PSDS Design- Worksheet "A" v.1

LFH At-grade Area Sizing

The complete system is to comply with the Alberta Private Sewage Systems Standard of Practice and requirements set out in the LFH At-grade systems Varience.

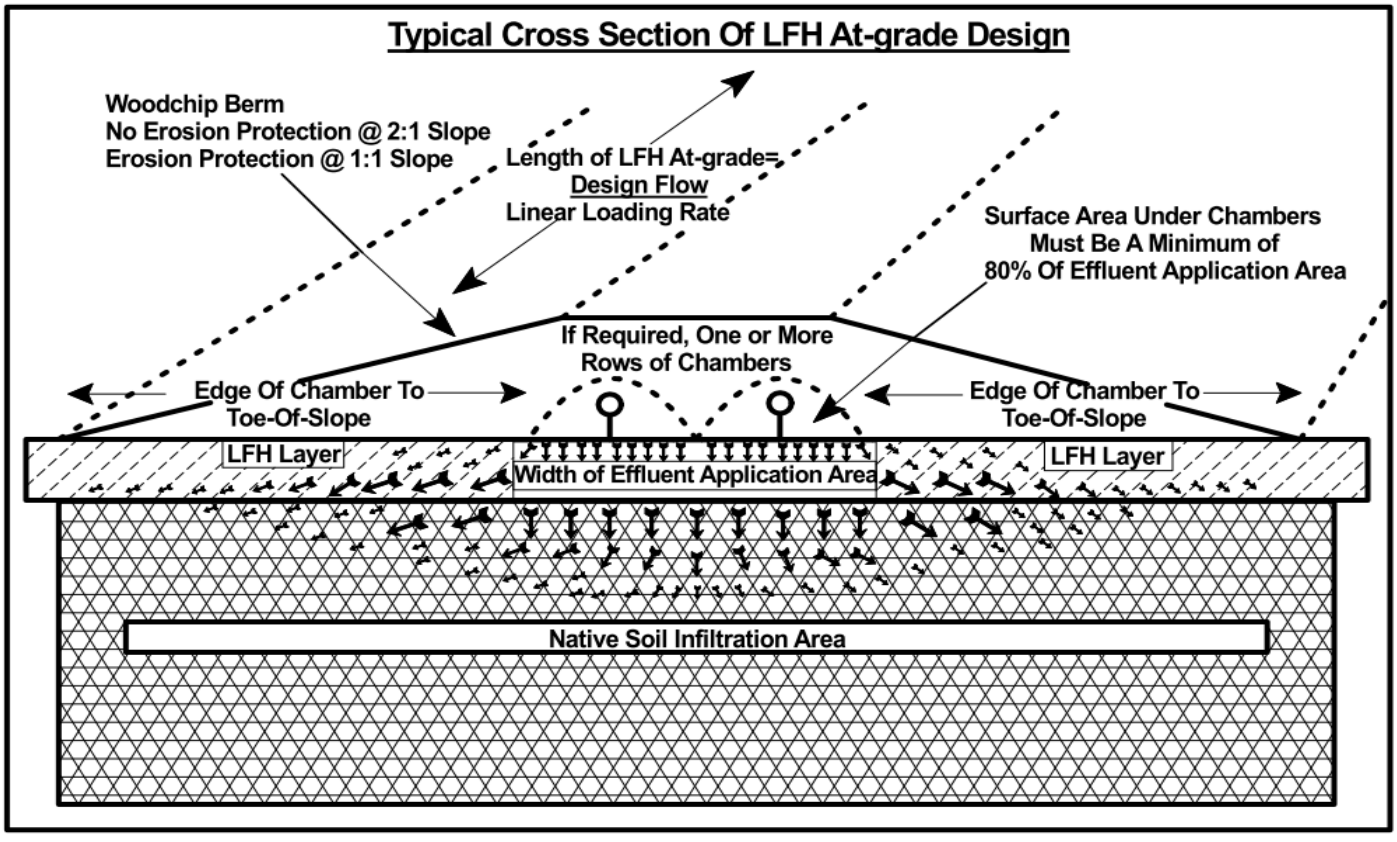
This Worksheet is for use in Alberta to: Size the effluent application area under the chamber(s) area, To size the area that must be covered by the woodchip material.

It can be used for: Design of LFH At-grade

Use only Imperial units of measurements throughout this worksheet (feet, inches, Imperial gallons, etc.)

Use the following Worksheet to determine the Minimum required dimensions for an LFH At-grade and fill in the blanks on the appropriate diagram below for a level site or a sloping site of over 1%

THE TERMS USED IN THIS DRAWING DESCRIBE SPECIFIC AREAS OF THE LFH AT-GRADE AND ARE USED IN THE FOLLOWING WORKSHEET



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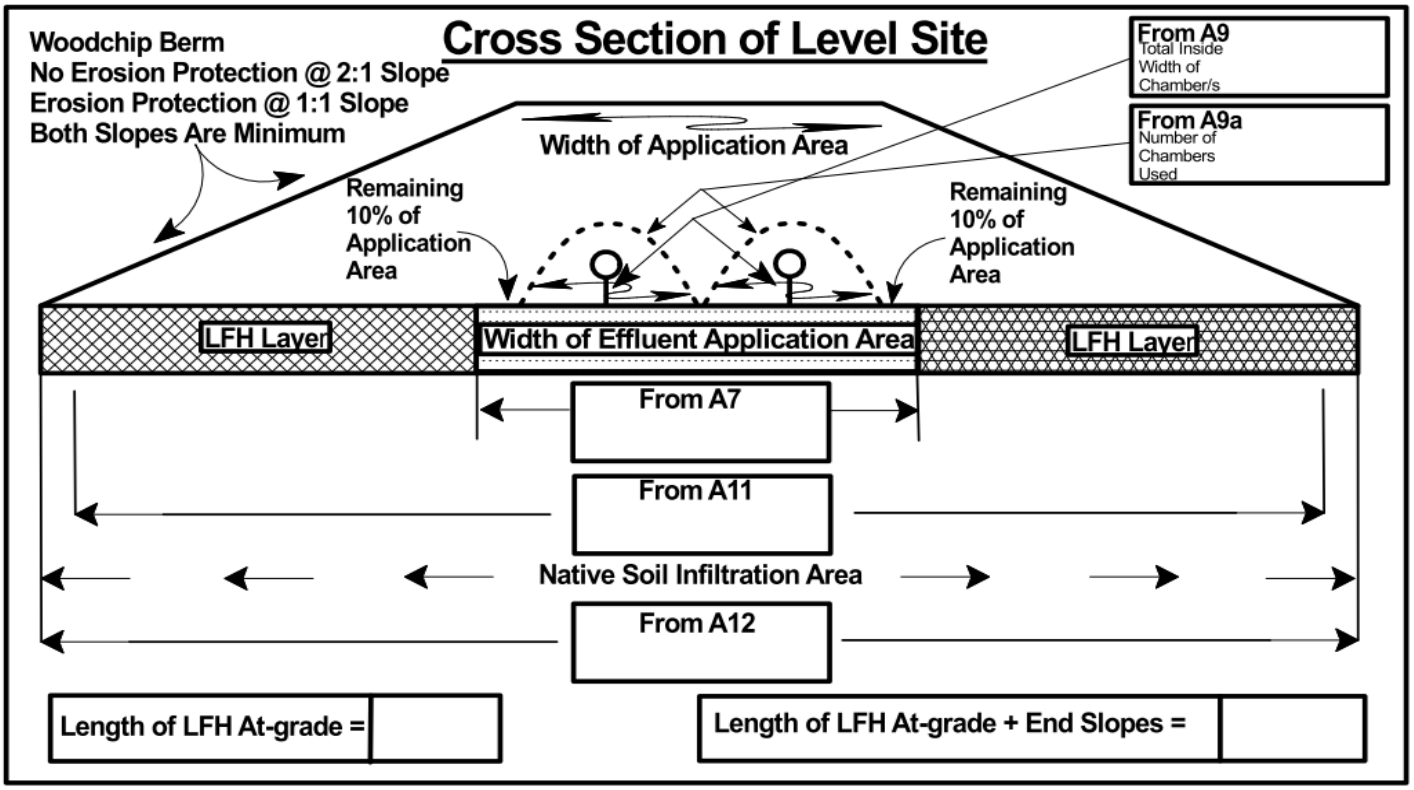
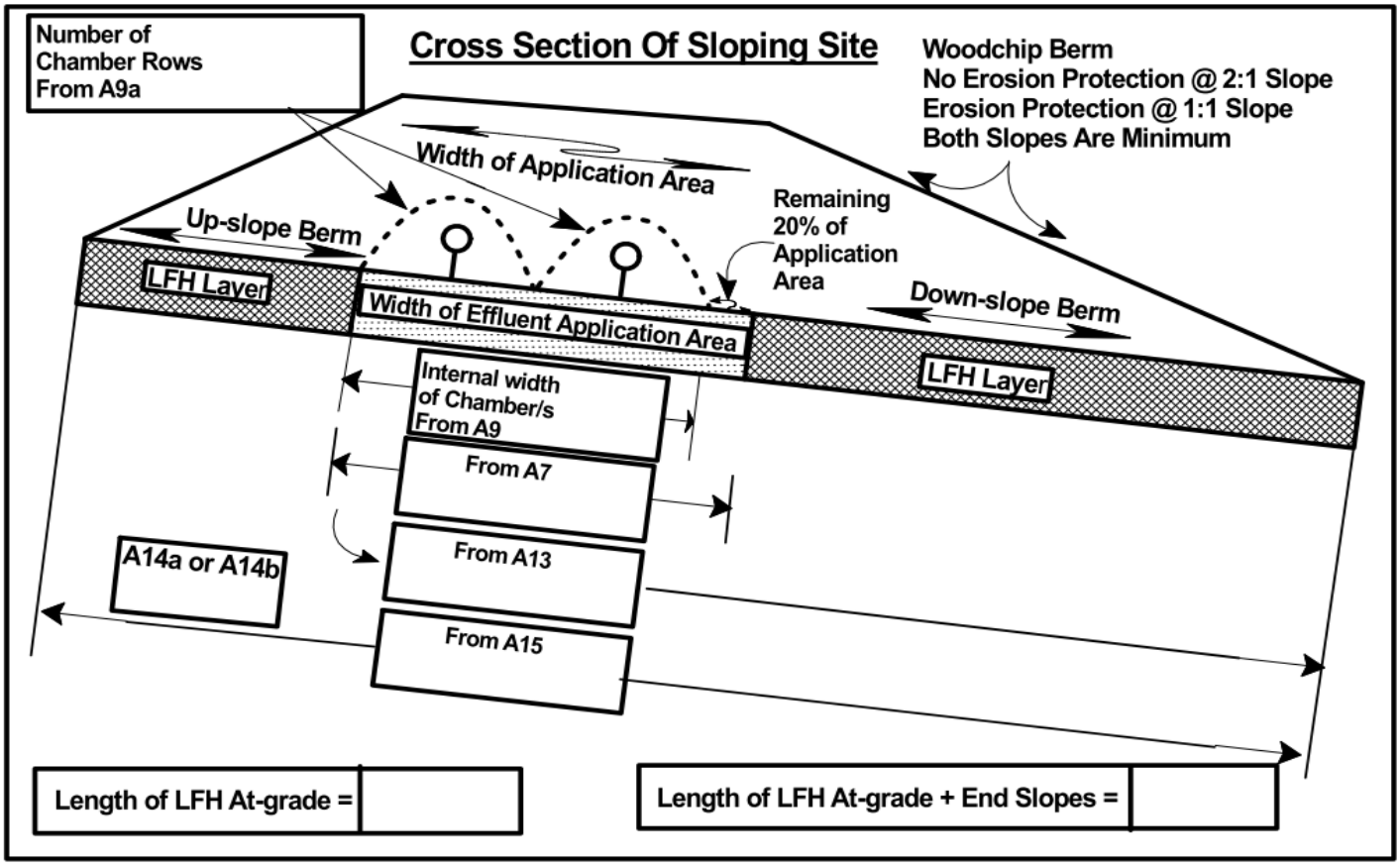

Cross Section of Level Site
Woodchip Berm
No Erosion Protection @ 2:1 Slope
Erosion Protection @ 1:1 Slope
Both Slopes Are Minimum
From A9
Total Inside Width of Chamber/s
From A9a
Number of Chambers Used
Width of Application Area
Remaining 10% of Application Area
Remaining 10% of Application Area
LFH Layer
Width of Effluent Application Area
LFH Layer
From A7
From A11
Native Soil Infiltration Area
From A12
Length of LFH At-grade =
Length of LFH At-grade + End Slopes =


Number of Chamber Rows From A9a
Cross Section Of Sloping Site
Woodchip Berm
No Erosion Protection @ 2:1 Slope
Erosion Protection @ 1:1 Slope
Both Slopes Are Minimum
Width of Application Area
Up-slope Berm
Remaining 20% of Application Area
LFH Layer
Width of Effluent Application Area
Down-slope Berm
LFH Layer
Internal width of Chamber/s From A9
From A7
From A13
A14a or A14b
From A15
Length of LFH At-grade =
Length of LFH At-grade + End Slopes =

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

Note: Use Table 2.2.2.2.A or B to determine expected peak volume of sewage per day. Provide any required allowance for additional load factors as detailed in Article 2.2.2.3

Confirm sewage strength does not exceed the requirements laid out in Article 2.2.2.1

Expected Peak Volume of Sewage per Day

A1

Gals. per day

Step 2) Determine the slope criteria of the installation site:

Note: If the slope of the installation site exceeds 1% use the drawing "sloped site". If there is no slope, use the drawing "level site" 1% or less.

Slope of Installation Site

% **A2**

Step 3) Determine Effluent Hydraulic Loading Rate on Native Soil:

From site evaluation information the following is needed to be determined: 1) Soil Texture, 2) Soil Structure, 3) Grade. Based on those soil characteristics, determine the hydraulic effluent loading on the native soil. Article 8.1.1.10

Use the hydraulic effluent loading rates for effluent quality of <30 mg/L BOD

Hydraulic Effluent Loading Rate on Native Soil

A3

Gal./Sq. Ft. / day

Step 4) Determine the Hydraulic Linear Loading Rate on Native Soil:

From site evaluation information the following needs to be determined: 1) Soil Texture, 2) Soil Structure, 3) Grade of structure, 4) Depth of infiltration distance. Use that criteria to determine the allowed Hydraulic Linear Loading Rate. Article 8.1.1.10.

Hydraulic Linear Loading Rate

A4

Gal./Linear Ft./day

Step 5) Determine Length of LFH At-grade:

Expected Peak Volume of Sewage Per Day		Hydraulic Linear Loading Rate		Minimum Length of LFH At-grade	
	Divided By		**Equals**		**A5**
From A1		**From A4**		**Lineal Feet**	

Step 6) Calculate Effluent Application Surface Area Required

Expected Peak Volume of Sewage Per Day		Refer to 8.1.2.2.(2) SOP 2009, Allowed Loading Rate May be ≤ 0.83 gal/sq.ft./day		Total Minimum Effluent Application Area	
	Divided By		**Equals**		**A6**
From A1		**Typically 0.83 gal/sq. ft./day except on sandy soils**		**Sq. Ft.**	

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Step 7) Determine Minimum Width of Effluent Application Area:

Effluent Application Area		Minimum Lenth of At-grade from Box A5		Minimum Width of Effluent Application Area
	Divided by		Equals	
Sq. Ft From A6		A length exceeding A5 can be selected to result in narrower width required under chambers A7a		Ft. A7

Step 8) Determine Minimum Internal Open Width of Chambers:
(the internal width covered by a chamber or # of chambers)

Minimum Effluent Application Width		Apply Allowed Reduction factor. Actual open area of chambers must cover 80% of total Application area		Minimum Actual Internal Open Width Provided by Chamber(s)
	Multiply by	0.8	Equals	
Ft. From A7				Ft. A8

Step 9) Select the Chamber(s) to be Used and Number of Rows of Chambers Required:

Width of selected chamber in FEET - enter actual internal effective width (not manufacturer's oustside dimensions)		Number of chamber row(s) selected		Actual width of open area provided by chambers for effluent application area
	Multiply By		Equals	
Example: 19 inches divided by 12 inches = 1.6 feet 31 inches divided by 12 inches = 2.6 feet		A9a		Ft. This amount cannot be less than A8 A9

Step 10) Calculate minimum Native Soil Infiltration Surface Area: [this is the area to be covered by the woodchip cover and includes the area under the chamber(s)]

Expected Peak Volume of Sewage Per Day		Hydraulic Effluent Loading Rate		Minimum Required Native Soil Infiltration Area
	Divided By		Equals	
From A1		From A3		Sq. Ft. A10

Step 11) Determine Minimum Width of Native Soil Infiltration Area:

Native Soil Infiltration Area		Length of At-grade Selected		Minimum Width of Native Soil Infiltration Area
	Divided By		Equals	
From A10		From A7a		Feet A11

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Step 12) Cover Material Width of LFH At-grade; Site Slope 1% or Less.

Choose side slope of LFH At-grade cover material.

Toe to toe width based on 1:1 cover material slope		Toe to toe width based on 2:1 cover material slope		Minimum Width of Required Native Soil Infiltration Area from A11
	OR		BUT NOT LESS THAN	
A7 + (2 X distance at 0% slope) from slope chart.		A7 + (2 X distance at 0% slope) value from slope chart.		

Minimum Width of At-grade Cover Material

A12

The Greater Value of the Width Based on Chosen Cover Material Slope or Box A11

Step 13) Minimum Width of Cover Material; Up-Slope Edge of Chambers to Downslope Toe of Cover Material - Site slope greater than 1%;

Choose Side Slope of LFH At-grade Cover Material;

1:1 Downslope Berm Distance (from slope chart)		2:1 Downslope Berm Distance (from slope chart)		Minimum Native Soil Infiltration Width From A11
+		+		
Effluent Application Width From A7		Effluent Application Width From A7		
=		=		Enter the Greater Width of: A13a, A13b, or A11
A13a		A13b		A13

Width of Cover Material From Up-slope Edge of Chambers to Downslope Toe of Cover Material

Step 14) Determine Width of Upslope Berm

1:1 Slope		2:1 Slope	
A14a	Or	A14b	
From Slope chart		From Slope chart	

Step 15) Determine Toe to Toe Width of LFH At-Grade on Site Slope Greater Than 1%

Downslope Width		Upslope Width		
	+		=	A15
From A13		From A14a or A14b		Toe to Toe Width on Sites with Slope Greater Than 1 %

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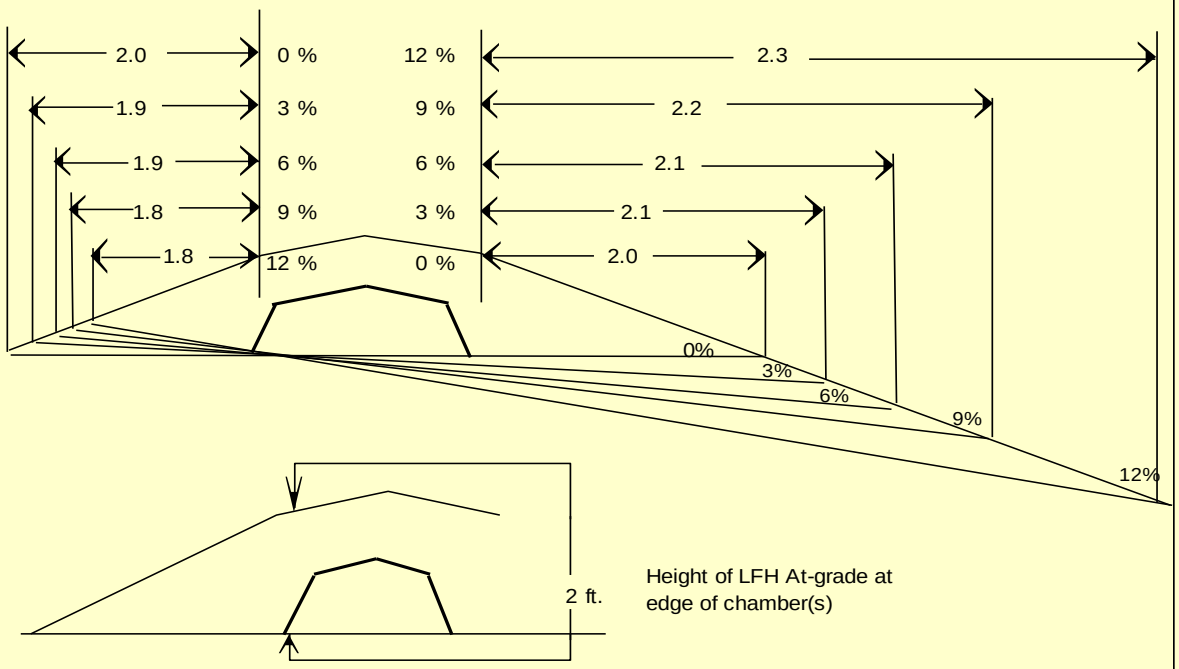
LFH At-grade Cover Material Width on 0% to 12% Sloped Sites

LFH At-grade Cover Material Slope Distance in Feet @ 1 :1 Berm slope

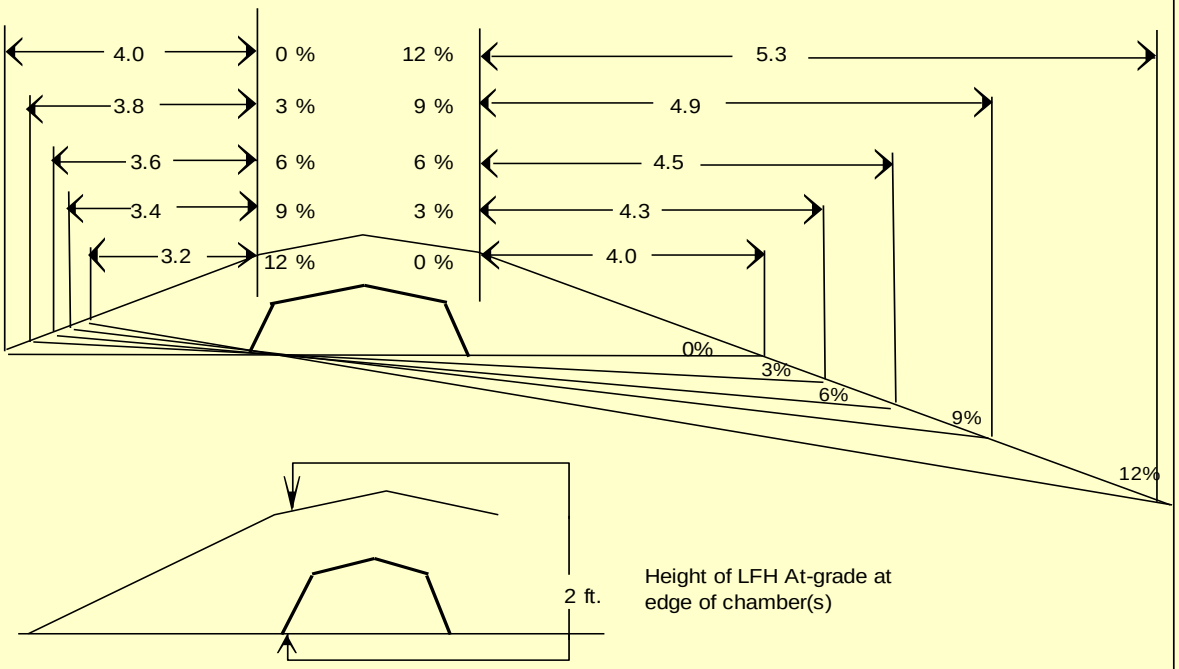


Height of LFH At-grade at edge of chamber(s)

Upslope Cover Material distance = Height of LFH At-grade at edge of chamber / (1.0 + [slope% / 100])

Downslope Cover Material Distance = Height of LFH At-grade at edge of chamber / (1.0 - [slope% / 100])

LFH At-grade Cover Material Slope Distance in Feet @ 2 :1 Berm slope



Height of LFH At-grade at edge of chamber(s)

Upslope Cover Material distance = Height of LFH At-grade at edge of chamber / (0.5 + [slope% / 100])

Downslope Cover Material Distance = Height of LFH At-grade at edge of chamber / (0.5 - [slope% / 100])

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