMIT.

DATE	LOT	TEST SITE	1' DROP (MIN)	SHALLOW DEPTH	DEEP DEPTH	
6/5/1989	3	2S	16	2'-6"	9'-6"	
6/5/1989	3	2W	1.5	4'	12'	
6/5/1989	3	3N	2	3' & 5'	13'	
7/25/2006	3	A	13	6'	11'-6"	1-B
7/25/2006	3	B	11	4'	8'	1-B
7/25/2006	3	C	FAIL	FAIL	FAIL	
7/25/2006	3	D	12	5'	12'	1-B
7/25/2006	3	*E1	FAIL	FAIL	FAIL	
7/25/2006	3	*F1	FAIL	FAIL	FAIL	
7/11/2006	3	E	13	4'-9"	11'-5"	
7/11/2006	3	F	20	5'-5"	11'	
7/11/2006	3	G	14	4'	10'	
7/11/2006	3	H	3	4'	8'	
7/11/2006	3	H	FAIL	4'-8"	8'	
8/17/2006	3	I	FAIL	4'-6"	8'-6"	
8/17/2006	3	J	FAIL	4'-8"	9'	
8/17/2006	3	ALT#1	FAIL	FAIL	FAIL	
8/17/2006	3	ALT#2	FAIL	FAIL	FAIL	
8/17/2006	3	ALT#3	FAIL	FAIL	FAIL	
8/17/2006	3	NORTH CRNR	WATER	3'-6"	FAIL	
1/19/07	3	K	FAIL	FAIL	FAIL	
1/19/07	3	L	FAIL	FAIL	FAIL	
1/19/07	3	M	9	5'	12'	1-B
1/19/07	3	N	4	5'	11'	
1/19/07	3	O	20	4'	10'	
1/19/07	3	P	12	3'-6"	9'	
1/19/07	3	P	FAIL	5'	9'	

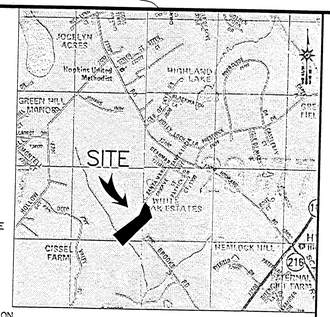
LEGEND

These standard symbols will be found in the drawing.

- GnB2 — SOIL DELINEATION
- EXISTING WOODEN FENCE
- EXISTING SEPTIC RESERVE
- PROPOSED SEPTIC RESERVE
- STORM DRAIN EASEMENT
- 75' STREAM BUFFER
- PROPOSED BUILDING LOCATION
- PERC LOCATION TO BE TESTED
- FAILING PERCOLATION TEST
- PASSING PERCOLATION TEST
- GV — GATE VALVE



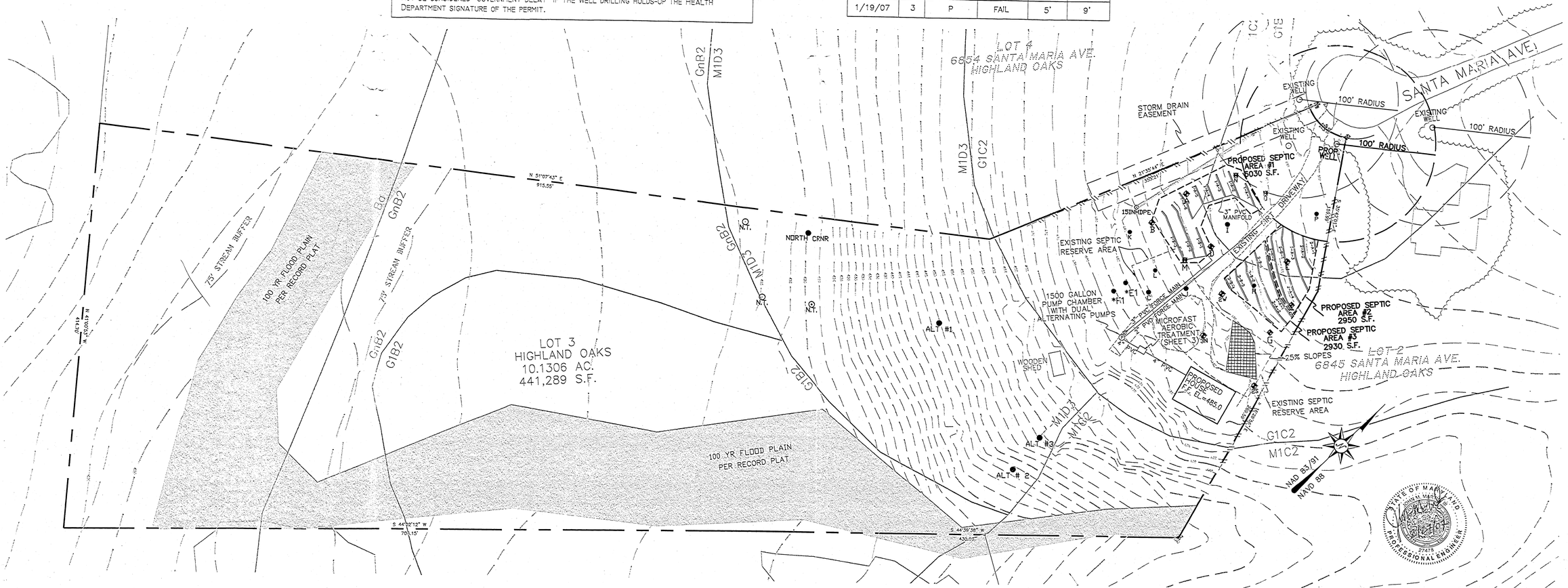
WELLS



VICINITY MAP
SCALE: 1"=2000'
PER ADC THE MAP PEOPLE

APPROVED FOR PRIVATE WATER AND PRIVATE SEWERAGE SYSTEMS

HOWARD COUNTY HEALTH OFFICER — DATE



O'Connell & Lawrence, Inc.
Construction Consultants, Engineers, Surveyors
17904 Georgia Avenue, Suite 302
Olney, Maryland 20832
Tel: (301) 924-4570 * Fax: (301) 924-5872

LANDS OF HIGHLAND OAKS
LOT 3

6851 SANTA MARIA AVENUE

LIBER 4865, FOLIO 577
5TH ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

PERCOLATION CERTIFICATION PLAN

ITEM	REVISION	BY

DESIGN BY: MLS
DRAWN BY: MLS
CHECKED BY: JMM
DATE: 2/26/2007
SCALE: 1" = 50'
PROJECT/FILE NO. 006-031
SHEET NO. 1 of 3

STATE OF MARYLAND — JOHN M. LAWRENCE — 21478 — PROFESSIONAL ENGINEER

P:\006-031\Surv\Comps\PERC_CERT_PLAN_LOW_DOSING_AEROBIC_2-7-07.dwg Feb 26, 2007-04:53pm

GENERAL NOTES
1. Property Data
LEGAL REFERENCE: Lot 3 Of Highland Oaks
Parcel Area: 10.1306 Acres
Tax Map: 48 Grid: 3
Zoning: RR/DEO
Watershed: Rocky Gorge Dam
ADC Map: 16-A27
Water and Sewer Categories: Private Well & Septic
Flood Plain: None per FEMA Map 240044 0016 Dated: December 4, 1986
2. Existing Site Data
Property lines shown hereon were taken from field observations and available records. This plan was been prepared without the benefit of a title examination.
Horizontal datum shown hereon is Maryland State Plane NAD 83/91
Topography and existing features shown hereon have been compiled from field observations and available Howard County records.
Vertical datum shown hereon is Maryland State Plane NAVD 88
The contractor shall field-verify grades prior to commencing any construction activities. If discrepancies are noted between the existing conditions and plans, contractor shall inform Engineer immediately so that appropriate modifications can be made. Contractor shall ensure positive drainage within any drainage structure
3. Utilities Data
Utilities locations shown hereon are taken from available plans and field observations where such information exist.
a) The Contractor shall hand dig test pits at all utility crossings to determine the exact location and depth well in advance of construction.
b) For marking locations of facilities, please contact "Miss Utility" at 1-800-257-7777 48 hours prior to any excavation or construction.
c) The Contractor shall field-verify actual size and locations.
4. Soils Data
Data shown hereon was obtained from the Soil Conservation Service Soils Survey for Howard County, Maryland, Map 28.

SEWAGE NOTES:
1. The purpose of this plan is to revise the previously approved septic easement for Lot 3 of Highland Oaks
2. This area [illegible] designates a private sewage disposal easement of at least 10,000 square feet as required by the Maryland Department of the Environment for individual sewage disposal. Improvements of any nature in this area are restricted. These easements shall become null and void upon connection to a public sewerage system. The County Health Officer shall have the authority to grant adjustments to the private sewage easement. Recordation of a revised sewage easement shall not be necessary.
3. Perc holes shown hereon per available county records and field testing.
4. Wells and septic systems within 100 feet of the property boundary have been shown to the best of our knowledge and information from available county records
5. The Lot shown hereon comply with the minimum ownership width and lot area as required by the Maryland Department of the Environment and Howard County.
6. 2' interval contour topography shown is field run by O'Connell & Lawrence, Inc.
7. Percolation test fee receipt number - 463923 & 463926

SOILS LEGEND

SOIL	NAME	CLASS
BaA	BAILE SIL T LOAM	D
GnB2	GLENELG LOAM, 3 TO 8 % SLOPES, MODERATELY ERODED	B
GnC2	GLENELG LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED	B
GnD2	GLENELG SIL T LOAM, 15 TO 25 % SLOPES, MODERATELY ERODED	B
M1C2	MANOR LOAM, 8 TO 15 % SLOPES, MODERATELY ERODED	B
M1D3	MANOR LOAM, 15 TO 25 % SLOPES, SEVERELY ERODED	B

SEPTIC SYSTEM ELEVATION SUMMARY TABLE

DESCRIPTION	ELEVATION
F.F. ELEV.	489.0 FT.
INVERT OUT OF HOUSE	477.2 FT.
INVERT INTO AEROBIC TREATMENT	476.6 FT.
INVERT OUT OF AEROBIC TREATMENT	475.70 FT.
INVERT INTO PUMP CHAMBER	475.5 FT.
PUMP OFF WATER ELEVATION	473.5 FT.
ELEV. INTO 1A	485.3 FT.
ELEV. INTO 1B	484.3FT.

SEPTIC FIELD SUMMARY TABLE

SYSTEM	AREA (SF)	TYPE	INITIAL TRENCH LENGTH REQUIRED	INITIAL TRENCH LENGTH PROVIDED
#1	5,830	LOW DOSING PRESSURE SYSTEM	390' *	395'
#2	2,830	LOW DOSING PRESSURE SYSTEM	285' *	285'
#3	2,830	LOW DOSING PRESSURE SYSTEM	285' *	285'
TOTAL	10,810			

* INITIAL TRENCH LENGTH FOR SEPTIC FIELDS BASED ON AN APPLICATION RATE OF 0.71 GAL/S/S.F. FOR 4 BR HOUSE USING 6" DEPTH OF 5' DIKE WITH 3' WIDE TRENCHES

WELL NOTES:
1. Ex. well to be field located, abandoned and sealed by a licensed well driller.
2. All wells to be drilled prior to building permit approval. It is the developer's responsibility to schedule the well drilling prior to building permit submission. It will not be considered "Government delay" if the well drilling holds-up the health department signature of the permit.

DATE	LOT	TEST SITE	1" DROP (MIN)	SHALLOW DEPTH	DEEP DEPTH
8/5/1988	3	2S	18	3'-6"	9'-6"
8/5/1988	3	2W	15	4'	12'
8/5/1988	3	3N	2	3' & 5'	13'
7/25/2006	3	A	13	6'	11'-6"
7/25/2006	3	B	11	4'	8'
7/25/2006	3	C	FAIL	FAIL	FAIL
7/25/2006	3	D	12	5'	12'
7/25/2006	3	#E1	FAIL	FAIL	FAIL
7/25/2006	3	#F1	FAIL	FAIL	FAIL
7/11/2006	3	E	13	4'-9"	11'-9"
7/11/2006	3	F	30 AVG	5'-5"	11'
7/11/2006	3	G	14	4'	10'
7/11/2006	3	H	3	4'	8'
7/11/2006	3	I	FAIL	4'-8"	8'
8/17/2006	3	I	FAIL	4'-8"	8'-6"
8/17/2006	3	J	FAIL	4'-8"	9'
8/17/2006	3	ALT#1	FAIL	FAIL	FAIL
8/17/2006	3	ALT#2	FAIL	FAIL	FAIL
8/17/2006	3	ALT#3	FAIL	FAIL	FAIL
8/17/2006	3	NORTH CRWR	WATER	3'-8"	FAIL
1/18/07	3	K	FAIL	FAIL	FAIL
1/18/07	3	L	FAIL	FAIL	FAIL
1/18/07	3	M	9	5'	12'
1/19/07	3	N	4	5'	11'
1/19/07	3	O	20	4'	10'
1/19/07	3	P	12	3'-6"	8'
1/19/07	3	P	FAIL	5'	8'

LEGEND
Some standard symbols will be found in the drawing

GnB2

SOIL DESIGNATION
EXISTING WOODEN FENCE
EXISTING SEPTIC RESERVE
PROPOSED SEPTIC RESERVE
STORM DRAIN EASEMENT
75' STREAM BUFFER
PROPOSED BUILDING LOCATION
PERC LOCATION TO BE REDUG
FAILING PERCOLATION TEST
PASSING PERCOLATION TEST
GATE VALVE

WELLS

N.T.S.

VICINITY MAP
SCALE: 1"=2000'
PER ADC THE MAP PEOPLE

APPROVED FOR PRIVATE WATER AND PRIVATE SEWERAGE SYSTEMS
HOWARD COUNTY HEALTH OFFICER
DATE

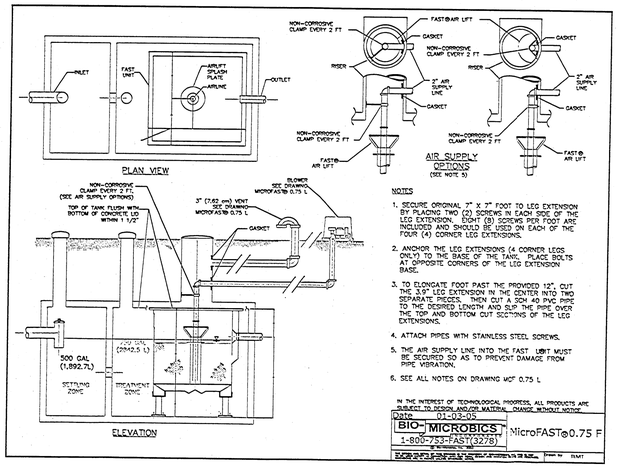
O'Connell & Lawrence, Inc.
Consulting Engineers, Surveyors
(7906 Contee Rd., Suite 202
Laurel, Maryland 20723
Tel: (301) 604-4676 * Fax: (301) 604-4672

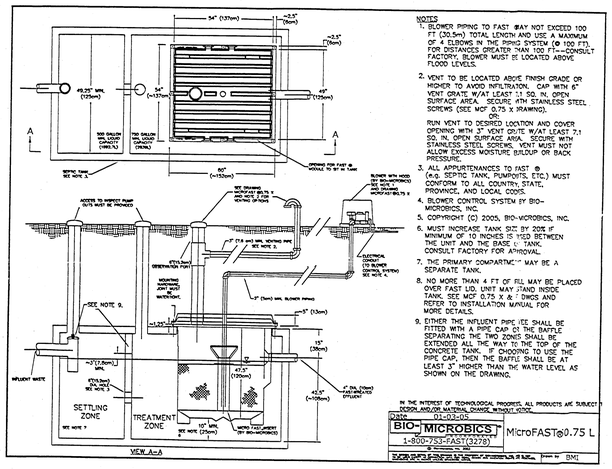
LANDS OF MICHAEL AND CHAD
LOT 3
6851 SANTA MARIA AVENUE
LOT 3 HIGHLAND OAKS
TAX MAP 48 GRID 3
ELECTION DISTRICT 6TH
HOWARD COUNTY, MARYLAND

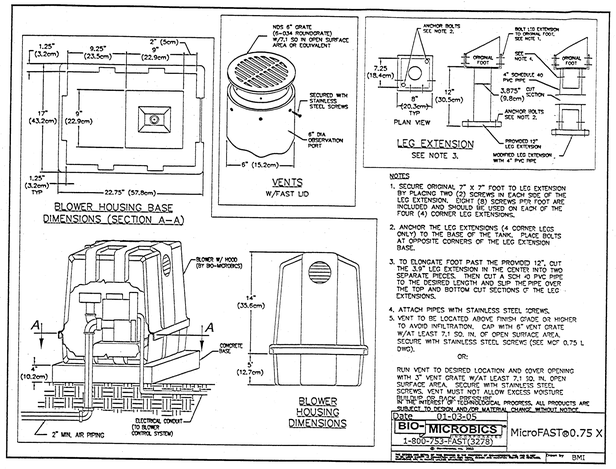
PERCOLATION CERTIFICATION PLAN

DESIGNED BY	MLS
DRAWN BY	MLS
CHECKED BY	JMT
DATE	2/26/2007
SCALE	1" = 80'
PROJECT NO.	006-031
SHEET NO.	1 of 3

MIRCOFAST AEROBIC TREATMENT SYSTEM







Specifications For MicroFAST 0.75 Wastewater Treatment System

1. GENERAL
The contractor shall furnish and install (1) MicroFAST 0.75 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include FAST System insert, insert lid (or leg extensions if that option is chosen), blower assembly, blower controls and alarms. The MicroFAST 0.75 unit shall be situated within a 750 gallon minimum compartment in a two compartment tank as shown on the plans, or in a 1250 gallon one compartment tank. Tank(s) must conform to local, state, and all other applicable codes. The contractor shall provide coordination between the FAST system and tank supplier with regard to fabrication of the tank, installation of the FAST unit and delivery to the job site.

2. OPERATING CONDITIONS
The MicroFAST 0.75 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (1) one to (11) eleven persons and not to exceed 750 US Gallons per day (2842.5 LPD).

3. MEDIA
The FAST media shall be manufactured of rigid PVC, polyethylene or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids immediately descend through the media to the bottom of the septic tank.

4. BLOWER
The MicroFAST 0.75 unit shall come equipped with a regenerative type blower capable of delivering 17–25 CFM. The blower assembly shall include an inlet filter with metal filter element.

5. REMOTE MOUNTED BLOWER
The blower may be mounted remote with no more than 100 ft (30.5 M) of piping and no more than four elbows, from the MicroFAST unit on a contractor supplied concrete base. The blower must not set in standing water and its elevation must be higher than the normal flood level. A two-piece, rectangular housing shall be provided with tamper–proof screws. The discharge air line from the blower to the MicroFAST shall be provided and installed by the contractor.

6. ELECTRICAL
The electrical source should be within 150 feet of the blower. Consult local code for longer wiring distances. All wiring must conform to code. The input power required for the blower is 115/230 Volts, Single Phase, 60/50 Hertz, 3.8/1.9 Full Load Amps, minimum wire size is 16 AWG. (Locked Rotor Amps are 18.6/9.3). All conduit and wiring between the electrical control panel (optional), the power supply, and the blower shall be furnished and installed by the contractor.

7. ALARMS
The alarm system shall consist of a visual and audible alarm to indicate loss of power to the blower and/or high water level. A manual silence switch is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS
All work must be done in accordance with local codes and regulations. Installation of the MicroFAST 0.75 shall be done in accordance with the written instructions provided by the manufacturer. No more than four feet of fill may be placed over the FAST tie. Operation manuals shall be furnished which will include a description of installation, operation, and system maintenance procedures. There shall be a separate manual for the installer, service provider, and owner, tailored to each.

9. WARRANTY
The manufacturer of the MicroFAST 0.75 treatment system shall warrant for three years from the date of shipment or two years form the date of start–up, whichever occurs first, that the equipment they provide will be free from defects in material and workmanship.

In the event a mechanical component fails to perform as specified or is proven defective in service during the warranty period, the manufacturer shall repair or replace such defective parts. (Cost of labor on repair/replacement is not covered under this warranty.) The replacement or repair of those items normally consumed in service such as air filter, etc., shall be considered as part of routine maintenance and upkeep.

It is not intended that the manufacturer assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material or workmanship, or delays in delivery, replacement, or otherwise.

9. FLOW AND DOSING
Wastewater treatment systems work best when influent flow is delivered as consistently as possible. FAST systems have been successfully designed, tested and certified receiving gravity, demand–based influent flow. However when influent flow is controlled (either by pump or other means) to the FAST system to help with highly variable flow conditions, than multiple feeding events should be used to help assure even flow, optimum performance, and reliability.

IN THE INTEREST OF TECHNOLOGICAL PROGRESS, ALL PRODUCTS ARE SUBJECT TO DESIGN AND/OR MATERIAL CHANGE WITHOUT NOTICE
Date 01-03-05
BIO-MICROBICS 1-800-753-FAST(3278)
MicroFAST@0.75 S
Drawn by BMT

GOULDS PUMPS

Submersible Effluent Pump

MODEL

3885

PROSURANCE AVAILABLE FOR RESIDENTIAL APPLICATIONS.

APPLICATIONS
Specifically designed for the following uses:
- Homes
- Farms
- Trailer courts
- Motels
- Schools
- Hospitals
- Industry
- Effluent systems

SPECIFICATIONS

Pump
- Solids handling capabilities: ¾" maximum.
- Discharge size: 2" NPT.
- Capacities: up to 140 GPM.
- Total heads: up to 128 feet TDH.
- Temperature: 104°F (40°C) continuous 140°F (60°C) intermittent.
- See order numbers on reverse side for specific HP, voltage, phase and RPM's available.

FEATURES

■ **Impeller:** Cast iron, semi-open, non-clog with pump-out vanes for mechanical seal protection. Balanced for smooth operation. Silicon bronze impeller available as an option.

■ **Casing:** Cast iron volute type for maximum efficiency. 2" NPT discharge.

■ **Mechanical Seal: SILICON CARBIDE VS. SILICON CARBIDE** sealing faces. Stainless steel metal parts, BUNA-N elastomers.

■ **Shaft:** Corrosion-resistant, stainless steel. Threaded design. Locknut on three phase models to guard against component damage on accidental reverse rotation.

■ **Fasteners:** 300 series stainless steel.

■ Capable of running dry without damage to components.

■ Designed for continuous operation when fully submerged.

MOTORS

■ Fully submerged in high-grade turbine oil for lubrication and efficient heat transfer.

■ Class B insulation.

Single phase:
- Built-in overload with automatic reset.
- All single phase models feature capacitor start motors for maximum starting torque.
- ½ and ½ HP – 16/3 SJTOW with 115, 208 and 230 Volt three prong plug.
- ¾-2 HP – 14/3 STOW with bare leads.

Three phase:
- Overload protection must be provided in starter unit.
- ½-2 HP – 14/4 STOW with bare leads.

■ **Designed for Continuous Operation:** Pump ratings are within the motor manufacturer's recommended working limits, can be operated continuously without damage when fully submerged.

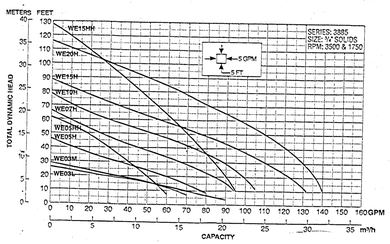
■ **Bearings:** Upper and lower heavy duty ball bearing construction.

■ **Power Cable:** Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. 20 foot standard with optional lengths available.

■ **O-ring:** Assures positive sealing against contaminants and oil leakage.

AGENCY LISTINGS
Tested to UL 778 and CSA 22.2 108 Standards By Canadian Standards Association File #LR38549

Goulds Pumps is ISO 9001 Registered.



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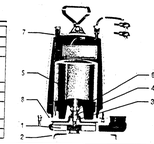
GOULDS PUMPS

COMPONENTS

Item No.	Description
1	Impeller
2	Casing
3	Silicon carbide vs. silicon carbide Mechanical seal
4	Shaft
5	Motor
6	All ball bearing heavy duty design
7	Power cable
8	O-ring



Submersible Effluent Pump

MODEL

3885

MODELS

Order No.	HP	Volts*	Phase	Max. Amp.	RPM	Solids	Wt. (lbs.)	Heaters
WE0311L	½	115	1	9.8	1750	1½"	55	N/A
WE0315L		208		5.5				
WE0312L		230		4.9				
WE0311M		115		9.8				
WE0318M		208		5.5				
WE0312M		230		4.9				
WE0511H	¾	115		14.5			60	K34 K52 K62
WE0518H		208		8.1				
WE0512H		230		7.3				
WE0538M		200	3	4.1				
WE0552M		220		3.7				
WE0534H		460		1.7				
WE0511HH	1	115	1	14.5			70	N/A
WE0518HH		208		8.1				
WE0512HH		230		7.3				
WE0538HH		200	3	4.1				K34
WE0552HH		230		3.8				K33
WE0534HH		460		1.8				K23
WE0718H	1½	208	1	11.0	3500	1½"	70	N/A
WE0712H		230		10.0				
WE0738H		200	3	5.4				K69
WE0732H		230		5.4				K39
WE0734H		460		2.7				K28
WE1018H	2	208	1	14.0				N/A
WE1012H		230		12.5				
WE1038H		200	3	8.1				K50
WE1032H		230		7.0				K43
WE1034H		460		3.5				K22
WE1518H	3	208	1	17.5			80	N/A
WE1512H		230		15.7				
WE1538H		200	3	10.6				K34
WE1532H		230		9.2				K52
WE1534H		460		4.6				K36
WE1518HH	1½	208	1	17.5				N/A
WE1512HH		230		15.7				
WE1538HH		200	3	10.6				K34
WE1532HH		230		9.2				K52
WE1534HH		460		4.6				K36
WE2018H	2	208	1	18.0			83	N/A
WE2012H		230		16.0				
WE2038H		200	3	12.0				K55
WE2032H		230		11.6				K51
WE2034H		460		5.8				K41

PERFORMANCE RATINGS (gallons per minute)

Order No.	WE03L	WE03M	WE05H	WE07H	WE15H	WE15HH	WE15MH	WE20H
HP	¾	¾	½	¾	1	1½	½	1½	2
RPM	1750	1750	3500	3500	3500	3500	3500	3500	3500
5	86	–	–	–	–	–	–	–	–
10	70	65	78	94	–	–	56	95	140
15	58	58	70	90	103	128	53	93	138
20	30	35	60	85	98	123	50	90	136
25	5	15	48	76	94	117	45	87	133
30	–	–	35	67	88	111	40	84	130
35	–	–	23	57	82	100	35	82	126
40	–	–	12	45	74	95	30	77	121
45	–	–	–	35	64	86	25	74	116
50	–	–	–	25	53	77	18	70	110
55	–	–	–	17	42	67	12	66	104
60	–	–	–	9	30	56	3	63	97
65	–	–	–	–	20	46	–	58	90
70	–	–	–	–	11	35	–	55	83
75	–	–	–	–	4	25	–	51	75
80	–	–	–	–	–	15	–	47	66
90	–	–	–	–	–	–	–	37	51
100	–	–	–	–	–	–	–	28	30
110	–	–	–	–	–	–	–	17	10
120	–	–	–	–	–	–	–	8	–

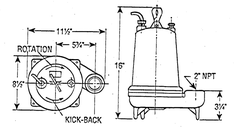
Total Head Feet of Water

EFFLUENT EJECTOR SYSTEM

Effluent ejector system offers ease of ordering and installation. A single ordering number specifies a complete system designed for most residential and commercial sump and effluent pump applications.

Pa-kage Includes:
Submersible Effluent Pump WE0311L, 12L or WE0311M, 12M, WE0511HH, 12HH
Mechanical Level Control Switch
AD-1(115V), AZ-6 (230V)
Basin and Cover AZ-1820P
Check Valve AA-2P
Order No.: SWE0311L, SWE0312L, SWE0311M, SWE0312M, SWE0511HH, SWE0512HH.

DIMENSIONS
(All dimensions are in inches. Do not use for construction purposes.)



Goulds Pumps
ITT Industries

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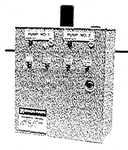
SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

GOULDS PUMPS

SES Series Customized Control Panels

NEMA 1 Duplex Controller with Alternator and Alarm



APPLICATIONS
Superior quality duplex liquid level controller, automatically maintains two pump operation, alternation and high level alarm warning for a variety of sump, effluent, sewage and water transfer applications. Not for use in damp, outdoor, or weatherproof applications.

SPECIFICATIONS
- Accepts single or dual power feed.
- Two hand-off automatic pump switches.
- On-off control circuit switch.
- Two oversized magnetic contactors.
- Numbered terminal strip-screw type.
- NEMA 1, 30 watt, flashing red light.
- NEMA 1, steel enclosure.
- NEMA 1, alarm horn – 95db.
- 115 V, 3 amp control circuit breaker.
- Auxiliary alarm contacts.
- **Non-modifiable.**

Single Phase
- Field adjustable for 115 or 230 V, 60 Hz.
- Two pump circuit breakers.
- 12" x 14" x 6" enclosure.

Maximum Pump Running Amps	Pump Circuit Breakers	Panel Order No.
20	25	D10020 N1

FEATURES
■ Provides fully automatic operation for two pumps. Alternates pump starting to distribute operating time. Provides extra pumping capacity in times of high inflow by energizing both pumps.

■ Solid state pump alternator circuit displays float status for ease of installation or trouble shooting.

■ High level alarm circuit includes through door mounted silence switch for manual silence of alarm horn.

■ Two through door mounted pump run lights.

■ Top mounted high intensity flashing red light provides 360° visibility.

■ Pulsating, corrosion proof alarm horn.

■ Color coded wiring, screw type terminals and plug in sockets, insure ease of field servicing.

■ Field wiring diagram, panel schematic and installation instructions included.

■ These duplex controls are factory wired for operation with three float switches. An easy field modification for four float switch operation using separate "lag-on" and "alarm switches" is provided.

■ Panel can be wired for a single power feed for pumps and control circuit or the control circuit can be wired to a separate power supply to insure alarm integrity in case of a tripped pump breaker.

■ Auxiliary alarm contacts provided for remote alarm connection.

■ Entire unit is UL and CUL listed.

■ Float switches must be ordered separately.

Goulds Pumps
ITT Industries

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SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

O'Connell & Lawrence, Inc.
Construction Consultants, Engineers, Surveyors
17904 Georgia Avenue
Olney, Maryland 20832
Tel: (301) 774-8787

LANDS OF HIGHLAND OAKS
LOT 3
6851 SANTA MARIA AVENUE
LIBER 4865, FOLIO 577
5TH ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

SEPTIC NOTES & DETAILS

DESIGN BY
DRAWN BY
CHECKED
DATE:
SCALE
PROJ.
SHT

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MICROFAST AEROBIC TREATMENT SYSTEM

Specifications For MicroFAST 0.75 Wastewater Treatment System

GOULDS PUMPS

Submersible Effluent Pump

3885

GOULDS PUMPS

Submersible Effluent Pump

3885

GOULDS PUMPS

3126 Series Customized Control Panels

NEMA 1 Duplex Controller with Alternator and Alarm

O'Connell & Lawrence, Inc.

6851 SANTA MARIA AVENUE

SEPTIC NOTES & DETAILS

2/29/2007

N.T.S.

006-031

3 of 3

SEWAGE DISPOSAL SYSTEM

SEWER PIPING
- GRAVITY SEWER SHALL BE PVC TO MEET ASTM D3034 (SDR-35) WITH PUSHON GASKETED JOINTS.
- 2" & 3" PRESSURE FORCE MAIN SHALL BE PVC SCHEDULE 40 WITH SOLVENT CEMENTED JOINTS.
- BEDDING SHALL BE CLASS 'C' UNLESS OTHERWISE REQUIRED BY THE ENGINEER IN FIELD.
- VALVES SHALL BE MADE OF PVC. THEY SHALL BE COMPATIBLE WITH THE SERVICE LINE PIPE ON WHICH THEY WILL BE INSTALLED. VALVES INSTALLED IN GROUND SHALL BE SET IN AN ACCESSIBLE VALVE BOX.

AEROBIC TREATMENT SYSTEM
-PROVIDE MICROFAST 0.75 TREATMENT SYSTEM OR EQUIVALENT WITH TREATMENT CAPACITY OF 750 GPD. BLOWER CAPACITY SHALL BE 1/3 HP AT 17-25 CFM (SEE DETAILS ON SHEET 3).

PUMP CHAMBER
- 1500 GAL PUMP CHAMBER SHALL BE PRECAST TO MEET ASTM C913. CONCRETE SHALL BE 4500 PSI MIN. AT 28 DAYS. REBAR SHALL BE ASTM A706 GRADE 60. WELDED WIRE FABRIC SHALL MEET ASTM A496; MIN. COVER FOR REINF. TO BE 2". PUMP CHAMBER SHALL BE DESIGNED TO WITHSTAND A-16 WHEEL LOAD AS SPECIFIED IN ASTM C-890.
-24" MANHOLE OPENINGS SHALL BE WATERTIGHT AND ACCESSIBLE WITHIN 18" OF FINAL GRADE ABOVE CHAMBER. CAST FRAME AND COVER SHALL BE BOLTED AND SET 6" ABOVE FINAL GRADE.
- PIPING SHALL EITHER BE SET DURING CASTING OR A RUBBER WALL SLEEVE GASKET SHALL BE INTEGRALLY CAST DURING MONOLITHIC POURING OF TANK WALLS TO PROVIDE FOR INSTALLATION OF PIPING IN THE FIELD. METHOD TO BE USED SHALL BE COORDINATED WITH FIELD CONTRACTOR.
- PUMP CHAMBER SHALL BE TESTED FOR WATERTIGHTNESS AFTER COMPLETION. CHAMBER SHALL BE FILLED TO THE INVERT OF THE OUTLET PIPE AND THE LEVEL HELD FOR 24 HOURS

PUMPING SYSTEM
- PROVIDE DUPLEX SUBMERSIBLE EFFLUENT PUMP GOULDS MODEL #3885 ORDER #WE10H OR EQUIVALENT FOR SEWAGE EFFLUENT HANDLING INTO SYSTEM 1-A WITH PUMP CAPACITY TO BE 71.40 GPM @ 41.30 FT. PROVIDE DUPLEX SUBMERSIBLE EFFLUENT PUMP GOULDS MODEL #3885 ORDER #WE07H OR EQUIVALENT FOR SEWAGE EFFLUENT HANDLING INTO SYSTEM 1-B WITH PUMP CAPACITY TO BE 84.62 GPM @ 20.21 FT.TOTAL DYNAMIC HEAD (SEE DETAIL-SHEET 3).
- MOTOR SHALL BE 208 VOLT, SINGLE PHASE AT MAXIMUM 3500 RPM. STATOR, ROTOR AND BEARINGS SHALL BE MOUNTED IN SEALED SUBMERSIBLE TYPE HOUSING.
- PUMPS TO BE HOUSED IN 1500 GAL. PUMP CHAMBER.
- PUMP CONTROL SHALL BE NEMA 1 DUPLEX CONTROLLER WITH ALTERNATOR AND ALARM OR EQUIVALENT AS SHOWN ON SHEET 3. PANEL TO BE LOCATED INSIDE THE BUILDLING, PROVIDED WITH RED LIGHT AND AUDIBLE ALARMS FOR HIGH WATER, ELAPSED TIME METER AND LIGHTENING SUPPRESSOR. ALARM IS TO BE WIRED INDEPENDENT OF THE SEWAGE PUMPS. FLOAT LEVEL CONTROL SHALL BE SEALED STEEL TUBE MERCURY SWITCHES ENCASED IN POLYSRETHANE FLOAT. STAINLESS STEEL FLOAT SUPPORT BRACKET SHALL BE MOUNTED IN WETWELL. FLOAT SHALL BE INSTALLED TO PROVIDE 150 GALLONS PER DOSE.

LOW PRESSURE DOSING SYSTEM
- ENDS OF ALL TRENCHES SHALL BE LOCATED BY FIELD SURVEY, MAINTAINING MINIMUM 12 FT CENTER TO CENTER SEPARATION.
- 1-1/4" AND 1-1/2" LOW PRESSURE DISTRIBUTION LATERALS SHALL BE PVC SCHEDULE 40 WITH SOLVENT CEMENTED JOINTS. PERFORATIONS SHALL BE PROVIDED ONLY WITHIN PORTIONS TO BE INSTALLED IN THE STONE FILLED DISPOSAL TRENCHES.
- 3" LOW PRESSURE DISTRIBUTION MANIFOLDS SHALL BE PVC SCHEDULE 40 WITH SOLVENT CEMENTED JOINTS.

SEWAGE DISPOSAL SYSTEM NARRATIVE

STEP 1: UPON LEAVING THE HOUSE, THE EFFLUENT GRAVITY FLOWS INTO THE AEROBIC TREATMENT SYSTEM WHERE IT ENTERS INTO THE INITIAL CHAMBER THAT ACTS AS A SETTLING TANK. THE EFFLUENT THEN PASSES INTO THE SECOND TREATMENT ZONE WHERE IT IS AERATED.
STEP 2: THE CLARIFIED EFFLUENT GRAVITY FLOWS FROM THE AEROBIC TREATMENT SYSTEM INTO THE 1500 GALLON PUMP CHAMBER. THIS PUMP CHAMBER FUNCTIONS AS A HOLDING TANK FOR TEMPORARY STORAGE OF THE EFFLUENT. THE CHAMBER HOUSES THE DUAL ALTERNATING PUMP SYSTEM. THE FLOATS SHALL BE INSTALLED TO DOSE A VOLUME OF 150 GALLONS OF EFFLUENT. THE PUMPS FEED THE EFFLUENT TO THE SEPTIC SYSTEM.
STEP 3: THE FINAL PORTION OF THE SEPTIC SYSTEM IS THE LATERALS. THE LATERALS ARE END-LOADED LOW PRESSURE DOSING SYSTEMS. ALTERNATING PUMPS ARE PROVIDED TO ALTERNATE DOSES TO EACH HALF OF THE SYSTEM THROUGH INDIVIDUAL FORCE MAINS. THE PUMP DESIGNATION FOR EACH SYSTEM IS LISTED IN THE TABLE BELOW.

Submersible Effluent Pump Sizing Calculations – System 1-A

**All calculations per "Gould's Pump Technical Data Manual" for wastewater applications, date October 2006

1. Rate of Flow = 71.40 GPM
2. Suction Conditions: Flooded Suction
3. Discharge Conditions
   a. Elevation Head = 20.80'
   b. Friction Losses:
      i. 2" Friction Loss @ 71.40 GPM = 9.18' (per 100' of length)

      2" Linear foot equivalents:
      (1) 90° Elbow (2") = 5.5'
      Length of Pipe (2") = 195.5'
      Total LF Equivalent = 201.0'

      2" Friction Loss: (200.0/100) (9.18) = 18.45'

      ii. 3" Friction Loss @ 71.40 GPM = 1.29' (per 100' of length)

      3" Linear foot equivalents:
      (3) 45° Elbow (3") = 11.4'
      Length of Pipe (3") = 84.0'
      Total LF Equivalent = 95.4'

      3" Friction Loss: (95.4/100) (1.29) = 1.23'

   c. Velocity Head
      $\frac{(71.40\ GPM) \times (0.409)}{(2")^2} = 7.30\ fps$
      Velocity Head = $V^2 / (2g) = (7.30)^2 / (2*32.16) = 0.83'$
   d. Total Dynamic Head = Elevation Head + 2" Friction Losses +3" Friction Losses + Dynamic Head
      TDH = 20.80' + 18.45' + 1.23' 0.83'
      TDH = 41.30'

Referring to "Gould's Pump Catalog" Model 3885 WE Series pump curve w/ 71.40 GPM & 41.30' TDH with 2.79' of design head, use model WE10H. This pump provides 2.79' of design head in addition to the total dynamic head required of 41.30'.

Submersible Effluent Pump Sizing Calculations – System 1-B

**All calculations per "Gould's Pump Technical Data Manual" for wastewater applications, date October 2006

1. Rate of Flow = 84.62 GPM
2. Suction Conditions: Flooded Suction
3. Discharge Conditions
   a. Elevation Head = 16.20'
   b. Friction Losses:
      i. 3" Friction Loss @ 84.62 GPM = 1.77' (per 100' of length)

      3" Linear foot equivalents:
      (1) 90° Elbow (3") = 8.0'
      (1) 45° Elbow (3") = 3.8'
      Length of Pipe (3") = 149.0'
      Total LF Equivalent = 160.8'

      3" Friction Loss: (160.8/100) (1.77) = 2.85'

   c. Velocity Head
      $\frac{(84.62\ GPM) \times (0.409)}{(2")^2} = 8.65\ fps$
      Velocity Head = $V^2 / (2g) = (8.65)^2 / (2*32.16) = 1.16'$
   d. Total Dynamic Head = Elevation Head + 3" Friction Losses + Dynamic Head
      TDH = 16.20' + 2.85' + 1.16'
      TDH = 20.21'

Referring to "Gould's Pump Catalog" Model 3885 WE Series pump curve w/ 84.62 GPM & 20.21' TDH with 3.68' of design head, use model WE07H. This pump provides 3.68' of design head in addition to the total dynamic head required of 20.21'.

PUMP DESIGN SUMMARY TABLE

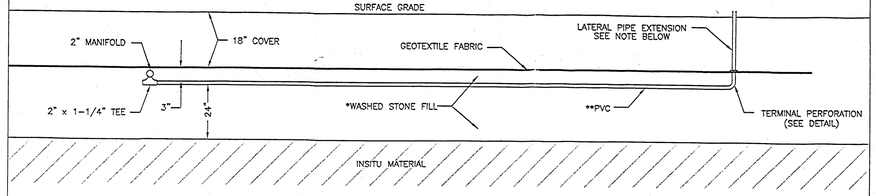
SYSTEM I.D.	ELEVATION HEAD	FRICTION LOSSES	VELOCITY HEAD	DYNAMIC HEAD (FT)	FLOW (GPM)	DESIGN HEAD (FT)	GOULD'S PUMP MODEL #3885* WE SERIES
1-A	20.8	19.68	0.83	41.30	71.40	2.79	WE10H*
1-B	16.2	2.85	1.17	20.21	84.62	3.68	WE07H*
2-A	24.3	12.75	0.42	37.48	51.05	2.84	WE07H*
2-B	22.2	12.63	0.51	35.34	56.18	2.38	WE07H*
3-A	20.8	14.98	0.47	36.26	53.98	2.90	WE07H*
3-B	19.9	23.85	1.21	44.96	86.07	2.64	WE15H*

*OR EQUIVALENT

LOW-DOSING TRENCH SCHEDULE

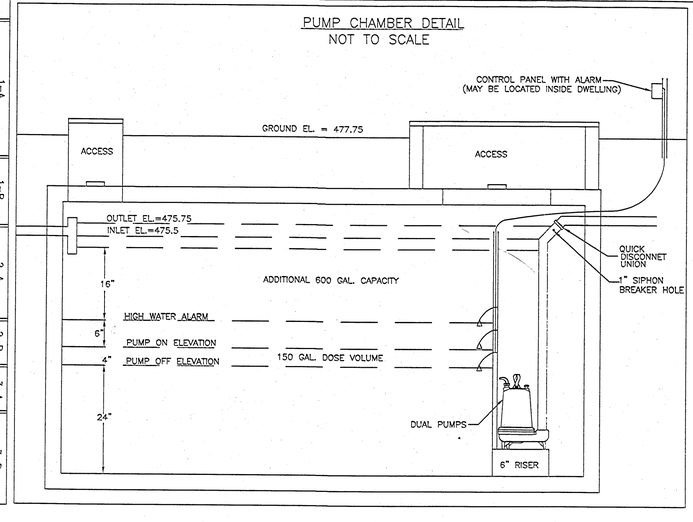
LATERAL I.D.	LATERAL DIA. (IN)	~~PIPE DEPTH~~ (FT)	USEABLE STONE DEPTH (FT)	TRENCH DEPTH (FT)	GROUND ELEV. (FT)	PIPE ELEV. (FT)	DELTA HEAD (FT)	DELTA + DESIGN (FT)	~~DIAM. HOLES~~ (IN)	FLOW PER HOLE (GPM)	~~SEPTIC TRENCH LENGTH (FT)~~	CALCULATED # OF HOLES	~~ACTUAL # OF HOLES~~	HOLE SPACING (FT)	FLOW PER LATERAL (GPM)	FLOW PER L.F OF LATERAL (GPM/FT)	
1-A-1	1-1/4	1.75	0.5	2.25	495.0	493.3	0.00	2.79	5/16	3.14	25.00	3.79	4	6.3	12.56	0.502	1-A
1-A-2	1-1/4	1.75	0.5	2.25	494.3	492.6	0.70	3.49	5/16	3.51	29.00	3.39	4	7.3	14.05	0.484	
1-A-3	1-1/4	1.75	0.5	2.25	493.5	491.8	1.50	4.29	5/16	3.89	24.00	3.05	3	8.0	11.68	0.487	
1-A-4	1-1/4	1.75	0.5	2.25	492.7	491.0	2.30	5.09	5/16	4.24	18.00	2.80	2	9.0	8.48	0.471	
1-A-5	1-1/4	1.75	0.5	2.25	491.6	489.9	3.40	6.19	5/16	4.68	20.00	2.54	2	10.0	9.36	0.468	
1-A-6	1-1/4	1.75	0.5	2.25	490.5	488.8	4.50	7.29	5/16	5.08	30.00	2.34	3	10.0	15.23	0.508	
~~1-B-1~~	1-1/4	~~1.75~~	0.5	2.25	490.5	488.7	0.00	3.68	~~5/16~~	3.61	~~31.00~~	7.83	5	~~6.2~~	18.03	0.582	1-B
~~1-B-2~~	1-1/2	~~1.75~~	0.5	2.25	489.6	487.9	0.85	4.53	~~5/16~~	4.00	~~60.00~~	7.06	9	~~6.7~~	36.01	0.600	
~~1-B-3~~	1-1/2	~~1.75~~	0.5	2.25	488.7	487.0	1.74	5.42	~~5/16~~	4.38	~~55.00~~	6.45	7	~~7.9~~	30.64	0.557	
2-A-1	1-1/4	1.75	0.5	2.25	498.5	496.8	0.00	2.84	5/16	3.17	13.51	4.03	2	6.8	6.34	0.469	2-A
2-A-2	1-1/4	1.75	0.5	2.25	497.8	496.1	0.70	3.54	5/16	3.54	38.09	3.61	5	7.6	17.69	0.464	
2-A-3	1-1/2	1.75	0.5	2.25	497.1	495.4	1.40	4.24	5/16	3.87	61.60	3.30	7	8.8	27.10	0.440	
2-A-4	1-1/4	1.75	0.5	2.25	496.4	494.7	2.10	4.94	5/16	4.18	27.00	3.06	3	9.0	12.54	0.464	
2-B-1	1-1/4	1.75	0.5	2.25	496.4	494.7	0.00	2.38	5/16	2.90	56.30	9.69	8	7.0	23.20	0.412	2-B
2-B-2	1-1/2	1.75	0.5	2.25	495.7	494.0	0.70	3.08	5/16	3.30	86.00	8.52	10	8.6	33.00	0.384	
3-A-1	1-1/2	1.75	0.5	2.25	495.0	493.3	0.00	2.90	5/16	3.20	85.00	8.43	10	8.5	32.02	0.377	3-A
3-A-2	1-1/2	1.75	0.5	2.25	494.1	492.4	0.90	3.80	5/16	3.66	57.97	7.37	6	9.7	21.99	0.379	
3-B-1	1-1/4	1.75	0.5	2.25	494.1	492.4	0.00	2.64	5/16	3.05	25.30	7.05	5	5.1	15.27	0.604	3-B
3-B-2	1-1/2	1.75	0.5	2.25	493.2	491.5	0.90	3.54	5/16	3.54	70.50	6.09	12	5.9	42.45	0.602	
3-B-3	1-1/4	1.75	0.5	2.25	492.3	490.6	1.80	4.44	5/16	3.96	35.20	5.44	5	7.0	19.81	0.563	
3-B-3	1-1/4	1.75	0.5	2.25	491.5	489.8	2.60	5.24	5/16	4.30	14.55	5.00	2	7.3	8.61	0.592	

LOW DOSING LATERAL TRENCH DETAIL
NOT TO SCALE

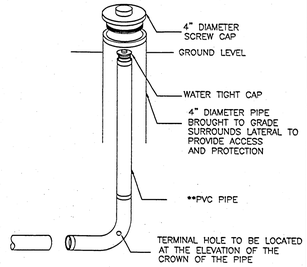


*NOTE: AGGREGATE SHALL BE CLEAN AGGREGATE FREE OF FINES AND BETWEEN 3/4 AND 2 INCHES IN DIAMETER. CRUSHED LIMESTONE SHALL NOT BE USED.
**NOTE: SEE LOW-DOSING TRENCH SCHEDULE ON THIS SHEET FOR PIPE SIZE

PUMP CHAMBER DETAIL
NOT TO SCALE



TERMINAL PERFORATION DETAIL
NOT TO SCALE



**NOTE: SEE LOW-DOSING TRENCH SCHEDULE ON THIS SHEET FOR PIPE SIZE

STATE OF MARYLAND — JOHN M. MARTINEZ — 21478 — PROFESSIONAL ENGINEER

O'Connell & Lawrence, Inc.
Construction Consultants, Engineers, Surveyors
17904 Georgia Avenue, Suite 307
Olney, Maryland
Tel: (301) 924-

LANDS OF HIGHLAND OAKS
LOT 3
6851 SANTA MARIA AVENUE
LIBER 4865, FOLIO 577
5TH ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

SEPTIC NOTES & DETAILS

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SEWAGE DISPOSAL SYSTEM

SEWER PIPING
- GRAVITY SEWER SHALL BE PVC TO MEET ASTM D3034 (SDR-35) WITH RUBBER GASKETED JOINTS.
- 2" & 3" PRESSURE FORCE MAIN SHALL BE PVC SCHEDULE 40 WITH SOLVENT CEMENTED JOINTS.
- BEDDING SHALL BE CLASS "C" UNLESS OTHERWISE REQUIRED BY THE ENGINEER IN FIELD.
- VALVES SHALL BE MADE OF PVC. THEY SHALL BE COMPATIBLE WITH THE SERVICE LINE PIPE ON WHICH THEY WILL BE INSTALLED. VALVES INSTALLED IN GROUND SHALL BE SET IN AN ACCESSIBLE VALVE BOX.

AEROBIC TREATMENT SYSTEM
- PRIMUS HYDROFAST 0.75 TREATMENT SYSTEM OR EQUIVALENT WITH TREATMENT CAPACITY OF 750 GPD. BLOWER CAPACITY SHALL BE 1/3 HP AT (7-25 CFM (SEE DETAILS ON SHEET 3.).

PUMP CHAMBER
- 1500 GAL PUMP CHAMBER SHALL BE PRECAST TO MEET ASTM C913, CONCRETE SHALL BE 4,500 PSI MIN. AT 28 DAYS. REBAR SHALL BE ASTM A706 GRADE 60. WELDED WIRE FABRIC SHALL MEET ASTM A4/A6, MIN. COVER PER MSHF, TO BE 2". PUMP CHAMBER SHALL BE DESIGNED TO WITHSTAND H-20 WHEEL LOAD AS SPECIFIED IN ASTM C-890.
- 24" MANHOLE OPENINGS SHALL BE WATERTIGHT AND ACCESSIBLE WITHIN 18" OF FINAL GRADE ABOVE CHAMBER. CAST FRAME AND COVER SHALL BE BOLTED AND RET 6" ABOVE FINAL GRADE
- PIPING SHALL EITHER BE SET DURING CASTING OR A RUBBER WALL SLEEVE GASKET SHALL BE INTEGRALLY CAST DURING MONOLITHIC POURING OF TANK WALLS TO PROVIDE FOR INSTALLATION OF PIPING IN THE FIELD. PIPINGS TO BE USED SHALL BE COORDINATED WITH FIELD CONTRACTOR.
- PUMP CHAMBER SHALL BE TESTED FOR WATERTIGHTNESS AFTER COMPLETION. CHAMBER SHALL BE FILLED TO THE INVERT OF THE OUTLET PIPE AND THE LEVEL HELD FOR 24 HOURS

PUMPING SYSTEM
- PROVIDE DUPLEX SUBMERSIBLE EFFLUENT PUMP GOULDS MODEL #3885 UNDER #WEKH OR EQUIVALENT FOR SEWAGE EFFLUENT HANDLING INTO SYSTEM 1-A WITH PUMP CAPACITY TO BE 71.40 GPM @ 41.30 FT. PROVIDE DUPLEX SUBMERSIBLE EFFLUENT PUMP GOULDS MODEL #3885 UNDER #WEOTH OR EQUIVALENT FOR SEWAGE EFFLUENT HANDLING INTO SYSTEM 1-B WITH PUMP CAPACITY TO BE 84.42 GPM @ 20.21 FT.TOTAL DYNAMIC HEAD (SEE DETAIL SHEET 3).
- MOTOR SHALL BE 208 VOLT, SINGLE PHASE AT MAXIMUM 3500 RPM. STATOR, ROTOR AND BEARINGS SHALL BE MOUNTED IN SEALED SUBMERSIBLE TYPE HOUSING.
- PUMPS TO BE HOUSED IN 1500 GAL. PUMP CHAMBER.
- PUMP CONTROL SHALL BE MEMA 1 DUPLEX CONTROLLER WITH ALTERNATOR AND ALARM OR EQUIVALENT AS SHOWN ON SHEET 3. PANEL TO BE LOCATED INSIDE THE B.B.D.H.S., PROVIDED WITH RED LIGHT AND AUDIBLE ALARMS FOR HIGH WATER, CLASS'S TYPE METER AND LIGHTNING SUPPRESSOR. ALARM IS TO BE WIRED INDEPENDENT OF THE SEWAGE PUMPS. FLOAT LEVEL CONTROL SHALL BE SEALED STEEL TUBE MERCURY SWITCHES ENCASED IN POLYURETHANE FOAM. STAINLESS STEEL FLOAT SUPPORT BRACKET SHALL BE MOUNTED IN WETWELL. FLOAT SHALL BE INSTALLED TO PROVIDE 150 GALLONS PER DOSE.

LOW PRESSURE DOSING SYSTEM
- ENDS OF ALL TRENCHES SHALL BE LOCATED BY FIELD SURVEY, MAINTAINING MINIMUM 12 FT CENTER TO CENTER SEPARATION.
- 1-1/4" AND 1-1/2" LOW PRESSURE DISTRIBUTION LATERALS SHALL BE PVC SCHEDULE 40 WITH SOLVENT CEMENTED JOINTS. PERFORATIONS SHALL BE PROVIDED ONLY WITHIN PORTIONS TO BE INSTALLED IN THE STONE FILLED DISPOSAL TRENCHES.
- 3" LOW PRESSURE DISTRIBUTION MANIFOLDS SHALL BE PVC SCHEDULE 40 WITH SOLVENT CEMENTED JOINTS.

SEWAGE DISPOSAL SYSTEM NARRATIVE
STEP 1: UPON LEAVING THE HOUSE, THE EFFLUENT GRAVITY FLOWS INTO THE AEROBIC TREATMENT SYSTEM WHERE IT ENTERS INTO THE INITIAL CHAMBER THAT ACTS AS A SETTLING TANK. THE EFFLUENT THEN PASSES INTO THE SECOND TREATMENT ZONE WHERE IT IS AERATED.
STEP 2: THE CLARIFIED EFFLUENT GRAVITY FLOWS FROM THE AEROBIC TREATMENT SYSTEM INTO THE 1500 GALLON PUMP CHAMBER. THIS PUMP CHAMBER FUNCTIONS AS A HOLDING TANK FOR TEMPORARY STORAGE OF THE EFFLUENT. THE CHAMBER HOUSES THE DUAL ALTERNATING PUMP SYSTEM. THE FLOATS SHALL BE INSTALLED TO ZONE A VOLUME OF 150 GALLONS OF EFFLUENT. THE PUMPS FEED THE EFFLUENT TO THE SEPTIC SYSTEM.
STEP 3: THE FINAL PORTION OF THE SEPTIC SYSTEM IS THE LATERALS. THE LATERALS ARE DOSED LOW PRESSURE DOSING SYSTEMS. ALTERNATING PUMPS ARE PROVIDED TO ALTERNATE DOSES TO EACH HALF OF THE SYSTEM THROUGH INDIVIDUAL FORCE MAINS. THE PUMP DESIGNATION FOR EACH SYSTEM IS LISTED IN THE TABLE BELOW

Submersible Effluent Pump Pump Calculations - System 1-A

**All calculations per "Goulds's Pump Technical Data Manual" for wastewater applications, 6th October 2004

1. Rate of Flow = 71.40 GPM
2. System Conditions: Flooded Suction
3. Discharge Conditions:
   a. Elevation Head = 30.00'
   b. Friction Losses:
      i. 3" Friction Loss @ 71.40 GPM = 8.19' (per 100' of length)
      3" Linear Feet equivalents:
      (1) 90° Elbow (3") = 5.5'
      Length of Pipe (3") = 163.5'
      Total LF Equivalent = 169.0'
      3" Friction Loss: (200.0/100) (9.18) = 18.43'
      ii. 2" Friction Loss @ 71.40 GPM = 1.29' (per 100' of length)
      2" Linear feet equivalents:
      (3) 45° Elbow (2") = 13.4'
      Length of Pipe (2") = 86.6'
      Total LF Equivalent = 99.4'
      2" Friction Loss: (99.4/100) (1.29) = 1.23'
   c. Velocity Head
      (71.40 GPM) x (0.408) = 7.30 fps
      (2")²
      Velocity Head = V² / (2g) = (7.30)² / (2*32.16) = 0.83'
   d. Total Dynamic Head = Elevation Head + 3" Friction Losses +2" Friction Losses + Dynamic Head
      TDH = 30.00' + 18.43' + 1.23' 0.83'
      TDH = 41.30'

Referring to "Gould's Pump Catalog" Model 3885 WE Series pump curve w/ 71.40 GPM & 41.30' TDH with 2.79" of design head, we model 3PE10H. This pump provides 2.79" of design head in addition to the total dynamic head required of 41.30'.

Submersible Effluent Pump Pump Calculations - System 1-B

**All calculations per "Goulds's Pump Technical Data Manual" for wastewater applications, 6th October 2004

1. Rate of Flow = 84.42 GPM
2. System Conditions: Flooded Suction
3. Discharge Conditions:
   a. Elevation Head = 14.20'
   b. Friction Losses:
      i. 3" Friction Loss @ 84.42 GPM = 1.77' (per 100' of length)
      3" Linear feet equivalents:
      (1) 90° Elbow (3") = 8.8'
      (1) 45° Elbow (3") = 3.4'
      Length of Pipe (3") = 148.8'
      Total LF Equivalent = 160.9'
      3" Friction Loss: (160.9/100) (1.77) = 3.83'
   c. Velocity Head
      (84.42 GPM) x (0.408) = 8.63 fps
      (3")²
      Velocity Head = V² / (2g) = (8.63)² / (2*32.16) = 1.16'
   d. Total Dynamic Head = Elevation Head + 3" Friction Losses + Dynamic Head
      TDH = 14.20' + 3.83' + 1.16'
      TDH = 20.21'

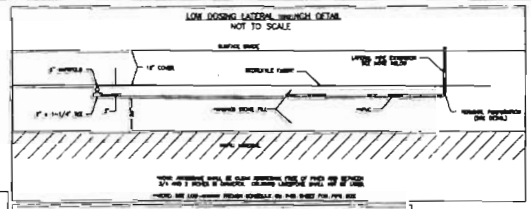
Referring to "Gould's Pump Catalog" Model 3885 WE Series pump curve w/ 84.42 GPM & 20.21' TDH with 3.48' of design head, we model 3PE10H. This pump provides 3.48' of design head in addition to the total dynamic head required of 20.21'.

PUMP DESIGN SUMMARY TABLE

SYSTEM I.D.	ELEVATION HEAD	FRICTION LOSSES	VELOCITY HEAD	DYNAMIC HEAD (FT)	FLOW (GPM)	DESIGN HEAD (FT)	GOULD'S PUMP MODEL (OR EQUIV. SEE NOTE)
1-A	30.0	10.00	0.83	41.30	71.40	2.79	WE10H*
1-B	14.2	3.66	1.17	20.21	84.42	3.66	WE07H*
2-A	24.0	12.75	0.42	37.49	51.06	2.84	WE07H*
2-B	22.2	12.83	0.51	35.54	54.15	3.38	WE07H*
3-A	20.0	14.98	0.61	35.28	63.98	2.80	WE07H*
3-B	18.9	22.85	1.21	44.96	59.67	2.84	WE10H*

* OR EQUIVALENT

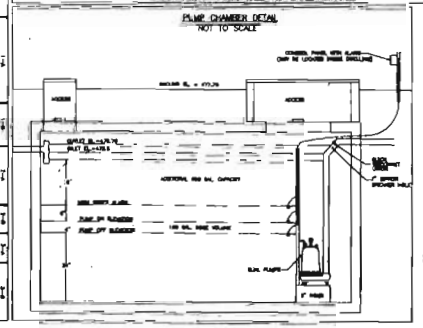
LOW DOSING LATERAL BRANCH DETAIL
NOT TO SCALE



LOW-DOSING TRENCH SCHEDULE

LATERAL I.D.	LATERAL DIA. (IN)	PIPE DEPTH (FT)	GRAVELLESS SYSTEM DEPTH (FT)	TRENCH DEPTH (FT)	GROUND ELEV. (FT)	PIPE ELEV. (FT)	HEAD LOSS (FT)	HEAD + SCHEDULE (FT)	DRAIL HOLES (IN)	FLOW PER HOLE (GPM)	ORIFICE DIAMETER (IN)	CALCULATED # OF HOLES	ACTUAL # OF HOLES	HOLE SPACING (FT)	FLOW PER LATERAL (GPM)	FLOW PER L.F. OF LATERAL (GPM/FT)
1-A-1	1-1/4	1.79	0.5	2.75	488.0	483.2	0.80	5.79	5/16	3.14	25.00	3.79	4	6.3	12.58	0.302
1-A-2	1-1/4	1.79	0.5	2.79	484.3	481.5	0.79	5.49	5/16	3.01	29.00	3.39	4	7.2	14.05	0.484
1-A-3	1-1/4	1.75	0.5	2.29	483.5	481.2	1.50	5.29	5/16	3.98	34.00	3.08	3	8.0	11.98	0.667
1-A-4	1-1/2	1.75	0.5	2.29	482.7	481.0	3.30	5.09	5/16	4.24	38.00	2.80	3	8.0	8.46	0.471
1-A-5	1-1/4	1.75	0.5	2.29	481.8	480.5	3.40	5.15	5/16	4.68	20.00	2.24	2	15.0	9.36	0.468
1-A-6	1-1/4	1.75	0.5	2.29	480.3	480.0	4.39	7.29	5/16	5.08	30.00	2.24	3	5.0	15.23	0.905
1-B-1	1-1/4	1.79	0.5	2.29	488.8	488.7	0.00	3.48	5/16	3.14	21.00	2.83	5	5.0	15.72	0.785
1-B-2	1-1/2	1.75	0.5	2.29	488.6	487.8	0.85	4.53	5/16	4.09	40.00	2.06	9	3.7	36.84	0.920
1-B-3	1-1/2	1.75	0.5	2.25	488.7	487.8	1.74	5.42	5/16	4.24	25.00	6.48	7	7.9	30.84	0.987
2-A-1	1-1/4	1.79	0.5	2.29	488.3	488.0	0.00	3.84	5/16	3.17	13.81	4.03	2	9.8	6.34	0.449
2-A-2	1-1/4	1.79	0.5	2.25	487.8	486.1	0.90	3.84	5/16	3.84	36.08	3.81	9	7.6	27.38	0.684
2-A-3	1-1/2	1.75	0.5	2.29	487.1	486.4	1.40	4.09	5/16	3.87	61.40	3.36	1	8.8	27.10	0.448
2-A-4	1-1/4	1.79	0.5	2.29	486.6	484.7	2.90	4.84	5/16	4.18	27.00	3.08	3	9.0	12.54	0.466
2-B-1	1-1/4	1.79	0.5	2.25	488.4	484.7	0.00	3.28	5/16	3.84	86.20	6.95	8	7.8	23.20	0.412
2-B-2	1-1/2	1.79	0.5	2.29	488.7	484.0	0.70	3.08	5/16	3.38	88.20	8.52	10	8.8	33.80	0.384
3-A-1	1-1/2	1.79	0.5	2.29	488.8	483.3	0.00	2.99	5/16	3.38	88.20	8.43	10	8.5	32.82	0.377
3-A-2	1-1/2	1.79	0.5	2.29	484.1	482.4	0.90	3.69	5/16	3.68	57.57	7.37	8	8.7	31.88	0.379
3-B-1	1-1/4	1.79	0.5	2.29	484.1	482.4	0.69	3.84	5/16	3.68	29.30	7.09	5	8.1	19.27	0.804
3-B-2	1-1/2	1.79	0.5	2.29	483.2	481.5	0.90	3.84	5/16	3.84	70.80	6.08	12	8.8	42.46	0.884
3-B-3	1-1/4	1.79	0.5	2.25	482.3	480.8	1.89	4.44	5/16	3.96	35.30	8.44	8	7.8	18.81	0.261
3-B-4	1-1/4	1.79	0.5	2.29	481.3	480.8	2.80	5.24	5/16	4.28	14.58	8.80	2	7.2	8.81	0.392

PUMP CHAMBER DETAIL
NOT TO SCALE



TERMINAL PERFORATION DETAIL
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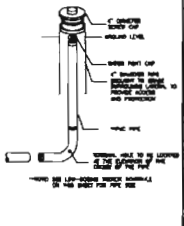
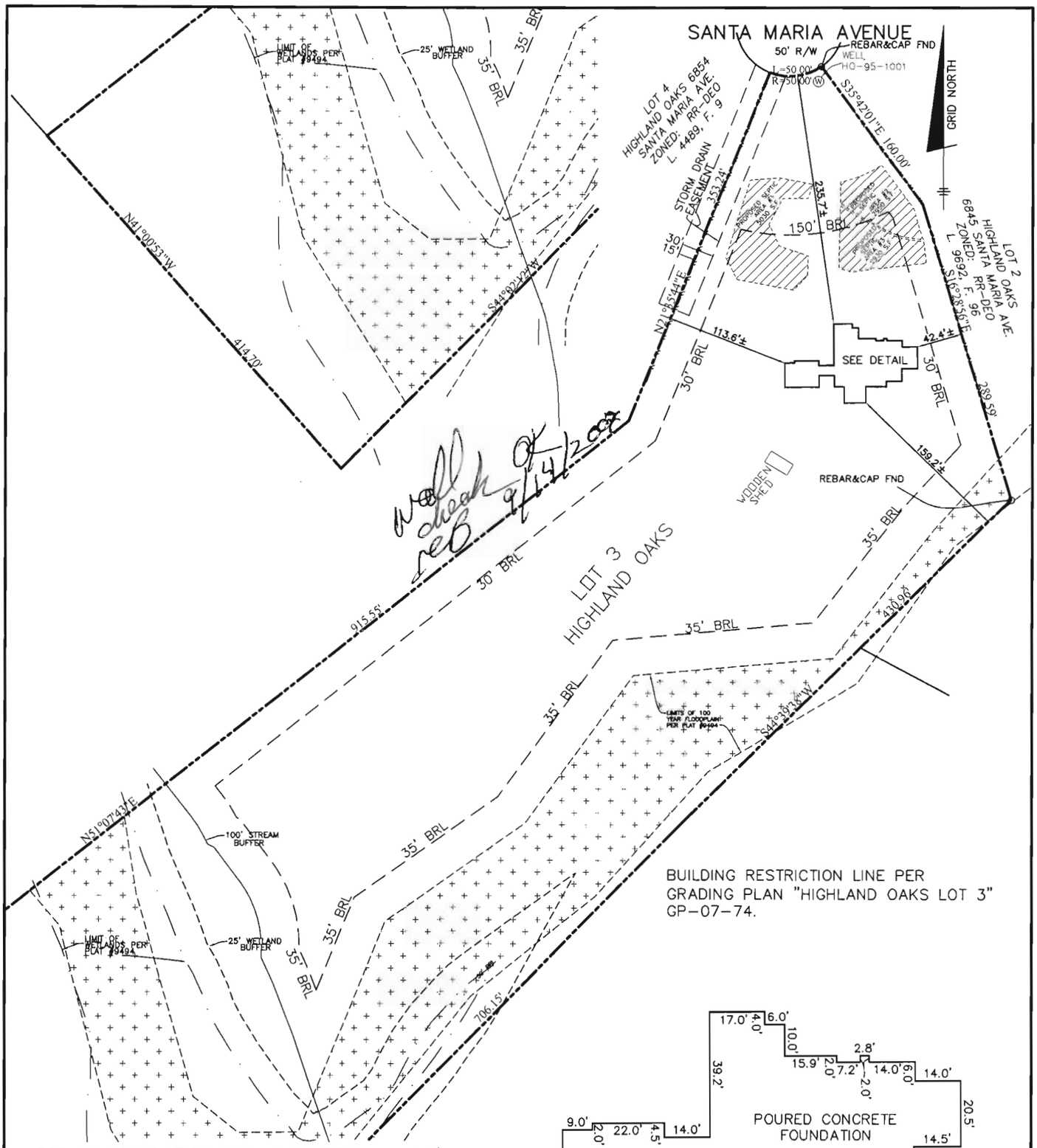


O'Connell & Lawrence, Inc.
Civil Engineers & Land Surveyors
17900 Georgia Avenue, Suite 300
Olney, Maryland 20832
Tel: (301) 924-4778 • Fax: (301) 924-3977

LANDS OF JOSEPH AND CHRISTINE DIFILIPPO
6851 SANTA MARIA AVENUE
LOT 1, BLOCK A
SANTA MARIA ESTATES SUBDIVISION
ELECTION DISTRICT 6
MONTGOMERY COUNTY, MARYLAND

SEPTIC NOTES & DETAILS

DESIGN BY	MLS
DRAWN BY	MLS
CHECKED BY	JMC
DATE	2/20/2007
SCALE	N.T.S.
PROJECT NO.	06-051
SHEET NO.	2 of 3



Well check 9/14/2007

BUILDING RESTRICTION LINE PER GRADING PLAN "HIGHLAND OAKS LOT 3" GP-07-74.

TOP OF FOUNDATION WALL ELEVATION = 486.8'

OFFSET DIMENSIONS TO PROPERTY LINES ARE ± 0.2'

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION AND BELIEF, THAT THE DIMENSIONS OF THE BUILDING WALLS SHOWN HEREON ARE CORRECT; THAT THEY ARE BASED ON A FIELD RUN SURVEY PERFORMED BY BENCHMARK ENGINEERING, INC. ON 08/02/07. THE RECORD DIMENSIONS OF THE LOT HAVE BEEN ALIGNED TO THE TWO MONUMENTS SHOWN. NO OTHER WERE SOUGHT.

8/7/07

STEPHAN JALON
PROFESSIONAL LAND SURVEYOR
MD REG. No. 10726
FOR BENCHMARK ENGINEERING, INC.
MD REG. No. 351

FEMA FIRM No. 240044 0032 B
ZONE: C
DATED: 12/04/86

PROFESSIONAL LAND SURVEYOR 10726 STEPHAN JALON STATE OF MARYLAND

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

FOUNDATION DETAIL
SCALE: 1" = 40'

WALL CHECK

TAX MAP;40 GRID:3
PARCEL 38
PLAT No.
LOT No. 03

6851 SANTA MARIA AVENUE

5TH ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

FIELD OBS. BY KLD
COMP. BY EWF
DRAWN BY EWF
SCALE: 1" = 120' DATE: 08/02/07

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TABLE 4.2 PIPELINE SIZE AND VOLUME

A. Actual Inside Diameter (Inches)

Nominal Pipe Size (inches)	Outside Diameter (inches)	PVC Flexible Pressure Pipe				PVC Rigid Pipe	
		SDR32.5	SDR26	SDR21	SDR17	Sch. 40	Sch. 80
1	1.315		1.195	1.189	1.161	1.049	.957
1¼	1.660	1.54	1.532	1.502	1.464	1.380	1.278
1½	1.90	1.78	1.754	1.72	1.676	1.610	1.50
2	2.375	2.229	2.193	2.149	2.095	2.067	1.939
2½	2.875	2.699	2.655	2.601	2.537	2.469	2.323
3	3.50	3.284	3.23	3.166	3.088	3.068	2.90
3½	4.0	3.754	3.692	3.62	3.53	3.548	3.364
4	4.50	4.224	4.154	4.072	3.97	4.026	3.826
5	5.563	5.221	5.135	5.033	4.909	5.047	4.813
6	6.625	6.217	6.115	5.993	5.845	6.065	5.761
8	8.625	8.095	7.961	7.805	7.609	7.981	7.625

B. Volume Per 100 Feet (Gallons)

Nominal Pipe Size (inches)	PVC Flexible Pressure Pipe				PVC Rigid Pipe	
	SDR32.5	SDR26	SDR21	SDR17	Sch. 40	Sch. 80
1		5.8	5.8	5.5	4.5	3.7
1¼	9.7	9.6	9.2	8.7	7.8	6.7
1½	12.9	12.6	12.1	11.5	10.6	9.2
2	20.3	19.6	18.8	17.9	17.4	15.3
2½	29.7	28.8	27.6	26.3	24.9	22.0
3	44.0	42.6	40.9	38.9	38.4	34.3
3½	57.5	55.6	53.5	50.8	51.4	46.2
4	72.8	70.4	67.7	64.3	66.1	59.7
5	111	108	103	98.3	104	94.5
6	158	153	147	139	150	135
8	267	259	249	236	260	237

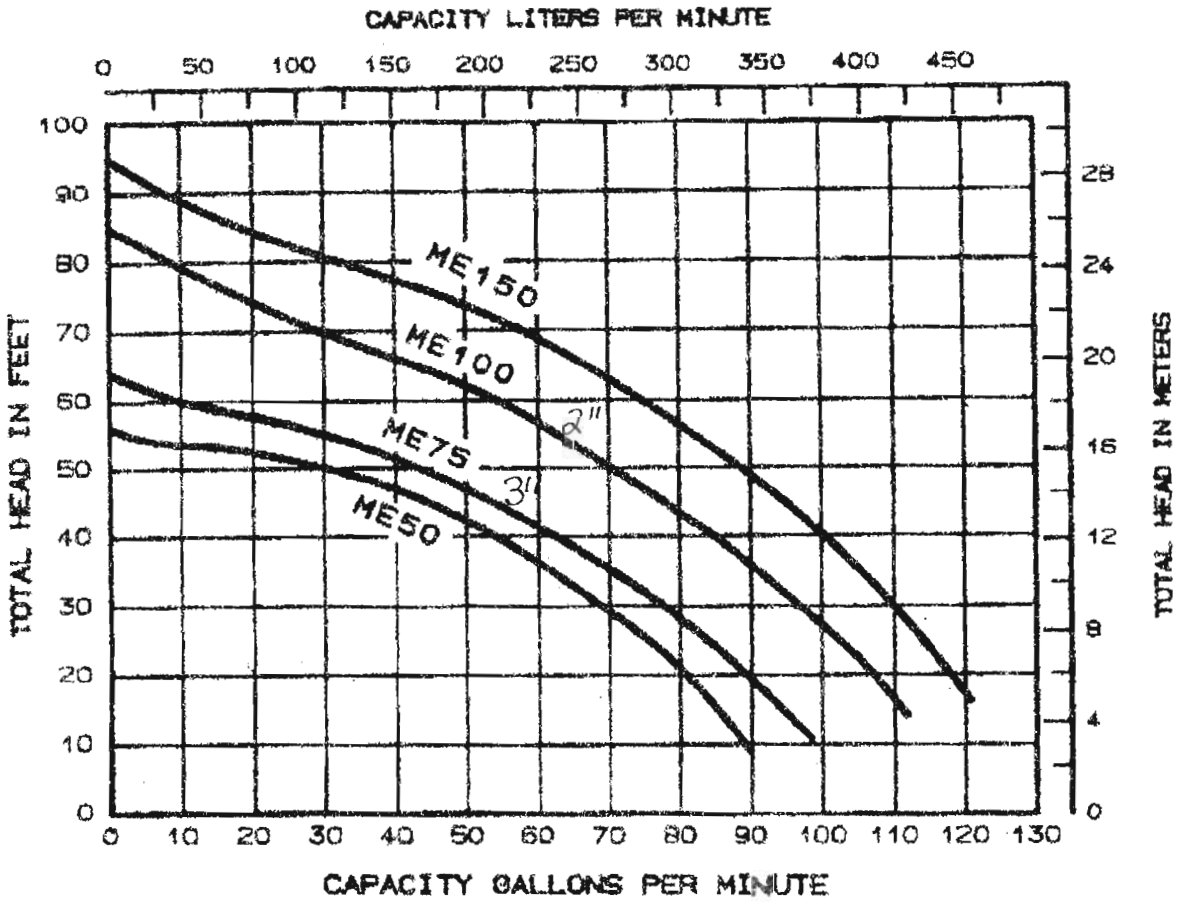
Notes:

"SDR" means standard dimension ratio and is the ratio of outside pipe diameter to wall thickness.

Source: Modified from ASTM Standards D-1785, D-2241, D-2729, and F-405.

ME Series
1/2 through 1-1/2 HP
Effluent Pumps
Performance Curve

Myers®



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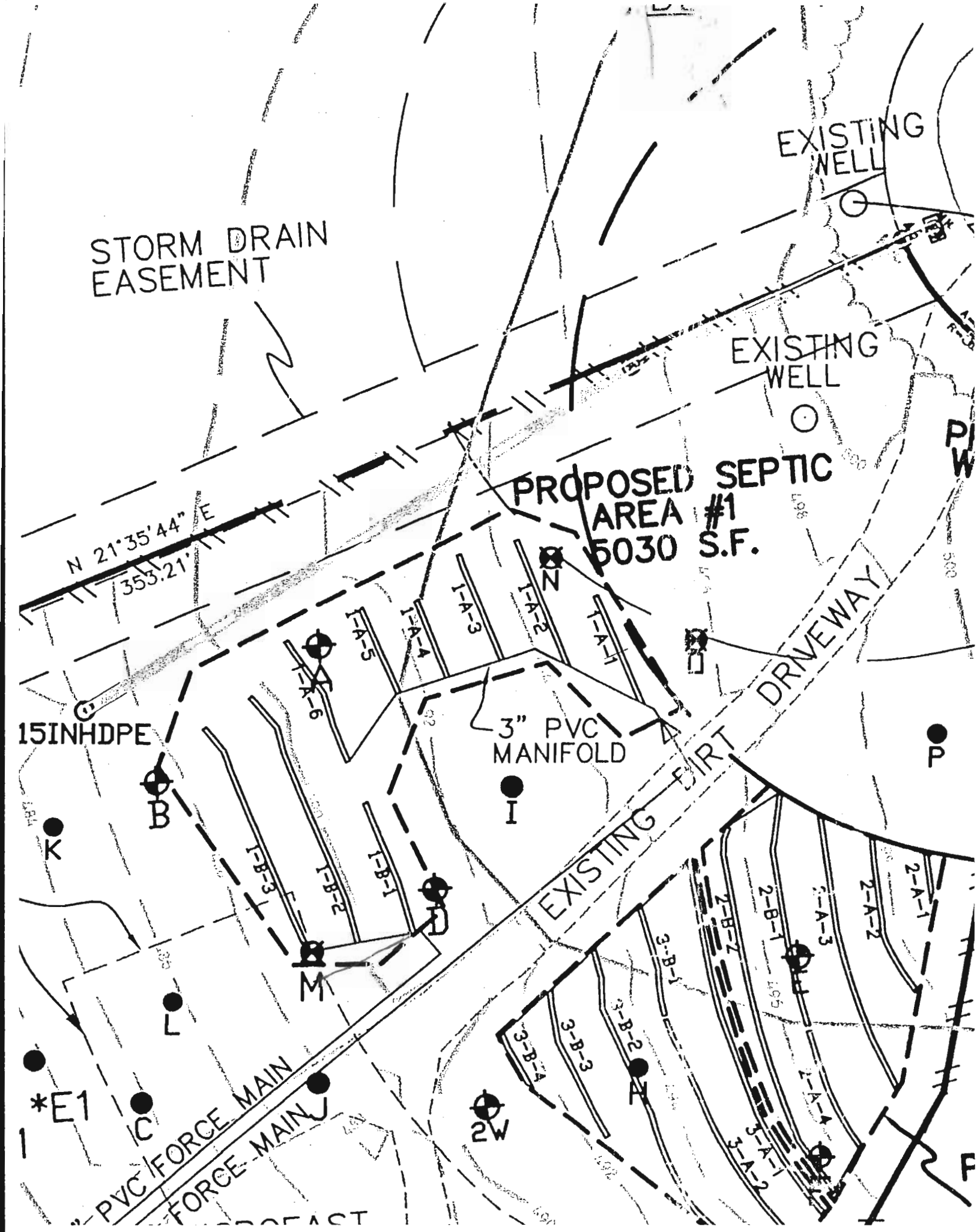
EXISTING WELL
STORM DRAIN EASEMENT
EXISTING WELL
PROPOSED SEPTIC AREA #1 5030 S.F.
N 21°35'44" E
353.21'
1-A-1
1-A-2
1-A-3
1-A-4
1-A-5
1-A-6
15INHDPE
3" PVC MANIFOLD
EXISTING DIRT DRIVEWAY
1-B-1
1-B-2
1-B-3
2-A-1
2-A-2
2-A-3
2-B-1
2-B-2
3-B-1
3-B-2
3-B-3
3-B-4
3-A-1
3-A-2
PVC FORCE MAIN
FORCE MAIN
*E1
A
B
C
D
I
K
L
M
N
P
1
2