

Design Choices for Effective Infiltration Practices



Infiltration Performance

After two decades, only a few studies on topic. It should be good, but take these with grain of salt:

Sediment and bacteria (90%)

Phosphorus (65%)

Nitrogen (35 to 50%)

Metals (Zn, Cu, Pb) (65% or more)

Great for Temperature and runoff reduction



* Limited or zero removal of soluble metals & chlorides

Infiltration Design Guidelines

Level 1 Design (RR:50; TP:25; TN:15)	Level 2 Design (RR:90; TP:25; TN:15)
TV= (R_v)(A)	TV= 1.1(R_v)(A)
Maximum CDA of one acre	Max CDA of 0.5 acre, nearly 100% IC
At least one form of pretreatment	At least two forms of pretreatment
Soil infiltration rate of 0.5 to 1.0 in/hr	Soil infiltration rates of 1.0 to 4.0 in/hr
Underdrain needed due to soils	No underdrain utilized
All Designs: no hotspot runoff	

Infiltration Design Choices: Small Scale or Large Scale



Put a Max Limit on CDA or Require 100% IC in CDA?

Infiltration Design Choices: Minimum Design Infiltration Rate

Minimum of 0.5 inches/hr
measured on-site

The real infiltration rate is what
the practice actually does
several years after
construction – research
indicates it should be reduced
in half

Trees and shrubs promote
infiltration through macro-
pores

Try not to force a lot of
infiltration depth over a small
surface area



Infiltration Design Choices: Single versus Combo Systems

For larger system, a combo of filtration or bioretention prior to infiltration provides greater:

- Groundwater protection
- Pollutant treatment
- System reliability
- Pretreatment



Can be in bottom of a quantity pond

Infiltration Design Choices: Degrees of Pretreatment

- Try to have a least two levels of pretreatment to keep sediment out
- Keep contributing drainage area as close as 100% IC as possible
- Factor in road sanding loads



Design Choices for Infiltration: Underground Injection Permit?

- These pesky permits are needed when discharging into a sinkhole or when the depth of infiltration is larger than the maximum surface distance



Design Choices for Infiltration: Exfiltration Interface

- Lose the bottom liner—
bottom sand filter
instead



Infiltration Design Choices: Snowmelt and Sediment Management

- Understand how winter operations will impact the infiltration area



Infiltration Design Choices

Hotspot Runoff

Soluble pollutants will not be treated by infiltration practices and will enter groundwater

So will spills and leaks

Preventative approach:

Restrict infiltration near groundwater supply areas (wells) and restrict infiltration at hotspot land uses





Hotspot List

Need to define a local list of operations, activities and land uses that are considered a hotspot risk and where infiltration without treatment is prohibited

Infiltration Design Choices: Construction Sequence

- Even stricter than bioretention
- Reserve infiltration areas inside limits of disturbance
- Use silt fence to prevent any clearing or access by construction equipment
- Wait until rest of site is fully stabilized

