

Pervious Pavement Section Calculations Using LA County Method

Given

Area to Be Drained - Non-pavement impervious surfaces (roofs and hardscape) and assumed pervious parking area A_T
 Storm Intensity, in I
 Permeability Rate of Soil, in/hr E
 From geotechnical report
 Detention Time of Water in Pervious Pavement Section, hr t_d
 Generally not in excess of 24 hours, less is preferable

Assumed or Tested

Void Ratio of Pervious Pavement, r_p
 Void Ratio of Aggregate Base, % r_b

Calculate

Volume of Water, cf $V = \text{Area to Be Drained} \times \text{Storm Intensity}$
 $A_T * I$

Depth of Pervious Concrete, in $H_{dc} = (\text{Detention Time} \times \text{Infiltration Rate}) / \text{Void Ratio}$
 $(t_d * E) / r_p$
 H_{dc} may be assumed for ease of calculation

Required Pervious Concrete Area, $A_s = \text{Vol of Water} / (\text{Void Ratio} \times \text{Depth of Pervious Concrete})$
 $V / (r_p * H_{dc})$
 If A_s is greater than pervious pavement area assumed to determine A_T , recalculate the surface areas, change H_{dc} , or add a permeable rock base using originally assumed pavement area (A_b) and an arbitrary pervious pavement thickness (H_{dc}).

Volume of Water in Arbitrary H_{dc} , $V_{arb} = \text{Void Ratio} * \text{Volume per Square Foot} * \text{Assumed Area}$
 $r_p * H_{dc} * A_p$

Volume of Water in Rock Base, cf $V_b = \text{Volume of Water} - \text{Water in Arbitrary } H_{dc}$
 $V - V_{arb}$

Depth of Aggregate Base Reservoir, in $H_{db} = \text{Volume of Water in Rock} / (\text{Void Ratio} \times \text{Assumed Area})$
 $V_b / (r_b * A_{int})$

Pavement Section Detention Time, $t_{dc} = \text{Total Volume of Water} / (\text{Pervious Area} \times \text{Permeability of Soil})$
 $A_T / (A_p) * E$

Example of Pervious Pavement Section Calculation Using LA County Method

Given			Example		
			Building (A_b)	Pervious (A_p)	Total
Area to Be Drained, sf	A_T	=	60,000	35,000	95,000
Storm Intensity, in	I	=	1		
Permeability Rate of Soil, in/hr	E	=	0.5		
Detention Time of Water in Pervious, hr	t_d	=	24		

Assumed or Tested

Percent Voids of Pervious Pavement, %	r_p	=	15
Percent Voids of Aggregate Base, %	r_b	=	25
Pervious Pavement Thickness	H_{dc}	=	6

Calculate

Volume of Water, cf	V	=	$A_T * I$ 7,917
Required Pervious Concrete Area, sf	A_s	=	$V / (r_p * H_{dc})$ 105,556

Area Check

Is A_s less than or equal to Assumed Parking Area **No**

If "Yes", go to "Check Pavement Detention Time"

If "No", then calculate rain storage in pervious section or assume different pervious thickness and recalculate

Volume of Water in Arbitrary H_{dc} , cf	V_{arb}	=	$r_p * H_{dc} * A_p$ 2,625
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Volume of Water in Rock Base, cf	V_b	=	$V - V_{arb}$ 5,292
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Depth of Aggregate Base Reservoir, in	H_{db}	=	$V_b / (r_b * A_b)$ 7
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Check Pavement Section Detention Time, hr		=	5
<= Assumed Detention Time, t_d			24

If "Yes" then design is complete **Yes**

If "No", then re-evaluate H_{dc} and H_{db} .

Recap of Pavement Section

Pervious Concrete, in	6
Rock Base, in	7

Note: If rock base is needed, use a minimum thickness of 6".