Date Received_____ Check#_____
Cash_____

NEWTON COUNTY HEALTH DEPARTMENT
P.O. Box 447
NEOSHO, MO 64850
417-451-6549
417-451-1852 FAX

LPP System Checklist of the permit application for:

Name_____ Address_____

Installer_____ Date Reviewed_____

LPP System Constants for Newton County

1 ½ inch lateral line size Sch. 40
2 inch manifold line size Sch. 40
3 foot pressure head
5/32 hole diameter every 5 foot
5 foot minimum spacing of trenches
ball valves

( ) Owner's name/address/signature
( ) Precise directions to site
( ) Installer's name/signature/phone number
( ) Legal description of property
( ) E911 address of property
( ) Number of bedrooms
( ) Number of persons served
( ) Loan

CHECKLIST

Depth of trench_____ Distance between trenches_____

Slope_____ Elevation of highest point of supply line___

Daily waste flow_____ Pump tank (elevation)_____

Septic tank size_____ Septic tank manufacturer_____

Pumping tank size_____ Brand of **effluent** pump and size_____

Pumping tank manufacturer_____ Brand of filters in pump tank_____

Total lateral line length_____ Number of lateral lines_____

Dosing Volume_____ Total Square feet_____

TDH_____ _____ GPM at _____ ft. of head

Measured length + fittings loss = _____

Pumping uphill or downhill (circle one) Is installer doing electrical connections? Y or N

Curtain drain? Y or N Check valve? Y or N

Completed worksheet? Y or N

_____ Signature of Environmental Public Health Specialist

LPP WORKSHEET

Absorption Area

Step 1 is calculating daily waste flow

_____ Bedrooms at 120 gal/day/bedroom = _____ gal/day

Step 2 Determine loading rate (1st page of site evaluation)

_____ gal/day per sq. ft.

Step 3 Total area needed for absorption area =

_____ gal/day divided _____ (loading rate) = _____ total sq. ft. needed in absorption area
gal/day per sq. ft.

Step 4 Determine total length of lateral lines. Spacing between trenches is 5' minimum to prevent Overloading. Divide total square feet by 5 to get total length of lateral lines.

_____ sq. ft. divided by 5 foot = _____ linear feet of lateral lines

***Remember..... lateral lines <u>can not</u> exceed 70 feet.**

Number of lateral lines _____.

Dosing Rate

<u>Use Constants</u>

5/32" hole diameter
5' hole spacing
3' pressure head

Step 1 Calculate the number of holes

_____ ft. lines divided by 5' spacing = _____ holes per line

_____ holes x _____ lines = _____ total number of holes

Step 2 Flow rate is measured in gallons per minute

Flow rate per hole – Use <u>Table 2</u> for flow rates
<u>At 3' pressure head + 5/32" holes = .50 gallons per minute</u>

.50 GPM x _____ total holes = _____ gallons per minute

Pump Selection

Use Table 3 for pipe friction

Total Dynamic Head (TDH)

Static Head + Operating Head + Friction head = TDH

Static head = vertical distance from pump turn off level to the point of discharge

Operating (pressure) head = 3 ft. (this is a constant)

Friction head = Resistance to flow from fittings (measured length & loss from fittings) Use Table 6

1. Static head_____
2. Operating head 3'
3. Friction head = _____ measured length + _____ loss from fittings.

Divide total from (3) above by 100 (_____ divided by 100 =) _____ per 100'
This gives you feet in 100' increments.

Using Table 3 Multiple your friction head per 100' increments by the figure in table 3 at _____gal/min in 2" pipe.

_____ X _____ = total ft. in friction head _____

Then add your static head _____ + operating head_____ + friction head_____ = TDH

***Make sure you use the right pump curve that goes with your individual pump.**

***Compare the TDH in feet by the total gallons per minute, to get the correct pump size.**

Check valve calculation

Use check valve only when total storage volume of pipe is greater than ¼ of the total daily waste flow.

Volume Storage = Volume of supply line + volume of lateral lines

( ) + ( ) = GPD

_____GPD X .25 = +_____

Dosing Volume

Use Table 4 to find storage capacity

Volume Dose = Volume supply line + 5 (volume lateral lines)

1. Supply line = _____ ft, of 2" pipe

Volume supply = (_____ ft. divided by 100 ft.) X 16.2 gallons (table 4)

= _____ gallons

2. Lateral lines = _____ ft. total of 1 ½ " pipe

Volume laterals = (_____ft. divided by 100 ft.) X _____ gallons (table 4)

= _____ gallons

3. Volume Dosing = Volume of laterals _____ X 5 = _____gallons + Volume of supply _____

Dosing Depth = (volume dosed divided by volume tank) X liquid depth of tank in inches

( ) divided by ( ) X ( )

_____ = inches

The float control switch for the pump should be set for a _____" drawdown to provide automatic doses of _____ gallons.

Table 2

FLOW RATES
(GPM)

Pressure Head		Hole Diameter (inches)			
Ft.	psi	5/32	3/16	7/32	¼
1	0.43	0.29	0.42	0.56	0.74
1.5		0.35			
2	0.87	0.41	0.59	0.80	1.04
2.5		0.45			
3	1.30	0.50	0.72	0.98	1.28
3.5		0.54			
4	1.73	0.58	0.83	1.13	1.48
4.5		0.61			
5	2.16	0.64	0.94	1.26	1.65
5.5		0.66			
6	2.58	0.69	1.04	1.37	1.81

Table 3

Friction loss per 100 feet of plastic pipe

Flow Rate GPM	Pipe size (inches)						
	1"	1 ¼"	1 ½"	2"	2 ½"	3"	4"
2	0.3						
3	0.6						
4	1.0	0.3					
5	1.5	0.4	0.2				
6	2.1	0.6	0.3				
7	2.9	0.8	0.4				
8	3.6	1.0	0.5				
9	4.6	1.2	0.6				
10	5.5	1.5	0.7	0.2			
12		2.1	1.1	0.3			
14		2.7	1.3	0.4			
16		3.5	1.7	0.5	0.2		
18		4.4	2.1	0.6	0.3		
20		5.2	2.5	0.9	0.3		
21				0.975			
25			3.8	1.3	0.5		
30			5.2	1.8	0.6		
35				2.4	0.8		
40				3.1	1.0	0.4	
45				3.8	1.3	0.6	
50				4.7	1.6	0.7	
60					2.2	0.9	0.2
70					2.9	1.2	0.3
80					3.7	1.5	0.4
90					4.6	1.9	0.5
100						2.3	0.6

Table 4

Storage capacity per 100 ft of PVC pipe

Pipe Diameter (inch)	Storage Capacity gal/100 feet	
	60 PSI	**Schedule 40**
1	5.8	4.1
1 ¼	9.0	6.4
1 ½ lateral	12.5	9.2
2 supply	19.4	16.2
3	42.0	36.7

Table 6

Friction losses through plastic fittings in terms of equivalent lengths of plastic pipe

Type Of Fitting	Nominal Size Fitting & Pipe					
	1 ¼"	1 ½"	2"	2 ½"	3"	4"
	Equivalent Length of Pipe – Feet					
90* STD. Elbow	7.0	8.0	9.0	10.0	12.0	14.0
45*Elbow	3.0	3.0	4.0	4.0	6.0	8.0
STD. Tee (Diversion)	7.0	9.0	11.0	14.0	17.0	22.0
Check Valve	11.0	13.0	17.0	21.0	26.0	33.0
Coupling or Quick Disconnect	1.0	1.0	2.0	3.0	4.0	5.0
Ball Valve	0.9	1.1	1.4	1.7	2.0	2.3

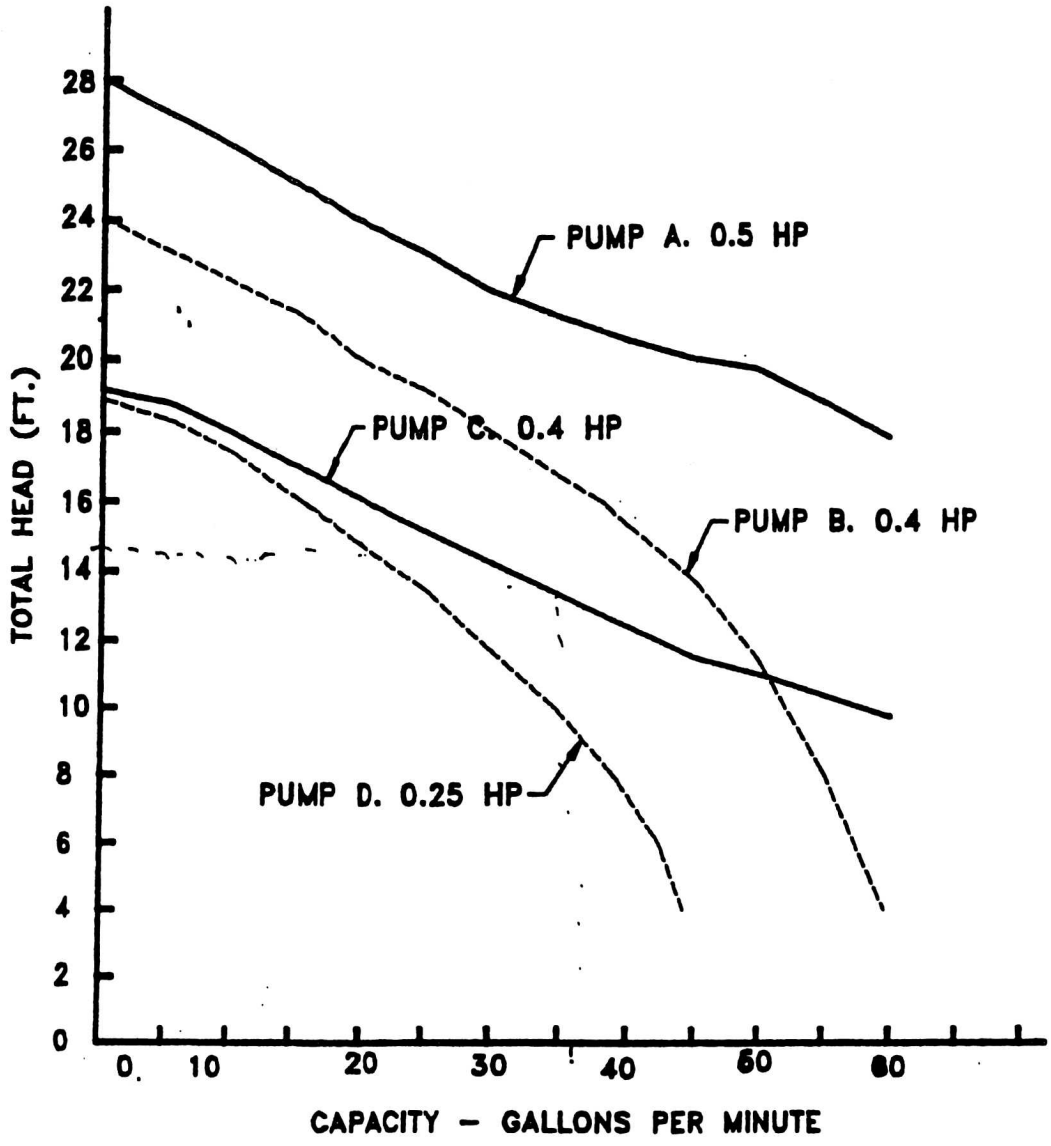

Figure 5. Samples of performance curves (capacity vs total head) for four effluent pumps

Class Example:

Loss from fittings (see Table 6)

3	90° elbows	@	2" = 3 x 9.0 = 27.0
1	coupling	@	2"= 1 x 2.0 = 2.0
1	ball valve	@	2"= 1 x 1.4 = 1.4
5	Std Tees	@	2"= 5 x 11.0 = 55.0
6	90° elbows	@	1 1/2"= 6 x 8.0 = 48.0
6	ball valves	@	1 1/2"= 6 x 1.1 = 6.6

140.0

Dosing Depth=

1000 gal
49 inches = 20.4 gal/inch

(Volume dose)
189.3 gal
2 doses = 94.6-95 gallons for each dose

95 gallons
20.4 gal/in = 4.66-5 inches