

**BEFORE  
THE OHIO POWER SITING BOARD**

<b>In the Matter of the Application of</b>	)	
<b>Kingwood Solar I LLC for a Certificate</b>	)	<b>Case No. 21-0117-EL-BGN</b>
<b>of Environmental Compatibility and</b>	)	
<b>Public Need</b>	)	

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**DIRECT TESTIMONY OF NOAH WATERHOUSE**

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**Q.1. Please state your name, title and business address.**

**A.1.** My name is Noah Waterhouse. I am the Director of Solar - Civil Engineering for EVS, Inc. My business address is 10025 Valley View Road, Suite 140, Eden Prairie, MN 55344.

**Q.2. What are your duties as the Director of Solar – Civil Engineering?**

**A.2.** As the Director of Solar Civil at EVS, my role is to lead a group of engineers in providing civil design for solar projects. That leadership includes developing design procedures, establishing scopes with clients, overseeing project execution, and educating staff on Solar Civil specific design principles.

**Q.3. What is your educational and professional background?**

**A.3.** I have a Bachelor of Science in Civil Engineering from the University of Minnesota. I am a licensed Professional Engineer in the State of Minnesota. I have worked as a Civil Engineer at EVS continuously for the past 18 years, and have been doing work exclusively for solar projects for approximately seven years. I became Director of Solar Civil at EVS in 2017. During my career I have been the site design engineer for both government, including military, and commercial projects. I have performed project management and design duties, including field work, regarding grading and drainage,

1 stormwater management, utilities, erosion control, pavement design, and demolition  
2 design. I have also prepared permit applications for a number of projects, including  
3 stormwater discharge permits and various local permits for grading, driveway connections,  
4 and stormwater management. I have extensive experience evaluating drainage and runoff  
5 issues and/or drain tile at dozens of sites, including more than 50 solar projects. In  
6 September of 2021, I was invited by the Indiana Association for Floodplain and  
7 Stormwater Management to serve as an expert panelist at their annual conference for a  
8 session dedicated to education on stormwater impacts of large scale solar projects. I have  
9 designed and/or reviewed the design of four utility scale solar projects in Ohio as well as  
10 10+ similar projects throughout the upper Midwest including Minnesota, Iowa, Wisconsin,  
11 Illinois, Michigan, and Indiana. The projects in Ohio range from 60 megawatts to 195  
12 megawatts. Two of the Ohio projects are currently in design, a third is actively in  
13 construction, and the fourth is complete. The completed project has been observed in its  
14 post construction condition and is performing as expected.

15 **Q.4. On whose behalf are you offering testimony?**

16 **A.4.** I am testifying on behalf of the Applicant, Kingwood Solar I LLC, in support of its  
17 application filed in Case No. 21-0117-EL-BGN.

18 **Q.5. What is the purpose of your testimony?**

19 **A.5.** The purpose of my testimony is to summarize the projected impacts of the  
20 Kingwood Solar Project (“Project”) on drain tile, drainage, and runoff in the area in which  
21 the Project will be located (“Project Area”). I will also address proposed revisions to  
22 certain conditions in the October 19, 2021 Staff Report of Investigation.

23 **Q.6. Have you previously testified before the Ohio Power Siting Board?**

1       **A.6.**   Yes. I previously testified before the Board on two utility-scale solar projects, the  
2       Alamo Solar project and the Angelina Solar project in Case Nos. 18-1578-EL-BGN and  
3       18-1579-EL-BGN respectively.

4       **Q.7    Have you reviewed the Application in this proceeding.**

5       **A.7.**   Yes, I have reviewed the Application, various responses to Staff Data Requests and  
6       the October 29, 2021 Staff Report of Investigation.

7       **Q.8.   How can drain tile be located in the Project Area?**

8       **A.8.**   Based on my experience, locating drain tile will include both desktop and onsite  
9       physical evaluation of the Project Area. Specific measures that can be utilized include  
10      evaluation of aerial images, location of inlets and outlets, soil subsidence, and topography,  
11      all of which can provide indications of the location of drain tile. In addition, fields with  
12      more recent drain tile installations will have GPS mapping of the drain tile which is  
13      standard today when installing drain tiles in fields. Following these measures, physical  
14      exploration allowing drain tile routes to be marked and surveyed can be used. These  
15      physical measures could include:

- 16      • Using an excavator or other small piece of equipment to dig trenches perpendicular to  
17      the suspected drain tile route until the pipe is exposed, where it can be marked and  
18      surveyed.
- 19      • Using a T-handled steel rod during soft soil conditions to press vertically down into the  
20      soil where drain tile is suspected to occur. When the rod touches a tile, the spot is  
21      marked and surveyed.
- 22      • Using a maverick tile finder. A flexible rod is inserted into the drain tile at a known  
23      location. Embedded in the rod is a copper wire that sends a signal to a locator on the  
24      surface. The locator traverses the approximate drain tile route above and when a  
25      positive signal is encountered, the location is marked and surveyed.

26      These methods have been used effectively on most of the projects that I've designed in  
27      similar land uses. A typical effective practice is to review aerial imagery and produce an  
28      exhibit showing likely or possible drain tile locations. The contractor then takes the exhibit

1 into the field for visual observation and determines where to utilize the physical locating  
2 methods.

3 **Q.9. Based on your experience, do you believe there are any unique circumstances in the**  
4 **Project Area that would hinder locating drain tile?**

5 **A.9.** No. It should be possible to identify drain tile in the Project Area using the methods  
6 described previously. If advance identification is not possible, it should be possible, during  
7 construction, to identify damaged drain tile and repair it at that time. Damaged drain tile  
8 generally can be identified by the presence of water flowing out of the ground in an  
9 unexpected location. Excavating the area and following the source of the flowing water  
10 will lead to any broken pipe. The construction period for a project of this nature should be  
11 long enough for an ample number of rain events to reveal any locations in which tile was  
12 damaged but not immediately discovered and repaired.

13 **Q.10. How can drain tile repairs be made after the Project is constructed?**

14 **A.10.** Drain tile can be repaired by excavating to uncover the damaged area, repairing  
15 the damaged tile, and backfilling. Such work can be done with a small excavator capable  
16 of working between the rows of solar panels. I am not aware of any solar projects  
17 requiring drain tile repair after construction, but I have observed the addition of drain tile  
18 within a solar installation for the purpose of correcting an area of poor drainage that  
19 existed prior to the project.

20 **Q.11. What is your overall assessment of the potential impact of the Project on drain tile?**

21 **A.11.** Many megawatts of solar energy facilities have been designed and constructed on  
22 agricultural land similar to the Project throughout the Midwest where drain tile is  
23 commonly used. Unknown drain tile locations can present a challenge, but one that can be

1 overcome through a well-coordinated program of research, preliminary mapping, physical  
2 investigation, locating, surveying, and design. My understanding is that the Applicant will  
3 undertake such a program to ensure that neither the Project Area itself nor adjacent  
4 properties are negatively impacted by damage to existing drain tile networks. Based on  
5 my experience, I do not believe the Project will have an adverse impact on existing drain  
6 tile networks.

7 **Q.12. Based on your experience, will the Project have an adverse impact on drainage and**  
8 **runoff within the Project and in nearby areas?**

9 **A.12.** The Project should not have an impact on drainage, nor should it result in an  
10 increase in runoff from the Project Area. Although the solar panels and some of the  
11 ancillary equipment are impervious, the large gaps between panel arrays to prevent shading  
12 and other open areas, combined with the vegetation surrounding and beneath each panel,  
13 means that drainage and runoff characteristics should not be dissimilar from a farmed field  
14 with crops growing on it. In my experience, the construction and operation of similar  
15 projects to the Project has not led to drainage issues, or an increase in runoff. In fact, when  
16 compared to a fallow field, I would expect the Project to have superior drainage and runoff  
17 characteristics, due to the year-round vegetation maintained in and around the Project Area.

18 **Q.13. Have you reviewed Conditions 31 and 32 of the Staff Report of Investigation?**

19 **A.13.** Yes, I have reviewed those conditions.

20 **Q.14. Do you agree with Staff's recommendation to include those conditions in any**  
21 **certificate that is issued for the Project?**

1       **A.14.** While I am generally in agreement of some form of condition addressing  
2       drainage, I do not agree with Staff's recommendations on Condition 32. Staff's proposed  
3       conditions are below:

4               Condition 31: The Applicant shall avoid, where possible, or minimize  
5               to the extent practicable, any damage to functioning field tile drainage  
6               systems and soils resulting from the construction, operation, and/or  
7               maintenance of the facility in agricultural areas. Damaged field tile  
8               systems shall be promptly repaired or rerouted to at least original  
9               conditions or modern equivalent at the Applicant's expense to ensure  
10              proper drainage. However, if the affected landowner agrees to not  
11              having the damaged field tile system repaired, they may do so only if  
12              the field tile systems of adjacent landowners remain unaffected by the  
13              non-repair of the landowner's field tile system.

14             Condition 32: The Applicant shall ensure that nearby parcels are  
15             protected from unwanted drainage problems due to construction and  
16             operation of the project. The Applicant shall ensure this by  
17             implementing one of the following:

18               a) documenting benchmark conditions of surface and subsurface  
19               drainage systems prior to construction, including the location of  
20               laterals, mains, grassed waterways, and county maintenance/repair  
21               ditches. The Applicant will make efforts to conduct a perimeter dig  
22               utilizing a tile search trench and consult with owners of all parcels  
23               adjacent to the property, the county soil and water conservation  
24               district, and the county to request drainage system information over  
25               those parcels. The Applicant shall consult with the county engineer  
26               for tile located in a county maintenance/repair ditch.

27               b) locate and replace all field tile drainage systems

28               c) agree to compensate parcels owners affected by damage to  
29               functioning field tile drainage systems and soils resulting from the  
30               construction, operation, and/or maintenance of the facility in  
31               agricultural areas for damage to crops or other agricultural activities.

32       Condition 31 is a reasonable and practical approach to avoiding negative impacts to field  
33       drainage of the project area and surrounding properties. I don't believe Condition 32 is  
34       necessary because Condition 31 accomplishes the goal of protecting and repairing damaged

1 drain tile. I also do not agree with part (c) of Condition 32 as it creates a payment obligation  
2 with no specifics and could easily lead to disputes as to the source of damage.

3 **Q.15. Have you reviewed the proposed revisions to those conditions in Mr. Stickney's**  
4 **testimony?**

5 **A.15.** Yes, I have reviewed those revisions. The revisions proposed by Mr. Stickney are  
6 as follows:

7 Condition 31

8 (31) The Applicant shall avoid, where possible, or minimize to the extent  
9 practicable, any damage to functioning field tile drainage systems and  
10 compaction to soils within the facility footprint resulting from the construction,  
11 operation, and/or maintenance of the facility in agricultural areas. Damaged  
12 field tile systems shall be promptly repaired or rerouted to at least original  
13 conditions or modern equivalent at the Applicant's expense to ensure proper  
14 drainage. However, if the affected landowner agrees to not having the  
15 damaged field tile system repaired, they may do so only if the field tile systems  
16 of adjacent landowners remain unaffected by the non-repair, non-replacement,  
17 or non-rerouting of the landowner's field tile system.

18  
19 Condition 32

20 (32) The Applicant shall ensure that ~~nearby~~ parcels adjacent to the Project area are  
21 protected from unwanted drainage problems due to construction and operation  
22 of the project. The Applicant shall ensure this by ~~implementing one of the~~  
23 ~~following:~~ 1) conducting a search of the Project as necessary to locate drain  
24 tiles between the Project area properties and adjacent parcels, consulting with  
25 owners of all parcels adjacent to the properties making up the Project as to  
26 locations of drain tiles on those parcels, consulting with the Greene Soil &  
27 Water Conservation District (the "District") and the Greene County Engineer  
28 to determine the location of any tile located in a county maintenance ditch; and  
29 subsequently a) documenting benchmark conditions of surface and subsurface  
30 drainage systems prior to construction, including the location of laterals, mains,  
31 grassed waterways, and county maintenance/repair ditches or 2) The Applicant  
32 will make efforts to conduct a perimeter dig utilizing a tile search trench and  
33 consult with owners of all parcels adjacent to the property, the county soil and  
34 water conservation district, and the county to request drainage system  
35 information over those parcels. The Applicant shall consult with the county  
36 engineer for tile located in a county maintenance/repair ditch. b) locate and if  
37 necessary replace, repair or reroute field tile drainage systems on the Project  
38 properties. c) agree to compensate parcels owners affected by damage to

1                    ~~functioning field tile drainage systems and soils resulting from the construction,~~  
2                    ~~operation, and/or maintenance of the facility in agricultural areas for damage to~~  
3                    ~~crops or other agricultural activities.~~

4    **Q.16. Do you agree with the proposed revisions to Conditions 31 and 32 in Mr. Stickney's**  
5                    **testimony?**

6                    **A.16.** I agree with the proposed revisions to Condition 31 in Mr. Stickney's testimony as  
7                    the revision provides a reasonable limitation on what should be repaired and also  
8                    recognizes that tile can be repaired, rerouted or replaced. While I continue to believe that  
9                    Condition 32 is not necessary, I agree with Mr. Stickney's proposed revisions to Condition  
10                   32 as it is a more reasonable level of effort that can still be expected to produce the desired  
11                   result of protection from unwanted drainage problems.

12   **Q.17. Does this conclude your direct testimony?**

13                   **A.17.** Yes, it does.  
14



### **CERTIFICATE OF SERVICE**

I hereby certify that a copy of the foregoing was served upon the following via email on  
this 23rd day of February 2022.

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