NEW LOW PRESSURE MANIFOLD GRAVITY DISTRIBUTION WITH T & J PANELS FOR SUBSURFACE WASTEWATER DISPOSAL 107 ESTES PARK DRIVE MOORESVILLE, NC 28117

Prepared for
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March 10, 2014
Revised: January 14, 2015
(revised footprint and added bedroom)

APPROVED JAN 2 0 2015

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WARNING . . . . WARNING . . . . WARNING

The ultimate success of this new home will depend on a reasonable amount of care in preserving both the existing and future additional septic and repair areas. All ingress and egress across the front of the lot will have to be away from the new septic lines (Figure 1). All septic and repair should be fenced (except drives) before any demolition or construction begins. If the septic area is damaged, even after the house is built, the septic permit can be voided and occupancy not allowed. Parking, staging, and material storage are going to be a challenge for the builder, but these activities must not be on the area designated for septic. This fence should be maintained during the entire building until final landscaping. Many general contractors mark the fence with signage such as "septic area-do not enter" which is usually effective. Builder supervision of subcontractors makes this effective.

If in doubt, ask questions!

BACKGROUND

This permit request is for a new five bedroom single family residence. This replaces a 45 year old home and a bed septic system. The soil was evaluated to a depth of 48 inches and found to have usable soil. The LTAR of the soil described by Toney Jacobs, LSS was 0.3 for initial and 0.3 LTAR for repair.

The proposed system will be a Type III(b) and does not require a maintenance contract with a certified operator; however, the designer always *recommends management on some frequency to protect this valuable asset.*

APPLICATION INFORMATION

1. Prepared for: Karen Browder
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   Soil Scientist
   and Designer: Toney C. Jacobs, LSS
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2. Water supply is provided by an existing 6" on-site well. One old 2" well will be abandoned.
3. Facility to be served by the proposed system is a four bedroom permitted as 600gpd.

LOCATION

The property is a 0.80 acre tract located on the left of Tuskarora Trail at the intersection of Estes Park Drive.

REFERENCES

Law and Rules for Sewage Treatment and Disposal Systems, 15A NCAC 18A, Section .1900,

Department of Environment Health and Natural Resources, August 1, 1998.
Design, Installation and Maintenance of the T & J Panel Wastewater Treatment System.

Berkowitz Pressure Manifold Design....

CONSTRUCTION NOTES

The initial system is in a mostly open area with some tree and shrub removal required. The old septic tank must be pumped out and brought up to present code for reuse. A new pump tank will be installed (Fig. 1). Drive will be removed from required septic repair area.

PLANS AND SPECIFICATIONS FOR SPECIFIC SYSTEM COMPONENTS

Septic Tank

1. A new 1500 septic tank shall be watertight, structurally sound, and not subject to excessive corrosion or decay. Riser and filter must be added. Recent evaluation showed tank to be sound.
2. The septic tank must be of two-compartment design for maximum solids retention. The inlet compartment of two-compartment tank shall hold between two-thirds and three-fourths of the total tank capacity.
3. Effluent from the two-compartment septic tank flows by gravity through a State approved effluent filter and a four-inch solid PVC pipe to the pumping tank.
4. Both the septic tank and pumping tank must be provided with above ground approved manhole risers to provide easy access for clean-out and pump service.
5. When prefabricated concrete tanks or tanks of other material are used, they shall be constructed in accordance with the plans which have been approved by the State and shall comply with all requirements of Section .1953 of 15A NCAC 18A.
6. On the outlet tee of the septic tank an effluent filter must be installed. This filter should be equivalent to a Zabel Model A1800 or other State approved unit supplied by the tank manufacturer.

Pumping Tank

1. A new 1500 gallon State approved pumping tank must be installed with an access manhole extending at least 6 inches above finished grade.
2. A septic tank effluent pump that will not be corroded by sewage shall be used in the pumping tank.
3. The pump must be placed on two concrete blocks set next to each other on the bottom of the tank. This prevents the pumping of any solid particles that can clog the system.
4. A piece of nylon rope or other non-corrodible material should be attached to the pump and to the outlet pipe for lifting the pump in and out of the chamber.
5. The lower level control or "pump-off" must be positioned above the pump, so that the pump remains submerged at all time.
6. The pump outlet pipe should be connected to the supply manifold with a threaded PVC union to allow quick removal.
7. Pump and Simplex control circuits shall be provided with manual circuit disconnects within a

watertight, corrosion-resistant, outside enclosure (NEMA 4X or equivalent) adjacent to the pump tank, securely mounted at least 12 inches above finished grade. Pump control (Simplex) may be mounted on side of house if long cord pump is used. The pump shall be manually operable without requiring the use of special tools or entrance into the tank for testing purposes. Conductors shall be conveyed to the disconnect enclosure through water proof, gas proof, and corrosion-resistant conduits, with no splices or junction boxes provided inside the tank. Wire grips, duct seal or other suitable material shall be used to seal around wire and wire conduit openings inside the pump tank and disconnect enclosure. There shall be two electric circuits for controls: one for pump power, one for the alarm. These will require 2 circuit breakers.

8. The pump tank shall have a properly functioning high-water alarm. The alarm circuit shall be supplied ahead of any pump overload and short circuit protective devices. It should be on a separate electrical circuit from the pump power line. The alarm shall be audible and visible by system users and included in the pump and control enclosure (Simplex Panel). The alarm is activated if the water level in the pump tank rises above the "pump-on" float control. The tank provides at least one day or more of excess storage capacity (depending on water use in the home) during which time the system must be repaired.
9. Float switch for the high water alarm shall be set no more than 3 inches above the high water level of pump cycle.
10. Float switch tie downs to be made of corrosion resistant material, no tape or metal hose clamps. For maintenance flexibility, tree must be used to set floats.
11. Approved pressure bell may be used with compatible panel 8, 9, 10 above.
12. Watertight testing per .1900 rules shall be required on two piece pump tanks.
13. Wiring between the pumping tank and the house should meet State and local code requirements.

Pipe and Fittings

1. All pipes and fitting should be made of SCH 40 PVC.
2. All joints must be sealed with appropriate PVC-solvent cement.
3. There should be a threaded PVC union above the pump to allow easy removal or replacement.
4. A gate valve for final pressure adjustment is installed in the supply line inside the manifold box.
5. Approved manifold and valve box, either constructed or commercially purchased. Reference upon request.

CONSTRUCTION INSTALLATION

Site Preparation

1. One of the most important concerns for an on-site system is to protect the site from soil disturbance. Leveling should not be required and the trees that are present can be either worked around or removed with rubber tire backhoe..
2. The absorption field area has been designed. It should be protected before and after system installation.

Installation

1. The two-compartment septic tank will be reused.
2. The pumping tank is then installed next to the septic tank.
3. The tanks are connected with an appropriate length of solid, four-inch PVC pipe.

Supply Manifold

1. The supply manifold conveys effluent from the pump to the distribution laterals.
2. Design of the manifold is shown on attached diagrams.
3. After the supply manifold has been placed in its trench and lateral lines connected, it should be backfilled with tightly tamped soil. The supply manifold trench must not be backfilled with gravel or sand, or the trench may become a conduit for downslope flow effluent from the laterals.
4. For equal loading the six taps (3/8 Sch 80) will feed the panel lines.

50% Reduction Laterals

1. Install per cited reference material and this plan.
2. Trenches shall be 24" wide, and 8' minimum on center. Trenches shall be "level" from end to end. They will be slightly deeper when topo dictates.

PROPER OPERATION CHECK AND PRESSURE HEAD ADJUSTMENT

1. After all connections have been installed and connected, the system should be checked for proper operation. With electrical power turned off, fill the pump tank with a garden hose until the liquid rises to the level of the high-water alarm float.
2. Turn on the electrical power. The alarm light should go off when the liquid level falls below the high-water float. The pump should turn off when the liquid reaches the lowest float control. Be sure the pump is still completely submerged.
3. The pressure head is measured as the height liquid will rise above the manifold.

FINAL LANDSCAPING

1. After the system is installed, the following should be checked to ensure that the system will not be overloaded with excess rainwater and runoff. The distribution field is shaped to shed rainwater and is free of low areas.

2. Finally, the entire area should be planted with grass in order to prevent erosion. The soil should be properly tilled, limed (if necessary) and fertilized before planting. After applying an appropriate grass seed, the area should be heavily mulched with straw or other suitable material.

QUALITY ASSURANCE REQUIREMENTS

The system must be installed by a qualified and competent contractor. Critical stages of the installation which should be checked are:

1. System layout
2. Septic and pump tank installation prior to backfilling
3. Manifold and lateral installation prior to backfilling
4. Final landscaping, operation and pressure head check

The system design is based on a maximum waste flow of 600 gallons per day. Homeowners should pay particular attention to the section titled Resident Suggestions for ways to minimize the burden on the system.

OPERATION AND MAINTENANCE PROCEDURE

The system is classified as Type III(b) and DOES NOT require a maintenance contract with a certified operator.

- Septic system shall be pumped every 4 years or when solids accumulate to 1/3 the volume of the tank.
- At 6-month intervals, inspect the effluent filter. When washing the filter, debris must be sprayed directly back into the septic tank and not onto the lawn.
- Pressure head for manifold should be checked and adjusted after installation and semi-annually thereafter.
- All piping and fittings shall be checked annually for damage and/or proper operation and corrections made immediately.
- The property should be inspected to insure all surface water is diverted away from the fields and tank. Any ponding of surface water should be corrected.
- Grasses shall be mowed and maintained and any erosion shall be corrected promptly.
- The nitrification field area shall be checked for leakages, blowouts or malfunction, indications of damp or mushy areas compared to surrounding area or evidence of noticeable odor of sewage. Repairs shall be made immediately.
- The pump electrical should be checked to insure tight, clean connections with no corrosion and proper operation.
- Pump switches shall be checked for free operation and proper level set.
- Pump draw down depth and delivery rate shall be checked each year.
- Check septic tank and pump tank for evidence of damage or leakage. Check the quality of effluent including grease and sludge accumulation.

RESIDENT SUGGESTIONS

Most systems do not require much effort to operate and maintain. Even though the effort is small, the system must be maintained properly so that it operates reliably and at a minimum cost. Following are suggestions for the homeowner to minimize the burden on the septic system.

1. Garbage disposals should not be used in on-site systems. The ground garbage adds large amounts of solids to a septic tank, causing sludge to build up at a quicker rate than without. If disposal is installed, use should be limited.
2. Grease, cooking oils and coffee grounds should never be put into a septic tank.
3. Items such as disposable diapers, cigarettes, facial tissues and other solid or paper wastes should not be flushed into the on-site system.
4. Used motor oil and other such oily liquids (paint and cleaners) should not be put into a septic tank.
5. Using less water can reduce the amount of water flowing to the treatment and disposal field.
6. Water-saving fixtures and devices can be installed on sinks, toilets and showers to reduce the rate at which the water flows from the fixture.
7. Dishwashers and washing machines should only be run with full loads.
8. Leaky faucets and toilets can add large volumes of water to the daily flow of water into the on-site system. Repair the leaks to save water and give the treatment and disposal field a rest.

DESIGN SPECIFICATIONS

107 Estes Park Drive

Daily design flow	600 gpd.
Septic tank size	new 1500 gal. (2 compartments)
Pumping tank size	1500 gal.
Initial system	7 each 50' of T&J panels, (350'), 77 panels
Effluent loading rate, Initial system	0.3 gpd/ft^2 by soil evaluation
Total length and diameter of supply pipe	approx. 75 ft. 2" SCH 40 PVC
Number and length of laterals	7 @ 50', end-fed from pressure manifold gravity distribution
Flow rate through the system	46.97 gpm from seven (7) each ½ Sch 80 taps, from a 4" manifold
Elevation head	Approx. 12' (to be verified by installer)
Pressure head	3.0'
Friction head	3.435'
20% contingency	3.687'
Total head	22.1'
Pump requirements	47.0 gpm at 22.1' of head; use Gould WEO5H pump or equivalent with compatible electrical
Dosing volume	277 gal. – 2.16 doses/day at design flow
Depth of water pumped per dose	calculated to specific tank by measure or dealer engineering specifications (1 cubic ft. of water equals 7.48 gal.)
Pump run per dose	approx. 5.9 min
Check valve	yes
Siphon break hole	no
Effluent loading rate, Repair system	0.3 gpd/ft^2 front yard
Repair system	pressure dose T & J panels, 7 @ 55', 55', 55' 50', 50', 45' & 35' (sum = 335')

Revised calculations 1-23-2015

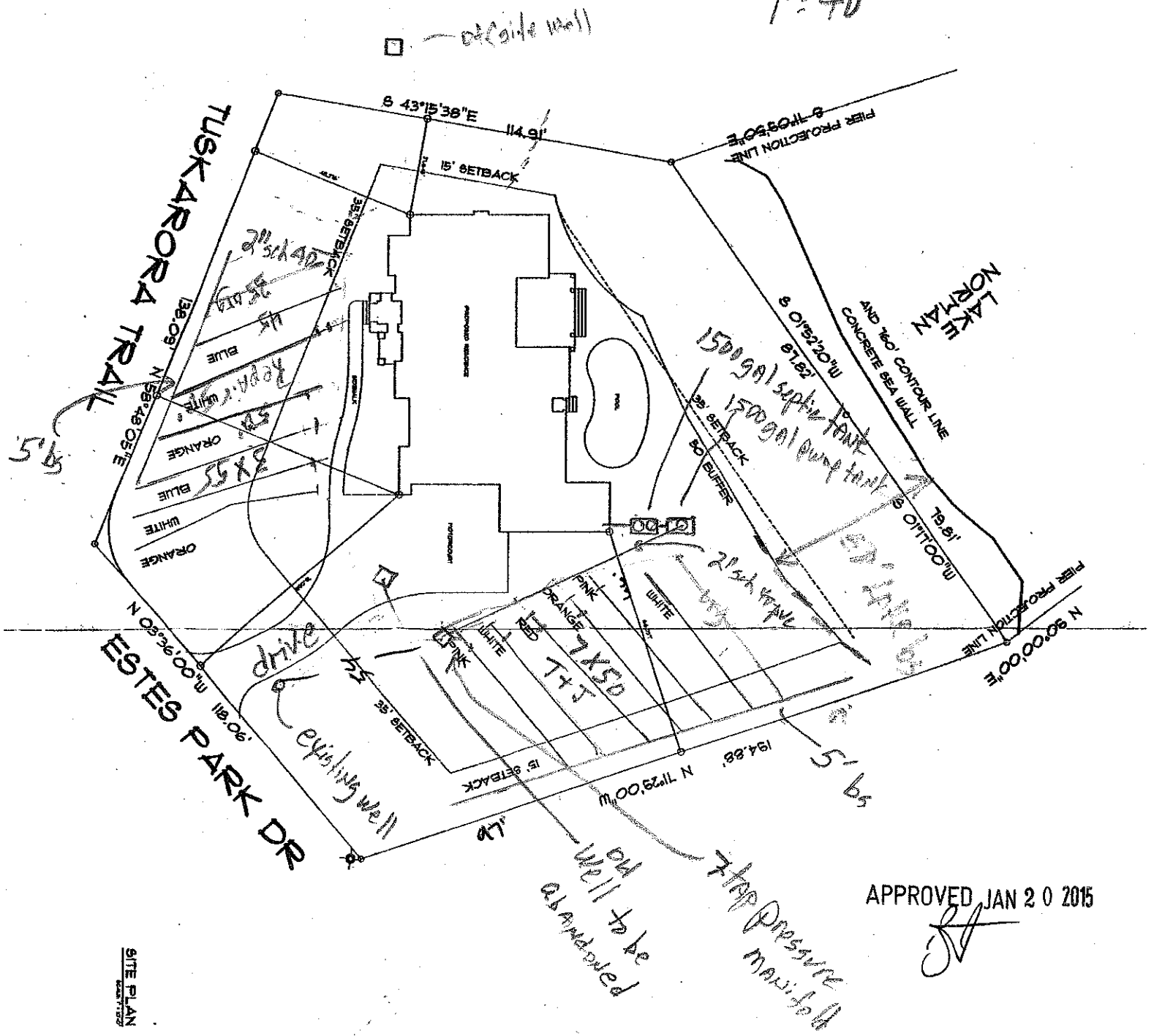
1.6.39

Site plan

107 Estes Park Dr

28117

1" = 40'



APPROVED JAN 2 0 2015

SITE PLAN

DRAWN BY:	J.BARAJAS/J.STEPANIK
DATE:	12/12/2014
REVISED:	
SHEET	1
OF	15

THE BROWDER RESIDENCE

LOT 387, ESTES PARK DR

PROJECT:

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ENGINEERED BY:
INTELLIGENT DESIGN ENGINEERING P.C.
1000 THE PLAZA, SUITE B
CHARLOTTE, NC 28205
NO. C-3118

P.O. Box 951286
Mint Hill, NC 28227
tel: 704-545-2928
fax: 704-545-0600

Property ID# _____

SOIL/SITE EVALUATION WORKSHEET

Sheet 1 of 2

County _____

Date evaluated 3/10/15

Owner/client Karen Brouder

Proposed facility 4 BR SF Design flow 480

Site LTAR int. 0.3 rep. 0.3

Site location 107 Gates Park Dr Property size _____

Site classification PS

Soil described by TJ Others present _____

Antecedent moisture M Weather clear/light

Water supply: ( ) public ( ) community (✓) on-site well ( ) spring ( ) other Evaluation method: ( ) auger boring (✓) pit ( ) cut

Type of wastewater: ( ) sewage ( ) industrial process ( ) mixed

APPROVED JAN 21 2015

PPROFILE #	LANDSCAPE/SLOPE	DEPTH INCHES	HORIZON	COLOR	MUNSELL	TEXTURE	STRUCTURE	CONSISTENCY MOIST	CONSISTENCY WET	MOTTLES	INCLUSIONS	INCLUSIONS	BOUNDARY	COMMENTS
1	5 SW RP	0-4		brown	10YR 4/3	sl	gran	very friable						
		4-10	A/E	light gray		sil	m sbk	fri	ss sp so					
		10-51	B	red		cl	m sbk	fri	ss sp so					
														0.3
2		0-6				sil	sl m sbk				many fine			
		6-51	B	red		cl	m sbk	fri	ss sp so		common distinct			
3		0-6	A			sil	gran	fri	ss sp so		many fine			
		6-55	B	red		cl	m sbk	fri	ss sp so					
														0.3
4	SW RP	0-5			brown 10YR 5/3	sil	gran	very fri	ss sp so					
		5-55	B	red		cl	m sbk	fri	ss sp so					
											0.3			
5	SW SP	0-6	A	brown		sil	gran	very fri	ss sp so		many fine			
		6-55	B	red		cl	m sbk	fri	ss sp so					
											0.3			

Property ID# _____ **SOIL/SITE EVALUATION WORKSHEET** Sheet 1 of 2

County _____ Date evaluated _____

Owner/client Green

Proposed facility _____ Design flow _____ Site LTAR int._____ rep._____

Site location _____ Property size _____ Site classification_____

Soil described by _____ Others present _____

Antecedent moisture _____ Weather _____

Water supply: ( ) public ( ) community ( ) on-site well ( ) spring ( ) other Evaluation method: ( ) auger boring ( ) pit ( ) cut

Type of wastewater: ( ) sewage ( ) industrial process ( ) mixed

APPROVED JAN 21 20[illegible]

BA

PROFILE #	LANDSCAPE/SLOPE	DEPTH INCHES	HORIZON	COLOR	MUNSELL	TEXTURE	STRUCTURE	CONSISTENCY MOIST	CONSISTENCY WET	MOTTLES	INCLUSIONS	INCLUSIONS	BOUNDARY	COMMENTS
6a		0-8	A	Br		SCL	G	Vfr	SS SP		Many			
		8-50	B	red		SCL	Mod Sbk	Fi	SS SP		Cf quartz			
													12.3	