Western Canada Onsite Wastewater Management Association

PSDS Design - Worksheet "M"

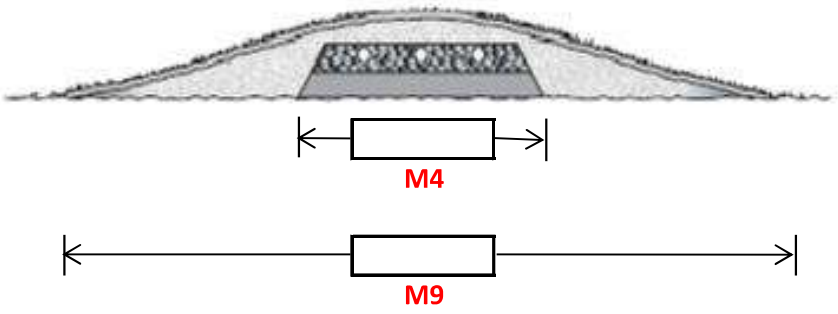
Treatment Mound: Area Sizing

The complete system is to comply with BC SPM V3

This worksheet does NOT consider all of the requirements of the Standard Practice Manual

Use only Metric units of measurement throughout (meters, liters, etc…)

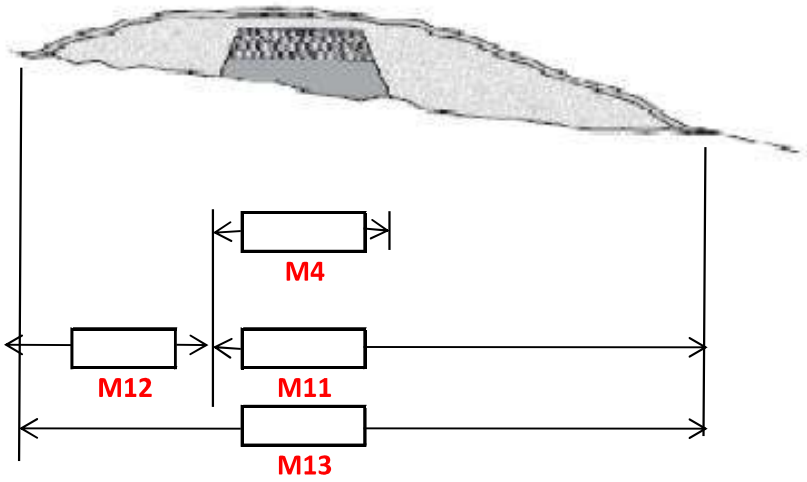
Level Site



Sand Layer Length (m) [ ] M3

Overall Length of Mound (m) [ ]

Sloping Site



Slope [ ] M8

Sand Layer Length (m) [ ] M3

Overall Length of Mound (m) [ ]

Step 1a) Determine the design Type 2 Hydraulic loading rate (HLR) for native soils:

Texture		Structure		Grade		Consistence		Consistence Category			
[ ]	&	[ ]	&	[ ]	&	[ ]	=	[ ]	=	[ ] L/day/m^2	Soil HLR M1a

Kfs		Percolation			
[ ] mm/day	OR	[ ] min/in	=	[ ] L/day/m^2	Permeability or percolation HLR M1b

Use Table II-22 and Table II-23 in SPM Version 3 - Volume II

Note:
Select the more conservative HLR from soil classification /or/ Permeability results. If the 2 loading rates vary significantly, you will have to return to site and conduct more soil or permeability tests

Site Slope [ ] %

Step 1b) Determine the design Linear Loading Rates (LLR)

Texture	&	Structure	&	Grade	&	Consistence	=	Consistence Category	=	L/day/m	Soils LLR M1c
	&		&		&		=		=		

mm/day	OR	min/in	=	L/day/m	Permeability or Percolation LLR M1d
Kfs		Percolation			

Use lower of values from M1c or M1d to determine Design LLR

You must review Section II- 5.6 and use Table II-27 or Table II- 28 to determine LLR

Step 1) Determine the Daily Design Flow (DDF) :

Volume of sewage per day. Provide allowance for additional load factors as needed

Assure that the sewage strength does not exceed the requirements of the SPM Version 3 - Table III- 8

Daily Design Flow: _____ L /day **M1**

Step 2) Calculate the minimum area of the sand layer (AIS):

Daily Design Flow	÷	Sand Layer HLR	=	AIS for Sand Layer
L /day		L /day/m²		m² M2
From M1		Use Table II-24 and specify the sand media type		

Step 3) Calculate the minimum length of the top of the sand layer (MCL):

Daily Design Flow	÷	Native Soil LLR	=	Sand Layer MCL
L /day		L/day/m		m M3
From M1		From M1c or M1d		

Step 4) Calculate the minimum width of the sand layer:

AIS for Sand Layer	÷	Sand Layer MCL	=	Width of the Sand Layer
m²		m		m M4
From M2		From M3		

Step 5) Determine the native soil hydraulic loading rate:

Native Soil HLR: _____ L/day/m² **M5**

From M1a OR M1b

Revised December 14 2020

Step 6) Calculate the native soil infiltration area required:

Daily Design Flow		Native Soils HLR		Required Soil AIS	
L/day	÷	L/day/m²	=	m²	M6
From **M1**		From **M5**			

Step 7) Calculate the required width of the infiltration area:

Required Soil AIS		Sand Layer MCL		Width of Required Soil Area	
m²	÷	m	=	m	M7
From **M6**		From **M3**			

Step 8) Determine the slope criteria of the Final Treatment component:

NOTE: If the slope of the installation site exceeds 2%, proceed to Step 11.
If the slope is 2% or less, proceed to Step 9.

Refer to Section II- 5.6 and Section III- 5.6 and Figure III- 23

Slope of Installation Site

% M8

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 vertical separation from restrictive layer to the water table) the following calculations are NOT adequate for the design.

For Slopes of 2% or Less, Use Steps 9 to 10.

Step 9) Determine the toe to toe width of the mound:

	MIn 2h:1v		2 berms		Width of Sand Layer		**Toe to Toe Width**	
m	X 2 =	m	X 2 =	m	+ m	=	m	M9
Max Mound height		Single berm width		Two berm widths	From **M4**			

Sand Mound toe berms are 2H : 1V - minimum
Refer to Figure III- 23 in Section III- 6.15

Step 10) Proceed to Step 14:

Steps 11 to 13 are used only for installations where the slope exceeds 2%.

For Slopes Exceeding 2%, Use Steps 11 to 14.

Step 11) Determine the width of the sand layer plus downslope berm:

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

- the toe to toe width as determined by the required soil width area, **or**
- the width determined by 2:1 slope calculations on last page of this worksheet

Downslope Berm Width Based on 2:1 Slope Requirements

_____ m

M11a

Refer to Berm Dimensions Diagram (this worksheet)

+

Width of Sand Layer

_____ m

M11b

From **M4** (this worksheet)

Add M11a and M11b

_____ m

M11c

or

Width of Required Soil Infiltration Area Under Sand Layer and Downslope Berm

_____ m

M11d

From **M7** (this worksheet)

=

Width of Sand Layer and Downslope Berm

_____ m **M11**

2:1 Slope Requirement is the greater of **M11c** or **M11d**

Step 12) Determine the width of the upslope berm:

Width based on 2:1 Slope
Refer to Berm Dimensions Diagram (this worksheet) or determine by calculation.

Width of Upslope Berm

_____ m **M12**

Step 13) Determine the toe to toe width of the mound:

Width of Sand Layer and Downslope Berm

_____ m

From **M11**

+

Width of Upslope Berm

_____ m

From **M12**

=

Toe to Toe Width of Mound

_____ m **M13**

Summary

Step 14) Summarize the information:

Width of Sand Layer (From **M4** this worksheet)	m
Length of Sand Layer (From **M3** this worksheet)	m
Slope of Installation Site (From **M8** this worksheet)	%
Toe to Toe Width of Mound <2% slope (From **M9** this worksheet)	m
Toe to Toe Width of Mound>2% slope (From **M13** this worksheet)	m

Step 15) Complete the berm diagram dimensions on the first page:

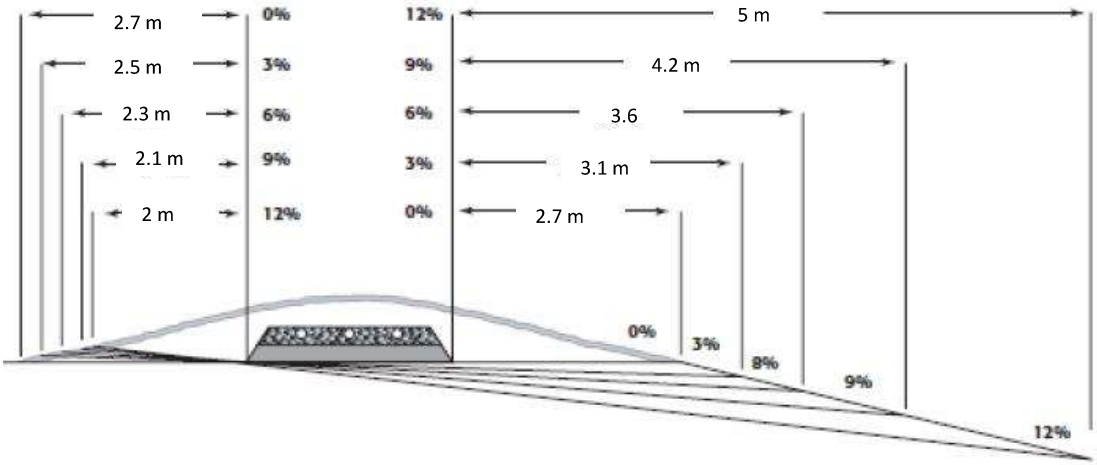
Fill the appropriate diagram on the first page with the numbers calculated in this worksheet.
Complete a scale drawing of the mound describing all dimensions of aggregates and plumbing.

Step 16) Confirm the design complies with the SPM V3

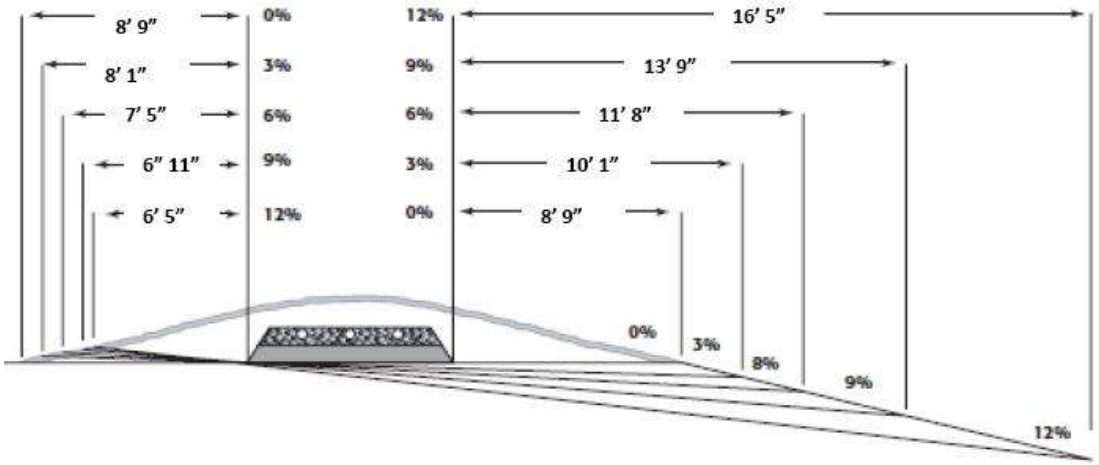
This worksheet does NOT consider all the requirements of the mandatory Standard. Please work safely and follow safe practices near trenches and open excavations.

Treatment Mound Berm Dimensions on Slopes

Metric



Imperial Measurement



This Diagram is Based on a Minimum Mound Height and a Minimum Berm Slope of 2:1

Based on:
Minimum 15cm (6") cover soil depth (+)
15cm (6") sand media over bed(+)

Bed depth (+)

30 - 60cm (12 - 24") sand media under bed