

(1) LAF Benefit Toolkit: National Stormwater Calculator

Location: IM West Parking Lot, MSU Campus, East Lansing, MI, 48823



(2) Variables in the model

Variable Inputs:

- Location
- Soil Type
- Soil Drainage
- Topography
- Precipitation/Temperature
- Land Cover
- LID Controls
- Project Cost

Variable Outputs: Summary Information

- Average annual rainfall (inches)
- Average annual runoff (inches)
- Days per year with rainfall
- Days per year with runoff
- Percent of wet days retained

- Smallest rainfall w/ runoff (inches)
- Largest rainfall w/o runoff (inches)
- Max rainfall retained (inches)

(3) Numerical inputs to test:

LID Controls

- Rain gardens
- Permeable pavement

(4) Existing Site Conditions as Baseline Scenario

- Sand: low runoff
- Soil drainage: 0.336 inches/hour
- Topography: moderately flat 5% slope
- Precipitation/Temperature taken from Capital City Airport statistics
- Land Cover: 5% lawn
- LID Controls
 - Rain gardens (0%)
 - Street planters (0%)
 - Permeable pavement (0%)
- Project Cost
 - Re-development
 - Site suitability: moderate
- 20 years to analyze
- 0.1 event threshold

(5) Range of values for input (X)

- Rain gardens (20%)
- Permeable pavement (20%)

(6) Run model, different values of selected inputs each time

See excel spreadsheet titled “LA883_SensitivityAnalysis_Zachos”

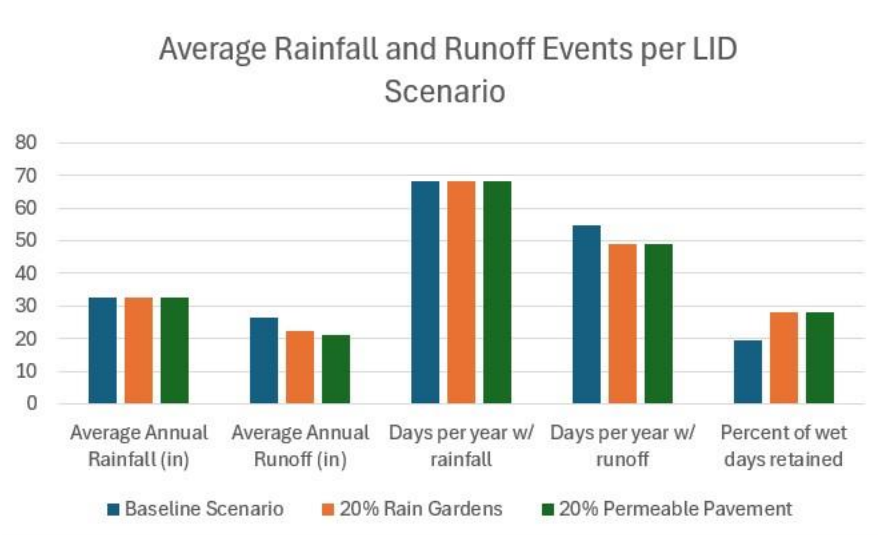
	Average Annual Rainfall (in)	Average Annual Runoff (in)	Days per year w/ rainfall	Days per year w/ runoff	Percent of wet days retained
Baseline Scenario	32.71	26.28	68.16	54.82	19.57
20% Rain Gardens	32.71	22.39	68.16	49.17	27.86
20% Permeable Pavement	32.71	21.04	68.16	49.12	27.93

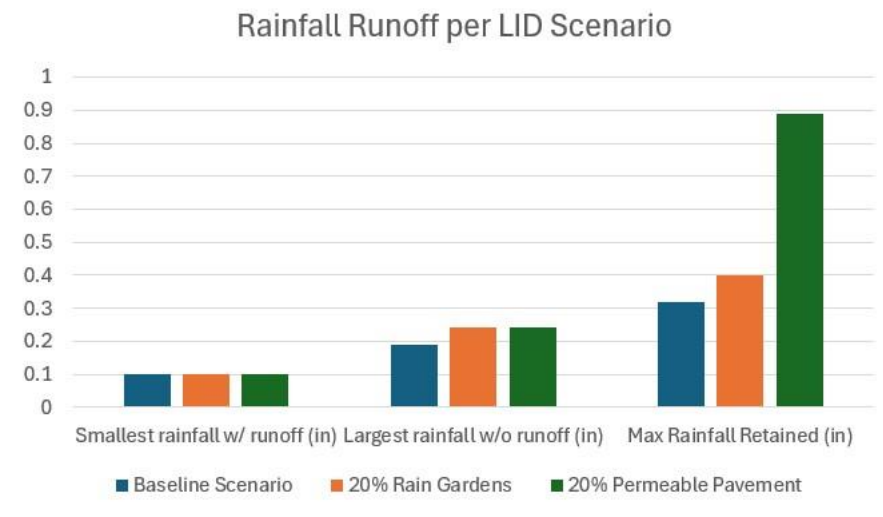
	Smallest rainfall w/ runoff (in)	Largest rainfall w/o runoff (in)	Max Rainfall Retained (in)
Baseline Scenario	0.1	0.19	0.32
20% Rain Gardens	0.1	0.24	0.4
20% Permeable Pavement	0.1	0.24	0.89

(7) Results Analysis

- Average annual runoff decreases with both LID controls. The biggest decrease occurs with permeable pavement.
- The days per year with runoff decrease with both LID Controls. The biggest decrease occurs with permeable pavement, but not by a large amount.
- The maximum rainfall retained is largest in permeable pavement.

(8) Visual relationship between percent of LID (X) and stormwater results (Y)





(9) Results Interpretation

- Permeable pavement has a generally bigger impact on stormwater calculations in the given site conditions.
- Permeable pavement decreases average runoff greater than rain gardens in the given site conditions.
- More rainfall is retained with permeable pavement than rain garden installation in the given site conditions.
- A limitation of the toolkit is the ability to compare multiple scenarios at one time. Current capability only allows results to be shown for one current scenario and one baseline scenario for side-by-side comparison.