Case Officer: Simon McFarlane
Major Projects Officer
Planning Team D Development Services
South Walks House
South Walks Road
Dorchester
Dorset
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Dear Simon,

Full Planning Application P/FUL/2021/01018

Install ground-mounted solar panel photovoltaic solar arrays, substation, inverter and transformer units, security fencing, gates and CCTV; form vehicular access, internal access track, landscaping and other ancillary infrastructure.

Our Interest

'Save Hardy's Vale' (SHV) is an unincorporated community association[1]. It was formed to protect 190 acres of productive agricultural land in a sensitive and valued landscape, at the heart of the Blackmore Vale, from the significant harm that would result from granting the Application.

The development proposed is for the installation of approximately 200,000[2] metal mounted solar arrays, substation, inverter and transformer units, security fencing, gates, CCTV and the formation of vehicular access and ancillary infrastructure, on a site of 190 acres (77 hectares).

[1] SHV committee members are David Horrell, Catherine Langham, Mark Bentley, Peter Moise and Ian Bryan
[2] Estimates based on the CPRE data range between 150,000 and 200,0000

COMMENTS - PROPOSED CHANGES TO THE NDF SOLAR PLANNING APPLICATION

Save Hardy's Vale responses to the Agent's letter to the Case Officer (24/9/ 2021 15:29)

READ THE SUMMARY

Detailed Sequential Test

1. We fully understand that the decision, whether or not the developer should undertake a detailed Sequential Test, as part of the Flood Risk Assessment, is one for the developer and the local planning authority. That said, we believe the guidance in Flood risk assessment: the Sequencial Test for applicants - GOV.UK (www.gov.uk) indicates that the test is required. Part of the proposed site is in Flood Zones 2 and 3, and it does not appear, from the application record, that a Sequential Test has been carried out for the same type of development on the site in the past.

2. We appreciate that the Applicant would not need to undertake a Sequential Test for a development in flood zone 1 , unless there are flooding issues in the **area** of the development. In this case there clearly are flooding issues - **in the area.**

3. We also appreciate that the Applicant originally considered all the fields within the farm before deciding to restrict the development site to the fields 4, 6 to 13, 16 and 17, and left out fields 1 to 3, 5, 14, 15 and 18 to 27 *"which have been excluded from **the Site** as a result of preliminary environmental assessments and identified planning constraints."*

4. Only the Local Authority would know if the Applicant checked the adopted local plan for other sites that had already been allocated for development and could be suitable for the solar installation being proposed.

5. Likewise, it is not clear from the record, whether the Applicant considered alternative sites that had not been allocated in the local plan, but that had been granted planning permission for a development the same, or similar, to the development proposed.

6. Finally, we do not know whether the Applicant checked, with Dorset Council planning, whether there are any 'windfall sites' in their search area that could be available for development.

7. We believe that, for the reasons outlined, that a more detailed Sequential Test and Flood Risk Assessment should be undertaken.

Flood Zones 2 and 3

8. We appreciate that solar panels can be located in Flood Zones 2 and 3 - but only on condition that the Exception Test is passed. We believe the Applicant would need to show that the development will be safe for its lifetime, and that it won't increase flood risk elsewhere. Given the nature of the river catchment and the area's susceptibility to unpredictable rapid flash flooding, we do not believe it would be possible to meet the two criteria in this case.

9. We are confident that decisions on planning applications will be taken in accordance with the local development plan, and that the Application will be considered on its own merits. Clearly, it is for the decision maker to decide what weight is to be given to the material considerations in each case. We are not convinced that simply because solar developments in Flood Zones 2 and 3 have been approved by other Authorities, that it is a material planning consideration which should attract much weight in this case.

10. It is suggested (bullet point 3) that *"Any flood depths in the nearby vicinity of the proposed solar arrays would be shallow".* While the issue relates to the height of the panels and their safety, we do have concerns that the reference to "shallow" flooding might be misleading. The Applicants Flood Assessment points out that, in places, flooding "nearby" could reach 1 metre. Paragraph 3.28 of the FRA notes: "It has been demonstrated that the access/egress route could flood during the 0.1% AEP event to an estimated depth of between 0.5 and 1 metre, and that in accordance with FD2320/TR23, the hazard rating for this area would a danger for all, i.e. danger for the general public including the emergency services.

11. Paragraph 3.29 of the FRA, states: "it is anticipated that personnel will only be on-site during the construction phase of the proposed development, and for occasional maintenance visits once construction has been completed. There will be no other personnel present at the Site for the majority of the operational lifetime of the development." This appears to be partly contradicted in other Application documents e.g., FRA Table E1: Swale Operation and Maintenance Requirements, and R009 the 'Landscape and Ecological Management Plan' (LEMP) where the 'Specific management requirements' list the frequency of visits to the site to achieve the work listed in the LEMP.

12. The FRA goes on to say that: "The developer and maintenance contractor would sign up to the EA's flood warning service for the local area. This would ensure that all personnel would have sufficient time to leave the Site or reschedule their planned visits." - and at paragraph 3.30 concludes: "that the future occupant of the development would be safe during the design flood event for its operational lifetime. "For the following reasons, we have very serious doubts that this arrangement would work, or be safe. In fact, flood warnings are not available for this area from www.gov.uk/sign-up-for-flood-warnings.

13. North Dorset is a high rainfall area, and there is a significant risk of 'rapid discharge' flash flooding, particularly in the area of the site and its access road. The Lydden River, Parsonage Farm Brook and Short Wood Brook almost surround the site. Their catchment is initially fed by steep sided valleys to the south, which run from the high North facing escarpments and ridges within the Dorset Area of Outstanding Natural Beauty. During intense rainfall events, these tributaries tend to 'flash flood' into the vales - often with little or no warning. Road access routes to the proposed site can quickly become flooded and impassable, and as already noted, a 'danger for all', i.e., for those on the development site, the general public, and the emergency services. Dangerous flash flooding of the access roads around the proposed site has occurred on occasions when no flood warnings had been issued.

14. The tributaries of the River Stour are primarily located in the north of the district, the risk of surface water flooding is far more extensive in this area compared to that south of the ridges. Overland flow routes are primarily located along roads, and isolated ponding occurs in lower lying areas. There are a number of properties and roads shown to be at risk from surface water flooding in the vicinity of the NDF site. It is likely that this risk will grow, due to increased rainfall intensity as a result of climate change.

Hydrologic Response of Solar Farms/Cook and McCuen/No full examination

15. In the Save Hardy's Vale Memorandum about flooding and runoff, we outlined our very serious concerns about the inapplicability of the report's findings to the North Dairy Farm site. In particular, the significant effect the soil infiltration rates, used in the modelling, could have on the findings. We believe that the rates around the site will turn out to be close to zero, and therefore, much lower than the infiltration rates used in the Cook and McCuen modelling. In the Applicant's email, (Rachel Ness, 24 September 2021 15:29) the study is described as representing: "the best available information of the hydrological impacts of solar farms." We note that the Cook and McCuen study appears to be the *only* research undertaken on the subject!

16. Cook and McCuen report that, although the solar panels could concentrate runoff onto the ground, this only has the potential to cause erosion if it falls directly onto bare ground. For this reason, the applicant has concluded that solar farms only significantly change the hydrologic response if patchy grass or bare ground is created between rows.

17. We have examined the 'Hydrologic Response of Solar Farms' paper, and while we are not qualified to calculate and assess how accurately the modelling results will match reality on the proposed site, and while you wait for an expert view from your colleagues, we make the following observations:

- By relying solely on the findings of the Cook and McCuen modelling; and accepting that planting and maintaining grass cover under the PV arrays might avoid additional runoff, and therefore eliminate the need for site drainage, we believe that the possible effects on downstream riparian owners, of runoff from the site during construction and operation of the development, have not been fully examined and properly considered by the Applicants.

- They have not fully considered the impacts of the increasing intensity and frequency of heavy rainfall events. Other than pulling back the panels from Flood Zones 2 and 3

- Little consideration appears to have been given to the fact the proposed site is almost surrounded by waterways; or to the fact that the drainage streams, which divide the site, discharge into the surrounding waterways and flood plains

- It appears that the basic Green Field Runoff volume calculations for the whole site have not yet been undertaken

- The infiltration rates used in the Cook and McCuen modelling are significantly higher than the rates found in the area close to the proposed site, and therefore, for such a large solar development, the report findings cannot be relied upon. This view is supported within the 'Essex Solar Guidance'

- We are very concerned about the prospect of the 'bare earth' construction and removal phases of the proposed development. Clearly, those are the periods of greatest risk of contaminated runoff and increased downstream flooding – and in combination those periods could last for over 12 months!

Runoff can increase/Offsite impact/High velocity

18. Cook and McCuen note that, if the ground cover under the panels becomes bare ground: "the peak discharge may increase significantly, and that storm-water management would be needed." They go on: "It was determined that the kinetic energy of the water draining from the solar panel could be as much as **10 times greater** than that of rainfall. Thus, because the energy of the water draining from the panels is much higher, it is very possible that soil below the base of the solar panel could erode". (See image 1.)

19. As far as we are aware, no existing runoff volume calculations or infiltration tests have yet been undertaken for the site - with the exception of the cabin, inverter, transformer and substation areas. This appears to be contrary to the guidance contained in Dorset's Strategic Flood Risk Assessment. Under 'Drainage strategies and Sustainable Drainage' It notes that: "For proposed developments, it is **imperative** that a site-specific infiltration test is conducted early on as part of the design of the development, to confirm whether the water table is low enough to allow for SuDS techniques that are designed to encourage infiltration."

20. The Applicant acknowledges that Cook and McCuen say: "it is possible that the velocity of water draining from the edge of the panels is sufficient to cause erosion of the soil below." But, even when assuming perfect grass cover, the mathematical modelling results showed a slight increase in runoff volumes and peak discharge times for grass with solar arrays installed. For large solar developments, even a slight increase in runoff can be significant, and increase the risk of offsite and downstream flooding. (See The Essex Guide)

21. The final, and more realistic condition Cook and McCuen modelled, involved the assumption of healthy grass beneath the panels and bare ground in the spacer section, which would simulate the condition of damaged grass resulting from vehicles that drive over the spacer section. In this scenario "the **peak discharge increased by 100%,** which reflected the increases in volume and a decrease in timing."

A realistic possibility

22. We believe that less than perfect grass cover is a real possibility. This is supported by Cook and McCuen who state: "Bare ground beneath the panels and in the spacer section is a realistic possibility." The following images demonstrate why this is a serious concern.

23. The images were originally selected from British Solar Renewable's Web site: Nanteague - 7.7 MW - British Solar Renewables (britishrenewables.com) 7.7 MW 24.7 acres 2015

Image 1. Shows very poor grass cover on the worked-on area. Lower right clearly shows the ground scouring caused by water runoff from the lower edges of the solar panels. The kinetic energy of the water draining from the solar panel could be as much as 10 times greater than that of rainfall. (Cook and McCuen 2013)

Image 2. Bare earth or poor grass regeneration on the working area within the shadow line.

Our View

24. We believe that (as Cook and McCuen note) it is a "realistic possibility" that run off from the areas of solar panels could increase, particularly during the higher frequency of intense heavy rainfall events being experienced now, and which are predicted to increase. Even though the Applicant intends to seed and maintain grass under the PV panels, and introduce landscape enhancements designed to help reduce runoff.

25. Grass takes time to stabilise the ground, and this could be as much as 8 weeks. Potentially that could provide 8 months for intense rainfall events to cause channelisation, increased runoff rates and soil erosion. The Applicants plan to make site visits every six months to check the grass cover, and if needed, reseed.

26. With even a small increase in the rate of runoff from the proposed site, because of the clay soil, the propensity of the land within the site to surface flood, the short distances to the waterways that drain the site and the increase of intense rain events, we believe that turbid water could be discharged from the site into the streams which (almost) surround it, and which eventually feed into the river Lydden.

27. The County's Strategic Flood Strategy requires that new development of land should wherever possible seek opportunities to reduce the overall level of flood risk at the site, for example by reducing volume and rate of runoff through the use of SuDS, as informed by national and local guidance.

28. Guidance also requires that the Applicants FRA should identify the risk of existing flooding to adjacent land and properties, to establish whether there is a requirement to secure land to implement strategic flood risk management measures to alleviate existing and future flood risk. By relying on the Cook and McCuen findings, and deciding that SuDS were not needed, the Applicants have failed to identify and fully consider the risks to the adjacent land and properties.

29. The report findings of the 2013 modelling undertaken by Cook and McCuen are dealt with in 'Section 4 of the FRA and Drainage Strategy report. In the FRA, they are described as providing: "robust evidence that SuDS are not required to manage solar farm surface water runoff." This conclusion appears to conflict with the guidance that: "wherever possible, SuDS should be promoted".

30. The use of SuDS for stormwater storage are aimed at addressing both treatment and hydraulic management of stormwater runoff. It is stressed that the Floods and Water Management Act 2010 requires the use of SuDS. Although underground storage systems can be used, we note that the Environment Agency very much prefer the use of surface level, vegetative systems for conveyance and temporary storage (swales, basins and ponds etc.) if possible.

About Turn

31. Throughout the long process of this Application, and despite all the planning guidance to the contrary (applicants are required to give priority to SuDS as a technique to manage surface water flood risk) the Applicants have maintained the view that the Cook and McCuan findings enabled them to avoid considering SuDS in the panelled areas of the site. However, they have now proposed to add swales to help manage the runoff. We are a little surprised by their explanation that a SuDS has only been proposed "to help reassure the local community local residents." (sic) We believe that the paramount objective for the Applicants must be to design a SuDS to ensure the development reduces the risk of flooding from the site or, as a minimum, to match the existing greenfield runoff volumes, and time to peak flow rate, are not exceeded.

32. We are very concerned that, as the greenfield runoff calculations for the whole site have not been presented, we are unable to feel "reassured" that the proposed SuDS have been properly considered and designed to avoid, or reduce, runoff and flooding for those homes and businesses which are close to, or downstream, of the proposed development. Without the 'numbers' for the existing runoff, and infiltration rates, it is impossible to be certain that the proposed SuDS (swales) are sized and positioned to effectively manage future runoff at the current greenfield rates, or below. Only the rates for the 0.1-hectare substation impermeable areas, the containers, inverters and transformer bases are presented in the FRA.

33. It is also not clear to us, from the planning record, whether the guidance requiring Applicants to consult with Dorset Council LLFA team, the Environment Agency and Wessex Water, was followed at an early stage, to discuss flood risk, including the requirements for site-specific detailed hydraulic modelling and drainage assessment and design.

34. The impact that Dorset's very high rainfall* will have, during the estimated 5-month construction period, **does not** appear to have been properly considered. With a**n** average of nearly 15 wet days each month, **just** "minimising" tracking over the grassed areas may not be enough to effectively protect it, or prevent the site resembling those featured in the attached images. The Applicant's intention that: "Vegetation disturbance should be minimised by using the proposed internal gravel tracks wherever possible**"** and that **"**repeated tracking over grassed areas should be minimised during wet weather conditions" may be insufficient to avoid damage to the ground cover and reduce runoff. *(2nd highest in the UK over the past six months.)

35. We have serious doubts that the swales proposed by the Applicant have been appropriately designed or positioned to avoid additional runoff, or reduce downstream flooding, particularly during the construction phase.

36. The attached images also undermine the Applicants claims about reseeding, and their suggestion that the disruption to the grass and soil would be comparable to ploughing a field. Ploughing might only take a couple of days, but the construction and operational stages of the proposed development would mean the land is drastically transformed from a site that would see minimal usage/disturbance until planting, to one that requires complete year-round accessibility by "transit" vehicles, heavy machines and workers.

37. Farmers and land managers in the area have long recognised the need for Rural Sustainable Drainage Systems to reduce runoff, pollution and flooding, and many have already taken advantage of the support available under the various levels of the Stewardship Schemes. It is not necessary to industrialise the proposed site in order to bring about biodiversity improvements or reductions in runoff and flooding from the farm.

Temporary Construction Compound Area Flooded

38. A serious issue has come to light as a result of the intense rain events and flooding that happened on the 29th ,30 and 31st October, when some 86.3mm of rain fell during the three days. On Saturday 30th, 38.6 mm of rain was recorded between 03:00 to 12:00. Along with local access roads becoming impassable, extensive fluvial and pluvial flooding covered the land selected for the Temporary Construction Compound. While we do not have precise flow rates and flood depths, it is clear in the image that the site chosen for parking and unloading HG deliveries was extensively flooded.

Image 3 – Fields 8, 9, 10 and 16 - Proposed Temporary Compound flooded It is worth noting that many of the flooded fields are currently grassed!

39. While the Applicants FRA notes that: "the EA's JFLOW model commonly overestimates fluvial flood extents" (this is not the informed view of the local residents) the flooding shown in the image is evidence that, on this occasion, the EA mapping (Image 9) significantly **underestimated** the extent of actual Zone 2 and 3 flooding.

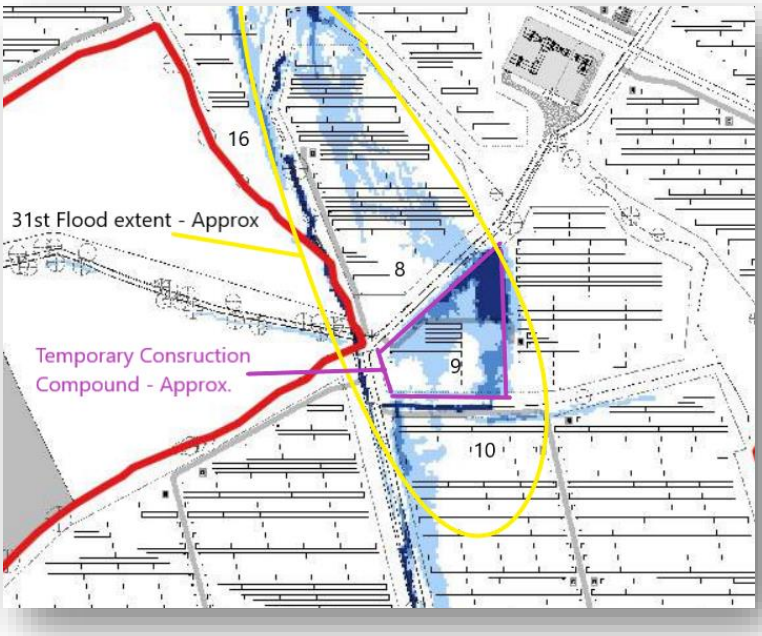

Image 4 - The E.A. Flood Zones 2 and 3 – Proposed Temporary Construction Compound

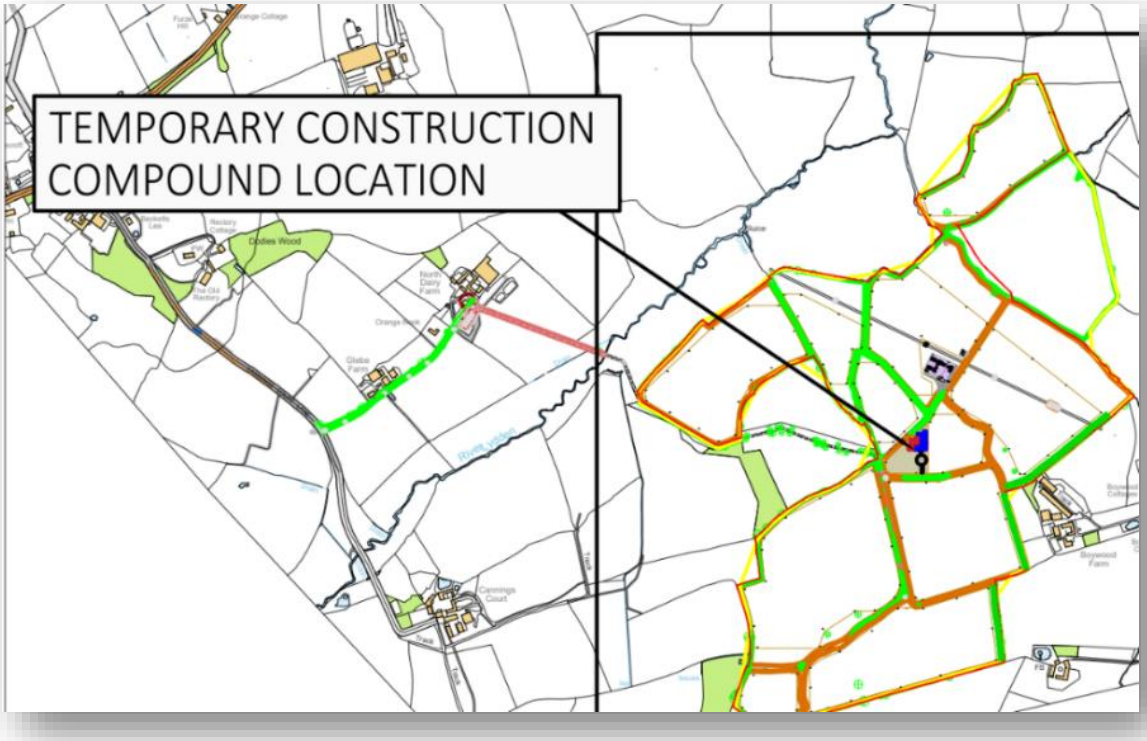

Image 5 – The location of the Temporary Construction Compound

40. Paragraph 4.45 of the FRA notes that: "Good construction practices will be undertaken to ensure that no adverse impacts on surface water or groundwater quality occur during the construction phase." The fact that the selected area for the compound could be under water would make that difficult to achieve.

Conclusion

41. It appears to us, that insufficient information has been submitted with respect to the Flood Risk Assessment, and there is little data to demonstrate the impacts of the measures proposed to manage the runoff at the site.

42. And lastly, can you confirm that the Council has consulted the Environment Agency's 'Flood Risk Standing Advice for Local Planning Authorities' when reviewing the North Dairy Farm Solar planning application?

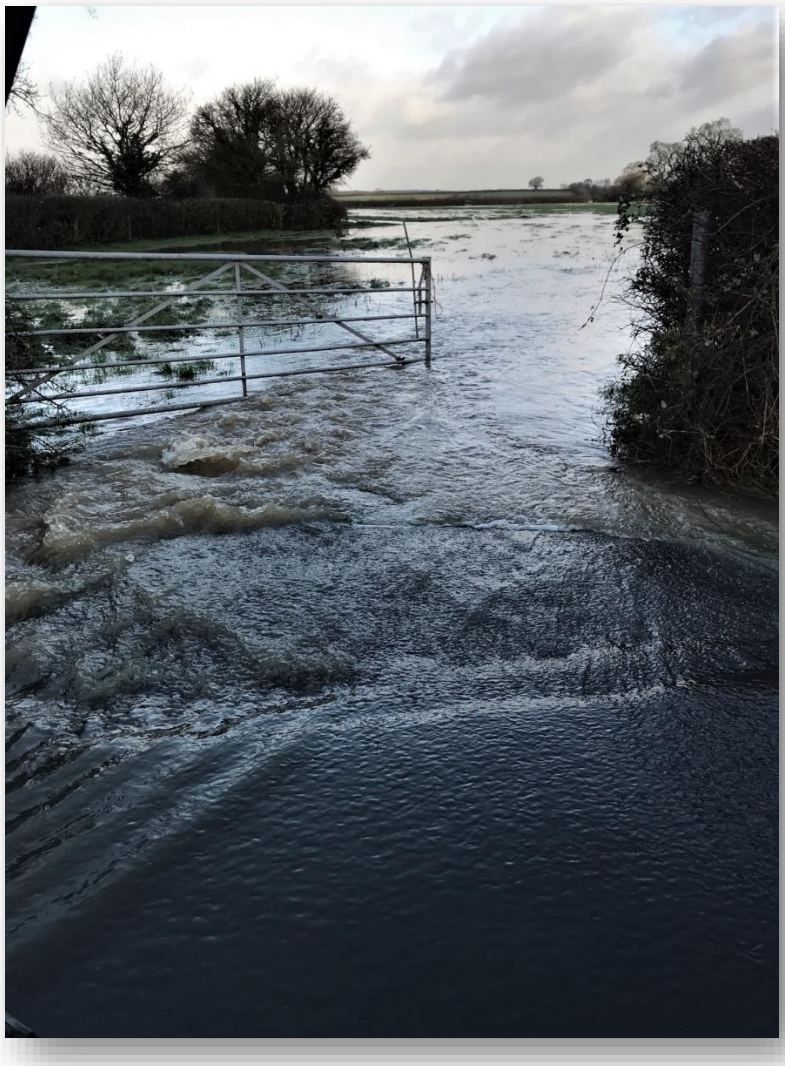

Image 6. Povert

SUMMARY

43. Dorset's rainfall is the second highest in the UK. There are an average of 15 wet days a month in North Dorset. The recent flooding on and around the proposed site (including the Temporary Construction Compound) indicates, contrary to the claim in the Flood Risk Assessment, that the extent of EA Flood Zones are underestimated.

44. It has been recently demonstrated that the access/egress route can flood, as predicted, to an estimated depth of 1 metre and that would be a "danger for all", i.e. for site workers, the general public and the emergency services. We do not believe that the future occupant of the development would be safe during flood event, as flood warnings are not available for the development area from: https://www.gov.uk/sign-up-for-flood-warnings Dangerous flash flooding of the access roads around the proposed site has occurred on occasions when no flood warnings had been issued.

45. We believe the high infiltration rates used in the Cook and McCuan study exceed the infiltration rates on the North Dairy Farm site. The Essex Solar Guidance supports the view that the Cook and McCuan findings should not be relied on for large solar sites.

46. We do not believe that grass cover under the PV arrays would avoid all additional runoff from the site, or eliminate the need for SuDS. The Essex Guide points out, that for large solar developments, even slight increases in runoff can be significant, and increase the risk of offsite and downstream flooding. The Applicants should be aiming to reduce the existing offsite flooding.

47. Guidance notes that it is "imperative" that site-specific infiltration tests are conducted early on in the design of the development, to confirm whether the water table is low enough to allow for SuDS techniques, intended to encourage infiltration. However, no existing runoff volume calculations or infiltration tests have yet been undertaken for the site - with the exception of the substation, inverter, transformer and cabin areas.

48. We believe that additional expert information about the flooding risks is needed. Without the 'numbers' for the existing runoff, and infiltration rates, it is impossible to be certain that the proposed SuDS (swales) are sized and positioned to effectively manage the future runoff at the current greenfield rates, or below. We believe that the possible effects to the adjacent land, properties and downstream riparian owners, of runoff from the site during construction and operation of the proposed development, have not yet been fully examined and properly considered by the Applicants.

49. The 'bare earth' construction and removal phases of the proposed development are clearly the periods of greatest risk of contaminated runoff, and increased downstream flooding – and in combination those periods could last for over 12 months!

50. The land would be drastically transformed from a site that would see minimal usage and disturbance until planting, to one that requires complete year-round accessibility by “transit” vehicles, machines and workers. Clearly, damaged grass takes time to stabilise the ground.

51. We believe that Insufficient information has been submitted with respect to the Flood Risk Assessment, and there is little data to demonstrate the impacts of the measures proposed to manage the runoff at the site. Therefore, we believe that a Sequential Test and a more detailed Flood Risk Assessment should be undertaken.

Yours sincerely

Ian Bryan

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16th October 2021

For and on behalf of the Save Hardy’s Vale community group.

SHV Web

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