

# PSDS Design - Worksheet "M" v1.3

## Treatment Mound: Area Sizing

The completed system is to comply with the Alberta Private Sewage Systems Standard of Practice 1999.

### Treatment Mound: Area Sizing

**This worksheet is for use in Alberta to:** size the sand layer, mound base area, and berm dimensions as required in the construction of a treatment mound.

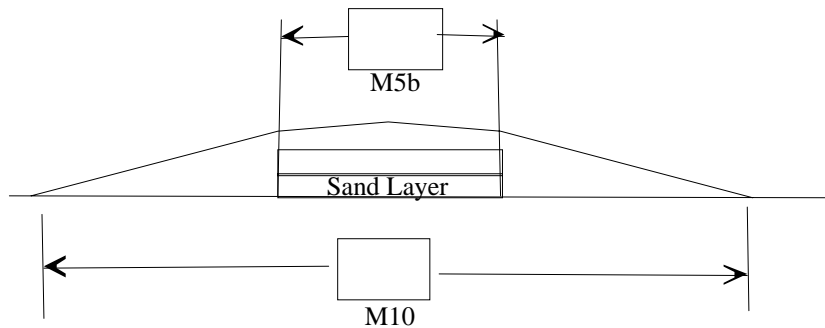
**It can be used for:** design of a treatment mound.

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

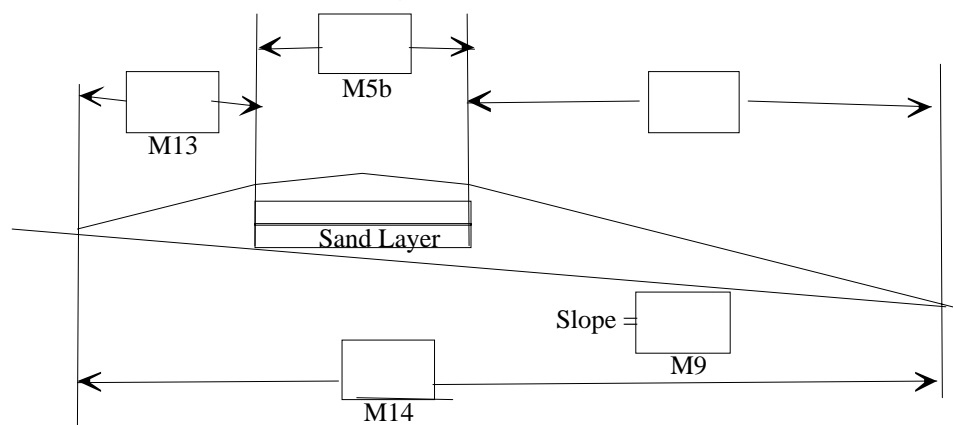
Use the following Worksheet to determine the minimum required dimensions for a treatment mound and fill in the blanks on the appropriate diagram below for a level site or a sloping site of over 1%.

### Treatment Mound Dimensions

#### Level Site



#### Sloping Site



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### Step 1) Determine the expected volume of sewage per day:

Note: Use Table 3.1.14.A. page 15 as a guide to determine expected volume of sewage per day. Provide allowance for additional load factors as detailed in 3.1.14.

Assure that the sewage strength does not exceed the requirements of 3.1.9.

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

gal/sq. ft. per day

The maximum rate of 1 is detailed in 8.1.2.(a).

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.

The minimum area of the sand layer is 400 sq. ft. as required in 8.1.2.(b)

or

Area of Sand Layer for Treatment

sq. ft.

From **M2** this worksheet.

Area of Sand Layer

sq. ft. **M3**

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. as detailed in 8.1.2.(c).

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

Note: Effluent loading rate can be determined from soil texture classification according to 7A.1.5. **or** from percolation test results according to 7A.1.4.

Table A.4.A. (column 4) page 61 provides the effluent loading rates for soils between 5 and 60 minu

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

From **M1** this worksheet.

Soil Effluent Loading  
Rate

gal/sq.ft. per day

From **M5** this worksheet.

Preliminary  
Infiltration Area

sq. ft. **M6**

( 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.

(Before Reduction Factors.)

From **M6** this worksheet.

**X**

Reduced Area Factor

**0.7**

A reduction of up to  
30% (1 - 0.70) can be  
applied to treatment mounds  
as provided in 8.1.3.(a).

Required Infiltration  
Area

sq. ft. **M7**

(Including Reduction  
Factors.)

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### Step 8) Calculate the required width of the infiltration area:

Required Infiltration Area <input style="width: 100%; height: 20px;" type="text"/> sq. ft. (Including Reduction Factors.) From <b>M7</b> this worksheet.	$\div$	Length of Sand Layer <input style="width: 100%; height: 20px;" type="text"/> ft. From <b>M4</b> this worksheet.	=	Width of Required Infiltration Area <input style="width: 100%; height: 20px;" type="text"/> ft.	<b>M8</b>
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### Step 9) Determine the slope criteria of the installation site:

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

Slope of Installation Site	<b>M9</b>
<input style="width: 100%; height: 20px;" type="text"/> %	

**Note: The following calculations apply ONLY to the minimum height configuration of a mound. 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 to 11

### Step 10) Determine the toe to toe width of the mound:

Toe to Toe Width Based on 4:1 Slope Requirement <input style="width: 100%; height: 20px;" type="text"/> ft. <b>M10a</b> 4:1 Slope Requirement (8.2.12.) Refer to Berm Dimensions Diagram this worksheet, or determine by calculation	or	Width of Required Infiltration Area Within Berms <input style="width: 100%; height: 20px;" type="text"/> ft. <b>M10b</b> Refer to 8.1.3. From <b>M8</b> this worksheet.	=	Toe to Toe Width of Mound <input style="width: 100%; height: 20px;" type="text"/> ft.	<b>M10</b>
				The greater of M10a or M10b.	

### Step 11) Proceed to Step 16:

Steps 12 to 15 are used only for installations where the slope exceeds 1%.

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### For Slopes Exceeding 1%, Use Steps 12 to 15

#### Step 12) Determine the width of the sand layer plus downslope berm:

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	Width of Required Infiltration Area Under Sand Layer and Downslope Berm	Width of Sand Layer and Downslope Berm
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Downslope Berm Width at 4:1  
ft.

**M12a**

Refer to Berm Dimensions Diagram this worksheet.

+

Sand Layer Width  
ft.

**M12b**

From M4b this worksheet.

ft.

**M12c**

4:1 Slope Requirement is detailed in 8.2.12.

or

ft.

**M12d**

Refer to 8.1.3. 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 8.2.12.)  
Refer to Berm Dimensions Diagram this worksheet, or determine by calculation.

Width of  
Upslope Berm

ft.

**M13**

#### Step 14) Determine the toe to toe width of the mound:

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:

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### Summary

#### Step 16) Summarize the information:

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

#### Step 17) Complete the berm diagram dimensions on first page.

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

#### Step 18) Confirm the design complies with the Standard of Practice.

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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