

# Sand Treatment Mound Design – Worksheet (page 1 of 7)

## Treatment Mound: Area Sizing

This form is to be completed and submitted with the OWMS application to register

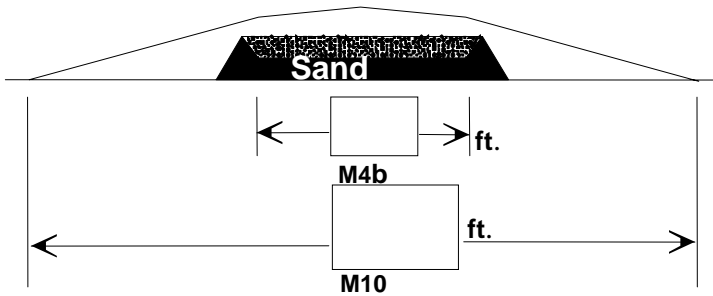
**This worksheet is for use in Manitoba to:** size the sand layer, mound base area, and berm dimensions as required in the construction of a treatment mound. **It can be used for:** design of a treatment mound.

Use only Imperial units of measurement throughout (feet, inches, Imperial gallons, etc.)

Use the following Worksheet to determine the minimum required dimensions for a treatment mound and fill in the blanks on the appropriate diagram below for a level site or a sloping site of over 1%.

## Treatment Mound Dimensions

### Level Site



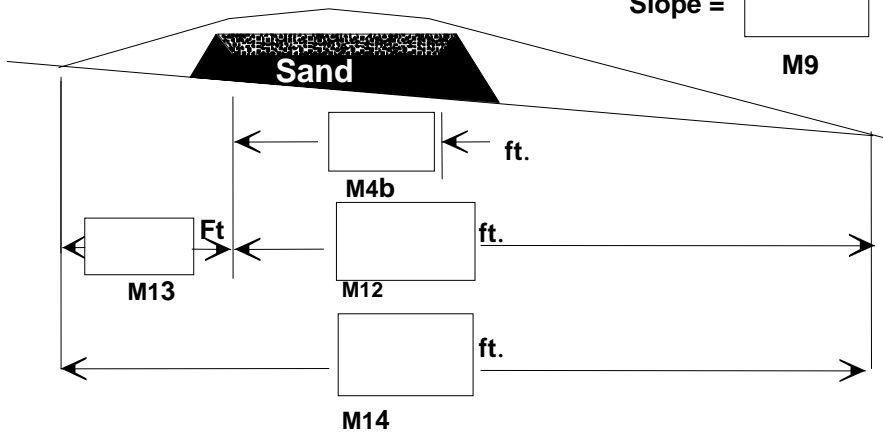
Sand Layer Length (ft.)

Overall Length of Mound (ft.)

### Sloping Site

Slope =

M9



# Sand Treatment Mound Design – Worksheet (page 2 of 7)

## Treatment Mound: Area Sizing

The completed installation is to comply with MR 83/2003

### STEP 1: Determine the expected volume of sewage per day:

*Note: Use Manitoba Minimum Expected Volume of Sewage Per Day as a guide to determine expected volume of sewage per day. Provide allowance for additional load factors.*

*Assure that the sewage strength does not exceed the requirements of Residential Strength Sewage.*

**Expected Volume of Sewage per Day**

 gal/day.

**M1**

### STEP 2: Calculate the treatment area of the sand layer:

**Expected Volume of Sewage per Day**

 gal/day.

*From M1 this worksheet*

÷

**Sand Layer Effluent Loading Rate**

1 gal/sq. ft. per day

=

**Treatment Area Required for Sand Layer**

 sq. ft.

**M2**

### STEP 3: Determine the minimum allowable sand layer area:

**Minimum Sand Layer Area**

 400 sq. ft.

or

**Area of Sand Layer for Treatment**

 sq. ft.

*From M1 this worksheet*

**Area of Sand Layer**

 sq. ft.

**M3**

*The minimum area of the sand layer is 400 sq. ft.*

*The greater of 400 or M2*

### STEP 4: Calculate the length of the sand layer:

**Area of Sand Layer**

 sq. ft.

**M4a**  
*From M3 this worksheet*

÷

**Width of Sand Layer**

 ft.

**M4b**

*Select a width to a maximum of 10 ft.*

=

**Length of Sand Layer**

 ft.

**M4**

*Note: The width of the sand layer will influence the total width of the treatment mound and the amount of fill material required. The lowest cost configuration is often to make the sand layer as wide as allowed, however, on sloping sites, a narrower and longer sand layer design can reduce the amount of fill required.*

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## Treatment Mound: Area Sizing

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### STEP 5: Determine the (design) soil effluent loading rate:

Note: Effluent loading rate can be determined from soil texture classification **or** from percolation test results.

Attachment 1 provides the effluent loading rates for various soil classifications between 5 and 120 minute per inch perc rates.

**Soil Effluent Loading Rate**

gal/sq. ft. per day.

**M5**

### STEP 6: Calculate the preliminary infiltration area of the soil BEFORE area reduction factors:

**Expected Volume of Sewage per Day**

gal/day.

÷

**Soil Effluent Loading Rate**

gal/sq. ft. per day.

=

**Primary Infiltration Area**

sq. ft.

**M6**

*From M1 this worksheet*

*From M5 this worksheet*

*(Required for Soil. Before Reduction Factors.)*

### STEP 7: Calculate the required infiltration area INCLUDING allowed area reduction factors:

**Infiltration Area Required for Soil**

sq. ft.

**X**

**Reduced Area Factor**

**0.75**

=

**Required Infiltration Area**

sq. ft.

**M7**

*(Before Reduction Factors.) From M6 this worksheet*

*A reduction of up to 25% (1-0.75) can be applied to treatment Mounds.*

*(Including Reduction Factors.)*

# SDS Design – Worksheet “M” v1.3 (page 4 of 7)

## Treatment Mound: Area Sizing

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**STEP 8: Calculate the required width of the infiltration area:**

<b>Required Infiltration Area</b>		<b>Length of Sand Layer</b>		<b>Width of Required Infiltration Area</b>	
sq. ft.	÷	ft.	=	ft.	<b>M8</b>
(Including Reduction Factors.) From <b>M7</b> this worksheet		From <b>M4</b> this worksheet			

**STEP 9: Determine the slope criteria of the installation:**

If the slope of the installation site exceeds 1%, proceed to Step 12.  
If the slope is 1% or less, proceed to Step 10.

<b>Slope of Installation Site</b>	
%	<b>M9</b>

Note: The following calculations apply ONLY to the minimum height configuration of a mound unless a value is entered above. If it is necessary to raise the sand layer, (for example to provide clearance to the water table) the following calculations are NOT adequate for the design.

For slopes of 1% or less, use **STEPS 10 - 11**

**STEP 10: Calculate the required infiltration area INCLUDING allowed area reduction factors:**

<b>Toe to Toe Width Based on 4:1 Slope Requirement</b>		<b>Width of Required Infiltration Area within Berms</b>		<b>Required Infiltration Area</b>	
ft.	or	ft.	=	ft.	<b>M10</b>
<b>M10a</b> 4:1 Slope Requirement Refer to Berm Dimensions Diagram this worksheet, or determine by calculation		<b>M10b</b> From <b>M8</b> this worksheet		The greater of <b>M10a</b> or <b>M10b</b>	

**STEP 11: Proceed to STEP 16:**

**STEPS 12-15** are used only for installations where the slope exceeds 1%

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## Treatment Mound: Area Sizing

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For slopes exceeding 1%, use **STEPS 12 - 15**

**STEP 12: Calculate the required width of the infiltration area:**

The width of the mound is based on the **greater of**:

- the width as determined by the 4:1 slope requirement, or
- the width required to provide adequate infiltration area.

**Downslope Berm Width Based On 4:1 Slope Requirement Plus Width of Sand Layer**

Downslope Berm Width at 4:1  
ft.

**M12a**

*Refer to Berm Dimensions Diagram this worksheet*

+

Sand Width Layer  
ft.

**M12b**

*From M4b this worksheet*

ft.

**M12c**

*4:1 Slope Requirement*

OR

ft.

**M12d**

*From M8 this worksheet*

=

ft.

**M12**

*The greater of M12c or M12d*

**STEP 13: Determine the width of the upslope berm:**

**Width based on 4:1 Slope Requirement**

*Refer to Berm Dimensions Diagram this worksheet, or determine by calculation.*

**Width of Upslope Berm**

ft.

**M13**

**STEP 14: Calculate the required infiltration area INCLUDING allowed area reduction factors:**

**Width of Sand Layer and Downslope Berm**

ft.

*From M12 this worksheet*

+

**Width of Upslope Berm**

ft.

*From M13 this worksheet*

=

**Toe to Toe Width of Mound**

ft.

**M14**

**STEP 15: Proceed to STEP 16:**

# Sand Treatment Mound Design – Worksheet (page 6 of 7)

## Treatment Mound: Area Sizing

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**STEP 16: Summarize the information:**

<b>Width of Sand Layer</b>	(from <b>M4b</b> this worksheet)	<input type="text"/>	ft.
<b>Length of Sand Layer</b>	(from <b>M4</b> this worksheet)	<input type="text"/>	ft.
<b>Slope of Installation Site</b>	(from <b>M9</b> this worksheet)	<input type="text"/>	%
<b>Toe to Toe Width of Mound</b>	(from <b>M10</b> or <b>M14</b> this worksheet)	<input type="text"/>	ft.

**STEP 17: Proceed to STEP 16:**

*Fill in the appropriate diagram on the first page with the numbers calculated in this worksheet.*

**STEP 18: Proceed to STEP 16:**

*This worksheet does NOT consider all the requirements of the Mandatory Standard.  
Please work safely and follow safe practices near trenches and open excavations.*

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## Treatment Mound: Area Sizing

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