

APPENDIX E

Nutrient Management Plan Based on Land Application Area for Compost Toilet Wastewater Irrigation

The purpose of determining the land application area is to ensure minimum movement of nitrogen from the specified area of application to surface and groundwaters where they can potentially have a detrimental effect on water quality. This is to ensure that there is sufficient land area based on the flow to ensure vegetative uptake of the nutrients. By completing this section of the NOI, you are helping to protect local waters and the Chesapeake Bay.

To complete the discharge information in Section III of the NOI, the applicant must determine the area required for Land Application of their compost toilet wastewater using the average gallons discharged per year (based on the sizing of the holding tank) and the average concentration of total nitrogen in the wastewater. Calculate the total nitrogen in lbs/year that will come from the discharge (X) using the model below. Then use the total nitrogen value to calculate the square feet required for the discharge (Z). Include this result in Section III of the NOI.

$$\text{Total N} = \frac{(\text{V}) \text{ gallons}}{\text{Year}} \times \frac{3.785 \text{ liters}}{\text{Gallon}} \times \frac{(\text{W}) \text{ mg}}{\text{liter}} \times \frac{\text{lb}}{453,592 \text{ mg}} \times (1 - 0.15) = (\text{X}) \text{ lbs/year}$$

Using the table on the next page, identify which vegetation will be discharged onto and use the associated Total Crop N Uptake Rate value in the equation below (Y). If you plan to discharge onto vegetation other than those listed in the table, contact the Department for additional Crop N Uptake Rates. With both the total nitrogen in lbs/year calculated in the above equation (X) and the Total Crop N Uptake Rate, the minimum amount of land that could safely absorb this amount of nitrogen each year is:

$$\text{Area Required} = \frac{(\text{X}) \text{ lbs}}{\text{Year}} \times \frac{\text{acre-year}}{(\text{Y}) \text{ lbs}} \times \frac{43,560 \text{ square feet}}{\text{acre}} = (\text{Z}) \text{ square feet}$$

| Crop | Total Crop N Uptake Rate (lb/ac-yr) |
|-------------------|--|
| Barley | 59 |
| Buckwheat | 32 |
| Corn | 208 |
| Oats | 75 |
| Rice | 106 |
| Rye | 50 |
| Sorghum | 121 |
| Wheat | 70 |
| Flax | 78 |
| Oil Palm | 107 |
| Peanuts | 203 |
| Rapeseed | 332 |
| Soybeans | 221 |
| Sunflower | 159 |
| Cotton | 34 |
| Pulpwood | 0.1 |
| Alfalfa | 180 |
| Bahiagrass | 76 |
| Big Bluestem | 59 |
| Birdsfoot Trefoil | 149 |
| Bluegrass-pasted | 116 |
| Bromegrass | 187 |
| Clover-grass | 182 |
| Dallisgrass | 115 |
| Guineagrass | 250 |
| Bermudagrass | 301 |
| Indiangrass | 60 |
| Lespedeza | 140 |
| Little Bluestem | 66 |
| Orchardgrass | 176 |
| Pangolagrass | 260 |
| Paragrass | 172 |
| Red Clover | 100 |
| Reed Canarygrass | 176 |
| Ryegrass | 167 |
| Switchgrass | 69 |
| Tall Fescue | 138 |
| Timothy | 60 |
| Wheatgrass | 28 |