**Potential MDC for Green Roofs**

for MDC Team discussion on January 12, 2015

With notes from Sally Hoyt (1/23/15) after discussion with Elizabeth Fassman-Beck on 1/20/15. Notes represent the content provided by Elizabeth unless otherwise marked.

Track changes shown for the MDC text for Annette’s benefit.

1. MEDIA SPECIFICATION. The maximum organic fraction of the media shall be 10% by volume.

*Notes:*

* *Specification should be by VOLUME not by WEIGHT because the lightweight aggregate used in many green roofs has a density that varies greatly based on moisture content. If the specifications for weight are based on dry density (as is typical of other materials), the media composition could vary significantly based on the moisture content of the media at the time of mixing.*
* *To address the issue above: (a) the density specific to the moisture content can be obtained and use to convert volume to weight or (b) mixing with dry materials could be required.*
* *Sally’s opinion: It’s not necessary to call out the lightweight aggregate (LWA) in the MDC. Designers will use LWA in extensive roofs and may use other materials in intensive roofs. It’s also not necessary to give a minimum of 5% as an MDC, since we are requiring vegetative coverage.*
1. MEDIA DEPTH. Green roof depth shall be calculated as the design storm depth in inches divided by the plant available water (PAW) for the specified media. The maximum design storm depth is 1.5 inches.

*Notes:*

* *Dmedia = (Design storm depth) / (PAW)*

*Note that I used design storm depth instead of runoff reduction depth.*

* *Plant available water (PAW) can be obtained from media suppliers. It does not need to be tested on site for a specific delivery.*
* *Research to date shows a maximum runoff reduction of approximately 1.2". However, Elizabeth and Bill suggest it is reasonable to allow a 1.5" design depth, to allow green roofs to be implemented in coastal areas of NC with the 1.5" design depth.*
* *For roofs with media deeper than one foot, it could be assumed that regardless of the PAW, the maximum runoff reduction depth (1.5") is provided. We may or may not want to include that in the MDC.*
1. MINIMUM MEDIA DEPTH. The minimum media depth shall be 4 inches. Lesser depths may be approved on a case-by-case basis.

*Notes:*

* *Roofs shallower than 4” have a more limited plant palate, may require irrigation, and are susceptible to plant die off. While their use is possible, the risk of maintenance problems that affect stormwater treatment is high. Aesthetic outcomes may also be compromised, contributing to perception of “failure”.*
* *Sally’s opinion: The text from our last meeting is somewhat ambigious about when and why a shallower roof would be approved. I looked for examples of similar requirements in the other MDC and added the case-by-case basis text based on the Wetlands. The statement could be extended with “...on a case-by case basis when owners agree to provisions that will ensure the long term performance of the practice.”*
1. VEGETATION SPECIFICATION. The green roof shall achieve a 75 percent vegetative cover within 2 years.

*Notes:*

* *Sally’s opinion: I looked at ASTM E2400-06. It provides good guidance, but is not prescriptive . It is a good reference in the design section, but does not need to be an MDC.*
* *The 75% cover can be established through the following planting specs and by providing adequate maintenance after installation:*
	+ *install a pre-planted or pre-established system with a minimum of 75% vegetative cover*
	+ *plant plugs at a density of 2-3 plugs per square foot of area*
	+ *spread cuttings (of plants that can regenerate from cuttings) at a rate of \_2.5-5\_ pounds per square foot*
1. DRAINAGE AREA. If the design storm is 1.5", no additional area shall be drained to the green roof. For areas with 1" design storms, an additional area up to 50% of the green roof area may be treated with the green roof. If additional drainage area is added, the runoff shall be discharged to the green roof in a manner that distributes the flow throughout the green roof area.
* *Sally’s opinion: This criteria starts to get complex and very limited in where/how it could be applied. I’m not sure how complex the MDC are getting. Should we add this as an MDC? Or should we say that green roofs only treat their footprint?*
* *This could be given as*

*Dmedia =[(DAgreenroof)/(Agreenroof)]\*(Design storm depth) / (PAW)*

*Where the maximum value of [(DAgreenroof)/(Agreenroof)]\*(Design storm depth) is 1.5”*

* *Acceptable methods to distribute runoff throughout green roof area:*
	+ *by subsurface when the system includes a basal moisture retention mat*
	+ *by irrigation system (e.g. drip, spray)*
* *NOT acceptable: sheet flow*
1. RECOMMENDATION: SLOPE. The green roof should have a slope (or pitch) of no greater than 15 percent.
2. RECOMMENDATION: PROTECTION OF ROOF DRAINAGE. Roof drainage features such as inlets, gutters, pipes should be protected from intrusion by vegetation roots and growing media.
3. RECOMMENDATION: CONSTRUCTION PHASING. Green roofs should be the final portion of the roof system installed to prevent excessive trampling of vegetation and compaction of media.
4. RECOMMENDATION: ACCESS. Consider construction and maintenance access when locating green roofs.