New Jersey Groundwater Recharge Spreadsheet Version 2.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
MONMOUTH CO., MARLBORO TWP	44.9	1.44

Project Name:	**Posh Carwash**
Description:	**Preliminary & Final Site Plan**
Analysis Date:	**07/01/20**

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.21	Impervious areas	Klej	0.0	-
2	0.03	Woods	Klej	13.7	1,496
3	0.015	Gravel, dirt	Klej	10.0	544
4	0.27	Open space	Klej	14.5	14,208
5	0.015	Gravel, dirt	Keyport	6.9	378
6	0.04	Woods	Keyport	11.9	1,725
7	0.32	Open space	Keyport	12.2	14,132
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	0.9			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				9.9	32,482

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.543	Impervious areas	Keyport	0.0	-
2	0.149	Open space	Keyport	12.2	6,580
3	0.142	Open space	Klej	14.5	7,472
4	0.066	Impervious areas	Klej	0.0	-
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	0.9			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				4.3	14,053

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)
		26,528
Post-Development Annual Recharge Deficit=	***18,429***	(cubic feet)

Recharge Efficiency Parameters Calculations (area averages)

RWC=	2.69	(in)	DRWC=	0.23	(in)
ERWC =	0.75	(in)	EDRWC=	0.06	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

Project Name	Description	Analysis Date	BMP or LID Type
Posh Carwash	Preliminary & Final Site Plan	07/01/20	

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	394.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	7.8	in
Upper level of the BMP surface (negative if above ground)	dBMPu	11.9	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	36.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	0	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.75	in
ERWC Modified to consider dEXC	EDRWC	0.06	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.05	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	0.12	in
Inches of Rainfall to capture	Pdesign	0.18	in
Recharge Provided Avg. over Imp. Area		8.3	in
Runoff Captured Avg. over imp. Area		8.4	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.01	unitless
BMP Volume	VBMP	256	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> OK
dBMP Check---> OK
dEXC Check---> OK

BMP Location---> Location is selected as distributed or undetermined

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	18,429	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	26,528	sq.ft
Root Zone Water Capacity	RWC	2.69	in
RWC Modified to consider dEXC	DRWC	0.23	in
Climatic Factor	C-factor	1.44	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	8.3	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		18,429	cu.ft
Avg BMP Recharge Efficiency		99.3%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		24.1%	%
%Runoff Recharged		23.9%	%
%Rainfall Recharged		18.6%	%

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.