STP Land Application Site Suitability and Selection Considerations in Montana

What do I look for besides a willing landowner?
So you want to land apply septage, eh?

Courtesy: Michigan DEQ – Water Bureau, Septage Program
Are you sure?

Courtesy: Michigan DEQ – Water Bureau, Septage Program
If so, first we’ll learn how to select a site
Site Suitability and Selection Considerations

- Seasonal High and Regional Depth to Ground Water
- Topography – maximum slope exceedances
- Soils and Geology
- Distance to Surface Water – includes intermittent
- Site Setbacks and Restrictions
- Crop Nitrogen Requirement and AAR
Site Suitability and Selection Considerations

Seasonal High and Regional Depth to Groundwater

Considerations for initial site screening:

• Depth to groundwater – including historical highs and lows
• Estimate of groundwater flow patterns
• Groundwater vulnerability
Site Suitability and Selection Considerations

Seasonal High and Regional Depth to Groundwater

- Rules require minimum 6 ft to groundwater

- Source of groundwater information:
  - On-site wells
  - GWIC website - http://mbmggwic.mtech.edu/
  - County Extension Office - NRCS
  - County Health Department
Site Suitability and Selection Considerations

Topography – Slope Considerations

Rapid runoff can transport pumpings to drainages

Slope limits to avoid runoff and ponding:

- Summer – no greater than 6%
- Winter – no greater than 3%
Site Suitability and Selection Considerations

Soils and Geology

Soil texture and parent geologic material are two of the most important aspects of site selection. Both influence permeability, infiltration, and drainage properties.

Moderately-drained soil

- e.g., Loam or silt loam

Thick soil profile

Source of soils information → NRCS Soil Survey
Sewage Disposal

Yellowstone County, Montana

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

<table>
<thead>
<tr>
<th>Map symbol and soil name</th>
<th>Pct. of map unit</th>
<th>Septic tank absorption fields</th>
<th>Sewage lagoons</th>
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### Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge

Yellowstone County, Montana

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Based on the Yellowstone County site information, would the site be suitable for land application of septage?

Why?
Site Suitability and Selection Considerations

Surface Water - Drainages

Location of all drainages in relation to land application area – including intermittent drainages, wetlands, and drainage swales

Setbacks must be maintained

ARM 17.50.809 states:

“A person may not apply pumpings to land within 150-feet of any state surface water, including ephemeral or intermittent drainages and wetlands. The department or local health officer or the health officer’s designated representative may require greater distances where slopes or other factors may increase the likelihood of runoff from the land application area.”
Site Suitability and Selection Considerations

Site Setbacks and Restrictions

Additional setback requirements:

- 500-feet from any occupied or inhabitable building
- 100-feet from any State, Federal, or County maintained road
- 100-feet from any drinking water supply source
Site Suitability and Selection Considerations

Given the siting and setback requirements, you need to ask yourself if there remains enough acreage to land apply...........

If so, let’s see how we determine how much you can apply
Agronomic Application Rate

It is the septage application rate that:

- provides the amount of nitrogen needed by the food crop, feed crop, cover crop, or vegetation grown on the land

- minimizes the amount of nitrogen in the septage that passes below the root zone of the crop or vegetation grown on the land and into the groundwater.
Site Suitability and Selection Considerations

AAR Calculation

Nitrogen requirement needed

There are a few basic things you need to know before you determine nitrogen requirement:

Identify Crop Type

Determine Crop Yield

Determine Nitrogen Requirement
Site Suitability and Selection Considerations

AAR Calculation

Sources of information on crop nitrogen requirements:

Seed Supplier

Soil Sample

“Fertilizer Guidelines for Montana Crops” – MSU Extension Service Publication #EB161
Site Suitability and Selection Considerations

AAR Calculation:

\[
AAR \text{ (septage)} = \frac{\text{crop N reqm’t.}}{0.0026}
\]

\[
AAR \text{ (porta-potty waste)} = \frac{\text{crop N reqm’t.}}{0.0052}
\]
AAR Calculation: Example #1

AAR (septage) = crop N \div 0.0026

Crop: Winter Wheat @ 50 bu/acre

N requirement: 130#/acre

AAR = 130/0.0026

AAR = 50,000 gallons/acre
Site Suitability and Selection Considerations

AAR Calculation: Example #2

AAR (septage) = crop N ÷ 0.0026

Crop: Alfalfa (1st planting) @ 3 tpa

N requirement: 20#/acre

AAR = 20/0.0026

AAR = 7,692 gal/acre
AAR Calculation: Example #3

AAR (ppw) = crop N ÷ 0.0052

Crop: Pasture Grass @ 2 tpa

N requirement: 50#/acre

AAR = 50/0.0052

AAR = 9,615 gallons/acre
Site Suitability and Selection Considerations

Now that you’ve selected a suitable site, what’s next?

Landowner approval required and must include certification that they are aware that:

- Use of the site is restricted
- Land application rate limited by AAR
- VAPR must be followed
- Landowner required to allow inspections
Site Suitability and Selection Considerations

Now that you’ve selected a suitable site, what’s next?

County Health Officer/Sanitarian provides final site approval

- Typically includes site visit
- May charge a fee for County site assessment

Counties may impose additional restrictions and requirements based on ordinances

State prepares checklist EA based on information provided
Site may NOT be used until checklist EA completed and published and licensee has been notified by State that the site has been approved and added to license file.