From: Elizabeth Squires [mailto:Squires@vikacapitol.com]
Sent: Tuesday, June 18, 2013 12:20 PM
To: Stack, Rebecca (DDOE); VanWye, Brian (DDOE)
Cc: Kyle Oliver; Soneil Charles; Shawn Frost
Subject: Discussion Re: The 2nd Proposed SWM Regulations & Guidebook

Rebecca/Brian –

We've had some time to review the recent release of the updated SWM rules and guidebook! The significant amount of time and effort put into the coordination of these publications is evident and very much appreciated.
In continuation of this collaboration, we've spent a significant time reviewing the technical & design segment of the regulations, specifically applying these regulations to typical development sites in DC.

While the design examples are helpful to understand the computations, it's our opinion that they do not quite exemplify typical sites in dc for the following reasons

- Example 1
  - Site is 25% impervious
  - Preservation of Natural Cover - How will the building be constructed without disturbing the the 8,000 sf of natural cover?
  - Site is routing impervious parking lot towards the bio garden, which is adjacent to the building. It is not good engineering practice to direct water towards a building.
- Example 2
  - This is the only example built to 100% of the site area, however it's a substantial improvement plan which has reduced SWRv
  - Assumes media & drainage porosity of green roof to be above the recommended quantities in equation 3.1 (recommended = 0.15). We understand an alternative porosity can be utilized if documentation is provided, but for preliminary computations, we have used the recommended values
- Example 3
  - Site is 20% impervious
  - Assumes the site has good infiltration

Therefore, in hopes of becoming more acquainted with the upcoming SWM regulations, we've applied them to a current site development which is to be submitted after the new regulations take effect. We believe this site to be "typical" for the downtown area of DC.

Site Info: 1.6 acre multi-use building which is would be a major site improvement, and zoned to be built to 100% of the lot area.

Total Site Area	71,217 sf
Impervious Cover	71,217 sf
Is site located within the AWDZ	No
Is site located within the MS4?	No
What type of activity is the site undergoing?	Major Land Disturbing
Total SWRv Required	50,607 gal
Existing Soils	Urban
Existing CN	71

The chart below is a summary of our analysis. Please note our overarching concerns regarding the 3 options:

1. Greenroof only –

- Required surface area – previous sites similar to this, experienced troubles meeting or exceeding 50% of the site/roof for green roof.
  - 71% is near impossible due to conflicts with building equipment & access requirements
  - Totally eliminates use of roof area as amenity to building
- Depth to meet detention requirements –
  - 18"+ of media will have a significant impact to the building height & structural designs for the building.
  - Can the additional storage volume from Option 2 to Option 3 be used as surplus SRC since it will be experiencing evaporation/transpiration?
- 71% of the site to be green roof at 18.5" media depth is the only way to meet both the retention & detention requirements using green roof only?

2. Rainwater Harvesting Only
   - Why doesn't increased volume proportionately decrease the necessary storage volume? (option 4 to Option 5)
   - Could a design example be provided for a tank that's intended for storage for the retention & detention volumes? (Tank Design #2)
   - When utilizing only a rainwater harvesting tank, no matter how big we make the tank, the detention volume is never satisfied. (option 5 vrs option 6). It doesn't appear a site can utilize a cistern only for these requirements?
3. Green roof and Rainwater Harvesting
   - Minimum benefits in providing multiple facilities – (option 5 vs option 7)
     - An oversized rainwater harvesting tank provides similar benefits to utilizing both Green roof & rainwater harvesting tank. Developers will likely opt for option 5, as it reduces design & construction costs, inspection & maintenance demands, material costs, etc.
     - If a literal "greener" dc is the intention of these regulations, we believe more advantages should be placed on the green roof volume
   - Computation questions –
     We want the treatment volume from the greenroof to will overflow to the RWH tank; but it is unclear how to incorporate overflow volume from green roof (which is provided by the compliance calculator in gallons) into the CDA of the rainwater harvesting calculator
   - A 50% green roof at 19" depth, in addition to a 76,000 gal RWH tank is the only way to meet the retention & detention requirements?
4. General -
   - If the onsite detention requirements cannot be met, can this deficit be compensated with the in-lieu fee?
   - This analysis has raised concerns that these implications could inhibit development within DC, and/or prevent other social benefits, such as:
     - Creating outdoor livable areas – ie: open space for community gardens, roof top amenities, etc
     - Inhibits other environmentally beneficial designs (ie – use of rooftops for solar panels, beehives, etc)
     - Monopolizing land ownership & development, as the cost of such developments far exceed single family budgets and/or small business development

	Option	% roof to be Green roof	Additional Roof CDA	Green Roof Media Depth	Rain Wat Harvesting Tank (gal)	RWH SWR efficiency (%)	SWRv Provided (gal)	SWRv Surplus (gal)	In-Lieu Fee	2-YR CN	Additional Storage Reqd for 2-yr Storm (gal)	100% SWRv met?	2-yr Storm Control Met?	Notes
Green Roof Only	1	55%	25%	6"	-	-	25,636	-24,971	$87,397	92	36,080	No	No	Min extensive green roof area for min onsite SWRv. Previous sites were able to get approx 40-50% roof
	2	71%	-	10"	-	-	50,902	295	-	85	23,130	Yes	No	Considerable level of SWM, without attaining 2-yr detention requirements
	3	71%	-	18.5"	-	-	50,902	295	-	71	-	Yes	Yes	Can the additional detention volume incorporated into the GR be credited towards potential SRC credits?
RW Harvesting Only assume 100% roof goes to RWH tank	4	-	-	-	76000	71%	50,808	201	-	86	23,470	Yes	No	
	5	-	-	-	100,000	94%	67,212	16,605	-	81	16,780	Yes	No	Why does a 24k gal increase (from option 6), only result in a 7k decrease in detention requirement?
	6	-	-	-	200,000	94%	67,212	16,605	-	81	16,780	Yes	No	No matter how big we make the tank, can't meet detention requirements. How do we design for tank design 2?
Green Roof, overflow* & remaining roof area to RW Harvesting	7	40%	25%	6 in	76000	91%	67,007	16,400	-	81	16,830	Yes	No	Very little benefit to incorporating green roof to rainwater harvesting. Owner more likely to go with option #5.
	8	50%	25%	19 in	76,000	94%	70,013	19,406	-	71	-	Yes	Yes	

* unclear how to incorporate overflow from green roof into the CDA of the rainwater harvesting tank spread sheet

In sum, while we fully understand the demands of the Clean Water Act, and the necessity to implement updated stormwater management regulations, we wanted to share this "real world" example, and confirm that we have a comprehensive understanding of these proposed regulations and their impacts on DC development.

If possible, can we have a call to discuss this analysis? We want to make sure we have a proper understanding of these regulations.

Again and again, **<u>thank you</u>** both for you hard work and ensuring a smooth transition for these regulations.

Sincerely,

Beth Squires, P.E.
Project Manager

VIKA Capitol, LLC
DC CBE # LS94935022015

4910 Massachusetts Avenue, NW
Suite 214
Washington, DC 20016
(202) 244-4140
(202) 244-4196 (fax)
squires@vikacapitol.com

~~~~~~
~~~~~~