LINE SCHEDULE

LINE NUMBER	COLOR	FIELD ELEVATION	LENGTH (FT)	DESIGN LENGTH (FT)
1	BLUE	1.3	19	
2	ORANGE	1.5	52	50
3	PINK	2.3	85	85
4	RED	2.9	90	80
5	BLUE	3.6	87	83
6	WHITE	4.8	77	77
7	ORANGE	5.5	80	80
8	RED	6.2	63	55
9	BLUE	7.1	16	
10	PINK	8.3	16	
11	YELLOW	8.4	49	
12	PINK	9.3	66	
13	BLUE	10.9	79	
14	ORANGE	12.3	95	
15	RED	13.7	72	
16	YELLOW	14.9	56	

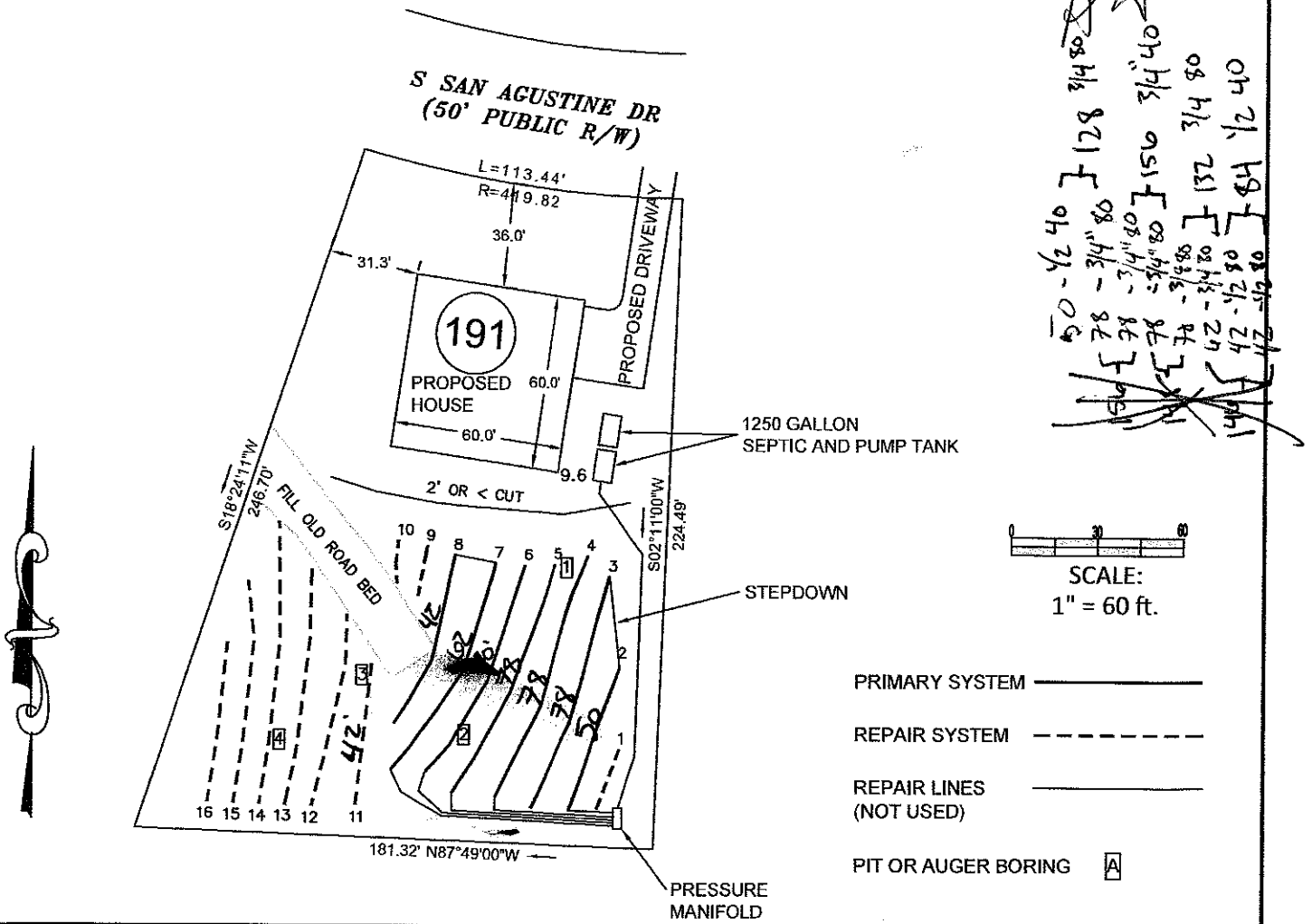
LOT 191 BELLS CROSSING SUBDIVISION

5-BEDROOM PRESSURE MANIFOLD SYSTEM
LINES 2-8 TOTAL 510 LINEAR FEET
EZFLOW OR CHAMBER
LTAR 0.3
36" TRENCH DEPTH

5-BEDROOM LPP FED PANEL BLOCK REPAIR
LINES 1 9-16 TOTAL 467 LINEAR FEET
LTAR 0.3
50% REDUCTION
36" TRENCH DEPTH
FOR GENERAL USE NOT A SURVEY
PRELIMINARY NOT FOR CONSTRUCTION

SOIL PROFILES AND ANALYSIS PROVIDED BY
PRICE ENVIRONMENTAL RESOURCE CONSULTING, P(

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Bateman Civil Survey Company
Engineers • Surveyors • Planners
200 N. Main Street, Holly Springs, NC 27540 Ph: 919.577.1080 Fax: 919.577.1081
www.batemancivilsurvey.com info@batemancivilsurvey.com
NCBELS Firm No. C-2378

Meritage

LOT 191
BELLS CROSSING SUBDIVISION
MOORESVILLE, NC
IREDELL COUNTY

DATE: 1/4/16 DRAWN BY: MBP CHECKED BY: TAB

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Pressure Manifold
Septic System Design

for

BELLS CROSSING PH 4 S/D Lot 191
Raleigh, North Carolina

Designed by:

Matt Burdette
Bateman Civil Survey Company, PC
Apex, North Carolina
BCSC Project #: 120314

12/08/2015

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BELLS CROSSING PH 4 S/D Lot 191

Table of Contents

Contact Information ---------- 1
Specifications (system) ---------- 2
Tap Chart (system) ---------- 3
Site Plan (System) ---------- 4
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Pump Specifications ---------- 7
Effuent Filter Specifications ---------- 9
Supply Line Hydraulic Profile ---------- 11

Attachments

Septic and Pumptank Details	Figure	1
Pressure Mainfold and Trench Details	Figure	2

PERC SOIL/SITE EVALUATION DESCRIPTIONS

Client: Bateman Civil Survey Company, PC Date Evaluated: Jan-15

Location of site: Bells Crossing Phase 4 Lot 191

Water Supply: [ ] Public [ ] Individual [ ] Well [ ] Spring [ ] Other

Evaluation Method: [ ] Auger Boring [X] Pit [ ] Cut

Type of Wastewater: [x] Sewage [ ] Industrial Process [ ] Mixed

PROFILE #	.1940 Landscape Position/ Slope%	Horizon Depth (IN.)	SOIL MORPHOLOGY .1941 Structure/ Texture	SOIL MORPHOLOGY .1941 Consistence Mineralogy	b PROFILE FACTORS .1942 Soil Wetness/ Color	.1943 Soil Depth (IN.)	.1956 Sapro Class	.1944 Restr Horiz	Profile Class & LTAR
1	LS 10%	0-6	W SBK / SCL	FR SS SP	>45	45	NA	NA	PS 0.3
		6-28	ABK / C	FR SS SP					
		28-45	W SBK / CL	FR SS SP					
2	LS 10%	0-5	GR / SL	FR SS SP	>52	52	NA	NA	PS 0.3
		5-32	ABK / C	FR SS SP					
		32-52	W SBK / CL	FR SS SP					
3	LS 15%	0-7	W SBK / SCL	FR SS SP	>53 RELIC MOTTLES @ 32"	53	NA	NA	PS 0.3
		7-32	ABK / C	FR SS SP					
		32-53	W SBK / CL	FR SS SP					
4	LS 15%	0-4	GR / SL	FR SS SP	>52 RELIC MOTTLES @ 28"	42	PS	NA	PS 0.3
		4-28	SBK / C	FR SS SP					
		28-42	W SBK / CL	FR SS SP					
		42-52	SLESS SAP/ L	FR SS SP					

COMMENTS: Pit 1 some weathered rock (WR) in profile, saprolite inclusions @ 28". Pit 2 WR in profile with yellow streaks. Pit 3 some quartz in profile. Pit 4 some WR in profile.

B1 0-12 Fill .3
12-16 B CL WFSBK
16-48 R CL WFSBK few WR incl.

B2 0-6 B CL WFSBK .3
6-20 R CL WFSBK
20-48 R CL WFSBK few Yellow mottles & WR

B3 0-6 B CL WFSBK .3
6-24 R C WFABK/SBK
24-34 R CL WFSBK few sap, few yellow mottles
34-48 R CL WFSBK many sap

B4 0-8 RB CL WFSBK
8-18 R C WFABK Fi SP .3
18-28 R C WFABK/SBK few sap
28-32 R CL/C WFSBK, few sap
32-48 Var L/SL Sap Bk

Evaluation By: Steven Price

Landscape Position	Group	Texture	.1955 LTAR
R-Ridge	I	S-Sand	1.2 - 0.8
SS-Shoulder Slope		LS-Loamy Sand	
LS-Linear Slope			
FS-Foot Slope	II	SL-Sandy Loam	0.8 - 0.6
NS-Nose Slope		L-Loam	
HS-Head Slope			
CC-Concave Slope	III	SI-Silt	0.6 - 0.3
CV-Convex Slope			
T-Terrace		SICL-Silty Clay Loam	
FP-Flood Plain		CL-Clay Loam	
		SCL-Sandy Clay Loam	
	IV	SC-Sandy Clay	0.4 - 0.1
		SIC-Silty Clay	
		C-Clay	

Structure
SG-Single Grain
M-Massive
CR-Crumb
GR-Granular
SBK-Subangular Blocky
ABK-Angular Blocky
PL-Platy
PR-Prismatic
W-Weak

Consistence Moist	Consistence Wet
VFR-Very Friable	NS-Non-Sticky
FR-Friable	SS-Slightly Sticky
FI-Firm	S-Sticky
VFI-Very Firm	VS-Very Sticky
EFI-Extremely Firm	NP-Non-Plastic
	SP-Slightly Plastic
	P-Plastic
	VP-Very Plastic

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LICENSED SOIL SCIENTIST
STEVEN M. PRICE
7153
STATE OF NORTH CAROLINA

APPROVED JAN 15 2016

BELLS CROSSING PH 4 S/D Lot 191

Contact Information

Client: Meritage Homes
Attn: Robert Price
Street Address: 11605 North Community House Road
Charlotte, NC 28277
Phone: (704) 944-8939
Fax: na

Designer: Bateman Civil Survey Company, PC
Attn: Matt Burdette
Street Address: 2524 Reliance Drive
Apex, NC 27539
Phone: 919-577-1080
Fax: 919-577-1081

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BELLS CROSSING PH 4 S/D Lot 191

Layout/Design Specifications

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AZP

Facility Type:	Single Family Home	
# of Bedrooms:	5	
Daily Flow:	600	**gal/day**
L.T.A.R.:	0.300	**gal/day/sq.ft**
Trench Depth:	36	**in**
Trench Width:	36	**in**
Stone Depth:	accepted	**in**
Manifold Length:	48	**in**
Manifold Diameter:	4	**in sch 80pvc**
Supply Line Length:	120	**ft**
Supply Line Diameter:	2	**in sch 40pvc**
Supply Line Volume:	20.88	**gallons**
Friction Loss + Fitting Loss:	7.58	**ft(supply line length + 70' for fittings in pump tank)**
Design Head:	2	**ft**
Elevation Head:	14.70	**ft**
Total Head:	24.28	**ft**
Dose Volume:	265.53	**gals**
% of Pipe Vol.	.80	
Drawdown:	12.18	**in @ 21.8 gal/in**
Pump Run Time:	5.73	**Minutes**
Control Panel:	SJE Rhombus Model112 control panel (or approved equivalent)	
Pump:	Zoeller M161 Flow-Mate (or approved equivalent)	
Tank Effluent Filter:	Zoeller 170-0144 residential effluent filter (or approved equivalent)	
Septic Tank:	1250	**gallon Shoaf**
Pump Tank:	1250	**gallon Shoaf**

BELLS CROSSING PH 4 S/D Lot 191
SYSTEM TAP CHART

Bench Mark:	0	= 100.00	**Manifold elev:**	1.00					
Pump tank elevation:	90.40		**Pump elev:**	85.00					
line	**color**	**rod read**	**elevation**	**length**	**hole size**	**flow/tap**	**gal/day**	**trench area**	**LINE LTAR**
2 & 3	Orange, Pink	1.50	98.50	135	3/4in SCH 40	12.5	161.88	405	0.3997
4	Red	2.90	97.10	80	1/2in SCH 40	7.11	92.08	240	0.3837
5	Blue	3.60	96.40	83	1/2in SCH 40	7.11	92.08	249	0.3698
6	White	4.80	95.20	77	1/2in SCH 40	7.11	92.08	231	0.3986
7 & 8	Orange, Red	5.50	94.50	135	3/4in SCH 40	12.5	161.88	405	0.3997
	P-TANK	9.60	90.40						
		total	**feet =**	**510**	**gal/min =**	**46.33**		**LTAR =**	**0.300**
				Des. Flow	600			**(ltar + 5%)**	0.32
				24 Hour Pump Run=	12.95			**(ltar W/ INOV)**	0.40
								(ltar + 5%)	0.42

Comments:

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CONTROL PANELS

112	1	W	9	1	4	H	3A, 8A, 8C

MODEL 112

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ALARM PACKAGE
- [ ] 0 = select options or no alarm package
- [X] 1 = alarm package (includes test/normal/silence switch, fuse, red light, horn & float)

ENCLOSURE RATING
- [ ] I = Indoor, NEMA 1 (metal)
- [X] W = Weatherproof, NEMA 4X (engineered thermoplastic)

STARTING DEVICE
- [ ] 1 = magnetic motor contactor 120/208/240V
- [X] 9 = magnetic motor contactor 120V only

PUMP FULL LOAD AMPS
- [ ] 0 = 0-7 FLA
- [X] 1 = 7-15 FLA
- [ ] 2 = 15-20 FLA
- [ ] 3 = 20-30 FLA

PUMP DISCONNECTS
- [ ] 0 = no pump disconnect
- [ ] 1 = pull-out with safety deadfront in a 10"x8" enclosure
- [X] 4 = circuit breaker 120V (select STARTING DEVICE option 9 above)
  120/208/240V (select STARTING DEVICE option 1 above)

FLOAT SWITCH APPLICATION
- [X] H or L = pump down or pump up
- [ ] X = no floats
  WITH alarm package
  WITHOUT alarm package

OPTIONS *Listed below*

★ ENCLOSURE UPSIZE - If you selected 3 or more of the ★ options, or one ★★ option, **a one-time enclosure upsize fee would apply.**

If additional features are required, call the factory for a quote on either a SJE-Rhombus Pro-Line or Engineered Custom control panel.

	CODE	DESCRIPTION
[ ]	1A	Red beacon only / no audio *(must select 1E if floats included)*
[ ]	1C	Horn only / no visual *(must select 1E if floats included)*
[ ]	1E	Alarm float
[X]	3A	Alarm flasher
[ ]	★ 3B	Manual alarm reset
[ ]	★ 4A	Low level cutout *(select option 4D if floats included)*
[ ]	★ 4B	Red low-level indicator & alarm *(must select 4A also)*
[ ]	4D	Low-level float
[ ]	★ 5A	Thermal cutout/heat sensor auto reset (for pumps w/thermal switch leads)
[ ]	★★5E	Seal failure circuit & red indicator (2 wire)
[ ]	6A	Auxiliary alarm contact, form C type
[X]	★ 8A	Elapsed time meter
[X]	★ 8C	Event (cycle) counter
[ ]	★★9_A	Pump overload specify amperage after number 9 followed by letter "A". Example: 912A = 12 amp pump.
	★★ [ ]	0-25 FLA
	★★ [ ]	25-30 FLA
[ ]	10E	Lockable latch - NEMA 4X
[ ]	10E	Lockable latch - NEMA 1
[ ]	★10F	Lightning arrester
[ ]	★10K	Anti-condensation heater

	CODE	DESCRIPTION
[ ]	11C	NEMA 1 alarm panel *must select option 6A*
[ ]	11D	NEMA 4X alarm panel *must select option 6A*
[ ]	★★14B	Main disconnect (rotary style, mounted through door) non-fused
★★ [ ]		0-20 FLA (total of both pumps)
★★ [ ]		20-30 FLA (total of both pumps)
[ ]	15A	Control / alarm circuit breaker *Does not include the circuit board as in standard.*
[ ]	16A	10' cord in lieu of 20' *(per float)*
[ ]	16B	15' cord in lieu of 20' *(per float)*
[ ]	16C	30' cord in lieu of 20' *(per float)*
[ ]	16D	40' cord in lieu of 20' *(per float)*
[ ]	17A	SJE SignalMaster® / mounting strap ● *(per float)*
[ ]	17B	SJE SignalMaster® / externally weighted ● *(per float)*
[ ]	17C	Sensor Float® / internally weighted ▲ *(per float)*
[ ]	17D	Sensor Float® / externally weighted ▲ *(per float)*
[ ]	17E	Sensor Float® Mini / pipe clamp ▲ *(per float)*
[ ]	17F	Sensor Float® Mini / externally weighted ▲ *(per float)*
[ ]	19T	TOA (Test/Off/Automatic) switch and pump run light through door mounted
[ ]	19U	HOA (Hand/Off/Automatic) switch and pump run light through door mounted
[ ]	19X	Door mounted pump run indicator
[ ]	21A	SJE PumpMaster® in lieu of on/off switches ●
[ ]	21B	SJE PumpMaster® Plus in lieu of on/off switches ●
[ ]	21C	Super Single® in lieu of on/off switches ▲
[ ]	21D	Double Float® in lieu of on/off switches ▲

● Mechanically-activated ▲ Mercury-activated

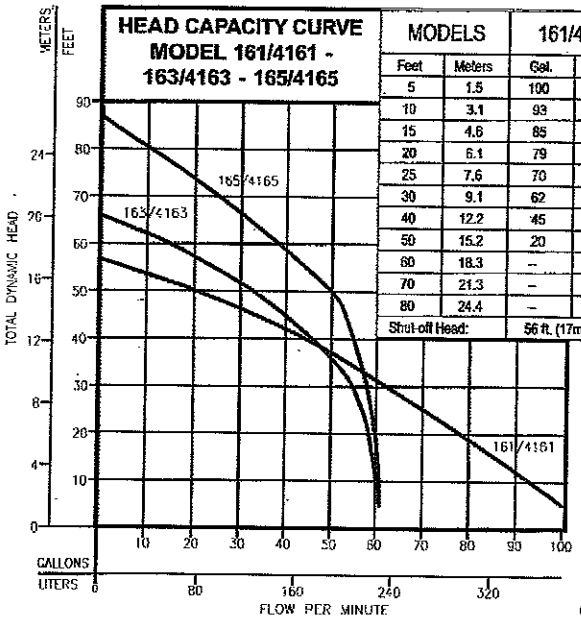
SAMPLE

MODEL	112	1	W	9	1	4	H	3A 8A

Alarm Package
Enclosure Rating
Starting Device
Pump Full Load Amps
Pump Disconnect
Float Switch Application
Options: Flasher, Elapsed Time Meter

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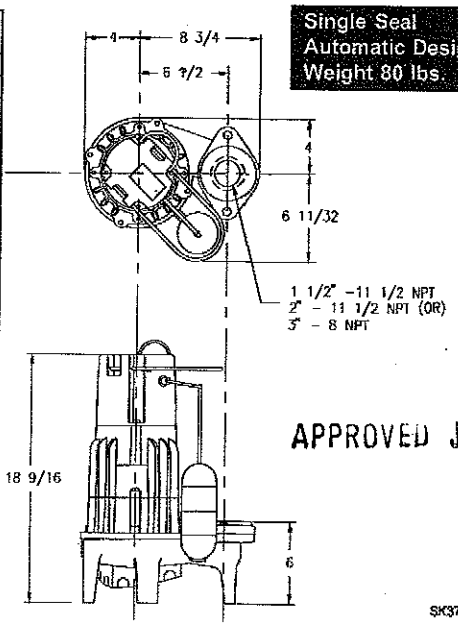
HEAD CAPACITY CURVE MODEL 161/4161 - 163/4163 - 165/4165



MODELS		161/4161		163/4163		165/4165	
Feet	Meters	Gal.	Liters	Gal.	Liters	Gal.	Liters
5	1.5	100	379	61	231	61	231
10	3.1	93	352	60.5	229	60.5	229
15	4.6	85	322	60	227	60.5	229
20	6.1	79	297	59	223	60	227
25	7.6	70	265	57	216	59	223
30	9.1	62	233	55	206	58	220
40	12.2	45	170	46	172	55	208
50	15.2	20	76	33	125	50	189
60	18.3	–	–	15	57	39	148
70	21.3	–	–	–	–	22.5	85
80	24.4	–	–	–	–	10	38
Shut-off Head:		56 ft. (17m)		66 ft. (20m)		86.5 ft. (26m)	

009920B

Single Seal Automatic Design Weight 80 lbs.



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Standard all models - 20 ft. cord - ½ H.P.

161 MODELS	4161 MODELS				Control Selection			Listings	
Single Seal	Double Seal	Volts -	Ph	Mode	Amps	Simplex	Duplex	CSA	UL
M161	—	115	1	Auto	15.5	1	—	Y	Y
N161	N4161	115	1	Non	15.5	2	3 or 5 & 6	Y	Y(1)
D161	—	230	1	Auto	7.5	1	—	Y	Y
E161	E4161	230	1	Non	7.5	2	3 or 5 & 6	Y	Y
* H161	—	200-208	1	Auto	8.8	1	—	Y	N
* I161	* I4161	200-208	1	Non	8.8	2	3 or 5 & 6	Y	N
* J161	* J4161	200-208	3	Non	6.4	4 & 6	3 & 4 or 5 & 6	Y	Y
* F161	* F4161	230	3	Non	5.2	4 & 6	3 & 4 or 5 & 6	Y	Y
* G161	* G4161	460	3	Non	2.9	4 & 6	3 & 4 or 5 & 6	Y	Y

Standard all models - 20 ft. cord - ½ H.P.

163 MODELS	4163 MODELS				Control Selection			Listings	
Single Seal	Double Seal	Volts -	Ph	Mode	Amps	Simplex	Duplex	CSA	UL
M163	—	115	1	Auto	15.0	1	—	Y	Y
N163	N4163	115	1	Non	15.0	2	3 or 5 & 6	Y	Y(1)
D163	—	230	1	Auto	7.5	1	—	Y	Y
E163	E4163	230	1	Non	7.5	2	3 or 5 & 6	Y	Y
* H163	—	200-208	1	Auto	8.5	1	—	Y	N
* I163	* I4163	200-208	1	Non	8.5	2	3 or 5 & 6	Y	N
* J163	* J4163	200-208	3	Non	6.0	4 & 6	3 & 4 or 5 & 6	Y	Y
* F163	* F4163	230	3	Non	4.8	4 & 6	3 & 4 or 5 & 6	Y	Y
* G163	* G4163	460	3	Non	2.9	4 & 6	3 & 4 or 5 & 6	Y	Y

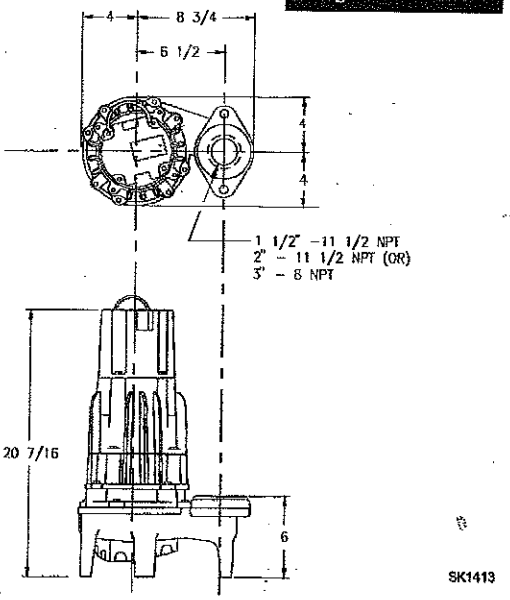
Standard all models - 20 ft. cord - 1 H.P.

165 MODELS	4165 MODELS				Control Selection			Listings	
Single Seal	Double Seal	Volts -	Ph	Mode	Amps	Simplex	Duplex	CSA	UL
D165	—	230	1	Auto	10.2	1	—	Y	Y
E165	E4165	230	1	Non	10.2	2	3 or 5 & 6	Y	Y
* H165	—	200-208	1	Auto	12.6	1	—	Y	N
* I165	* I4165	200-208	1	Non	12.6	2	3 or 5 & 6	Y	N
* J165	* J4165	200-208	3	Non	7.5	4 & 6	3 & 4 or 5 & 6	Y	Y
* F165	* F4165	230	3	Non	7.4	4 & 6	3 & 4 or 5 & 6	Y	Y
* G165	* G4165	460	3	Non	3.7	4 & 6	3 & 4 or 5 & 6	Y	Y
* BA165	* BA4165	575	3	Non	3.0	4 & 6	3 & 4 or 5 & 6	N	N

* No Molded Plug

(1) UL listed unit available with 20 Amp plug.

Double Seal Design Weight 87 lbs.



SELECTION GUIDE

1. Integral float operated 2-pole mechanical switch, no external control required.
2. Single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. Mechanical alternator M-Pak 10-0072 or 10-0075. Refer to FM0495
4. Simplex three phase control panel. Refer to FM1228.
5. See FM0712 for correct model of Electrical Alternator.
6. Variable level control switch 10-0225 used as control activator, specify simplex (3) float or duplex (3) or (4) float system.

For information on additional Zoeller products refer to catalog on Piggyback Variable Level Float Switches, FM0477; Electrical Alternator, FM0486; Mechanical Alternator, FM0495; Alarm Package, FM0732; and Sump/Sewage Basins, FM0487.

⚠ CAUTION

All installation of controls, protection devices and wiring should be done by a qualified licensed electrician. All electrical and safety codes should be followed including the most recent National Electric Code (NEC) and the Occupational Safety and Health Act (OSHA).

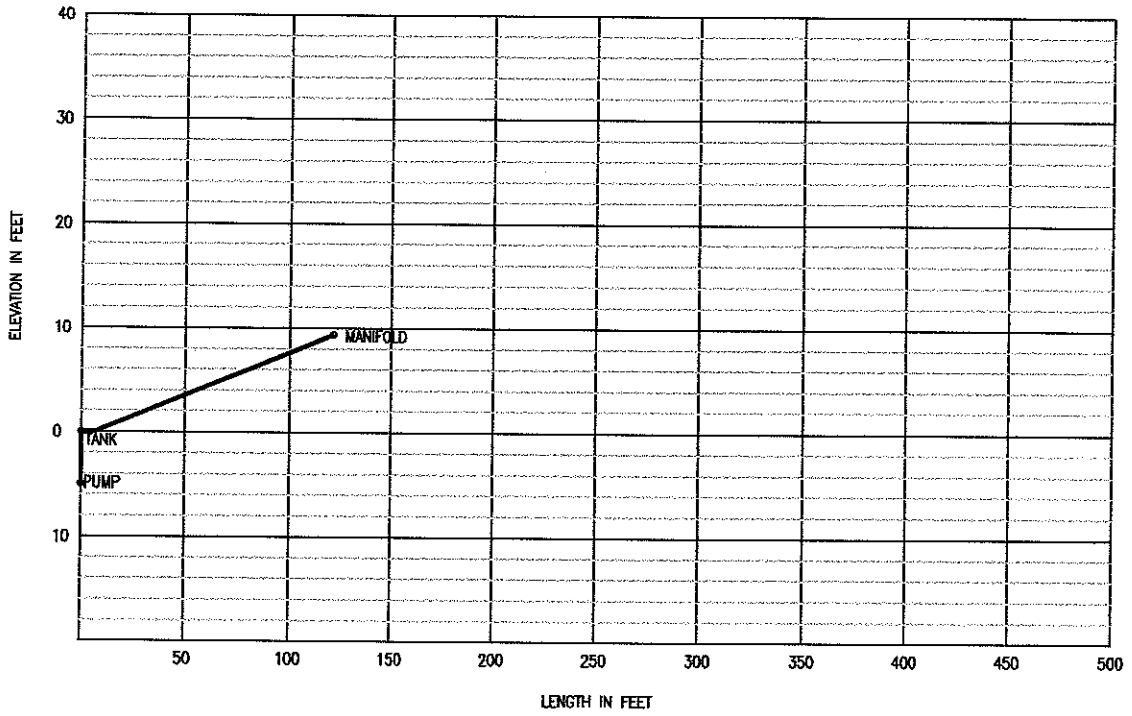
RESERVE POWERED DESIGN

For unusual conditions a reserve safety factor is engineered into the design of every Zoeller pump.

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SUPPLY LINE
HYDRAULIC PROFILE

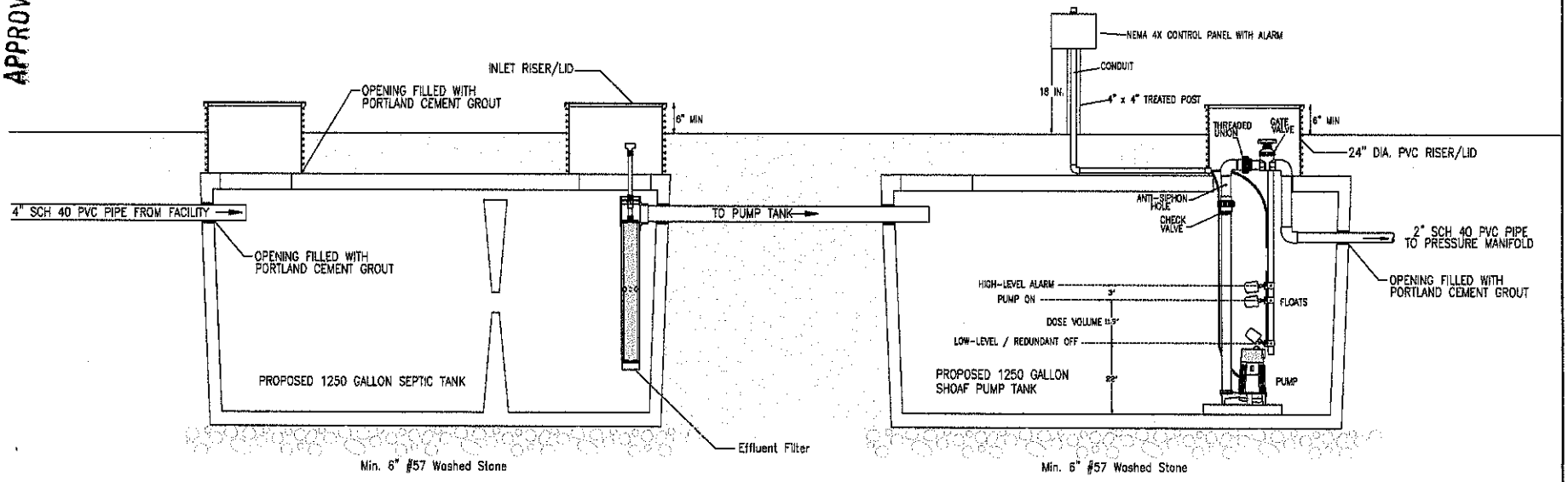


Bateman Civil Survey Company
Engineers • Surveyors • Planners
200 N. Main Street, Holly Springs, NC 27540 Ph: 919.577.1080 Fax: 919.577.1081
www.batemancivilsurvey.com info@batemancivilsurvey.com
NCBELS Firm No. C-2376

MeritageHomes

LOT 191
BELLS CROSSING SUBDIVISION
MOORESVILLE, NC IREDELL COUNTY
DATE: 12/15/15
DRAWN BY: DJS CHECKED BY: MB

APPROVED JAN 15 2016



NOTES:

1. **CONTROL PANEL SHALL HAVE A VISUAL AND AUDIO ALARM**
2. **FINAL GRADE SHOULD SHED WATER AWAY FROM TANKS**
3. **TANKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STATE RULE 15A NCAC 18A .1953**

TANK DETAILS - LOT 192

FOR

MeritageHomes

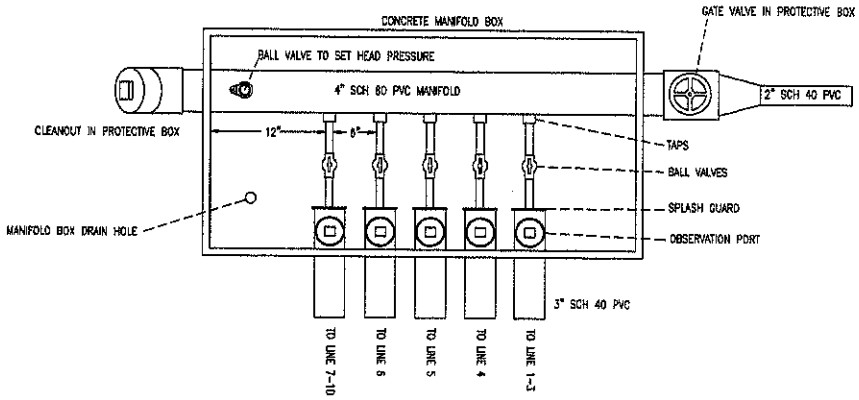
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Engineers • Surveyors • Planners
200 N. Main Street, Holly Springs, NC 27540 Ph: 919.577.1080 Fax: 919.577.1081
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BELLS CROSSING SUBDIVISION LOT 191
MOORESVILLE, NC
IREDELL COUNTY

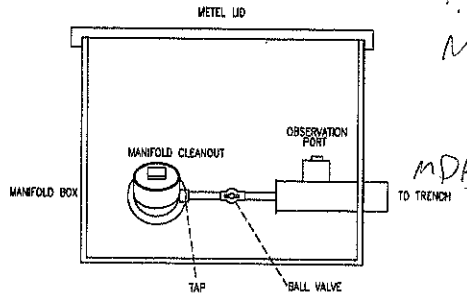
DATE: 12/08/15 DRAWN BY: TWB CHECKED BY: TWB

SCALE: AS SHOWN

PRESSURE MANIFOLD DETAILS
TOP VIEW



PRESSURE MANIFOLD DETAILS
END VIEW



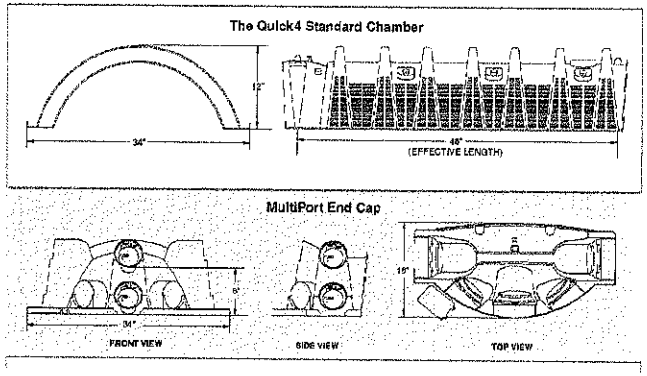
1-15-16

MDB 2-3

MDB 2-8

TAP SCHEDULE	
LINE #	TAP
~~3~~	3/4" SCH 40
4	1" SCH 40
5	1" SCH 40
6	1" SCH 40
~~7-10~~	3/4" SCH 40

The
Quick4® Standard
Chamber



INFILTRATOR CHAMBER DETAILS

Bateman Civil Survey Company
Engineers • Surveyors • Planners
200 N. Main Street, Holly Springs, NC 27540 Ph: 919.577.1080 Fax: 919.577.1081
www.batemancivilsurvey.com info@batemancivilsurvey.com
NCBELS Firm No. C-2378

MANIFOLD DETAILS - LOT 191
FOR
Meritage Homes

BELLS CROSSING SUBDIVISION LOT 191
MOORESVILLE, NC
IREDELL COUNTY
DATE: 12/08/15 DRAWN BY: TMB CHECKED BY: TVB
SCALE: AS SHOWN