DENR/DEH

ON-SITE WASTEWATER SECTION

Sheet 1 of 2
PROPERTY ID #: 4645128080
COUNTY: Iredell

# SOIL/SITE EVALUATION
## *for* ON-SITE WASTEWATER SYSTEM

OWNER: Rick Howard / Langtree Plantation APPLICATION DATE 10-15-14
ADDRESS: PO Box 355 Mt. Ourne NC 28123 DATE EVALUATED: 10-27-14
PROPOSED FACILITY: Event Center PROPOSED DESIGN FLOW (.1949): 532 w/Flow EQ PROPERTY SIZE: 7.934 ac
LOCATION OF SITE: 554 Langtree Rd PROPERTY RECORDED: Yes
WATER SUPPLY: ☐ Private ☒ Public ☐ Well ☐ Spring ☐ Other
EVALUATION METHOD: ☒ Auger Boring ☐ Pit ☐ Cut TYPE OF WASTEWATER: ☒ Sewage ☐ Industrial Process ☐ Mixed

| PROFILE # | .1940 LANDSCAPE POSITION/ SLOPE % | HORIZON DEPTH (IN.) | SOIL MORPHOLOGY (.1941) .1941 STRUCTURE/ TEXTURE | SOIL MORPHOLOGY (.1941) .1941 CONSISTENCE/ MINERALOGY | OTHER PROFILE FACTORS .1942 SOIL WETNESS/ COLOR | .1943 SOIL DEPTH | .1956 SAPRO CLASS | .1944 RESTR HORIZ | PROFILE CLASS & LTAR |
|---|---|---|---|---|---|---|---|---|---|
| B 1 | LSS 3-4% | 0-4 | B CL WFSBK | FR SS SP SE P | | 48" | - | - | PS .3 |
| | | 4-25 | RC M/WFSBK | FR SS SP SE P | Con mica | | | | |
| | | 25-48 | RCL WFSBK | FR SS SP SE P | few con Sap con mica | | | | |
| B 2 | LSS 4% | 0-8 | B CL WFSBK | FR SS SP SE P | | 48" | - | - | PS .3 |
| | | 8-27 | RC WFSBK | FR SS SP SE P | con mica | | | | |
| | | 27-48 | YR CL WFSBK | FR SS SP SE P | Con Sap few mica | | | | |
| B 3 | LSS 5% | 0-8 | R C MFSBK | FR SS SP SE P | | 48" | - | - | ~~PS~~ .35 |
| | | 8-48 | YR C WFSBK | FR SS SP SE P | con Sap con mica | | | | |
| B 4 | LSS 3-4% | 0-4 | B CL WFSBK | FR SS SP SE P | | 48" | - | - | PS .3 |
| | | 4-42 | RC M/WFSBK | FR SS SP SE P | Con mica | | | | |
| | | 42-48 | RCL WFSBK | FR SS SP SE P | few Sap con Mica | | | | |

| DESCRIPTION | INITIAL SYSTEM | REPAIR SYSTEM |
|---|---|---|
| Available Space (.1945) | PS | PS |
| System Type(s) | PM 25% Redu | PM 25% Redu |
| Site LTAR | 0.3 | 0.3 |

OTHER FACTORS (.1946): None
SITE CLASSIFICATION (.1948): PS
EVALUATED BY: ALP
OTHER(S) PRESENT: None

COMMENTS:

# SOIL/SITE EVALUATION

*(Continuation Sheet)*

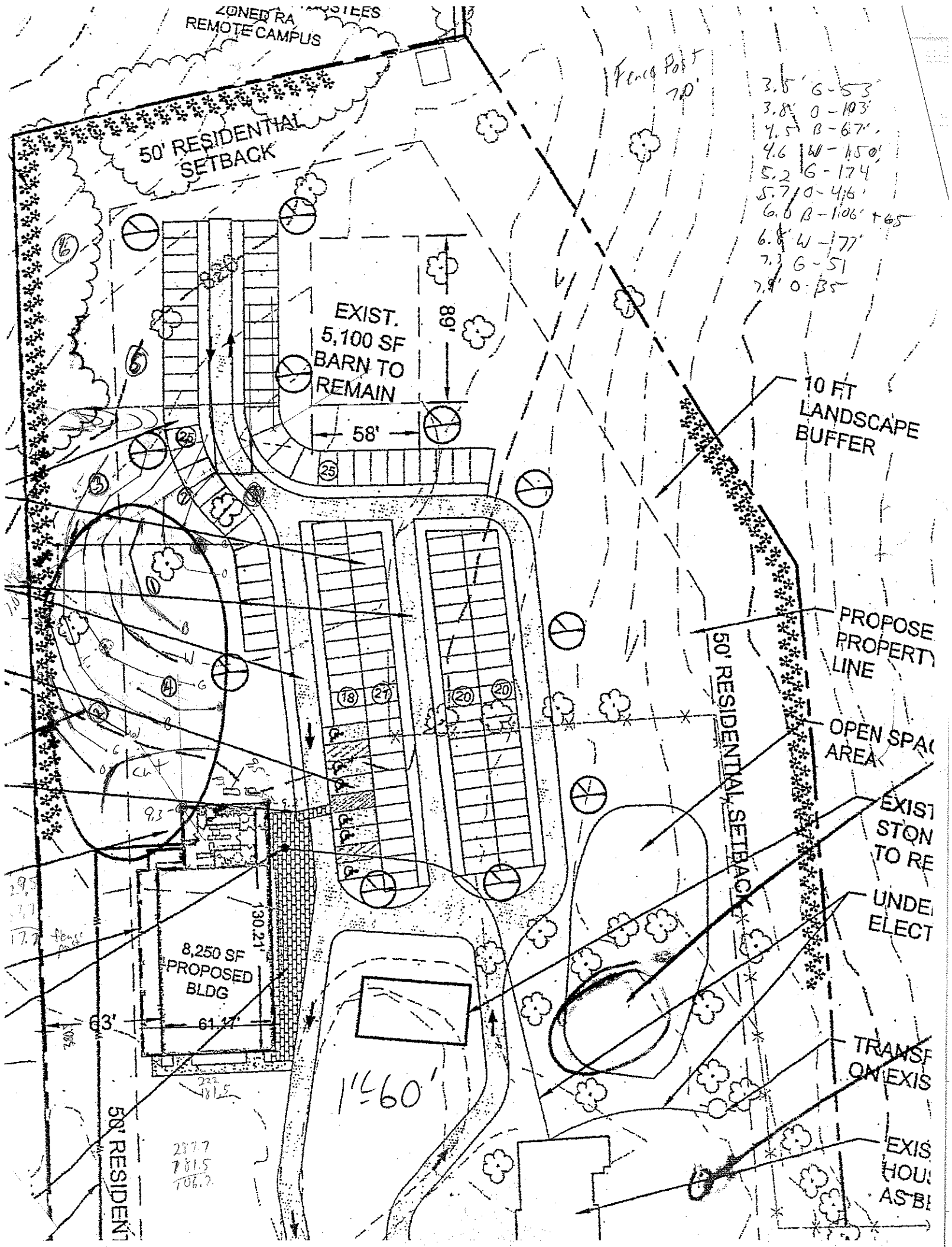


DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH

PROPERTY ID #: 4645128080
DATE OF EVALUATION: 10-27-14
COUNTY: Iredell

| PROFILE # | .1940 LANDSCAPE POSITION/ SLOPE % | HORIZON DEPTH (IN.) | SOIL MORPHOLOGY (.1941) .1941 STRUCTURE/ TEXTURE | SOIL MORPHOLOGY (.1941) .1941 CONSISTENCE/ MINERALOGY | OTHER PROFILE FACTORS .1942 SOIL WETNESS/ COLOR | OTHER PROFILE FACTORS .1943 SOIL DEPTH | OTHER PROFILE FACTORS .1956 SAPRO CLASS | OTHER PROFILE FACTORS .1944 RESTR HORIZ | PROFILE CLASS & LTAR |
|---|---|---|---|---|---|---|---|---|---|
| B 5 | LSS 8-10% | 0-10 | RB CL WFSBK | FR SS SP SE SP | com mica | 48" | - | - | PS .3-.35 |
| | | 10-20 | RC MFSBK | FR SS SP SE SP | com/many SAP | | | | |
| | | 20-48 | YR CL WFSBK | FR SS SP SE SP | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| B 6 | LSS 10% | 0-8 | RB CL WFSBK | FR SS SP SE SP | com mica | 48" | - | - | PS .3 |
| | | 8-32 | R C WFSBK | FR SS SP SE SP | many SAP | | | | |
| | | 32-48 | YR CL WFSBK | FR SS SP SE SP | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| B 7 | LSS 3% | 0-7 | B CL WFSBK | FR SS SP SE SP | com mica | 36" | - | 30" | PS .3 & 36" |
| | | 7-20 | R C WFSBK | FR SS SP SE SP | com SAP | | | | |
| | | 20-36 | R CL WFSBK | FR SS SP SE SP | | | | | |
| | | 36 | Quartz vein | | | | | | |
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COMMENTS:


ZONED RA
REMOTE CAMPUS
50' RESIDENTIAL SETBACK
EXIST. 5,100 SF BARN TO REMAIN
89'
58'
10 FT LANDSCAPE BUFFER
PROPOSE PROPERTY LINE
50' RESIDENTIAL SETBACK
OPEN SPAC AREA
EXIST STON TO RE
UNDE ELECT
TRANSF ON EXIS
EXIS HOU AS BI
8,250 SF PROPOSED BLDG
130.21'
63'
61.17'
1"=60'
50' RESIDEN
Fence Post
7.0'
3.5' G-53'
3.8' O-103'
4.5' B-67'
4.6' W-150'
5.2' G-174'
5.7' O-46'
6.6' B-106' +65
6.8' W-77'
7.3' G-51'
7.9' O-35'

# Langtree Plantation Flow Equalization

Total GPD flow – 372 people (maximum occupancy) x 5 gpd/person = 1,860 gpd

32 inch high water alarm

Open for events only Saturday and Sunday (two days a week)

123

Septic Tank Size Required: V = 0.75Q + 1,125
V = 0.75(1,860) + 1,125
V = 2,520 gallon septic tank

4 min.
12 hr rest
4 min run

| Day | Attendance (people) | Daily Flow (gallons) |
|---|---|---|
| Sunday | 372 | 1,860 |
| Monday | 0 | 0 |
| Tuesday | 0 | 0 |
| Wednesday | 0 | 0 |
| Thursday | 0 | 0 |
| Friday | 0 | 0 |
| Saturday | 372 | 1,860 |
| Weekly Total | | 3,720 |

Equalization Cycle – one week (7 days)

Equalization Daily Flow – Add all the flow generated over the equalization cycle and divide by the number of days in the equalization cycle

Equalization Daily Flow – 3,720gallons/7 days = 532 gpd

Drainfield Size – 532 gpd

Trench Bottom Area – 532 gpd/0.3 gpd/sq ft = 1,774 sq ft

Linear Footage – 1774 sq ft / 3 ft trench width = 592 ft

25% Reduction – 592 ft x 0.75= 444 ft

Dosing Volume – 444 ft x 65.3 gal/100 ft corrugated pipe = 290 gallons total capacity
290 gallons/2 doses/day = 145 gallons/dose **
- 40% of dosing capacity – 116 gallons
- 80% of dosing capacity – 232 gallons

Flow Balance

| Day | In | Out | Residual |
|---|---|---|---|
| Saturday | 1,860 | 532 | 1,328 |
| Sunday | 1,860 | 532 | 2,656** |
| Monday | 0 | 532 | 2,124 |
| Tuesday | 0 | 532 | 1,592 |
| Wednesday | 0 | 532 | 1,060 |
| Thursday | 0 | 532 | 528 |
| Friday | 0 | 532 | 0 |
| | | 3,724 | 0 |

If I start with the assumption that the pump tank will be at least twice the size of the septic tank, the minimum pump tank volume is 5,040 gallons. All 5,000 gallon concrete tanks are traffic rated and 99% of them have internal dimensions of 10 ft by 20 ft. (This is based on the maximum size of tank in length and width that can travel on the roads.) For a tank with internal dimensions of 10 ft x 20 ft, the gallons/inch is 125 gal/inch.

~~5000~~ Zellinger L= 155" 12.9 20
5000gal H= 138" 11.5'
Tank
148.35ft² x 7.48gal/ft³ = 1109.66gal/ft ÷ 12"/ft = 92.5 = 93 gal/inch water

To size the pump tank, start with the volumes for each section: pump submergence, minimum dose volume, equalization volume, and emergency storage volume.

Minimum dose volume – 145 gallons/dose = 145 gallons/125 gallons/inch = 1.16 inches or 1 inch

80%
232 gallons / 93 gal/in. = 2.49 = 2.5"

Equalization volume – 2,656 gallons – peak residual volume in flow equalization balance
2,656 gallons/125 gallons/inch = 21.2 inches or 22 inches

2656 gal / 93 gal/inch = 28.56 = 29"

Emergency storage volume – 1,860 gallons – peak daily flow = 1,860 gallons/125 gallons/inch = 14.9 inches or 15 inches

1860 gal / 93 gal/in = 20"

Pump submergence – don't have any information about the pump, but will pick three different heights which should cover most pumps USE Myers pump per installer

19" pump height + 2" pump block = 21" pump submergence
Myers ME50D pump

12 inch pump height (minimum)
12 inch pump height plus 6 inch block – 18 inches
20 inch pump height plus 6 inch block – 26 inches

Pump tank volume – 12 inch pump submergence
12 inches (pump submergence) + 1 inch (dose volume) + 22 inches (equalization volume) + 15 inches (emergency storage) = 50 inches total

21" + 2.5" + 29" + 20" = 72.5" total inches

So, 50 inches x 125 gallons/ inch = 6,250 gallons total

72.5" x 93 = 6742.5 gal PT minimum
7400 gallon Dellinger tank
PT-2031

Look at Dellinger PT-550R (6,290 gallons)
Inside dimensions
- L – 240 inches
- W – 120 inches
- H – 50 inches

Dellinger does not have a tank between 6500 + 7400 gallon

The tank, PT-550R, works for a 12 inch pump submergence, 50 inches needed and the tank has an internal height of 50 inches.

Float elevations – all measured from bottom up
- Off – 12 inches
- Enable – 13 inches (one inch)
- High Water Alarm – 35 inches
- Peak Enable – at or above high water alarm

21 off
23.5 enable
52.5 High water alarm

Pump tank volume – 18 inch pump tank submergence
18 inches (pump submergence) + 1 inch (dose volume) + 22 inches (equalization volume) + 15 inches (emergency storage) = 56 inches total

So, 56 inches x 125 gallons/inch = 7,000 gallons

Look at Dellinger PT-2031 (7,400 gallons)
Inside dimensions
- L – 240 inches
- W – 120 inches
- H – 61 inches

The tank, PT-2031, works for an 18 inch pump submergence, 56 inches needed and the tank has an internal height of 61 inches.

Float elevations – all measured from bottom up

- Off – 18 inches
- Enable – 19 inches (one inch)
- High Water Alarm – 41 inches
- Peak Enable – at or above high water alarm

Pump tank volume – 26 inch pump tank submergence
26 inches (pump submergence) + 1 inch (dose volume) + 22 inches (equalization volume) + 15 inches (emergency storage) = 64 inches total

So, 64 inches x 125 gallons/inch = 8,000 gallons

Look at Dellinger PT-529 (8,000 gallons)
Inside dimensions

- L – 264 inches
- W – 120 inches
- H – 60 inches

The gallons/inch on PT-529 is 137 gallons/inch.

So, working from the bottom up

- Pump submergence – 26 inches = 3,562 gallons
- Dose volume – 145 gallons/dose = 145 gallons/137 gallons/inch = 1.06 inches or 1 inch
- Equalization volume – 2,656 gallons = 2,656 gallons/137 gallons/inch = 19.4 inches or 20 inches
- Emergency storage volume – 1,860 gallons = 1,860 gallons/137 gallons/inch = 13.5 inches or 14 inches

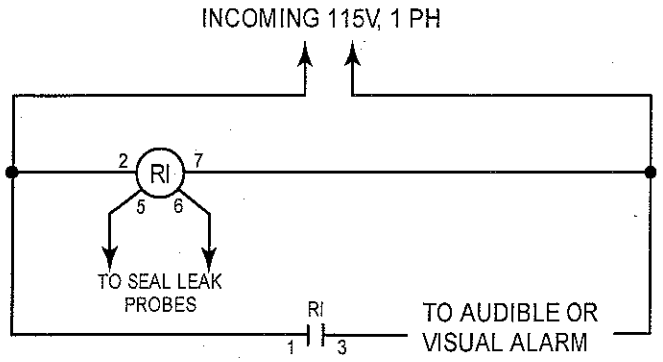
Total internal height of tank (based on actual gpi of tank, 137 gal/inch) = 26 inches + 1 inch + 20 inches + 14 inches = 61 inches

The tank, PT-529, does not work for a 26 inch pump submergence, as we need at least 61 inches. (In reality, my rounding errors could be argued that since I always rounded up, the tank would work. And I would not disagree with that argument. The main difference with this tank was that it did not have a 125 gal/inch drawdown.)

Float elevations – all measured from bottom up for PT-529

- Off – 26 inches
- Enable – 27 inches (one inch)
- High Water Alarm – 49 inches
- Peak Enable – at or above high water alarm

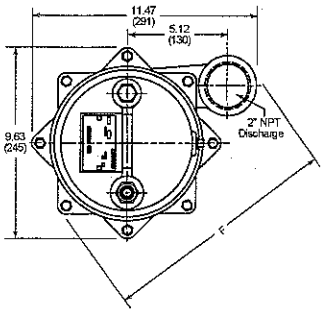
## Moisture Sensor Seal Probe Circuit

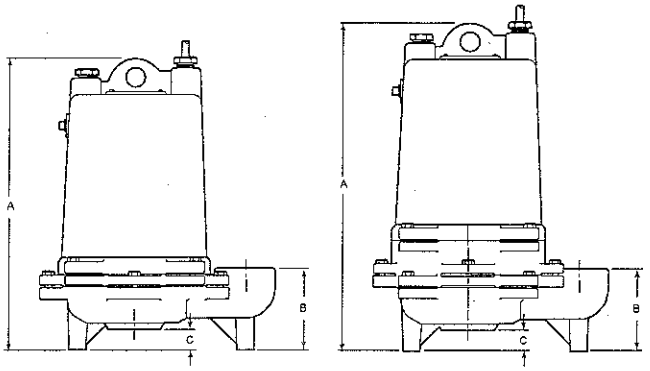



Relay: SSAC Inc. #LLC44A5A
Socket: Standard 8-pin plug-in type
If Myers panel is used see below.
Pumps: ME50D-11,
ME75D-11
Required Panel:
CMEP(SL)-11S, -11SW,-11D, or -11DW
Pumps: ME50D-01, ME50D-21,
ME75D-01, ME75D-21,
ME100D-01, ME100D-21,
ME150D-01, ME150D-21,
MWH50D-01, MWH50D-21,
MW100D-01, MW100D-21,
MW150D-01, MW150D-21,
MW200D-01, MW200D-21
Required Panel:
CMEP(SL)-21S, -21SW,-21D, or -21DW
Pumps: ME50D-03, ME50D-23,
ME75D-03, ME75D-23,
ME100D-03, ME100D-23,
ME150D-03, ME150D-23,
MWH50D-03, MWH50D-23,
MW100D-03, MW100D-23,
MW150D-03, MW150D-23,
MW200D-03, MW200D-23
Required Panel:
CMEP(SL)-23S, -23SW,-23D, or -23DW
Pumps: ME50D-43,
ME75D-43,
ME100D-43,
ME150D-43,
MWH50D-43,
MW100D-43,
MW150D-43,
MW200D-43
Required Panel:
CMEP(SL)-43S, -43SW,-43D, or -43DW

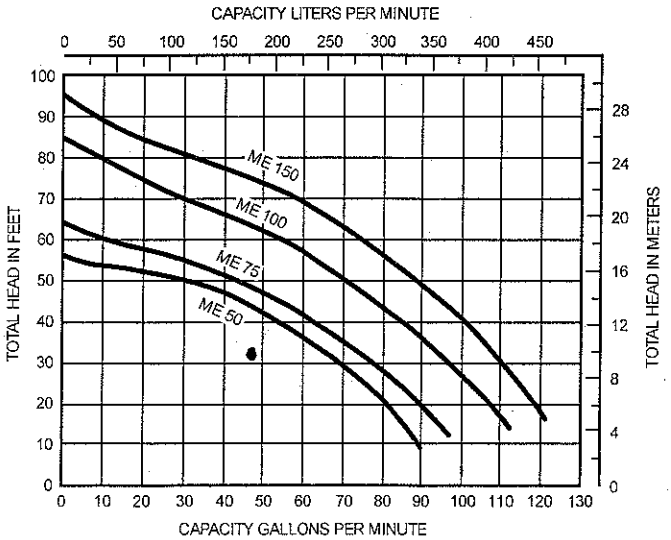
## ME Series Dimensions

| Model Series | Inches (milimeters) | | | |
|---|---|---|---|---|
| | A | B | C | F |
| ME50S | 16.8 (427) | 4.09 (104) | 1.03 (26) | 12.13 (308) |
| ME50D | 18.6 (472) | | | |
| ME75S, ME100S, ME150S | 16.8 (427) | 4.0 (102) | 1.06 (27) | 12.5 (318)) |
| ME75D, ME100D, ME150D | 18.6 (472) | | | |




## ME Performance Curve




TDH = 31.04 ft
GPM = 47.6
ST = 2500 gal



PT = 7400 gal

## Adrian Pruett

**From:** Angoli, Trish <trish.angoli@dhhs.nc.gov>
**Sent:** Monday, October 13, 2014 4:59 PM
**To:** Adrian Pruett
**Cc:** Justin Henderson; 'Brad Howard' (brad.howard@langtreegroup.com)
**Subject:** RE: Proposed Event/Wedding Venue

Adrian,

I would size the venue at a minimum of 5 gpd/person. I think that number is reasonable based on the time at the facility, no food prep, and that some events might have alcohol.

The 5 gpd/person is based on low flow fixtures being used.

They could also look at flow equalization if they are limited in soils based on what they are proposing to do.

Let me know if you need anything else from me.

Thanks
Trish

Patricia M. Angoli, PE
NC Department of Health and Human Services
Environmental Engineer, On-Site Water Protection Branch, Division of Public Health
5605 Six Forks Rd
1642 Mail Service Center
Raleigh, NC 27699-1642
919-707-5878 (Office)
919-845-3973 (Fax)
trish.angoli@dhhs.nc.gov
http://publichealth.nc.gov/

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**From:** Adrian Pruett [mailto:adrian.pruett@co.iredell.nc.us]
**Sent:** Monday, October 06, 2014 9:48 AM
**To:** Angoli, Trish
**Cc:** Justin Henderson; 'Brad Howard' (brad.howard@langtreegroup.com)
**Subject:** Proposed Event/Wedding Venue

Trish,
I had spoken with you a month or so ago about an Event/Wedding Venue that was being proposed. They have finally decided to move forward with it and have brought plans in. The issue I have is how many gallons per day should I assign to each person. I included a description from the owner of what will be going on there along with the site plan, floor plan and technical data. The scan quality is not great so hopefully you can see everything. The technical data does show the total occupancy at 372. I have also spoken with the owner and there will be no food prep on site or clean up, there is only a hand washing sink in the setup area. Also the bar is available for the serving of alcohol but there will not be alcohol stored on site or at every event, it will be served on an individual event basis.

Hopefully I have answered all the questions and thank you for your time.

Sincerely,

Adrian L. Pruett, REHS, LSS
Environmental Health Supervisor I
On-site Water Protection Program
610 E. Center Ave
Mooresville, NC 28115
704-660-3633

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## Adrian Pruett

**From:** Angoli, Trish <trish.angoli@dhhs.nc.gov>
**Sent:** Thursday, August 28, 2014 4:17 PM
**To:** Adrian Pruett
**Subject:** Wedding Reception Venue

Adrian,

Below is what I have advised other counties for trying to size wedding reception type venues.

I would look at between 5 to 15 gpd/person depending on what facilities are in the venue (floor plan of the building). What varies the design flow is the type of food service (single service vs full service), if food is prepared on site or off site (and what cleanup is done on site), if alcohol is served (if yes, a higher flow rate based on more bathroom visits), how long the attendees will be in the facility (1 hour vs 5 hours – such as for a wedding reception), and anything else that may be influential in the facility. The more yesses to answers, the closer I move the flow rate to 15 gpd/seat.

Let me know if you have any questions.

I am sure I will be talking to you soon.

Thanks
Trish

Patricia M. Angoli, PE
NC Department of Health and Human Services
Environmental Engineer, On-Site Water Protection Branch, Division of Public Health
5605 Six Forks Rd
1642 Mail Service Center
Raleigh, NC 27699-1642
919-707-5878 (Office)
919-845-3973 (Fax)
trish.angoli@dhhs.nc.gov
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## Ronda Hart

**From:** Adrian Pruett
**Sent:** Wednesday, October 15, 2014 7:28 AM
**To:** Ronda Hart
**Subject:** Fw: Proposed Event/Wedding Venue

I meant to cc you on this.
Adrian L. Pruett

Sent from my Verizon 4G LTE Smartphone

------ Original message------
**From:** Adrian Pruett
**Date:** Mon, Oct 13, 2014 5:46 PM
**To:** brad.howard@langtreegroup.com;
**Cc:** Elaine.Mackey@langtreegroup.com;Rick.howard@langtreegroup.com;
**Subject:**Re: Proposed Event/Wedding Venue

Brad,
What this means is a total 1860 gpd flow would be associated with the system unless you do flow equalization (flow eq). Flow EQ would take the days of peak flow and spread the water out across the week while there is no flow. This could substantially cut down on the size of the drainfield. For now you need to apply to our office and we will schedule a day to come out and evaluate the site. Be sure to fill the application out completely, show max capacity, use or the structure and days of week events will be scheduled including how many events per day.

Adrian L. Pruett

Sent from my Verizon 4G LTE Smartphone

------ Original message------
**From:** Brad R. Howard
**Date:** Mon, Oct 13, 2014 5:03 PM
**To:** Adrian Pruett;
**Cc:** Elaine Mackey;Rick Howard;
**Subject:**Re: Proposed Event/Wedding Venue

Adrian-
What would our next steps be?
What size system would this be?

Brad R. Howard
President & Principal
The Langtree Group

704.746.3252 office
704.658.7924 mobile

Permit # 20143

On Oct 13, 2014, at 4:58 PM, Angoli, Trish <trish.angoli@dhhs.nc.gov> wrote:

Adrian,

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Environmental Health Supervisor I
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