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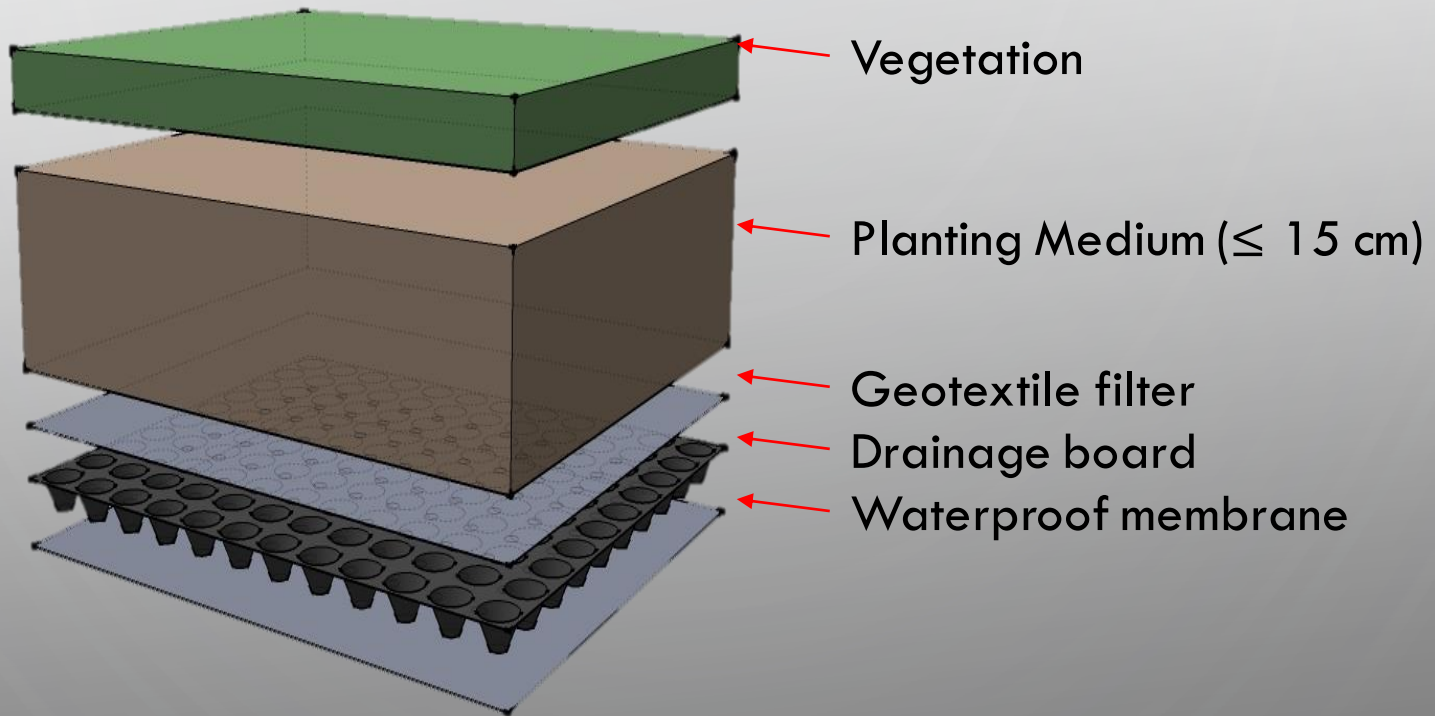




GREEN ROOFS: REFLECTIONS AND PREDICTIONS

Jenny Hill

EXTENSIVE GREEN ROOFS



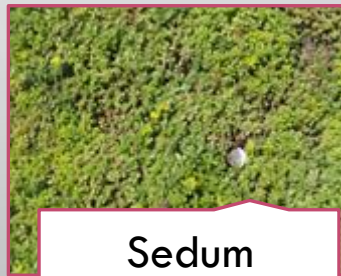
GRITLAB @ University of Toronto



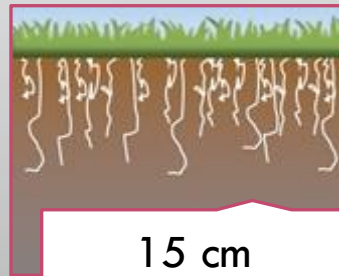
DESIGN VARIABLES



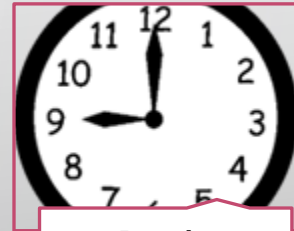
Compost
(high OM)



Sedum



15 cm



Daily



Sensor



Mineral
(low OM)



Natives

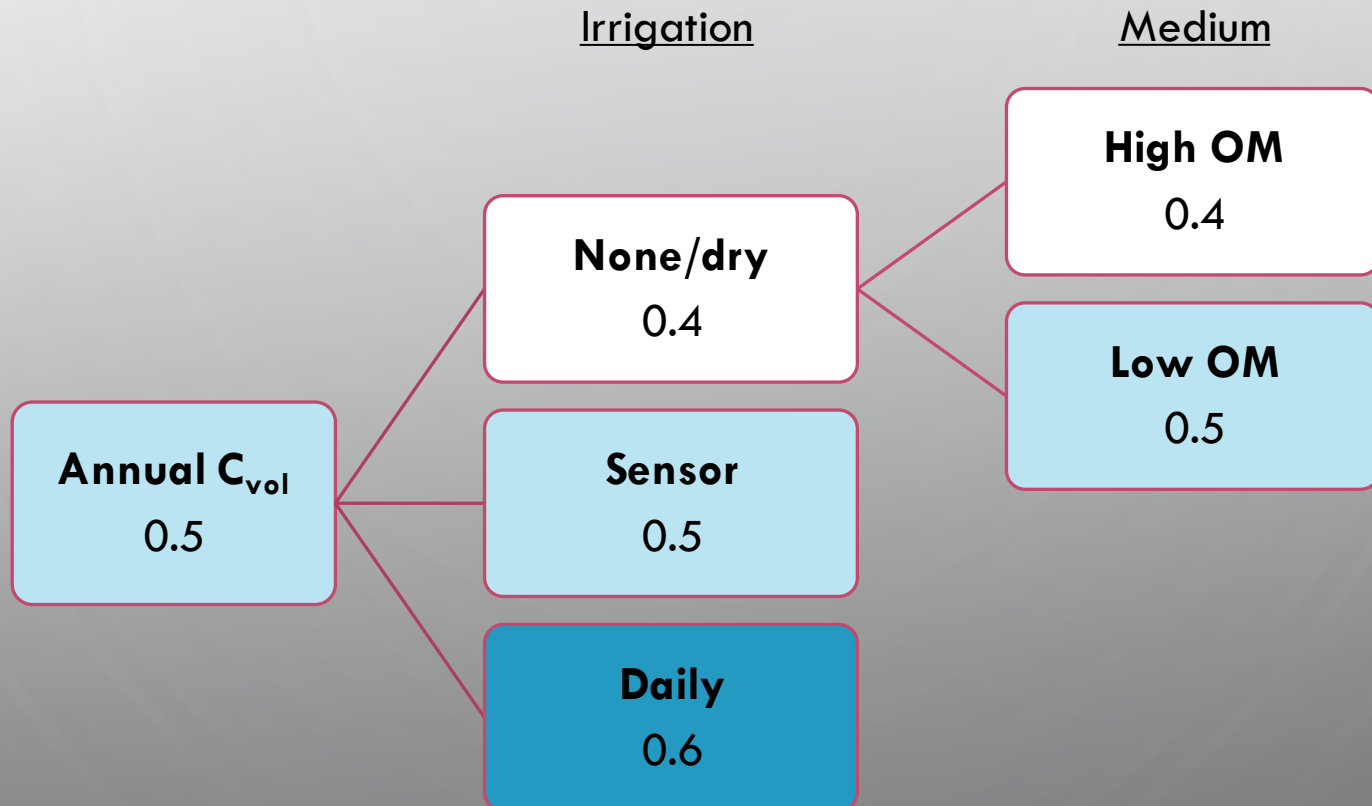


10 cm

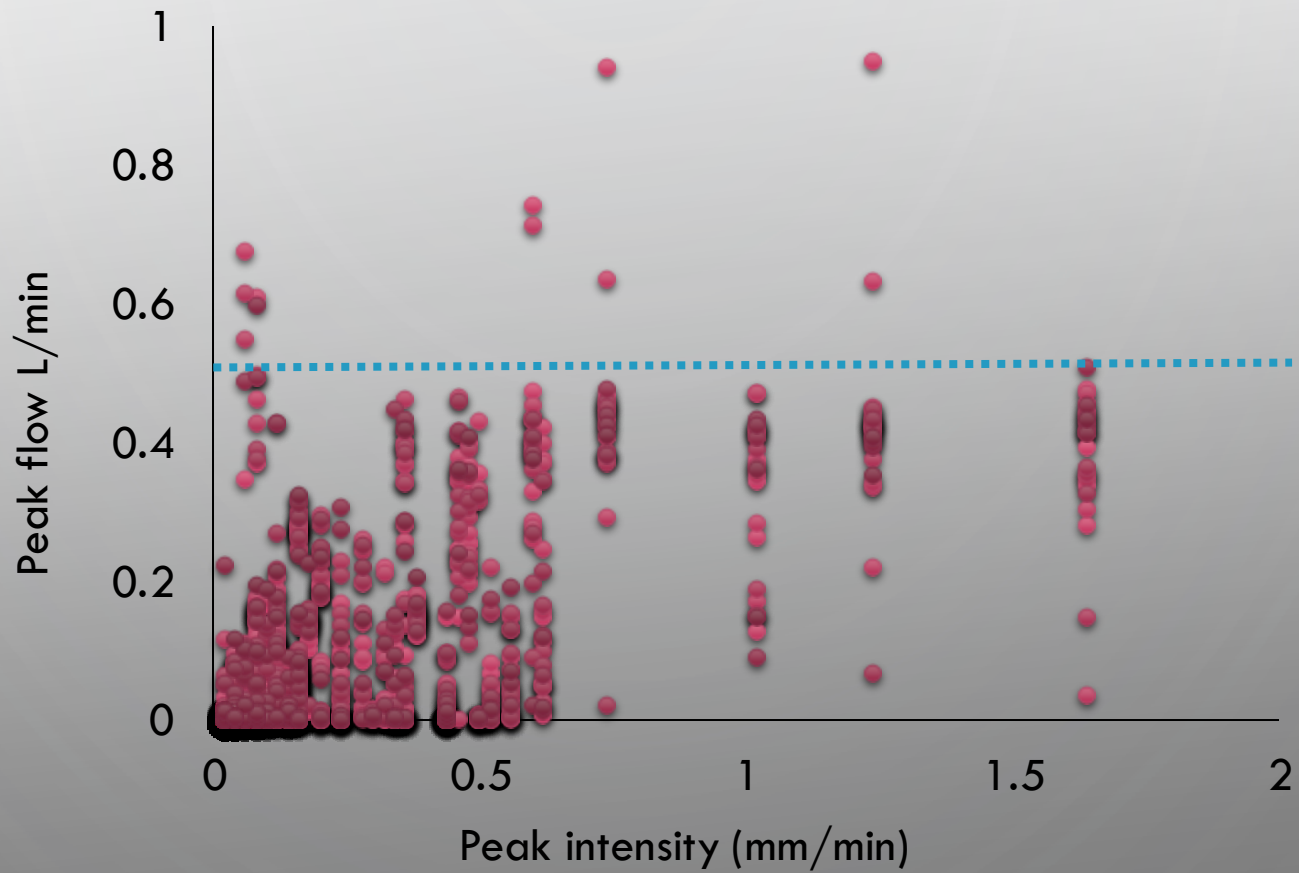


None

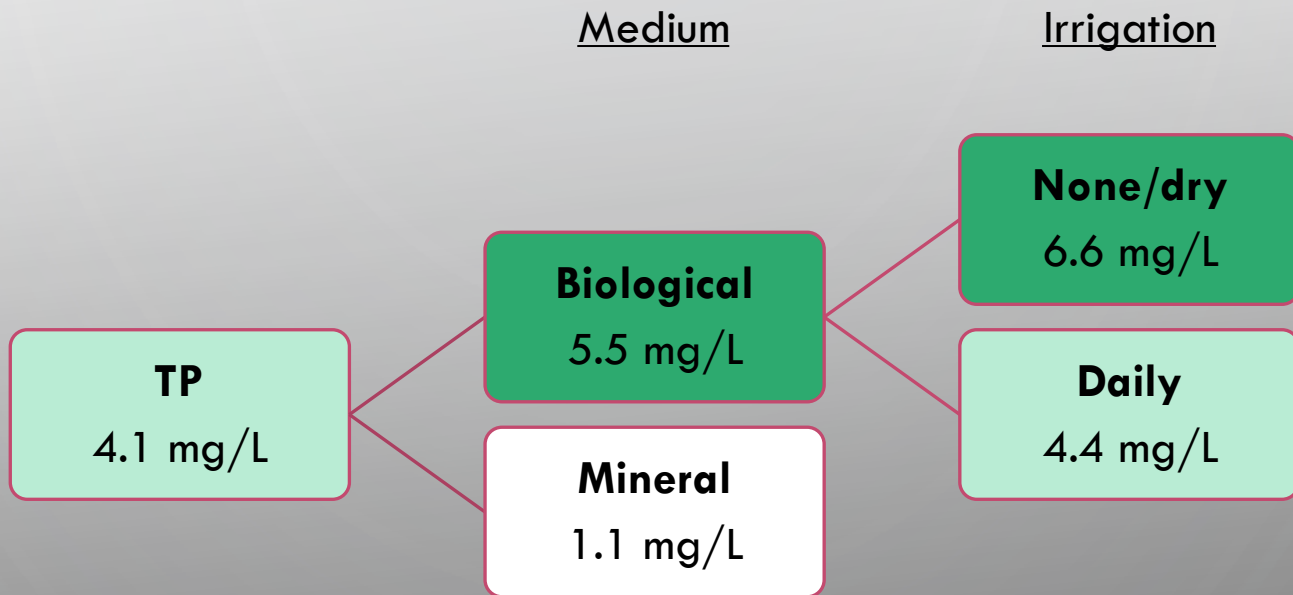
ANNUAL VOLUMETRIC RUNOFF COEFFICIENT



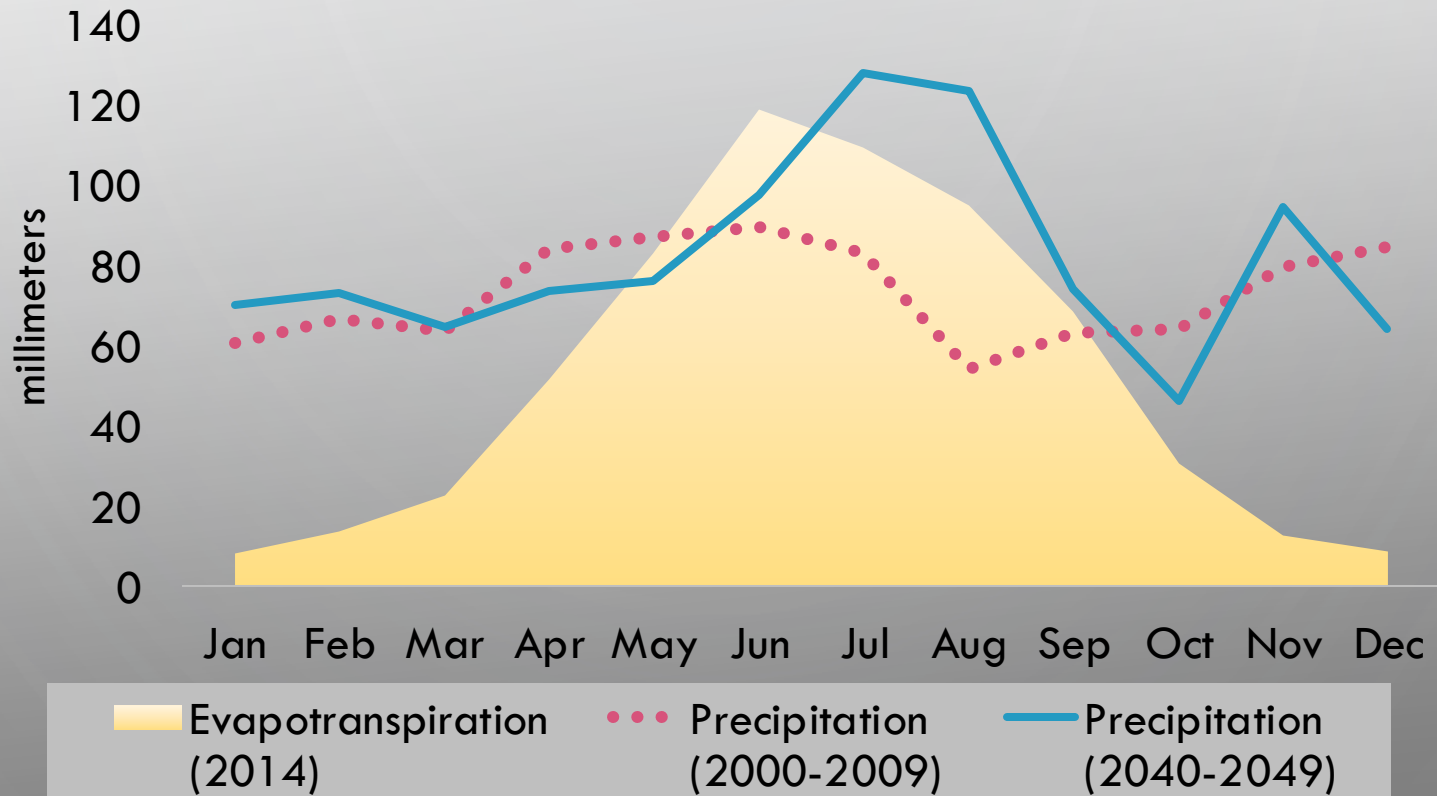
PEAK RUNOFF

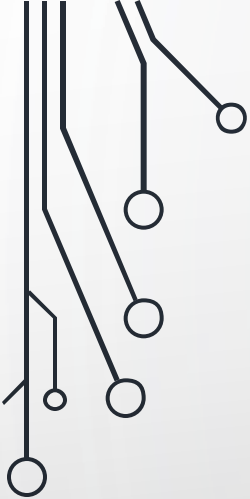


TOTAL PHOSPHOROUS

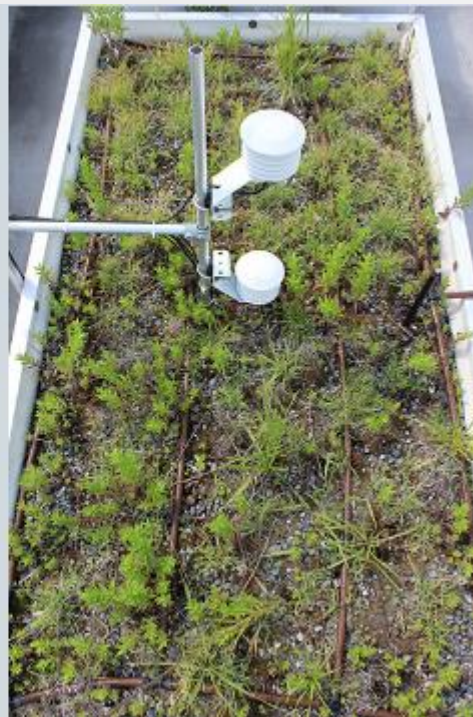


MAXIMISE EVAPOTRANSPIRATION WITH FREQUENTLY (RE)CYCLED IRRIGATION





Irrigated
High OM



Irrigated
Low OM



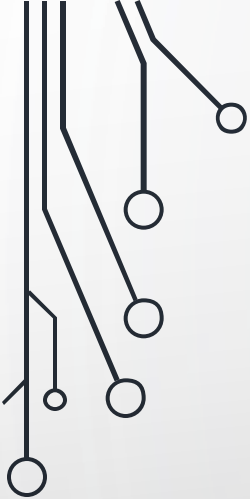
NATIVE
PLANTS

Dry
High OM



Dry
Low OM





Irrigated
High OM

SEDUM



Irrigated
Low OM



Dry
High OM



Dry
Low OM



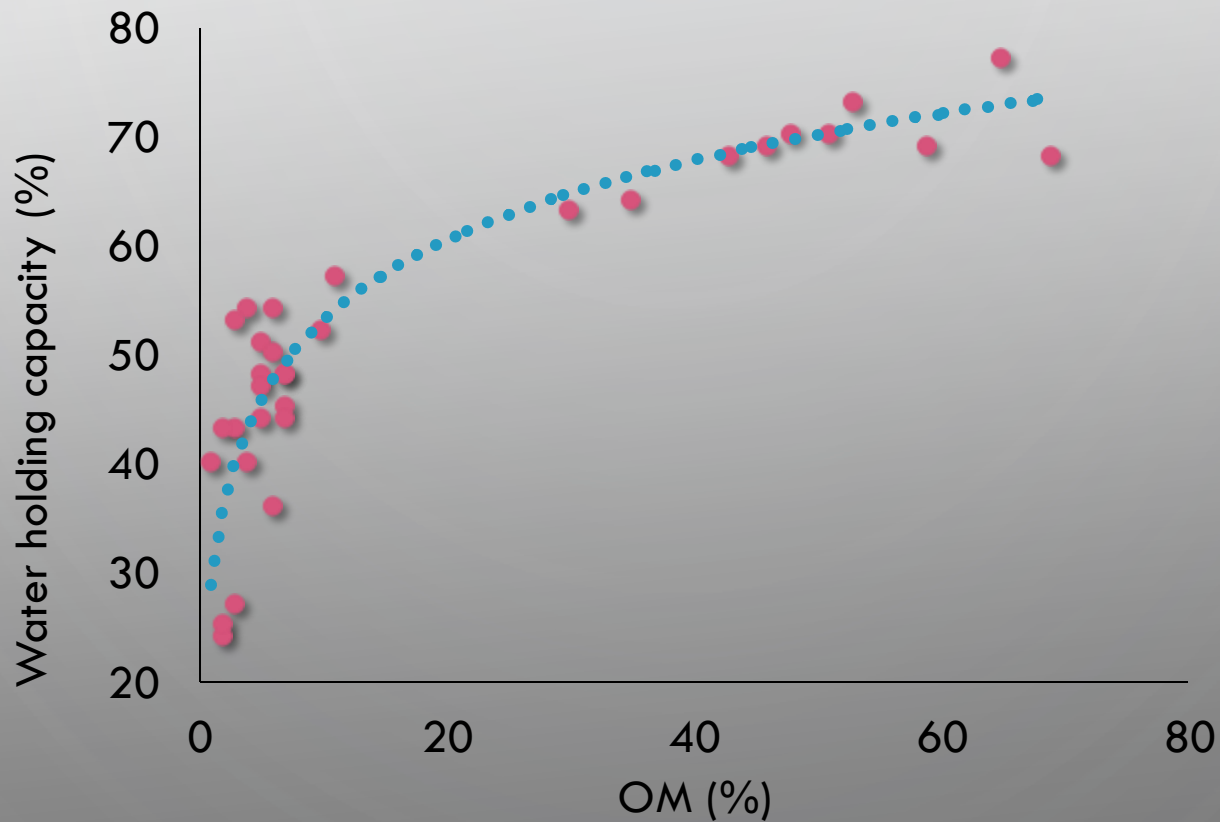
GREEN ROOFS OF SOUTHERN ONTARIO



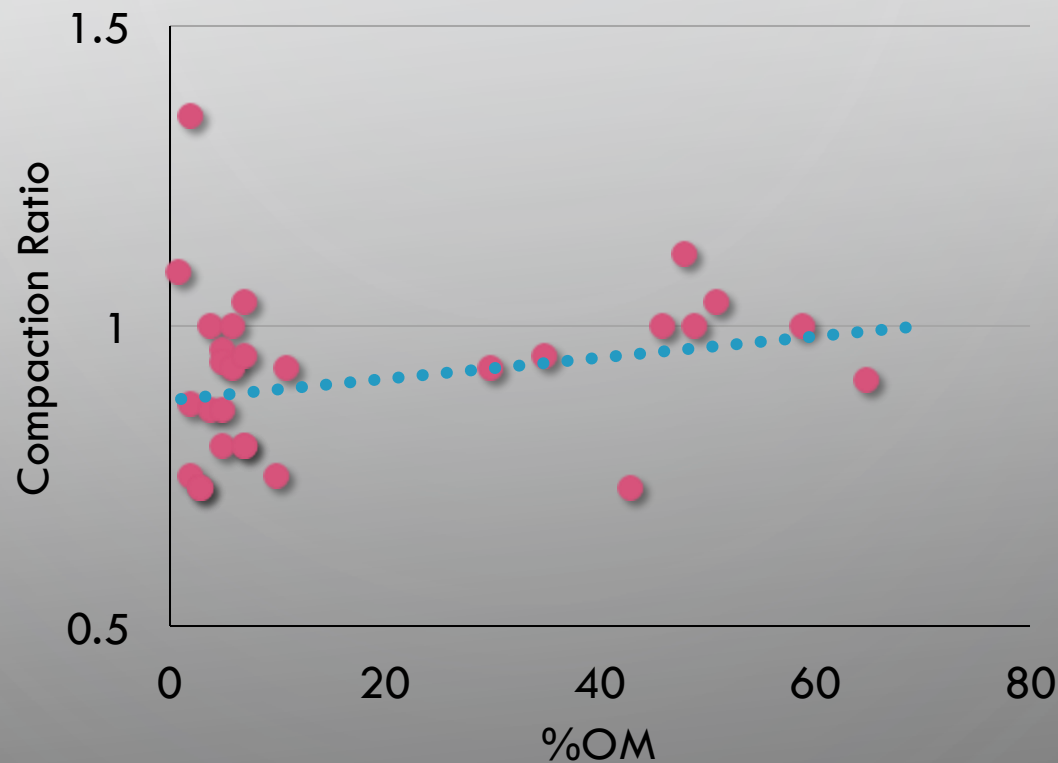




INCREASED WATER HOLDING CAPACITY ASSOCIATED WITH HIGHER OM



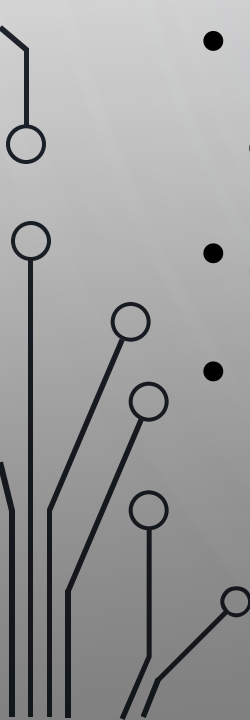

HIGH OM PLANTING MATERIAL DOES NOT LOSE DEPTH (UP TO 18 YEARS)






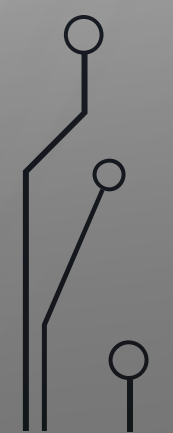
HIGH OM PLANTING MATERIAL

EXAMPLE: AGED COMPOSTED WOOD FINES

- Retains more water
 - Is lighter weight even when saturated
 - Has not been associated with the development of moss on older roofs
 - Supports many varieties of vegetation
 - Is associated with increased P in discharge water
- 
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IRRIGATION

- Sedum roofs may not need any once established
 - Native herbaceous planting requires regular irrigation, which can be moderated with soils sensors
 - Any kind of green roof can be irrigation at least daily if maximizing evapotranspiration is important for water balance targets.
- 
- 



PLANTING AND DEPTH

- No significant SWM improvement of 15 cm over 10 cm
 - Planting plans benefit from extra depth
 - No significant SWM effects between natives/sedums
 - Lowest maintenance roofs feature a combination of sedums with native plants, with minimal disturbance
- 
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ACKNOWLEDGEMENTS



Civil Engineering
UNIVERSITY OF TORONTO



gritlab
GREEN ROOF INNOVATION
TESTING LABORATORY



**NSERC
CRSNG**

