Worthington Board of Health Review of BWC Wades Stream LLC (hereafter BlueWave) Application for a Large-Scale Ground Mounted Solar Photovoltaic Installation (LSGMSPI) located at 190 Ridge Rd, Worthington, Massachusetts, Hampshire County
12/31/2025

(1) <u>Rapid Stormwater Runoff</u>. Aggregated agrivoltaic panels can cause rapid runoff because the panels are impervious surfaces. If the underlying soil is compacted, poorly maintained, and/or already saturated , runoff can be problematic leading to impacts on nearby septic systems and wells as well as pooling (see below (2) Climate Disruption). While the Blue Wave application shows 3 infiltration trenches; their location suggests they are designed to primarily handle runoff from the roadway and cement pads, not from the solar panels themselves.

BOH Concerns/Health Issues: The water table in the area of the agrivoltaic installation is already high as shown below in the data from the septic systems and wells of the abutters. Title V requires a minimum of 48" to groundwater. These systems have required special variances to allow for the high groundwater levels in the area.

Map/Lot	Address	Owner	Ground water	Well depth
407-26.2	138 Ridge Road	95 Dalton Ave, Nominee Trust	#1:56" #2: 46" (1996)	
407-28	190 Ridge Road	Tim Sena and Catherine Rude-Sena	#1: 34", #2: 36" #3:44", #4: 40" (2007)	
407-29	140 Buffington Hill Road	Matt and Annie Lagoy	#1: 22"; #2: 23" (2007)	
407-34	141 Buffington Hill Road	Karin Muller	#1: 28" #2: 29" (2003)	
407-35	151 Buffington Hill Road	Former Buffington Hill Partnership		45 ft. (DEP, 2004, now abandoned)
407-134	Worthington Golf Links	David and Helen Pollard	32-36" (estimated) (2017)	175 ft.
407-143	370 Huntington Road	Henry family	4 feet(estimated; based on dry basement)	

407-145	110 Buffington Hill Road	Stephen Szewczyk	#1: 44” #2: 36” (1993)	
407-147	87 Ridge Road	Michael & Kiersten Marich	>72” (estimated) (2017)	

(1) Rapid runoff can cause septic system flooding that could impact effectiveness and cause backups and failures. A flooded septic system can leak untreated wastewater into nearby water bodies, wells, or yards, posing a variety of health threats.
(2) Rapid runoff can cause pollution/contamination of nearby private wells and the public water supply. The data suggest that the prevention of negative impacts depends on effective site management that integrates farming and industrial practices. This coordinated approach to managing (the agrivoltaic installation is not identified in the plan.
The BOH requests (1) Perc tests with deep holes at several different locations within the site to determine current permeability of soils and depth to groundwater. (2) DEP determination of the safety of the Ridge Road installation for the adjacent public water supply.

(2) Climate Disruption: Worthington lies on the east slope of the Berkshires. According to a Mass.gov site (www.mass.gov/info-details/top-impacts-in-the-berkshires-and-hilltowns-region#most-urgent-impacts---human-sector 2022)), ongoing hazards include temperature extremes and changes in precipitation patterns with accompanying changes in patterns of both soil conditions and surface and ground water flows. In addition, acid rain continues to be a problem in this area (https://www.umass.edu/water-resources-research/sites/default/files/2025-11/Report%202025_Final.pdf?1764462992),
BOH Questions/Health Concerns.
(1) Acid rain can accelerate the leaching of zinc and iron from the galvanized iron supports (galvanic corrosion). Farm equipment and maintenance practices can further cause scratching or wear that, in turn, can allow rusting of the steel and lead to iron leaching into soil and water. Because of the large number of panels and the many thousands of support poles, local wells that are fed by groundwater and runoff as well as wells in the recharge area, may have higher levels of both. Symptoms of zinc toxicity include diverse abdominal effects (vomiting, diarrhea), inflections and flu-like symptoms. Symptoms of iron toxicity include abdominal effects and liver damage.
(2) The areas under solar panels are cool, moist and shady with the likelihood of tall grass and/or dense vegetation, the preferred environment for the ticks that carry Lyme and related diseases. The fencing may prevent predators from entering the area and permit an explosion in the populations of vectors such as tick-carrying mice.

(3) Standing water as a result of poor maintenance can lead to a higher incidence of mosquitoes leading to exposure to viral diseases such as West Nile Virus and Eastern Equine Encephalitis
The BOH would like to see a plan that indicates how the operator would monitor and address issues associated with tick infestations, mosquito-attracting standing water and galvanic corrosion. (see also Rapid Stormwater Runoff above

(3) Solar Panel Cleaning. https://www.havells-sylvania.com/solar-farms-and-water-the-surprising-truth-about-water-usage/ (8/20/25): BlueWave agrivoltaic installations require periodic cleaning and regular maintenance to ensure the panels operate at peak efficiency.. Solar panels are generally cleaned every 12 to 18 months to remove dust, bird droppings, and debris that block sunlight. For "agrivoltaic" or "dual-use" projects, where the panels are raised 8 to 10 feet off the ground**,** specialized cleaning equipment is needed.
BOH Questions/Health Issues: The proposed agrivoltaic installation is surrounded by woodland and open fields, with a high likelihood of significant bird droppings and accumulating debris from trees.
(1) It seems likely that cleaning will need to occur more often than annually. Is this the case?
(2) Who would operate the needed "special" cleaning equipment?
(3) Does this equipment add to the possibility of damage to the underlying support structure including scratching and removal of the galvanized material protecting the poles from rust.
(4) Are any chemicals used in the cleaning process and does the water used deplete local water supplies?
The BOH requests answers to these questions.

(4) Noise and Health Complaints: While agrivoltaic installations are generally considered quiet compared to other power generating systems, there have been noise complaints, especially in residential and rural communities. Noise sources include: (a) the tracking system motors that tilt panels throughout the day (a mechanical sound that can be heard at distances of up to 1,000 meters depending on the number of panels and atmospheric conditions); (b) inverters/transformers (a constant low-frequency "hum" typically around 120 Hz that some have described as "irritating" or like "living in a machine shop").The hum can vary depending on the electric load**.** (c) cooling fans for heat management (broadband noise) and (d) construction noise including noise from heavy machinery and pile drivers **BOH Concerns/Health Issues: The 190 Ridge Road location is both residential and rural. While state regulations (310 CMR 7.10) set noise limits (e.g. no more than 10 dB(A) above ambient or pure tones); response to noise can be highly subjective and can affect both humans and animals (and what affects animals**

affects humans). The Worthington Board of Health is responsible for handling any facility-related noise or other health complaints. Decibel levels are not the only concern: we have received noise complaints related to electric dog fences and other presumably "quiet" sources.
(1) If we do get noise complaints, who is responsible at BlueWave for handling this type of concern and what is their track record for responsiveness?
(2) What if there are other physiological complaints (e.g. nausea, headaches etc.)
(3) Might the agricultural requirements coincident with the solar panels and their infrastructure, require noisier than typical farming equipment?
(4) Might there be construction noise as part of maintenance or repair/replacement of panels and electric equipment?.
The BOH requests copies of any noise study conducted during operations and over time from a similar agrivoltaic system. Also, information about any noise complaints BlueWave may have received associated with their agrivoltaics installations. The BOH would also like the health officer from BlueWave identified, with information about background, experience, and availability.

(5) Security, becoming an "attractive nuisance": In Massachusetts, an attractive nuisance is a dangerous, human-made condition on private property that entices children to trespass, making the landowner liable for injuries even if the child is trespassing, provided the owner knew or should have known about the risk and failed to take reasonable care to protect kids, who often don't recognize the danger. Key examples include unfenced pools, machinery, or construction sites**. BOH Concerns/Health issues: The facility is located within easy walking distance of the Russel H. Conwell elementary school. There is no equivalent, heavily fenced industrial site in Worthington. Injuries can come from trying to breach the security fence; vandalism of the solar panels and the other electrical equipment leading to cuts or burns.**
The BOH requests that BlueWave delineate their approaches to preventing vandalism and access to the site by curious children.

(6) Buried Electrical Lines: Most agrivoltaic installations require electricity transmission between panels and other system components using buried electrical lines contained in PVC or other sheathing. **BOH Concerns/Health: There is no indication of how many lines there would be, how deeply they would be laid, and how they would be protected from damage from weather conditions (freezing and thawing) or mechanical factors (agricultural activities, cleaning and maintenance activities). They can cause system failures (see below), and/or pollute the agricultural land preventing later use if they are not properly disposed of or maintained. This can affect food supplies should there be an effort to return the land to food production.**

The BOH requests details about these buried lines and how they will be monitored and maintained.

(7) Transformers and Inverters: These are required to both convert the DC current produced by the solar panels to usable AC current as well as to boost the solar cell production for efficient long-distance transmission. BlueWave uses both in its installations.

BOH Concerns/Health issues: Transformers contain oils and other toxic chemicals. Oil spills/releases (even of presumably "non-toxic" oils) can pollute water supplies and require costly and difficult cleanup. Oils can also cause fires. Inverters can fail as a result of overheating, power surges and outages that cause grid instability, arcing, etc. They can have circuit boards that use heavy metals, and can generate significant heat leading to fires, toxic smoke, soil and water contamination, and hazardous waste. Specific risks depend on the specific transformer or inverter used and have been well-detailed elsewhere.

The BOH requests that Blue Wave identify the specific transformers and inverters likely to be used, including information about their potential toxicity as well as details about maintenance procedures and pollution monitoring and mitigation approaches.

(8) BESS (battery storage). The BOH shares in the many concerns related to function and maintenance of the battery electrical storage units (fires, toxic releases to both air and water, injuries that have been clearly laid out by Beth S. Greenblatt (Beacon Integrated Systems) in her Nov. 18, 2025, review of the BlueWave application as well as by many others both in Worthington and elsewhere.

The BOH requests answers to the questions raised by Beth S. Greenblatt in her review and well as by many other concerned local citizens.

(9) Waste Disposal. The agrivoltatic facility has an estimated lifespan of 20-25 years. The applicant; however, indicates that the rapidity of technological change prevents the identification of specific core components (e.g. the Inverter and BESS units) because construction is not likely to occur for several years and designs change. **BOH Questions/Health Issues: The likelihood of repairs and updates suggest that waste disposal could become an issue well in advance of the 15-20 year time frame indicated by the applicant. If discarded infrastructure is stored on site or simply abandoned, this could cause both physical endangerment and environmental pollution, including affecting future agricultural viability of the site. Among the questions:**

(1) How often are solar panels likely to need replacement because of either damage or changes in technology?

(2) How would discarded equipment be stored and/or disposed of?

(3) Would any infrastructure (e.g., conduits and buried transmission wires) be left to pollute the area?

The BOH requests a disposal plan that takes into account both final disposal as well as any interim disposal needs with delineations of approaches to address soil and water-polluting toxicants that may result from waste storage and/or disposal

(10) Overall Maintenance: Underlying many of these concerns is the fact that there is no detailed maintenance plan provided in the application for either the solar array or the agricultural portion of the project. BlueWave Solar primarily acts as a developer. In the past, they sold built projects to long-term owners/operators who then managed the ongoing operation and maintenance. **BOH Questions/Health Concerns:**

(1) Would BlueWave remain the operator?

(2) Who is responsible for assuring that the agricultural activities required as part of the project are properly conducted; i.e., they (a) do not damage the panels or their supports, (b) do not allow the soils under the panels to compact and flood or accrue standing water and (c) do not allow the use of toxic pesticides/herbicides etc. to be used on the property.

The BOH requests a detailed maintenance plan that takes into account the concerns outlined in items (1) – (9) above.

Prepared by Diane Brenner, Dr.P.H.
for the Worthington (Massachusetts) Board of Health