

# VIRGINIA POLLUTION ABATEMENT APPLICATION

## FORM D

### MUNICIPAL EFFLUENT AND BIOSOLIDS

#### PART D-I LAND APPLICATION OF MUNICIPAL EFFLUENT

##### General Information

1. Facility Name. Name given on Form A.
2. Briefly describe the design and provide a line drawing of the wastewater treatment facility which relates the various components of the treatment system including source(s), treatment unit(s) disposal alternatives and flow estimates from the various process units.
3. Briefly describe the disposal of any solid or sludge waste materials.
4. List all industrial contributors to the wastewater treatment facility.
5. Submit a copy of any leasing agreements related to the treatment works and the use or management of the application fields not under direct ownership of the applicant.
6. All Privately Owned Treatment Works (PVOTW) designed to serve 50 or more residences must be registered with the State Corporation Commission (SCC) prior to applying for a permit. Provide a copy of the SCC Certificate of Incorporation (for Virginia based operations) or the Certificate of Authority (for out of state operations) with the application.

##### Design Information

**Note:** This section should be completed for each alternative effluent application system.

##### Waste Characterization

7. Provide the design flow of the wastewater treatment plant.
8. Provide a sewage effluent characterization in accordance with Part D-III of the application. For a proposed facility, estimates based on data obtained from other similar facilities may be used. More than one sample may be required if the effluent may be expected to exhibit diurnal or seasonal variation.
9. Provide calculations describing the nutrient value of the effluent as mg/l nitrogen (PAN), phosphorus ( $P_2O_5$ ), potassium ( $K_2O$ ) and any liming effects which may occur from land application.

##### Storage and Land Application Requirements

10. Provide calculations justifying storage and land area requirements for wastewater application including an annual water balance on a monthly basis incorporating such factors as precipitation, evaporation, evapotranspiration, soil hydraulic conductivity, wastewater loading, dry periods, and monthly storage (input and drawdown). Provide daily, weekly and annual hydraulic loading rates (maximum and average).

All facilities must be designed and operated to prevent any discharge to State waters except in the event of a 25 year, 24 hour or greater storm event. DEQ recommends the storage capacity be sufficient to store the entire daily design flow of the treatment works for the duration of the winter months, when land application may be restricted, with a minimum of 60 days storage capacity where adequate climatological data are not available.

11. Provide calculations justifying the land area requirements for land application of sewage effluent taking into consideration average productivity group, crop(s) to be grown and most limiting factor(s), specifically PAN, metal loadings, and Sodium Adsorption Ratio (SAR) or Exchangeable Sodium, where applicable. Demonstrate the most limiting factor for land application on an annual and site life basis.

### **Site Characterization**

**Note:** A site characterization is required for each land application site on a field by field basis and for each storage facility. Site booklets organized by Operator/Land Owner and County are preferred.

Divide the land application site into individualized units of fields on the basis of agronomic management practices. For example, soils which are similar for productivity or pH adjustment which are adjacent to each other should be grouped as one field if they can be anticipated to receive effluent on similar schedules. Distinctly different soils which may require different agronomic management should be designated separately. For convenience in meeting permit reporting requirements, keep field units small.

12. Provide a general location map which clearly indicates the location of all the land application sites related to this permit application. (See General Instructions for Map Requirements.)
13. Provide a topographic map of sufficient scale (5 foot contour preferred) clearly showing the location of the following features within 0.25 mile of the site. More than one map may be required if the land application site(s) or treatment/storage facilities are not in close proximity. Provide a legend and approximate scale. Clearly mark field and property boundaries. (See Instructions for map requirements.)
  - a. Proposed or existing ground water monitoring wells
  - b. General direction of ground water movement
  - c. Water wells, abandoned or operating
  - d. Surface waters
  - e. Springs
  - f. Public water supply(s)
  - g. Sinkholes
  - h. Underground and/or surface mines
  - i. Mine pool (or other) surface water discharge points
  - j. Mining spoil piles and mine dumps
  - k. Quarry(s)
  - l. Sand and gravel pits
  - m. Gas and oil wells
  - n. Diversion ditch(s)
  - o. Agricultural drainage ditch(s)
  - p. Occupied dwellings, including industrial and commercial establishments
  - q. Landfills or dumps
  - r. Other unlined impoundments
  - s. Septic tanks and drainfields
  - t. Injection wells
  - u. Rock outcrops
14. For each land application site, provide a site plan, preferably topographically based, of sufficient detail to clearly show any landscape features which require buffer zones or may limit land application. Clearly show the field boundaries, property lines, and the location of any subsurface agricultural drainage tile, as appropriate.

Provide a site plan legend which identifies the following landscape features:

- a. Drainage ways
- b. Rock outcrops
- c. Sink holes
- d. Drinking water wells and springs
- e. Monitoring wells
- f. Property lines

- g. Roadways
- h. Occupied dwellings
- i. Slopes (greater than 8% by slope class)
- j. Wet spots
- k. Severe erosion
- l. Frequently flooded soils (SCS designation)
- m. Surface waters

15. Provide a detailed soil survey map, preferably photographically based, with the field boundaries clearly marked. (A USDA-SCS soil survey map should be provided, if available.)

Provide a detailed legend for each soil survey map which uses accepted USDA-SCS descriptions of the typifying pedon for each soil series (soil type). Complex associations may be described as a range of characteristics. Soil descriptions should include the following information:

- a. Soil symbol
- b. Soil series, textural phase and slope class
- c. Depth to seasonal high water table
- d. Depth to bedrock
- e. Estimated productivity group (for the proposed crop rotation).
- f. Estimated infiltration rate (surface soil)
- g. Estimated permeability of most restrictive subsoil layer

16. Representative soil borings and test pits to a depth of five feet or to bedrock if shallower, are to be coordinated for the typifying pedon of each soil series (soil type). Soil descriptions shall include as a minimum the following information:

- a. Soil symbol
- b. Soil series, textural phase and slope class
- c. Depth to seasonal high water table
- d. Depth to bedrock
- e. Estimated productivity group (for the proposed crop rotation).
- f. Estimated infiltration rate (surface soil)
- g. Estimated permeability of most restrictive subsoil layer

17. Collect and analyze soil samples for the following parameters for each field, weighted to best represent each of the soil borings performed for Item 16.

- a. Soil organic matter (%)
- b. Soil pH (std. units)
- c. Cation exchange capacity (meg/100g)
- d. Total nitrogen (ppm)
- e. Organic nitrogen (ppm)
- f. Ammonia nitrogen (ppm)
- g. Nitrate nitrogen (ppm)
- h. Available phosphorus (ppm)
- i. Exchangeable sodium (mg/100g)
- j. Exchangeable calcium (mg/100g)
- k. Copper (ppm)
- l. Nickel (ppm)
- m. Zinc (ppm)
- n. Cadmium (ppm)
- o. Lead (ppm)
- p. Chromium (ppm)
- q. Manganese (ppm)
- r. Particle size analysis or USDA textural estimate (%)
- s. Hydraulic conductivity (in/hr.)

## **Crop and Site Management**

18. Relate the crop nutrient needs to anticipated yields, soil productivity rating and the various fertilizer or nutrient sources from effluent and chemical fertilizers.

If the effluent may be expected to possess unusual properties, provide a description of any plant tissue testing, supplemental fertilization or intensive agronomic management practices which may be necessary.

19. Using a narrative format and referencing any related charts, describe the proposed cropping system. Show how the crop rotation and management will be coordinated with the design of the land application system. Include any supplemental fertilization program, and the coordination of tillage practices, planting and harvesting schedules and timing of land application.