



Fion L Maccree &lt;fmaccree@gmail.com&gt;

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**Fwd: Fw: Alfred Solar I, LLC**

1 message

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**Daniel Acton** <actond45@gmail.com>

Wed, Jan 12, 2022 at 6:14 PM

To: Fion L Maccree <fmaccree@gmail.com>, Matthew Snyder <matthewfsnyder@gmail.com>, Wendy Dailey <wendydailey.town.alfred@gmail.com>, Kenn Burdick <kenn.burdick@gmail.com>, "Town of Alfred (Clerk)" <town.alfred@gmail.com>

Dear Board,

I just received this from Fred Sinclair and forwarded it to our consultants for their review and opinion.

Dan

----- Forwarded message -----

From: **Frederick Sinclair** <fpsinclair@yahoo.com>

Date: Wed, Jan 12, 2022 at 5:00 PM

Subject: Fw: Alfred Solar I, LLC

To: Daniel Acton <actond45@gmail.com>, William Dailey <williamdailey48@gmail.com>, Shawn Grasby <mmtceo@frontiernet.net>

----- Forwarded Message -----

From: Scannell, Luke W (DEC) <luke.scannell@dec.ny.gov>

To: fpsinclair@yahoo.com <fpsinclair@yahoo.com>

Sent: Wednesday, January 12, 2022, 03:39:07 PM EST

Subject: Alfred Solar I, LLC

Good afternoon Fred,

The project that I was talking about is the Troupsburg Community Solar Project, Permit ID NYR11H173. I was only partially involved, my colleague Abigail Johnson handled site inspections and most of the follow up. I do not have the inspection reports or photos she took, you would need to FOIL those from her if you want more information on this project. In summary, this project was located on steep slopes with erosive soils, and without adequate controls experienced significant erosion problems. Slope averages were 56% soil slope phase C (8-15%), 18.8% soil slope phase D (15-25%), and 17.7% soil slope phase E and F (steep and very steep). With the remainder undefined in the USGS web soil survey. During construction they experienced significant erosion problems, and based on our experiences with this site we heightened our review and requirements for solar projects in this general area.

Here is the questions from Mary Steblein and responses I provided. She had some questions about a different project as well, so if it seems to be cut off somewhat that is why.

**Q1:** *In the other (a community solar project), the method below was used, which yields a CN that is **less** than meadow (78 in these soil conditions). They are showing a **reduction** in the peak flow rates – strictly because of these change in the CN from 78 to 75. At a minimum, I would think their calculation would yield 76 (not 75, based on rounding), but more importantly, and I am unsure that gravel can be treated like a soil in this calculation(if S is intended to be “soil moisture retention” then it doesn’t seem reasonable to use gravel the same way).*

The runoff curve number (CN) is based on a weighted average of ground cover and soil type. The underlying soil types are described in county soil maps. Site and grading plans and survey maps outline existing and proposed ground cover. CN values for specific locations are determined from the tables presented in TR-55. The proposed limited use pervious gravel driveway will be modeled with a curve number of 75. The curve number of 75 for the pervious driveway was developed using the following method:

$$S = 1000/CN - 10; CN = 1000/(S+10)$$

where:

Depth of gravel section = 8 inches

Assumptions = 40% Voids for limited use pervious gravel

S = Potential maximum retention after runoff

S = 8 inches of limited use pervious gravel with 40% voids (assumption) has a maximum retention of 3.2 inches

$$CN = 1000/(3.2+10) = 75.75 \approx 75$$

(I assume they used the method noted on this page: <https://www.hydrocad.net/curvenumber.htm> but the HydroCAD example uses sand, not gravel).

*I would appreciate your feedback or any DEC guidance on this topic. I am working with a Town Board on the review of this second project, and this roadway is contentious for several reasons (we also have a concern that nearby landowners indicate clayey soils and high groundwater in this area – the Developer won't complete Geotech. There is also on-going discussion from the Fire Code Official about whether that road can support 75,000 pounds). Have you seen the limited use pervious access roads function in areas of high groundwater and potentially limited by poorly draining soils?*

**DEC Response 1:** This is a trend that I have seen and am not yet comfortable with. My preference is that pervious access roads be treated as the existing site condition, i.e. no change in CN. However, it is true that in HSG D soils pervious access roads can provide better infiltration than the surrounding area and I have seen evidence of this on solar sites. The calculation they provided is as presented in TR-55, so I don't think that it is incorrect except for the rounding. I agree with you that it doesn't seem to be appropriate; applying it to gravel always strikes me as an odd application of this equation. There is unfortunately no official guidance on this that I am aware of, so for now I have been accepting it.

Regarding your second question, I do not think I would consider this type of road appropriate for heavy equipment on a site with high groundwater and poorly drained soils. My experience is that where Towns have required these sites to meet fire code, they did not find this road detail to be sufficient regardless of depth to groundwater. Similarly on wind turbine projects where they will need cranes to access the sites, they did not consider this road detail to have sufficient load bearing capacity. When you factor in persistent wet soils I would not expect this road design to adequately address the anticipated design needs.

**Q2:** *Another question came up during the second project I referenced in my email.*

*If the applicant is installing level spreaders in accordance with guidance the DEC has provided for solar facilities – would the level spreaders be modeled the way the limited use pervious access road - that is, no change to the CN potentially - it would be the existing site condition?*

*That is – would the level spreaders change the hydrology of the site?*

**DEC Response 2:** Some clarification to start, the DEC guidance is not clear that level spreaders should always be along the contours of the slope. It assumes that solar array rows are along the contours, but more often than not they aren't. Putting level spreaders along the drip edges can definitely concentrate flows in some circumstances.

Additionally, level spreaders don't need to be installed for every row of solar panels in an array. I have been recommending that they be spaced as per the water bar/compost filter sock detail. This is generally effective up to 10% slopes. Highly erosive soils may require additional considerations.

As far as modeling, I have seen them modeled two ways. The first is as you suggest, the panels are ignored and the underlying conditions are assumed for the CN values. For projects in agricultural areas this is typically meadow to meadow, however if they did land clearing they might be converting trees to meadow, et cetera.

The second method is to model the level spreaders as storage areas to show the offset in drainage flows. This is typically done on slopes steeper than 10% when the engineer has to show his calculations. This is not very common.

*Q3: He is calling the level spreaders "a novel approach", yet my understanding is that it's one of the options meant to be used for solar facilities. I don't see any guidance that leads me to believe level spreaders would automatically trigger Scenario 2.*

*He keeps pushing that the level spreaders are a "major change" in site hydrology. There is a portion of the site where trees will be removed, actually about a quarter of the site (and this where their use of 75 for a pervious road means they still don't alter hydrology even though the woods go from 77 to 78). But if level spreaders are modeled as the land below, then there's no "major change".*

*As for the road, we are conditioning site plan approval on geotechnical testing – so we have a way to address that (it could still lead to a modification in the future, if they have to go to an impervious road then they will need post-construction practices in a Scenario 2 situation).*

*I look forward to your feedback – namely, that level spreaders don't automatically trigger Scenario 2, per the DEC's guidance.*

**DEC Response 3:** I can provide some guidance on those issues. First, I should say that this response is not specific to the project you are working on as I have not reviewed any plans or documents for that project.

On your first point, level spreaders are designed to take concentrated flow paths and restore them to sheet flow. This dissipates energy, preventing erosion, and by slowing water down allows for more effective settling and filtering of the storm water. Because level spreaders are more porous than most soils and they are flush with ground level they typically decrease stormwater runoff rather than increase it. If level spreaders are correctly designed and installed they are not considered to change site hydrology. Whether or not they fully mitigate the impacts of other site improvements would need to be determined on a site specific basis.

For level spreaders to function correctly they need to be level. On solar sites this means that they need to be installed along the site contours as I mentioned in my previous email. I recommend that they be field checked after installation during a decent rain event to monitor for low spots where water is released as a concentrated flow. Once these spots are identified they can be easily fixed.

One of the main issues that level spreaders help to alleviate is potential concentrated flow paths from the panel drip edges when rows are perpendicular to the slope. I conducted several inspections of a facility on 5-10% slopes that showed signs of erosion during construction along the panel drip edges. At this site the installed level spreaders stopped further rill formation (minor erosion) on the slope. Once vegetation became densely established there were no signs of impact from the panel drip edge. I would be happy to provide photos from my site inspections if desired.

It is worth noting that the Department has observed issues on sites with highly erosive soils and steep slopes greater than 10%. If the site has these characteristics then additional precautions are warranted during and after construction of the site.

I hope that I was able to help answer your questions today.

Regards,

**Luke W. Scannell, PhD, P.E.**

he/him/his

Environmental Engineer, Division of Water

**New York State Department of Environmental Conservation**

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