



STATE OF WASHINGTON  
**DEPARTMENT OF HEALTH**  
OFFICE OF SHELLFISH and WATER PROTECTION  
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September 17, 2009

TO: [Project Applicant]  
FROM: Nancy Darling, WDOH  
SUBJECT: Nitrate Balance Requirements

A nitrate balance is required for the [project name] LOSS unless advanced treatment will be used that results in an effluent nitrate concentration of less than 10 mg/L. The nitrate balance is used as a screening tool for evaluating whether the size of the project and/or concentration of the wastewater will have probable impacts on the groundwater or surface water. All nitrate sources on the property should be identified and considered in the nitrate balance if appropriate.

The methodology for doing a nitrate balance is described in Chapter VIII of the Department of Ecology Permit Writer's Manual. The link for this information is <http://www.ecy.wa.gov/pubs/92109.pdf>. *Some of the parameters required by the Department of Health differ from those in Ecology's Permit Writer's Manual.*

The following format and default parameters should be used for the nitrate balance:

1. All calculations must be shown.
2. A link or pdf copy must be included in the N balance for all references.
3. All values for nitrate are nitrate-nitrogen.
4. If the predicted nitrate concentration is less than 5 mg/L before dilution in the aquifer, then no further evaluation is needed.
5. If adequate data is available which shows the aquifer is a confined aquifer, then a qualitative discussion of nitrate fate and transport may be acceptable in place of a nitrate balance.
6. Default values must be used unless site specific data is available.
7. Average daily wastewater flows are 200 gallons per dwelling unit unless site specific county information is provided. Wastewater flows for uses other than residential must be based on actual flows or literature references.
8. Default concentration for nitrate for residential strength effluent is 60 mg/L. Concentrations for other effluent sources (restaurant, RV, etc.) must be documented.

9. Flows and effluent concentrations should reflect an average mass loading of 11 grams nitrogen per day for a full time resident.
10. A credit for denitrification in the soils should be applied to the effluent concentration before it is multiplied by the volume of effluent.
11. The width of the aquifer is the width of the gross area of the drainfield (not the width of the property) perpendicular to the direction of groundwater flow.
12. Recharge values should be based on a documented percentage of precipitation. The recharge area is the drainfield plus any area between the drainfield and the point of compliance in the direction of groundwater flow.
13. Site specific aquifer information should be used where available. A slug test or pump test should be used for determining hydraulic conductivity. If not feasible, other approximation methods may be acceptable including use of the modified nonequilibrium (Jacob) equation (Groundwater and Wells, Driscoll, 1986). Nearby well logs can be used to obtain yield, drawdown, and aquifer thickness. If no information is available for determining hydraulic conductivity, a conservative literature value may be acceptable.
14. A minimum of three well logs are needed for determining hydraulic gradient. If this information is not available, then a conservative value of 1% should be used.
15. Groundwater background nitrate concentrations must be provided and can be obtained by either sampling nearby wells or using water quality information for nearby community wells. Information on nitrate levels in public drinking water wells can be found at <http://www.doh.wa.gov/ehp/dw/sentry.htm>.
16. Two points of compliance in the groundwater should be calculated. The first point of compliance is the downgradient edge of the drainfield. The second point of compliance is the down gradient property boundary, well, or water source (whichever is closest) in the path of the projected plume. If a surface water body is in the path of the plume, then impacts to the surface water should also be evaluated.
17. All wells within ¼ mile of the drainfield should be identified and a discussion of probable impacts on those wells included in the nitrate balance. Well logs for all wells within ¼ mile should be included with the nitrate balance and clearly identified on a topographic map.
18. Other nitrate sources, such as other drainfields or feeding lots within ¼ mile, should also be identified on a topographic map.
19. A 1:7,200 or other suitable scale topographic map showing section, township, and range should be used to show location of the drainfield, location of wells, surface water, other nitrate sources, and direction of groundwater flow.

If you have any questions, please give me a call at 360.236.3040.