

# NEWSC Filtration Workshop

## Site Considerations and Systems Design





# Overview

- Reasons to consider filtration and infiltration
- Infiltration vs. Filtration
- Single vs. Dispersed Systems
- Location considerations
- Size/shape considerations
- Media and Vegetation



# Practice Selection

Factors that may drive choice of infiltration or filtration devices:

- Infiltration performance standard
- No surface drainage to discharge to
- Owner does not want pond
- Small site-small pond can be aesthetics issue
- Airport Overlay districts



# Airport Overlay Districts

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U.S. Department  
of Transportation

**Federal Aviation  
Administration**

## **Advisory Circular**

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**Subject: HAZARDOUS WILDLIFE  
ATTRACTANTS ON OR NEAR  
AIRPORTS**

**Date:** 8/28/2007

**AC No:** 150/5200-33B

**Initiated by:** AAS-300    **Change:**

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**1. PURPOSE.** This Advisory Circular (AC) provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. It also discusses airport development projects (including airport construction, expansion, and renovation) affecting aircraft movement near hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

**2. APPLICABILITY.** The Federal Aviation Administration (FAA) recommends that public-use airport operators implement the standards and practices contained in this AC. The holders of Airport Operating Certificates issued under Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart D (Part 139), may use the standards, practices, and recommendations contained in this AC to comply with the wildlife hazard management requirements of Part 139. Airports that have received Federal grant-in-aid assistance must use these standards. The FAA also recommends the guidance in this AC for land-use planners, operators of non-certificated airports, and developers of projects, facilities, and activities on or near airports.

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# Infiltration vs. Filtration

- Cross-sectional differences
- Source area factors
- Site condition factors



# Infiltration Only

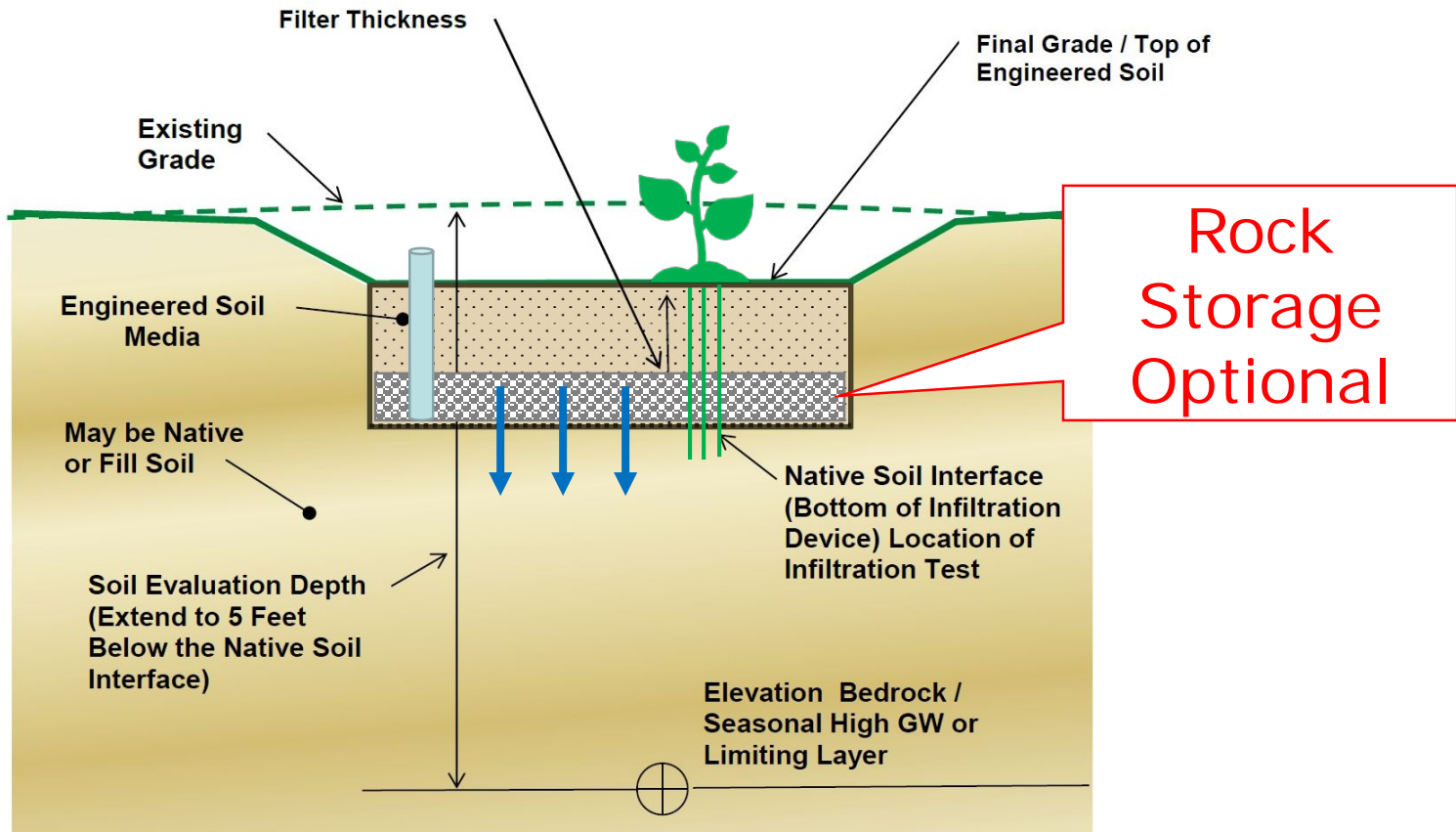
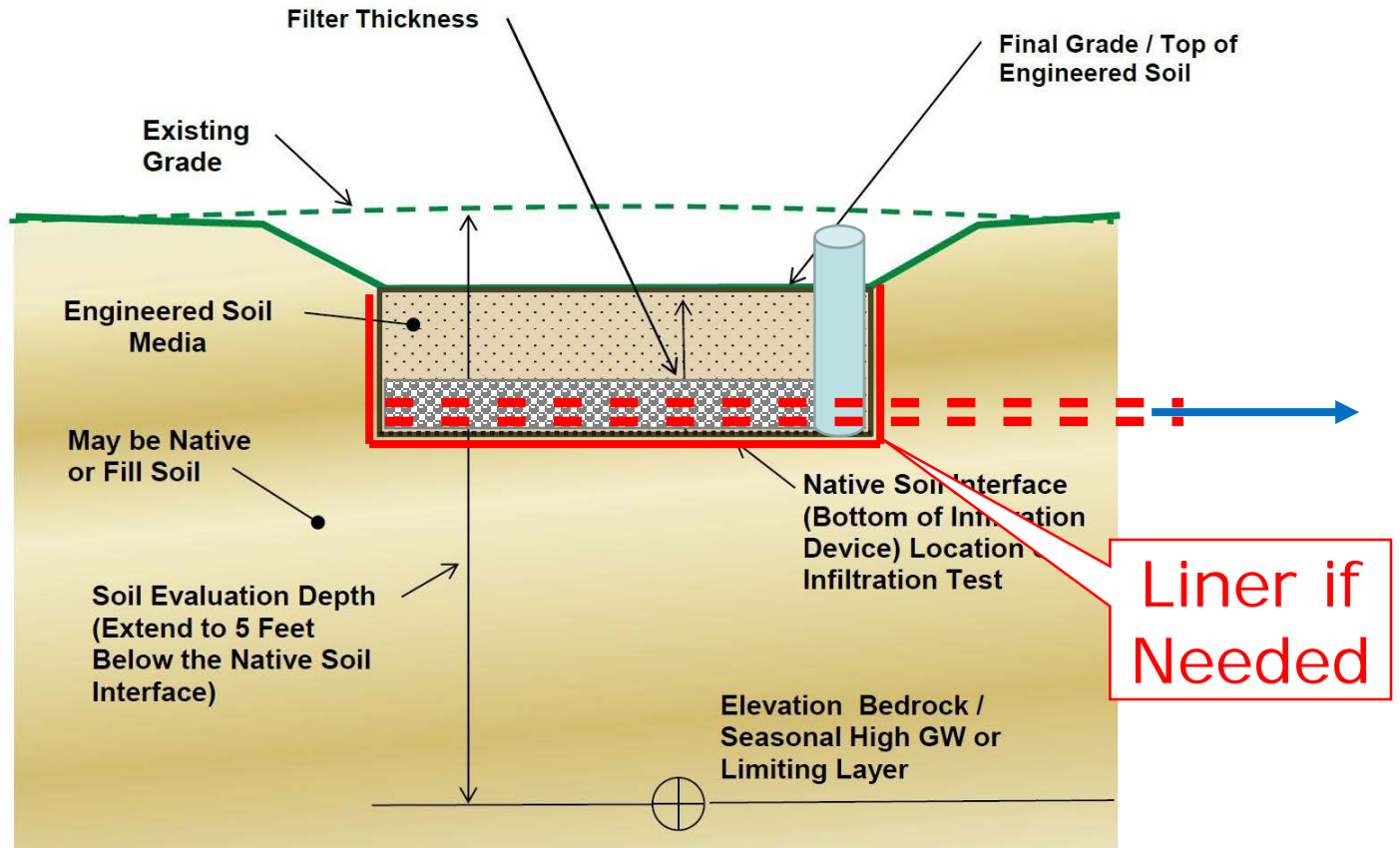


FIGURE 2 - EXAMPLE BIORETENTION BASIN SECTION

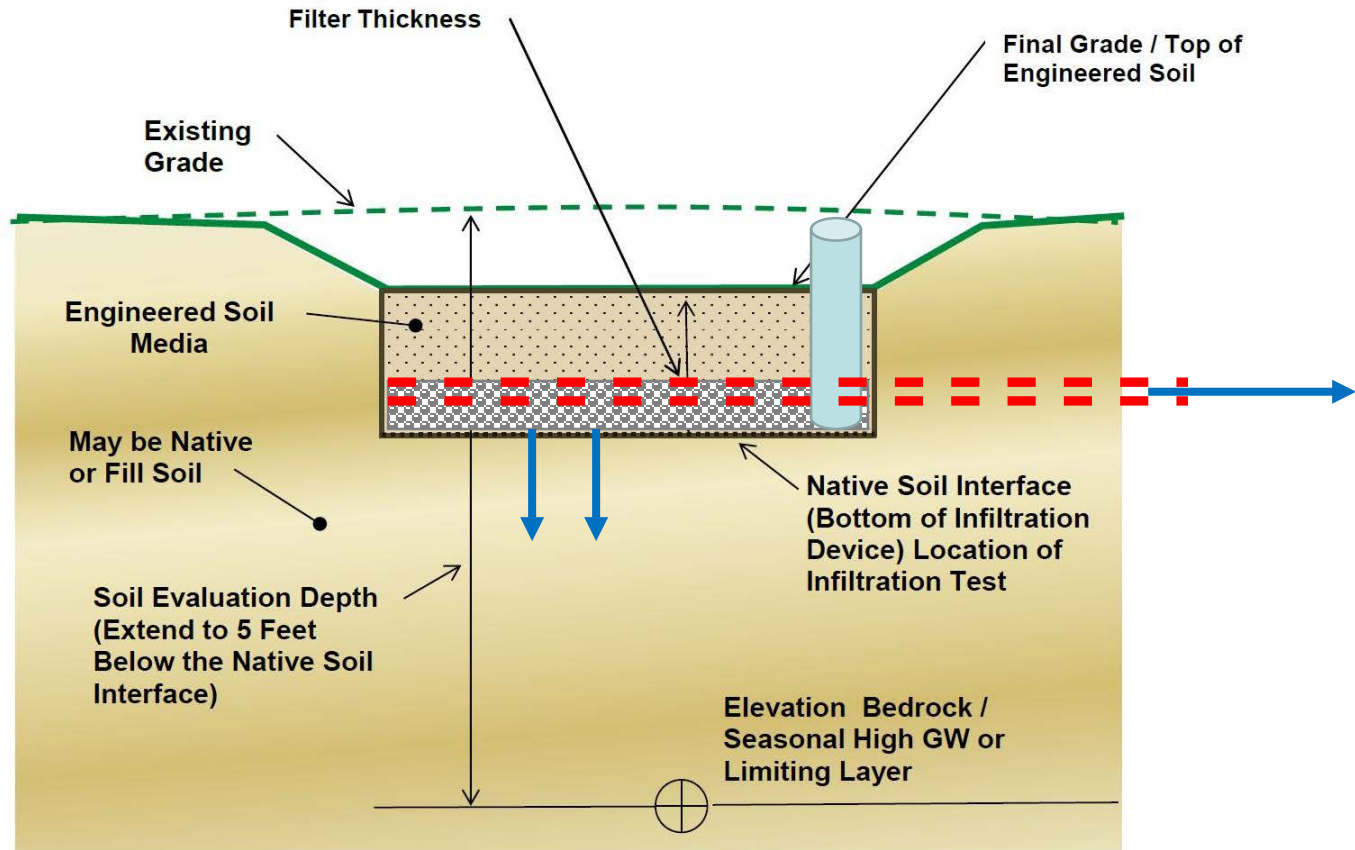
Not to Scale



# Filtration Only



# Infiltration and Filtration



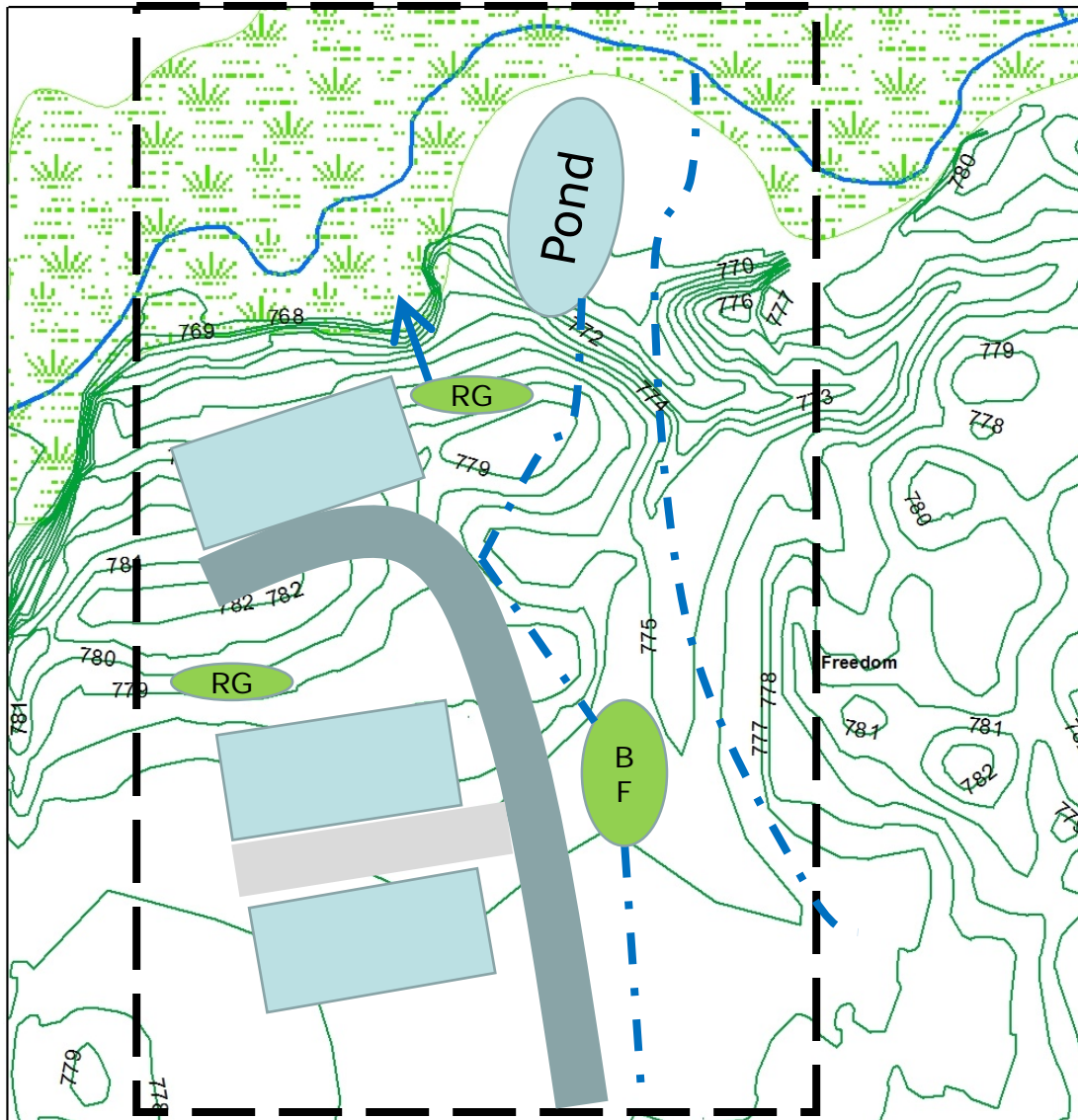




# Mini-Filter

- Plastic Container
- Straw
- Small pill bottle
- Stones
- Stone chips
- Sand

# Dispersed Infiltration



Ideas:

- Shallow Rain Gardens for Roofs
- Swales
- Biofilters
- Permeable Pavement



# Prohibited Source Areas

- Tier 1 Industrial Facilities (roof okay with concurrence)
  - Tier 2 Industrial Storage and Loading Areas
  - Fueling & Vehicle Maintenance Areas
- Consider Filtration-only practice with liner
  - Per NR 151.124(6) may infiltrate if NR 140 met



# Site Conditions

- Brownfield Sites
  - Consult Remediation and Redevelopment Staff
  - Case-by-case determination based on site conditions and nature of contamination
- Shallow Bedrock
- Shallow Seasonally High Ground Water



# Infiltration Separation

Source Area	Separation Distance	Soil Characteristics
Roofs Draining to Surface Infiltration Practices	<i>Not Applicable</i>	
Roofs Draining to Subsurface Infiltration Practices	1 foot or more	Native or Engineered Soil with Particles Finer than Coarse Sand
Residential Arterial Roads	5 feet or more	Filtering Layer
Industrial, Commercial, Institutional Parking Lots and Roads	5 feet or more	Filtering Layer
All Other Impervious Source Areas	3 feet or more	Filtering Layer

*Intended to protect ground water quality*



# Location Considerations

- Private and municipal well setbacks
- Well protection areas
- Proximity of steep slopes
- Separation from foundations

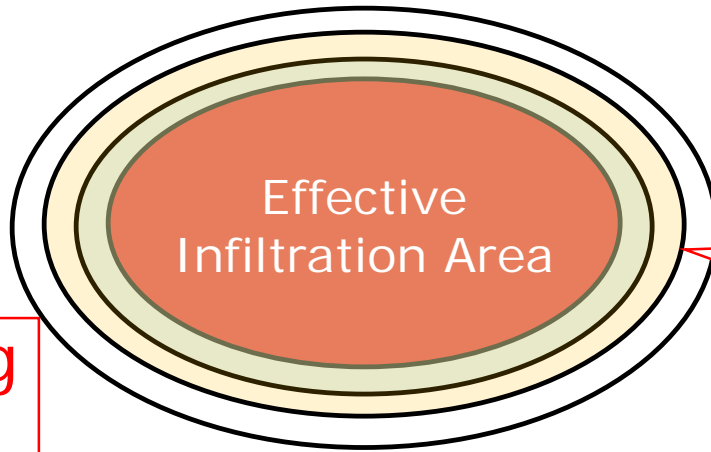




# Dimensional Considerations

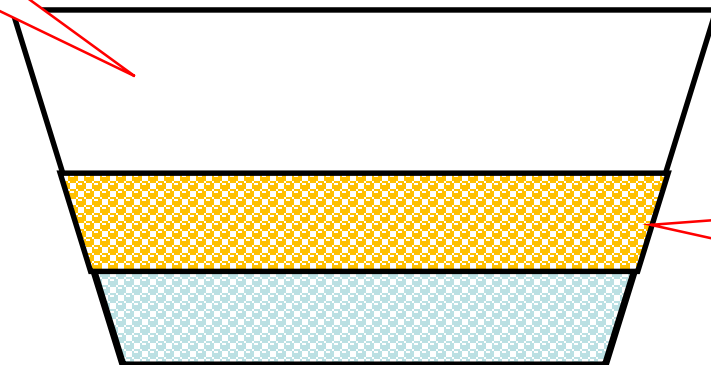
- Injection Wells (dug hole deeper than its widest cross sectional dimension) require additional permitting
- Ponding limitations for vegetation survival

# Effective Infiltration Area



Model surface as 'Water Body' to avoid double counting infiltration

Ponding area



Side infiltration minimal due to smearing during construction

Effective Infiltration area



# Engineered Soil Mix

<b>Sand/Compost Mix</b>	<b>Sand Only</b>	<b>Proprietary Mixes</b>
TSS Control Only (compost leaches P) for underdrain discharge	TSS and TP control for underdrain discharge	Technical standard under development
Compost allows greater variety of plants	Select Prairie Plants only	
Limit ponding due to compaction	Compaction of Engineered soil not as much of a concern	



# Vegetation

<b>Prairie Plants</b>	<b>Turf Grass</b>	<b>Other</b>
Native Deep-Rooted Plants	Shallow-rooted turf	Mulch, stone, etc
Evapotranspiration	Lower Evapotranspiration	No Evapotranspiration
Maintain or improve infiltration rates over time	Lower infiltration rates over time, minimal surface infiltration for sod grown in muck	More likely to clog over time
Preferred-especially for infiltration practices	Allowable with more frequent maintenance	Not preferred, allowed with more frequent maintenance

# Routing Water

