

Rain Garden Site Selection and Sizing Guide

Design Size Worksheet

Step 1: Preparation

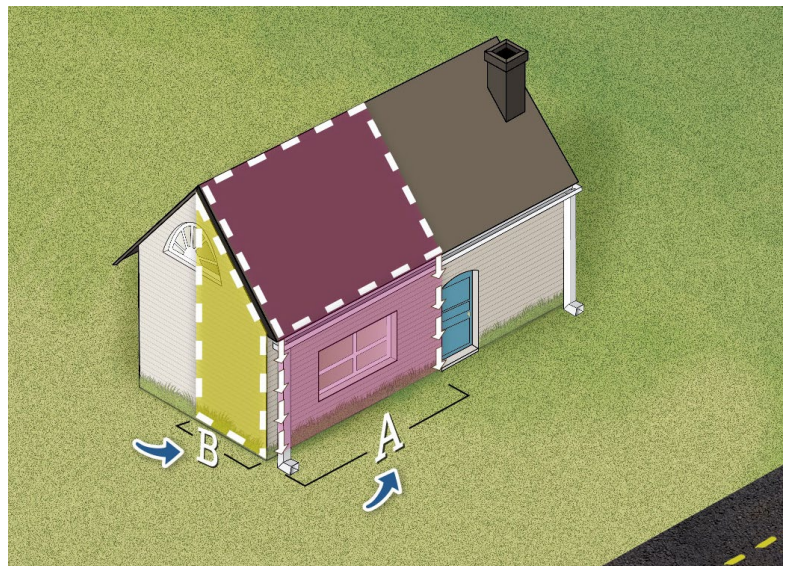
Collect the measurements referred to in the Site Selection and Sizing Guide (specific pages listed below in Steps 1A and 1B). If you're constructing more than one rain garden, you'll need to complete one worksheet per rain garden.

Step 1A Record drain area measurements from the roof that will contribute to the rain garden, and drain area measurements for any additional impervious surfaces that drain to the rain garden. **Refer to Page 12 in the Site Selection and Sizing Guide** for instructions and record your data below. Remember, length and width are measured along the ground. You may not have data for every row, and that's OK.

Drain Area	Length (feet)	Width (feet)
Roof Segment 1		
Roof Segment 2		
Roof Segment 3		
Roof Segment 4		
Triangular Roof Segment 1		
Triangular Roof Segment 2		
Triangular Roof Segment 3		
Impervious Area 1		
Impervious Area 2		
Impervious Area 3		

Step 1B Estimate your soil infiltration rate per day at the rain garden location by using the drain test on **Pages 19-20 of the Site Selection and Sizing Guide**. After conducting the test, record your data below. Don't forget to multiply your hourly rate by 24 to get your infiltration rate per day.

Enter infiltration rate per day: inches



Remember, length (A) and width (B) are measured along the ground.

Step 2: Calculate Drain Area

The measurements you recorded from **Step 1A** of this worksheet have been automatically added to the table below in order to calculate the contributing drain area. The calculations will tell you the total square footage that your rain garden drain area should be. The total will be at the bottom of the page.

Drain Area	Length (feet)	Width (feet)		Contributing Drain Area (square feet)
Roof Segment 1			→	
Roof Segment 2			→	
Roof Segment 3			→	
Roof Segment 4			→	
Triangular Roof Segment 1			→	
Triangular Roof Segment 2			→	
Triangular Roof Segment 3			→	
Impervious Area 1			→	
Impervious Area 2			→	
Impervious Area 3			→	

If you printed this worksheet out and you're completing your calculations manually, here are some helpful formulas to complete the tables above:

Roof Segment (rectangle):
Length x Width = Square Feet

Triangular Roof Segment:
(Length x Width) / 2 =
Square Feet

Impervious Area:
Length x Width = Square Feet

Drain Area:
(this will be automatically calculated once you enter measurements in the above table)

square feet

Step 3: Select Rain Garden Depth

Rain garden depth, which should range from 6 inches to 8 inches, is selected so that a rain garden filled with water will drain in 24 hours or less. Complete the steps below to find your rain garden depth.

Step 3A. Refer to the infiltration rate you recorded in **Step 1B** at the beginning of this worksheet.

Record that rate here: Your infiltration rate is inches per day.

Step 3B. Find which category your infiltration rate from **Step 3A** falls into below.

You may need to change your garden location based on the recommendations of your category.

Measured Infiltration Rate (per day)	Recommendation
Less than 6 inches	<p>If measured infiltration rate per day is less than 6 inches per day, then ANOTHER GARDEN LOCATION IS RECOMMENDED since infiltration is relatively poor.</p> <p>NOTE: If the garden location cannot be changed, and it will infiltrate 3-6 inches per day, then the garden depth can be set to the measured infiltration rate.</p> <p>NOTE: Shallow gardens will require significantly more area to construct and plant; shallow gardens also require accurate construction to maintain capacity.</p>
Between 6 and 8 inches	<p>This is the ideal category. If measured infiltration rate is between 6 inches and 8 inches per day, then set depth equal to infiltration rate.</p>
Greater than 8 inches	<p>If measured infiltration rate is greater than 8 inches per day, then set garden depth equal to infiltration rate UP TO A MAXIMUM DEPTH of 12 inches.</p> <p>NOTE: Gardens 8-12 inches deep may limit plant choices due to the increased potential for submerged plants.</p> <p>NOTE: Gardens deeper than 12 inches will require significant excavation and will limit plant selections due to the extended time for submerged plants.</p>

Step 3C. Your rain garden depth will be entered automatically below. Your depth will match your infiltration rate.

For example, if your infiltration rate is 6 inches per day, then your depth should be 6 inches.

Rain Garden Depth:

inches

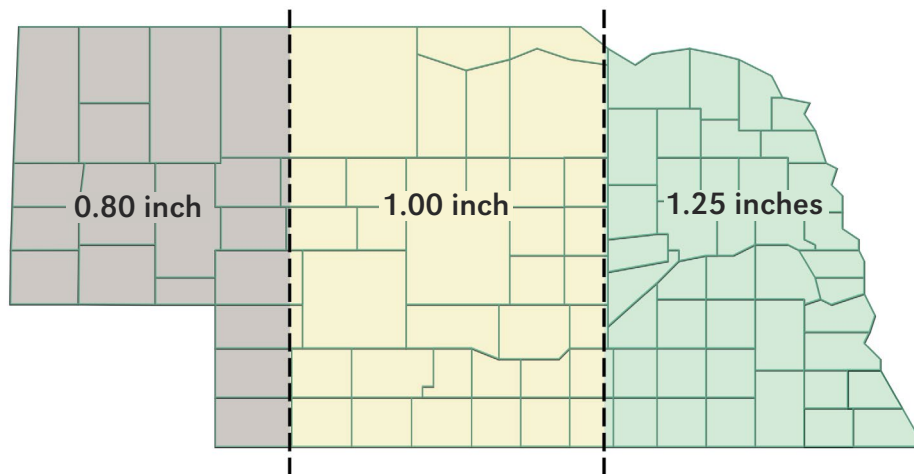
Step 4: Select Design Rainfall Depth

GUIDELINES

The design rainfall depth can be selected in one of two ways:

1. Use a standard recommendation of 1 inch. This means the rain garden will generally hold all water from a 1 inch rainfall, **or**
2. Select a regional rainfall depth that will capture approximately 90 percent of rainfall events.

Region	Design Rainfall Depth
Eastern third of Nebraska, 90% =	1.25 inches
Central third of Nebraska, 90% =	1.00 inch
Western third of Nebraska, 90% =	0.80 inch



Design
Rainfall Depth:

inches

Step 5. Compute Design Area

The design area is the area of the rain garden bottom that is excavated and leveled. This area is where water is stored aboveground and should not exceed 300 square feet. The volume of water stored is equal to the design area multiplied by the design depth. The form on this page computes the design area on the right once all data has been entered into the worksheet.

Drain Area <i>(from Step 2)</i>	<input type="text"/> square feet
Rain Garden Depth <i>(from Step 3)</i>	<input type="text"/> inches
Design Rainfall Depth <i>(from Step 4)</i>	<input type="text"/> inches

$\frac{(\text{Drain Area} \times \text{Design Rainfall Depth})}{\text{Rain Garden Depth}} =$	Design Area is: <input type="text"/> square feet <i>(round to nearest whole number, should not exceed 300 square feet)</i>
WHAT DO I DO WITH THIS RESULT?	
Create a rain garden shape with a water holding area equal to your recommended design area. This process is explained on the following three pages.	

WHAT IF MY DESIGN AREA EXCEEDS 300 SQUARE FEET?

It is fine to build a rain garden that has a different design area than the recommendations provided. However, it may be less functional in containing rainfall throughout the year if it is too small, and, depending on the depth, plants could suffer. Also, it will require extra, unnecessary soil movement and berm construction if it is designed too large. You may consider constructing two smaller rain gardens rather than one large garden. It is your choice. A small rain garden placed in a small urban lawn can still function and be a pleasant landscape feature even if it does not meet the depth and area recommendations suggested in this publication.

You can get assistance in designing your rain garden through your local Extension office or from UNL Extension specialists. Find additional information and contacts at the Extension Rain Garden website: <http://water.unl.edu/web/landscapes/rain-gardens>.

Step 6: Shape and Layout

After you've estimated the recommended design area of your rain garden, it's a good idea to outline your rain garden shape to get a good visual idea of how it fits into your yard. Shapes may vary, but should approximate a 2 to 1, length to width ratio. The water holding area should approximate the recommended design area from Step 5 of the Design Size worksheet. Account for berm area in your layout. Berms will extend beyond the design area.

GUIDELINES

When outlining your rain garden site in your yard:

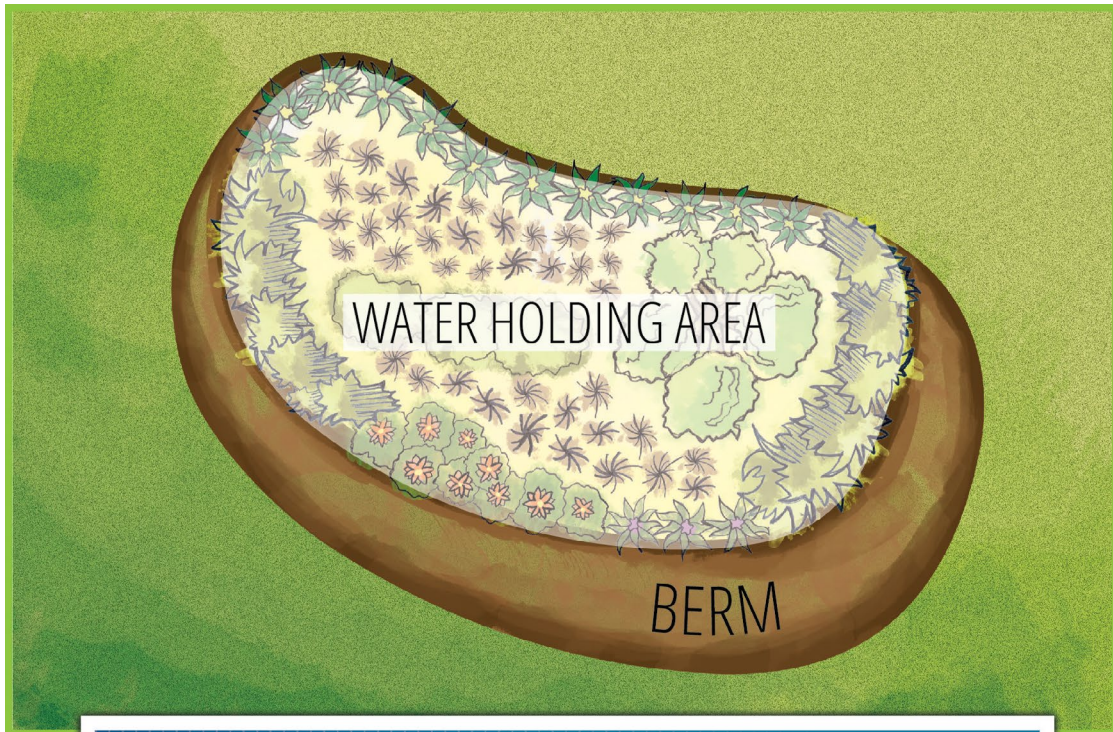
1. You could use small yard flags to outline your garden site.
2. Alternatively, you could use a garden hose to create the full outline of your garden.
3. Remember to account for the berm area as well when outlining your garden site.

Video | Outlining Your Rain Garden

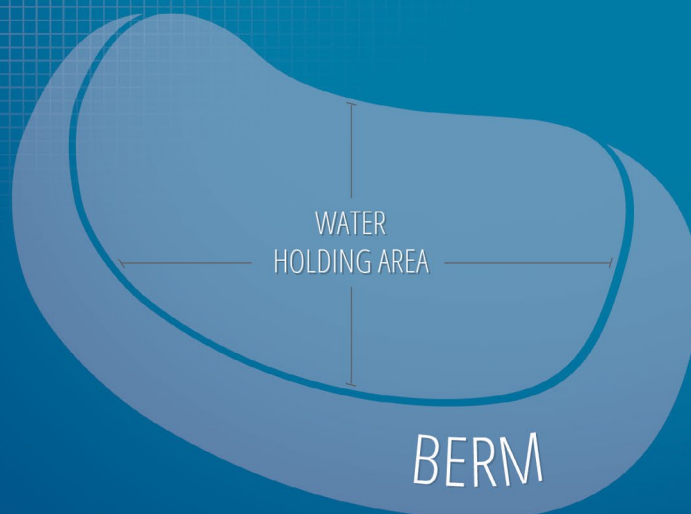


Step 6: Shape and Layout

Now that you know how many square feet your rain garden will occupy, you can lay out how it will be shaped in your yard. The total rain garden footprint includes the drainage area of the level bottom plus the area covered by the constructed berm (see illustration below).



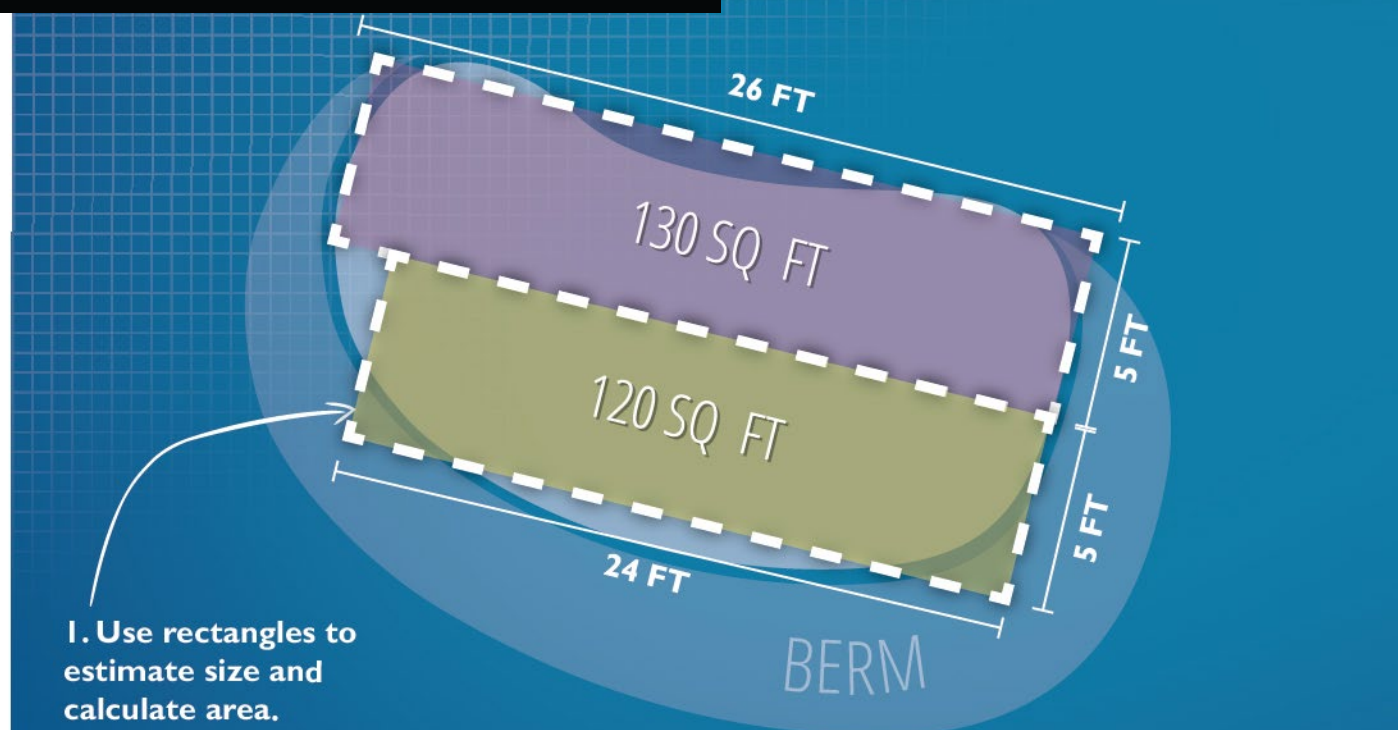
Estimate the square footage of the water holding area.
See calculations on page 8 of the Design Size Worksheet.



Step 6: Shape and Layout

Because rain gardens are typically unusual shapes (crescent or kidney-shaped), it is best to use rectangular and triangular shapes to estimate the shape of your berm and water holding areas.

HOW TO ESTIMATE YOUR WATER HOLDING AREA



1. Use rectangles to estimate size and calculate area.

Rectangles

LENGTH \times WIDTH = AREA

$$26 \text{ FT} \times 5 \text{ FT} = 130 \text{ SQ FT} \quad 24 \text{ FT} \times 5 \text{ FT} = 120 \text{ SQ FT}$$

2. Add together both rectangle area measurements for total square footage

$$130 \text{ SQ FT} + 120 \text{ SQ FT} = 250 \text{ SQ FT WATER HOLDING AREA}$$

If your calculated area does not match the recommended design area, lay out a larger or smaller shape and repeat the calculations.

The constructed berm will add 3-4 feet of additional width along the downhill side of the design area. This area is not calculated in the example above, but needs to be accounted for in your final garden layout.