



# City of Gloucester **Board of Health** Regulations

## **Subdivision Water Quality Assessment Regulations**

**Adopted**  
July 20, 1989

**Revised**  
August 3, 2000



**Public Health**  
Prevent. Promote. Protect.

Gloucester Health Department

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## **PURPOSE**

The purpose of the regulations is to protect public health and water quality from sewage derived contaminants. Excess nutrient loadings from lawn fertilizers and road run off contaminants by requiring the following requirements:

1. Demonstrations of the environment's ability to safely accept and disperse wastewater and contaminants.
2. Evaluation of a project's potential impact upon current and/or potential municipal and private drinking water sources and also a project's potential impact upon watercourses.
3. Determination of ambient water quality.

## **DEFINITIONS**

**ACEC**: Shall mean the Area of Critical Environmental Concern as designated by the Secretary of Environmental Affairs under the authorization of MGL C. 21A. Sec. 2(7).

**FORM A OR APPROVAL NOT REQUIRED (ANR)**: Shall pertain to those lots excepted in the provisions of the definition of "Subdivision" contained in the Gloucester Subdivision Law.

**GLOUCESTER SUBDIVISION LAW**: Shall mean the most recent version of the Rules and Regulations Governing the Subdivision of Land in Gloucester, Massachusetts, as adopted by the Gloucester Planning Board under the authority of the Subdivision Control Law. Massachusetts General Law, Chapter 41, Section 81K-81GG, inclusive, as amended.

**HYDRAULIC CONDUCTIVITY**: Shall mean the ration of flow velocity to driving force for viscous flow under saturated conditions of a specified liquid in a porous medium.

**MGL**: Shall mean the Massachusetts General Laws.

**PIEZOMETER**: Shall mean an instrument for measuring pressure head.

**POROSITY**: Shall mean the ration of the aggregate volume of the interstices in a rock or soil to its total volume (usually stated as a percentage).

**SUBDIVISION CONTROL LAW**: Shall mean the Subdivision Control Law as contained in Massachusetts General Law. Chapter 41, Sections 81K – 81GG, inclusive as amended.

**WATERCOURSE**: Shall mean the "watercourse" as defined in Title V of the State Environmental Code, and shall include any bordering vegetated wetland as supported by the water course.

**WATERSHED:** Shall mean a region or area bounded peripherally by a summit or boundary line separating the drainage districts of two streams and draining ultimately to a particular watercourse or body of water.

**WETLAND:** Shall mean any coastal wetland or freshwater wetland as described in MGL Ch. 131, Sec. 40.

## **HEALTH REGULATION 1: PLAN OF LAND DIVISION**

**Applicability:** The following regulation shall apply when any subdivision plan is submitted to the Board of Health pursuant to the Subdivision Control Law, MGL Ch. 41, Sec, 81U.

**OR**

Any plan to create "Form A. Approval Not Required (ANR)" lot is submitted to the Planning Board as per the Gloucester Subdivision Law and is so endorsed by the Planning Board after the effective date of these regulations.

### **EXEMPTIONS**

- A. The regulation shall not apply when the combined sewage flow from the project is less than or equal to 1500 gallons per day. The design sewage flows shall be calculated as per the values set for the in Title V, 310 CMR 15.00, except that each single family residential lot shall be considered as 500 gallons per day for the purpose of this regulation.
- B. The regulations shall not apply when all buildable lots created by the land division are at least 2 acres in size provided that no wetlands are included in the calculation of lot area.

### **REQUIREMENTS**

- A. The Board of Health shall not approve any subdivision plan pursuant to the Subdivision Control Act, MGL Ch. 41, Sec. 81U which has not been accompanied with the following water quality assessment information. The Board of Health shall not approve any subdivision plan pursuant to the Subdivision Control Act, MGL Ch. 41, Sec 81U, which has not met the performance standards of these regulations. The water quality assessment information shall be assembled and presented to the Board of Health and the Planning Board at the same time that the plan of land division is submitted for review by the Planning Board.

- B. The Board of Health shall not approve any application for Disposal Works Construction Permits serving a Form A. ANR (Approval Not Required) lot, and is so endorsed by the Planning Board after the effective date of this regulation, which has not been accompanied with the following water quality assessment information and/or has not met the performance standard of these regulations. The water quality assessment information shall be assembled and presented to the Board of Health and to the Planning Board at the same time that the ANR plan of land division is submitted for review by the Planning Board.

### **C. WATER QUALITY ASSESSMENT**

1. The plan of land division shall provide the proposed locations of septic system leaching facilities on the site, and the locations of existing watercourse, wetlands, and bedrock outcrops on-site and within 500 feet off-site. The plan also shall show any Area of Critical Environmental Concern (ACEC) and proposed or existing well (private or public drinking water supply and/or water quality monitoring wells) located within the boundary of the project or within 500 feet of the project boundaries.
2. The plan shall also describe:
  - a. The proposed and existing watershed drainage boundaries.
  - b. Any watercourses or wetlands receiving surface or subsurface water flow from the project.
3. Monitoring Wells:
  - a. Monitoring wells shall be installed by the applicant so as to provide for ground water flow characterization (flow direction, quantity, and quality) within each water shed drainage containing sewage disposal systems or stormwater discharge points (including detention or retention basins and groundwater recharge facilities). At least one monitoring well shall be place up-gradient and at least two monitoring wells shall be placed down-gradient for the proposed sewage disposal areas or stormwater discharge facilities.
  - b. Monitoring wells shall be constructed in such a manner as to meet or surpass the monitoring well construction standards as required by the Massachusetts Department of Environmental Protection, Division of Water Pollution Control, Groundwater Section.
  - c. All monitoring well locations shall be surveyed in place by the applicant, their elevations established in reference to Mean Sea Level, and their location plotted upon the plan of land division.
4. Groundwater sampling:
  - a. The groundwater samples for water quality characterization shall be obtained and analyzed by personnel from state certified laboratory using EPA approved methods for the following parameters:
    1. Nitrogen (Ammonia)
    2. Nitrogen (Nitrate)
    3. Total Kjeldahl nitrogen
    4. Total coliform bacteria

5. Foaming agents
  6. Sodium
  7. Temperature
  8. pH
  9. Total Phosphate
  10. Specific conductance
  11. Water level with respect to Mean Sea Level
- b. If the project is subject to use for non-residential purposes, then the above list of test parameters shall be expanded to include Volatile Organic Compounds (USEPA Method #524).
5. Sampling Schedule: Sampling for the above parameters will be required for groundwater samples drawn from the monitoring wells at the following stages of the project:
- a. Prior to the start of the project, a minimum of two samples shall be obtained so as to provide baseline data for future comparison. The samples should be taken during conditions of both high groundwater elevation (wet season) and low groundwater elevation (dry season).
  - b. After completion of the road surfaces and drainage systems prior to the acceptance of the project by the City of Gloucester as evidenced by the release of the performance guarantee established by the Gloucester Subdivision Law.
  - c. One year after the sample drawn in stage b above.
6. The cost for any sampling and analysis required by these regulations shall be borne by the project applicant or the applicant's successors.
7. If a monitoring well is to be located upon land that will not be a public way then an easement for right of passage and sampling by representative of the City of Gloucester shall be recorded on the plan. No monitoring well shall be willfully destroyed without prior approval of the Board of Health.

#### D. CALCULATION OF NUTRIENT LOADING

Nitrogen loading will be determined for the following items utilizing the loading rates in Table 1 below.

1. Calculation of nitrogen loading for the proposed division of land alone.
2. Calculation of the existing nitrogen loading within the total watershed area.
3. Calculation of the potential nitrogen loading within the total watershed area based upon existing zoning and subdivision ordinances.
4. Determination of the flushing rate of watercourses receiving the surface or subsurface water from the project.
5. Calculation of the predicted nitrogen concentrations (mass of nitrogen load/volume of the surface water) based upon the loading obtained in 3 above in the watercourse receiving the surface or subsurface water from the project.
6. Calculation of the critical nitrogen loading rate which will result in 0.75 mg/liter total nitrogen concentration in the watercourses receiving the surface or subsurface water from the project.

#### Table 1. LOADING AND RECHARGE FACTORS FOR ANALYTICAL MODEL

(Nelson, M.E., Horsley, S.W., Camareri, T.C., Giggey, M.D. Pinnette, J.R., Predicting Nitrogen Concentration in GROUNDWATER-An Analytical Model, Presented at National Water Well Association Conference, FOCUS on Eastern Ground Water Issues, Stamford, CT. Sept. 27-29, 1988)

Source	Concentration	Loading Rate	Flow/Recharge
Sewage (Res)	33.9 mg N/liter	(5.5 lbs. N/Pers-Yr)	55 gpd
Lawns	17.89 mg N/liter	(3 lbs. N/1000sf-Yr)*	18 in/yr
Pavement Runoff (Recharged to Ground)	1.5 mg N/liter	(0.19 lbs N/curb mi/day)	40 in/yr
Roof Runoff (Recharged to Ground)	0.75 mg N/liter	(0.15 lbs N/1000sf-Yr)	40 in/yr
Natural Land	0.05 mg N/liter	(0.005 lbs N/1000sf-Yr)	18 in/yr

\*Value obtained from Gloucester Subdivision Law Appendix B- Methods and Standards for Determination of Nutrient Loading

## E. ADDITIONAL REQUIREMENTS

For proposed lots which may require sewage disposal systems either:

- a. within 500 feet of a watercourse or wetland  
or
- b. within 500 feet of a drinking well  
or
- c. within 500 feet of a property line of abutting vacant land for which the public water system is not accessible within 1000 feet, then the following will also be required:
  1. The plan of land division shall provide the proposed locations of septic system leaching facilities on the site, and the locations of existing watercourse, wetlands, and bedrock outcrops onsite and within 500 feet offsite. The plan also shall show any Area of Critical Environmental Concern (ACEC) or proposed or existing well (private or public drinking water supply and/or water quality monitoring wells) located within the boundary of the project or within 500 feet of the project boundaries.
  2. A water table map (5 foot contours) showing groundwater flow directions and a bedrock topography map showing elevations (10 foot contours) of bedrock between the proposed septic system locations and wetland areas and/or wells and/or vacant property boundaries for which the public water system is not accessible within 1000 feet.
  3. A hydrogeology cross section map along the predicted groundwater flow line showing bedrock surface, surface geologic deposits, seasonal water table evaluation, and down-gradient wetlands.
  4. Determination of average hydraulic conductivity (K) and porosity (n) of surface deposits located along the hydrogeology cross sections. Hydraulic conductivities may be determined by piezometer tests (slug tests).
  5. The water table gradient (j) along the hydrogeology cross sections as determined by water level measurements and/or bedrock surface gradient.
  6. Calculation of average linear groundwater flow velocity utilizing Darcy's Law:  
$$V = Ki/n$$
where v = average linear velocity  
K = hydraulic conductivity  
i = hydraulic gradient (water table gradient)  
n = porosity
  7. Calculation of the 100 day groundwater travel distance for lots to be served by on site sewage discharges within 500 feet of a watercourse, within 500 feet of a drinking water well or within 500 feet of the property line of abutting vacant land for which the public water system is not accessible within 1000 feet.

## **F. PERFORMANCE STANDARDS**

1. Projected average nitrate/nitrogen concentrations shall not exceed 5 mg/liter in the groundwater underlying the parcel.
2. Projected total nitrogen concentrations shall not exceed 0.75 mg/liter in coastal waters.
3. Untreated road drainage shall not be directly discharged to watercourses or wetland where shellfish may be impacted. Where possible, drainage shall be recharged to the ground on site utilizing vegetated swales or retention basins. The bottom of any retention basin shall be located at least 2 feet above the maximum water table in the site of the basin.

Adjustment for mounding of the groundwater table beneath the basin shall be taken into consideration during design of the recharge system. The maximum depth of a basin shall be no greater than 6 feet in order to maintain an aerobic environment at the sediment water interface and in the upper sediment layer.

## **VARIANCES**

Variances to these local regulations may be granted for seriously aggrieved parties by the Board of Health when in its opinion:

- a. The enforcement thereof would do manifest injustice: and
- b. The applicant has proved that the same degree of environmental protections required under these regulations can be achieved without strict application of the particular provision.

Every request for a variance shall be made in writing and shall state the specific variance sought and the reasons therefore. No variance shall be granted except after the applicant has notified all abutters by certified mail at this own expense at least ten days before the Board of Health meeting at which the variance request will be on the agenda. The notification shall state the specific variance sought and the reasons therefore.



## **GLOUCESTER BOARD OF HEALTH SEPTIC REGULATION 22**

Pursuant to Massachusetts General Laws C. 111 s. 31, the following is hereby adopted:

- A. Maximum Feasible Compliance according to 1995 Title V Regulations for existing dwelling local upgrades where there is not an increase in flow or change of use.
- B. Local Regulations 1,7,19 are exempt from this regulation.
- C. A Board sub-committee, appointed by the Chair, now will review with the staff all upgrade approvals which do not comply with Local Regulations. (Any member of the Board still has the right to review and comment).
- D. Persons aggrieved by this regulation may apply to the Board for a variance.
- E. Local regulations are in effect for properties inside the CBZ (Critical Buffer Zone), as described in the Wastewater Management Plan.