

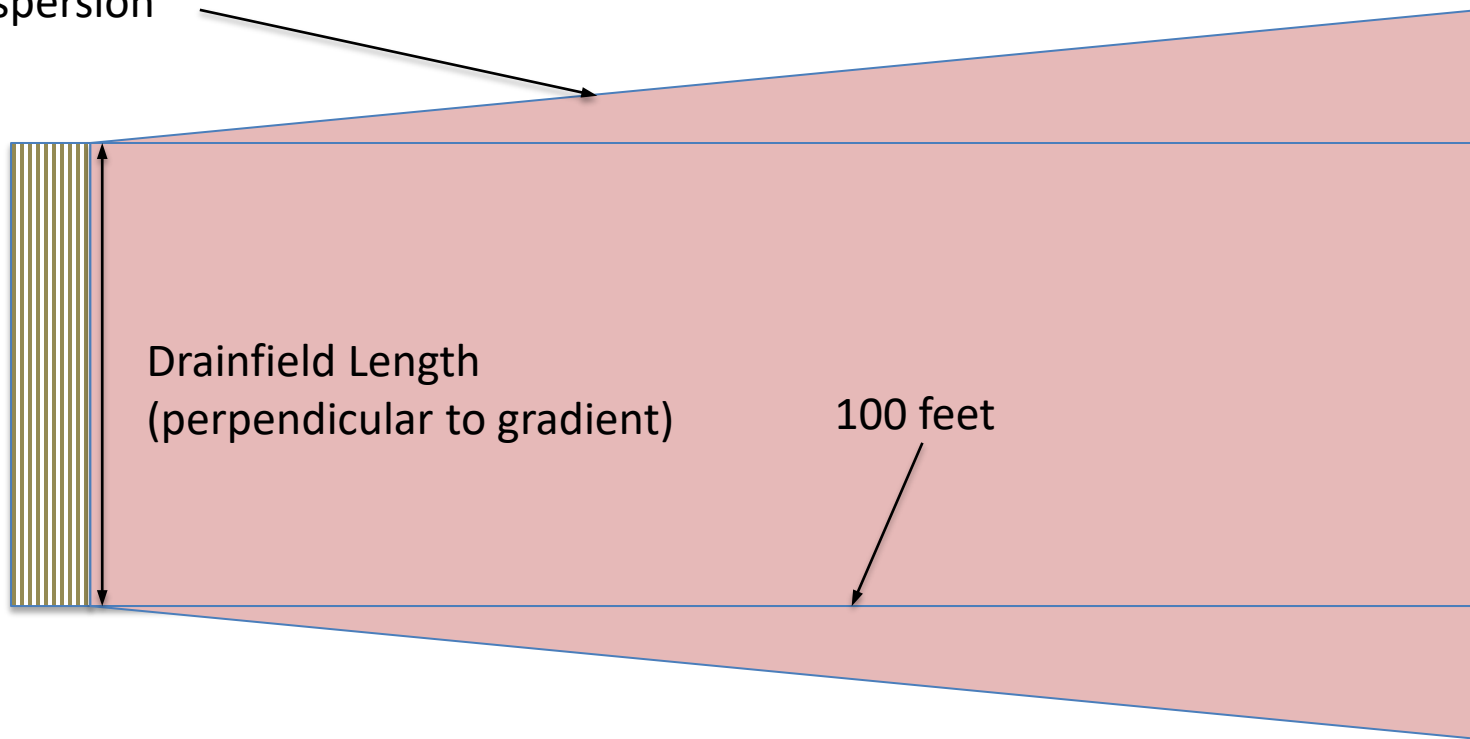
# Groundwater Mixing Zones

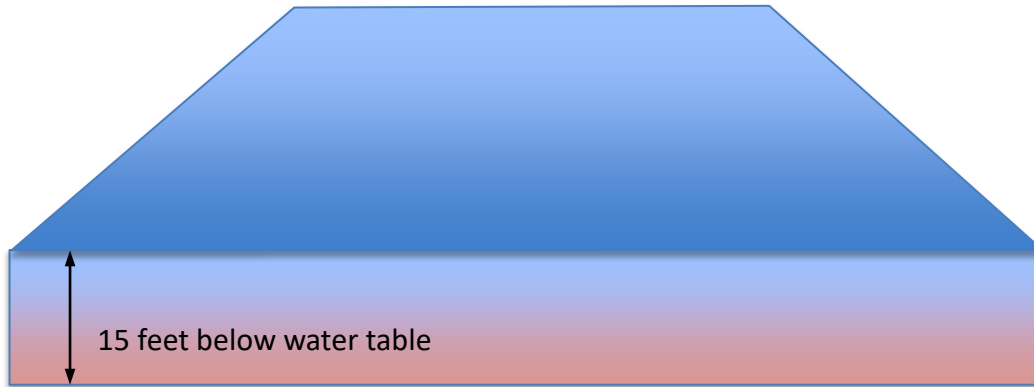
75.5.103(20), MCA "Mixing zone" means an area established in a permit or final decision on nondegradation issued by the department where water quality standards may be exceeded, subject to conditions that are imposed by the department and that are consistent with the rules adopted by the department.

ARM 17.30.518 (1) If adequate information regarding stream flow or ground water flow is not available or if a standard mixing zone is not applicable or desired by the applicant, an applicant may request a source specific mixing zone.

(2) A source specific surface or ground water mixing zone will only be granted after the applicant demonstrates to the department that the requested mixing zone will comply with the requirements of ARM 17.30.506 and 17.30.507 and the provisions of 75-5-303 , MCA.

5° Dispersion





## SSMZ shorter than guideline length

1. The subsurface wastewater treatment system (SWTS) being proposed must be pressure dosed according to applicable Chapters in DEQ 4.
2. Only proximal data applicable to the site will be allowed in determining the Hydraulic Conductivity and Hydraulic Gradient values used on the Nitrate Sensitivity Analysis. Hydraulic conductivity may still be determined from well logs but hydraulic gradient must be triangulated from wells or determined from published hydrogeologic data as specified in this manual. All other requirements of the Nitrate Sensitivity Analysis apply.
3. The ‘depth of aquifer’ or ‘mixing zone thickness’ value for lengths shorter than 100 feet, in the Nitrate Sensitivity Analysis must be adjusted by means of a linear ratio dependent on length of SSMZ being proposed. For example, the standard depth of aquifer for a 100-500 foot mixing zone is 15 feet, a SSMZ length of 50 feet requires an analysis with a depth of aquifer value of 7.5 feet and a requested SSMZ length of 25 feet requires the analysis with a depth of aquifer value of 3.75 feet.
4. Quality of the effluent reaching the infiltrative surface must be of residential strength.
5. An assessment of impacts to down-gradient drinking water supplies, including impacts from pathogens, should show 4-log microbial inactivation or the removal of 99.99% of viruses. 4-log microbial attenuation typically occurs within 200 days.

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## SSMZ for other than length

- Install three on-site monitoring wells to be completed in the shallowest ground water beneath the site.
- The three wells should be used to determine the hydraulic gradient beneath the site. The wells should be surveyed and the static water elevations measured (to the nearest 0.01 foot) on two separate dates at least two weeks apart.
- A long term pumping test (at least 24 hours long, with corresponding recovery data) shall be conducted on one of the three monitoring wells to determine the hydraulic conductivity of the shallow ground water beneath the site (observation wells may be used, and in many cases may provide a higher and more accurate hydraulic conductivity value than the pumping well). The test(s) shall be conducted in accordance with the requirements in section 2.7.1 (Aquifer Pumping Tests).
- Ground water from each well should be collected and analyzed for nitrate (as N) concentration for use in determining the background nitrate concentration.
- Long-term compliance monitoring may be required.
- A contingency plan may be necessary if pollutants migrate beyond the mixing zone at concentrations above the allowed limit.
- A specific explanation as to why the proposed mixing zone is the smallest practicable size and why it will have a minimum practicable effect on water users. The reviewing authority cannot require additional treatment for a SSMZ (pursuant to 75-5-305(1), MCA). However, in some cases (as determined on a site-by-site basis), the reviewing authority may remove some or all of the above requirements if the applicant proposes additional treatment, such as Level 2 treatment for nitrogen.

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