

GUIDANCE DOCUMENT FOR THE PERMIT APPLICATION OF RAPID INFILTRATION BASINS

**Technical Publication
WTS-3**

**Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Technical Services Branch**



Revised 2017

Purpose and Scope of this Document

Rapid Infiltration Basins (RIB) allow land treatment and disposal of treated effluent from a wastewater treatment system. Applied effluent percolates through the soils under the RIB where biological and physical treatment of remaining pollutants can occur. Information from the items listed below shall be present in all applications for a RIB. The Bureau of Water Pollution Control reserves the right to require further site characterization and additional design criteria. As a minimum, an application for RIBs shall include the following:

1. General Information (NAC 445A.232; 445A.233)

- o Appropriate fee
- o Application signed by owner, operator, or designated agent
- o Owner / responsible party information
- o Facility / site location

2. Site Assessment

- o Topographic map with elevation contours at two foot intervals, adjacent water courses, and distances to wells within 1 mile from the proposed RIBs. By regulation, RIBs cannot be closer than 200 feet from a public drinking water well (NAC278.460)
- o Soil classification to a depth of 10 feet below the bottom of the RIBs. Evidence demonstrating that excessive percolate mounding will not occur below the RIB shall be shown.
- o Borehole lithology (physical and chemical characteristics) of the vadose zone to a depth of 150 feet or to the top of the groundwater table. The depth to an impermeable layer below the basin bottom of less than 40 feet will not be allowed for an RIB unless mounding analysis shows this to be acceptable for disposal. (An impermeable layer is defined as strata of 3 inches or greater thickness with a minimum permeability of 0.014 in/hr (1.0×10^{-5} cm/sec).
- o A summary of the existing groundwater quality, flow gradients, and flux.
- o Infiltration and permeability tests results. The soils shall be tested at (1) the bottom of the RIB, and (2) five feet below the bottom of the basin. If geologic soils data shows discontinuous layering, then tests shall be performed at multiple sites. The tests shall be conducted in-situ or on 'undisturbed' samples. A flooding basin test or approved equal shall be used for the surface bottom test. At a minimum, the basin bottom permeability to a depth of 12 inches cannot be less than 2.0 in/hr (1.4 cm/sec).

3. Engineering Design Report (prepared and stamped by a licensed Nevada Professional Engineer)

- o Design criteria and calculations of hydraulic loading rates and required basin area.
- o The RIB systems should have a minimum of two (2) basins.
- o Infiltration mound modeling (if applicable).
- o Design plans drawn to scale; (includes a Site Plan, Grading Plan, Utility Plan, and Details).
- o Construction and Material Specifications.
- o Description of the proposed wastewater treatment system referencing the plans and specifications.
- o Stormwater control design and calculations.

4. Operational Design Plans

- o A draft Operations and Maintenance manual, written for the operator that covers, at a minimum, proper application of wet/dry cycling, groundwater monitoring, winter operation measures, and scarification.
- o The dose/drying cycle time required for RIB recovery and the wet/dry cycle ratio.
- o Documentation of degree of treatment if the RIB is used as a process component for treatment.
- o Groundwater monitoring well locations and depths. One up-gradient and two down-gradient wells from the RIBs. The down-gradient monitoring wells shall be located in the most probable pathway of the plume and no further than 250 feet from the RIBs.
- o Fencing and posting of signs. If the RIBs are used for wastewater disposal, a sign is required every 500 feet at minimum. If the length of the fence is less than 500 feet, then a sign is required on each outside corner of the fence.

See WTS 3A Guidance Document for the Design of Rapid Infiltration Basins for design recommendations.

References:

EPA. Process Design Manual for Land Treatment of Municipal Wastewater Supplement on Rapid Infiltration and Overland Flow. EPA 625/1-81-013a. 1984.

USEPA, "Supplement on Rapid Infiltration and Overland Flow",

The completed package must be sent to:

**Nevada Division of Environmental Protection
Attn: Bureau of Water Pollution Control
901 S. Stewart Street, Suite 4001
Carson City, NV 89701**