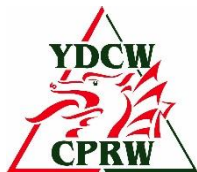


Appeal by Hendy Wind Farm Ltd against refusal of planning permission to construct and operate 7 wind turbines with a maximum tip height of 110m and maximum hub height of 69m together with ancillary development comprising substation, control building, new and upgraded access points and tracks, hard standing and temporary compound and associated works at land off A44, SW of Llandegley, Llandrindod Wells, Powys, LD1 5UG.

Evidence of Sarah Bond - HYDROLOGY

on behalf of

Brecon and Radnor Branch of The Campaign for the Protection of Rural Wales



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Witness Details

My name is Sarah Bond

My address is Pools Farm, Norton, Powys, LD8 2EW

I am a committee member of the Brecon and Radnor Branch of the Campaign for the Protection of Rural Wales, a Rule 6 party in this Public Inquiry.

I am a part time gardener and an upland sheep farmer.

I have a BA Hons in Fashion and Textiles from Leicester Polytechnic. (1978)

Natural history and industrial archaeology have been an interest since childhood. I have a particular interest in land use and habitat management in relation to the ecosystem services they provide. I believe ecosystem services will become more valued as the effects of climate change are better understood.

I have applied my practical knowledge of land management to analysis of evidence in the Environmental Statement.

SUMMARY

1. **Introduction** My name is Sarah Bond. I am a committee member of the Brecon and Radnor Branch of the Campaign for the Protection of Rural Wales, a Rule 6 party in this Public Inquiry.
2. My evidence critiques the hydrology chapter of the Environmental Statement and analyses the proposed mitigation and residual effects of the construction. It also notes the responses of consultees.
3. The red line boundary of the planning application includes the wind farm elements, a borrow pit plus its track and two access tracks to the wind farm site. The ownership boundary of the developer includes the wind farm site and borrow pit plus track but excludes the two access tracks. The latter cross common land. Within the redline and ownership boundary surface water features include field drains, springs, ponds, the Nant Brook and headwaters and tributaries of the River Edw. The Nant Brook and River Edw converge approx. 1km south of the ownership boundary. At their confluence the River Wye SAC/SSSI reaches its uppermost limit.
4. The NRW Screening Opinion in October 2013 requested that the entire development be assessed for environmental impacts but the hydrology chapter only assesses the area within the ownership boundary, omitting the access tracks across the common land. **NRW consultation responses never questioned this omission.**
5. The hydrology chapter should be complemented with a Technical Appendix but this was not submitted to Powys County Council or the Planning Inspectorate. It is impossible to predict whether deficiencies in the hydrology chapter would have been negated by the appendix because the author fails to reference the document. Also missing are plans showing the study area, surface water, e.g. streams, ponds, springs, Private Water Supply catchments and points of abstraction. **Neither PCC nor NRW noticed these omissions. NRW consultation responses are therefore based solely on the generic mitigation measures and unevicenced assertions about residual effects**

in the hydrology chapter because site specific calculations are missing. As a result little weight can be afforded to their responses.

6. The ES, (incorrectly), states that no construction will be on peat habitat therefore no peat will be affected, thus it is unnecessary to consider peat within the EIA. An extraordinary conclusion from a hydrologist. **Despite questioning proximity of construction to peat habitat NRW failed to ask for further information.**
7. **Statutory consultees accepted the unevicenced assertions that Private Water Supplies would not be affected by the development.**
8. The assessment of ecological designations FAILS to note the direct hydrological links to the River Wye SAC/SSSI, a serious error that affects the entirety of conclusions about significance of impacts. **NRW failed to notice this serious error.**
9. Construction, mitigation and residual effects are discussed in generic terms. There is no recognition that the entire development requires engineering works with cut up to approx. 12m deep and fill up to 8m high or that individual clusters of construction consisting of crane hard standing, turbine pad, access track and turning head each amount to large stoned areas that are either cut out of the hillside with the serious potential to interrupt flow paths of surface and ground water or built up with a significant risk of land slip.
10. Despite the ES assertions that hydrology and hydrogeology informed the wind farm design there is plenty of construction close to surface water features, e.g. wind farm site entrance, tracks requiring 6 separate culverts, the track to the borrow pit which is to be “newly constructed” but for which there is no description of works in the ES, and the borrow pit itself. In particular the wind farm site entrance requires considerable engineering works including culverting two watercourses, which are close together. All the construction plus heavy traffic volume at this location carries a significant risk of pollution to the River Edw. A 20m buffer zone is recommended between water

features and construction but **there can be little faith that buffer zones can or will be adhered to.**

11. Mitigation for construction of the wind farm elements includes: *“Construction activities will primarily take place during summer months when the weather is at its driest, to prevent working in wet conditions and risking direct flow pathways from construction sites to surface watercourses.”* and *“Scheduling construction activities to minimise the area and period of time that soil will be exposed, particularly during winter periods”*. Wind farms are constructed all year round and financial constraints mean that construction activities work to strict timetables.
12. To state that scheduling will take place to minimise the time soil is exposed is disingenuous for a development that requires such a large amount of cut or fill. The ES acknowledges that silt laden run off from exposed surfaces is a potential impact during and post construction. Steep embankments plus associated permanent drainage works such as swales and culverts require extra land take with further exposed surfaces. Culvert design details shows embankments will be 45° or steeper. Difficulty in establishing permanent vegetation on slopes and drains will result in exposed surfaces well beyond the construction stage of one year. Culverting affects both the Nant Brook and flow into the River Edw. Both watercourses are at high risk of flooding with potential to carry sediment to the River Wye SAC/SSSI.
13. The developer plans to quarry up to 26,000m³ of stone from a disused quarry beside peat habitat, turn it into aggregate somewhere unknown within the study area, then lug it on an undescribed track through priority habitat and across the Nant Brook and its tributaries which feed directly into the Wye SAC whilst apparently maintaining a 20m buffer zone.
14. Impacts from quarrying *“could lead to short term drainage of surrounding soils, particularly if the soils are saturated”* plus *“silt laden water from exposed ground and migration through preferential channels into controlled waters..... and potentially the site groundwater.”* Mitigation will include silt traps *“as necessary”* and possibly

“pumping of groundwater” which will be eventually discharged to *“surrounding watercourses or into vegetated ground”* and where necessary battening can prevent slumping or drainage of surrounding soils. Long term residual effects are not discussed. It is not known whether this quarry will be backfilled with surplus construction materials.

- 15. It is noted that the ES offers no explanation why it is considered a cliff face from quarrying may only temporarily drain surrounding soils which are all critical to the integrity of the adjacent peat areas or why it is appropriate to discharge to a Secondary A Aquifer and watercourses connected to a SAC a short distance away.**
16. Undescribed and unassessed construction of the access tracks to the wind farm site requires major works at Pye Corner, culverting watercourses of high flood risk plus reprofiling and widening of existing tracks close to the River Edw.
17. It is contended that failings in the ES mean that NRW cannot establish beyond reasonable doubt that there is no downstream flood risk, risk to aquifers or Private Water Supplies and no significant effects on the River Wye SAC and SSSI.
18. Overall, the omissions and lack of professional assessment of hydrology and hydrogeology at the proposed development site leads to the conclusion that a robust decision based on statutory duties with regard to environmental legislation, Welsh Government and Powys planning policy, best practice construction guidance and habitat management guidance should be one of refusal.

FULL TEXT

1 Introduction

1.1 The purpose of this evidence is to critique the hydrology and hydrogeology chapter in the Environmental Statement (ES) Vol 1 in order to note missing evidence and analyse construction evidence in the ES against proposed hydrological mitigation and residual effects, with the aim of noting the potential impacts on flood risk, groundwater and Private Water Supplies, and ecology.

1.2 This document complements the evidence of Dr. Christine Hugh Jones on the Special Area of Conservation and that of Margaret Tregear on the construction of the access tracks on common land. The conclusions in this evidence about environmental impacts have been considered against relevant legislation, policy and guidance.

2 Site description

2.1 Redline Boundary and Study Area

2.1.1 The application site area and ownership boundary are shown in ES Vol 2, Fig 1.1 and amended plan Redline Boundary and Site Layout, (Rev A), found in APP014 Applicant's Further Submission dated 24th March 2015. Contained within the redline boundary are the northern and southern access tracks to the wind farm site. Except for a small area adjacent to Pye Corner Lane the access tracks do not lie within the area owned. The part of the red line boundary containing turbines, tracks serving turbines, crane pads, turning areas and a borrow pit plus its access track lies within the owned area. The site area is described on the application form as 19.25 hectares.

2.1.2 The elements of the development with dimensions are set out in ES Vol 1, 3.1 to 3.9. A micro-siting allowance of 30m for turbines and 20m for tracks is assumed. Plans showing proposed construction are at ES Vol 2, Fig 1.2.1- 1.2.9 and 1.6 Culvert Design. There are no figures for other drainage features.

2.1.3 ES Vol 2, Figs 1.2.1 to 1.2.9 show construction details of a main access track to the wind farm entrance, seven turbines, their crane hard standings and six turning areas all connected by access tracks and a temporary construction compound. Plans show all construction is either cut or fill with six culverts over watercourses. Omitted from plans ES Vol 2 1.2.1 to 1.2.9 are the northern access track to the wind farm site and groundwork details of the electrical substation plus the track which runs south, passing over Nant Brook, to a disused quarry to be used as a borrow pit.

2.2 Local Topography and Surface Waters

2.2.1 The local topography is essentially an undulating raised basin as can be seen by the contours shown on ES Vol 2 fig 1.2.1. The undulations are broken by occasional rocky outcrops. Soils are slow draining and in places peaty as shown in ES Vol 2, Fig 7.4, Peat Probing. The wider geographical area is renowned for its mineral springs and fossils of unique preservation. The immediate locality has many springs, field drains, ponds and streams most of which ultimately drain to the south as can be seen on Proposed Hendy Wind Farm (P/2014/0672): Surface Water Flood Risk (Appendix A).

2.2.2 There is no doubt that parts of the local area are prone to waterlogging as confirmed by site visits, the extent of field-drains and the flora. Nant Brook and its higher tributaries traverse the owned area and application site in a convoluted north to south direction. The River Edw rises within and then flows along the eastern edge of the blueline boundary exiting just south of the wind farm site entrance where it joins a tributary and flows east more or less parallel to, but a short distance south of the main access track. By Pye Corner it is joined by another tributary and from there flows south before turning west to meet Nant Brook, the confluence being the upper limit of the River Wye SAC/SSSI.

3 ES Volume 1 Introduction to Hydrology Report

3.1 The author states at ES Vol 1, 10.1: *“This chapter is supported and should be read in conjunction with Technical Appendix 10.1 which can be found in Volume III (Technical Appendices) of this ES.”*

3.2 The appellant has never submitted a hydrology appendix, either to Powys County Council or PINS. It is impossible to predict whether deficiencies in the hydrology chapter would have been negated by the appendix because the author fails to reference the document.

3.3 It is of great concern that neither Development Management nor the statutory consultee, NRW, noticed this error prior to determination. NRW consultation responses can therefore only be based on the generic mitigation measures and unevidenced assertions about residual effects in the ES Vol 1, hydrology chapter; as a result little weight can be afforded to the NRW responses.

4 Baseline assessment hydrology methodology

4.1 ES Vol 1 10.1 states that the study area is approx. 250ha and *“is assumed to represent the baseline environment”*. There is no figure outlining the hydrology study area but at ES Vol 1, 1.1 it states that the EIA considered approximately 250ha which is the area outlined in blue in Vol 2, fig 1.1. It must therefore be this area to which the author refers, often called “the site”.

4.2 The planning application is not only for the wind farm within the study area but also entrances off the A44 and highly engineered upgrading of existing access tracks which fall outside the study area. Despite EIA Regulations requirement to consider the entire project, quoted at ES Vol 1, 2.2.1, and the NRW scoping response of 23.10.2013, Annex 1.3 (Appendix B), stating that this is required, there is no evidence they have been assessed.

4.3 NRW when consulted prior to determination did not refer back to their Scoping Opinion and respond to this omission.

4.4 ES Vol 1 10.3.2 explains the methodology as a desktop study and 2 days site walkover. There is no indication of weather conditions prior to or during the site visit thus it is impossible to ascertain whether the site visit was during a “typical” weather pattern. It is noted that two photos are presented in the text to illustrate soil conditions but there are no photos of water features.

5 Baseline environment

5.1 Peat

5.1.1 The hydrology report discusses the baseline conditions and at ES Vol 1 10.4.7, Soils and Land Use it states: *“Landis Soils capes view has been used to identify soil types present at the site. The following soil types were identified:*

- *Northern corner (10%) of the study area: Slowly permeable wet very acid upland soils with a peaty surface. Soils of low to moderate grazing value.*
- *Remainder of the study area (90%): Slowly permeable seasonally wet acid loamy and clayey soils. Suitable for grass production for dairying and beef, some cereal production often for feed.”*

5.1.2 Contrary to the Landis evidence, at ES Vol 2, Fig 7. 4, Peat probing, peat is shown to be in the centre and south of the study area. The hydrologist cannot have seen the peat probing evidence prior to writing the report because it is stated at 10.4.7: *“All of the 7 no. turbines currently planned are situated on the loamy and clayey soils. As no construction is planned on the soils with a “peaty surface” it has not been considered necessary to assess the impact on peat within the EIA.”*

5.1.3 The description of the site visit is completely superficial therefore this statement cannot be taken to be fact because there is no evidence presented from the site

walkover that construction is only outside peat habitat. To the contrary, peat probing, which is the result of habitat classification, (ES Vol 7.9.4), shows that peat could be elsewhere within the study area, (e.g. the track to the borrow pit although not probed passes through similar habitat classification, see NRW response below). ES Vol 2, fig 7.4 shows construction of the new access track to T6 and T7 passes through an area probed as peat of 0.25m to 0.74m depth and the proposed borrow pit is beside peat of 1m to 1.24m depth.

5.1.4 It is extraordinary that a hydrologist should consider that because “no construction is planned on soils with a peaty surface” there will be no significant effect on those soils without justifying their reasoning, particularly as the Severn River Basin Management Plan Part 2 (Appendix C Page 28 WFD Aims Article 1) which aims to deliver the WFD in the area seeks to protect groundwater derived habitats.

5.1.5 **NRW, when consulted did not request more information but only stated:** *“Peat depth maps showing the extent and depth of peat recorded was found to vary between shallow deposits to localised areas of peat, just over 1 metre deep. The ES states that the assessment of impacts of the proposal on peat is not necessary because no construction is planned on peaty areas. The access track in the southern part of the site may pass close to deeper areas of peat but the scale of the figure makes it difficult to quantify.”*

5.2 Private Water Supplies

5.2.1 ES Vol 1 10.4.10 discusses Private Water Supplies (PWS) and states: *“Local private water supply wells are situated 500m or more away from the proposed development and are considered unlikely to be affected by any activities carried out during the construction and operation phases of Hendy Wind Farm.”* This statement cannot be verified because there is no evidence submitted of PWS catchments or point of abstraction and no reasoning given as to why it is considered they will not be affected.

- 5.2.2 ES Vol 1 10.4.3 discusses water runoff during rain and states, *“Some limited recharge of the local shallow groundwater is also anticipated, helping to support springs and small Private Water Supplies (PWS) abstractions in the area”* and ES Vol 1 10.4.9 states, *“Shallow groundwater is expected to flow in the secondary A Aquifer in the same direction as the adjacent surface waters”*. Table 10.2 (ES Vol 1) shows PWS with grid references which are for the registered properties not the points of abstraction. 11 out of the 16 PWS are springs.
- 5.2.3 Construction works within the shallow groundwater zone include cut to approx. 12m deep, cable trenches 0.8m – 1.2m deep, turbine and substation foundations and a borrow pit. Table 10.3 considers PWS sources and their “immediate indicative catchment” a constraint unless mitigated, the rationale being the risk of contamination because of groundwater drainage, yet mitigation for below surface works includes temporary silt traps or permanent stops for cable trenches and pumping groundwater from foundations and the borrow pit. This mitigation will not protect PWS from contamination or loss of volume because of altered flow path.
- 5.2.4 **The LPA and NRW accepted the PWS statements at 10.4.10 without question despite no plans to show catchments and where abstractions are located.**

5.3 Ecological Designations

- 5.3.1 At ES Vol 1 10.4.11 ‘Ecological Designations’ the author only discusses the River Ithon SSSI and states it is the nearest at 2km away. This – the omission of sites including the River Wye Special Area of Conservation to the south of the site - is a serious error that affects the entirety of conclusions about significance of impacts.
- 5.3.2 Ecological Designations are shown at ES Vol 1, Ecology p7-20, Table 7.6 and ES Vol 2, Fig 7.1. Whilst the closest SSSI is 550m S of the study area, it is not designated for hydrological reasons. However, of significance is the River Wye SAC/SSSI located at just 1km S of the study area and with a direct hydrological link to the wind farm site via Nant Brook and the River Edw.

5.3.3 **NRW when consulted state:** *“Hydrological links between the development site and the River Edw, an important tributary of the River Wye, are identified in the ES. The River Edw supports features of the River Wye SAC, such as white-clawed crayfish. A Habitats Regulations Assessment is required, as discussed above.”* **This statement is factually correct but the hydrology chapter FAILS to make the link between the application red line boundary and the River Wye SAC and NRW failed to notice this serious error.**

5.3.4 **Sensitive Hydrological and Hydrogeological Features**

5.3.5 At ES Vol 1 10.4.14 it states: *“The hydrological and hydrogeological features with greatest sensitivity to the development are areas immediately adjacent to the surface watercourses. Other features of interest include the catchments relating to private water supply abstractions. The constraints caused by these features have been used to inform the design mitigation of the wind farm.”*

5.3.6 As the hydrology report fails to identify water features or habitats there is no evidence that surface water courses, PWS catchments or priority habitat have informed design.

6 **Construction, mitigation and residual impacts**

6.1 **Introduction**

6.1.1 ES Vol 1 10.4.14 claims that hydrology has informed wind farm siting but the description of proposed development, mitigation and residual effects is entirely generic raising serious doubts that the author has even seen the figs 1.2.1 – 1.2.9 and 1.6 in ES Vol 2. There is no recognition that the entire development requires engineering works with cut up to approx. 12m deep and fill up to 8m high. Crane hard standings of 28m x 40m with turbine pads of 20m x 20m about 4.5m running width tracks with turning areas of what appears to be circa 20m x 30m adjacent but at right angles. (ES Vol 1 10.7.4 states *“each turbine and neighbouring crane pad will disturb an area approximately 60m by 20m”*, this underestimates disturbance by 320m²).

These individual clusters of construction each amount to large stoned areas that are either cut out of the hillside, with the serious potential to interrupt flow paths of surface and ground water, or built up with a significant risk of land slip, as witnessed at Bryn Blaen, 25.1.2018, a result of continuous rain creating too much water for the track design, see photograph (Appendix D).

- 6.1.2 NRW consultation response, 22.12.2014, drew attention to the Habitats Regulations Assessment (HRA) needing to rely on mitigation in a Construction Environmental Management Plan (CEMP), noted proposed hydrological mitigation and residual effects in ES Vol 1 Chapter 10 and requested that the mitigation be included in a CEMP. NRW Response 3.3.2017 states: *“We are satisfied as demonstrated in the HRA, that the proposed development will not have any significant effects on any protected sites providing that the mitigation prescribed in the HRA will be implement in full.”* **These responses can only be based on the generic mitigation measures and unevidenced assertions about residual effects in the hydrology chapter because site specific calculations are missing; therefore, little weight can be afforded to the NRW responses.**

6.2 Construction Buffer Zones

- 6.2.1 ES Vol 1 10.5.1 states *“A 20m buffer zone has been incorporated to prevent development near watercourses”*, but ES Vol 1 Ecology p7-64 states *“A minimum distance of 25m will be maintained between construction activities and watercourses”*, nevertheless there is plenty of construction close to surface water features, e.g. wind farm site entrance, tracks requiring 6 separate culverts, the track to the borrow pit which is to be *“newly constructed”* (10.6.1) but for which there is no description of works in the ES, and the borrow pit itself.
- 6.2.2 At the wind farm site entrance the access track will culvert two different watercourses that feed into a pool which issues into the River Edw. ES Vol 2 Fig 1.2.1 shows that the red line boundary crosses this pool Fig 1.2.1 detail and ES Vol 2 Fig 1.2.4 (both Appendix E) shows one culvert almost abuts the pool. It is hard to believe that a 20m

buffer has been or could be applied at this location. Major groundworks combined with heavy volume of traffic carries a significant risk of pollution to this water.

6.2.3 **There can be little faith that buffer zones can or will be adhered to.**

6.3 Construction of wind farm elements

6.3.1 In relation to mitigation for wind farm tracks ES Vol 1 10.7.2 states: *“Construction activities will primarily take place during summer months when the weather is at its driest, to prevent working in wet conditions and risking direct flow pathways from construction sites to surface watercourses.”* The same mitigation of construction during drier periods is offered at ES Vol 1 10.7.3 for cable trenches and at ES Vol 1 10.7.4 mitigation for wind turbine and crane pad foundations includes: *“a) Scheduling construction activities to minimise the area and period of time that soil will be exposed, particularly during winter periods”*.

6.3.2 These statements are surmise and fail to properly consider the development as a whole, particularly as ES Vol 1 3.8 states that the wind farm development is expected to last approx. twelve months. Financial constraints mean that construction activities work to strict timetables. Wind farms are constructed all year round and the three Powys windfarms constructed 2016 to 2018 were built over winter months. The renewable industry trade magazine reNEWS reports the following for Garreg Lwyd Wind Farm: **“The contractor started work in January** on a £2m enabling works package involving a 3.5km track *up to the wind farm*” and for Tirgwynt in a report dated **21.3.2017**: *“Jones Bros regional manager Hefin Lloyd-Davies said: “The project has progressed smoothly from start to finish. **We had challenging weather conditions at times, and also had to adhere to strict deadlines** because of seasonal on-site restrictions due to local bird breeding.”*

6.3.3 Regardless of the time of year construction of wind farm elements are undertaken, to state that scheduling will take place to minimise the time soil is exposed is disingenuous for a development that requires such a large amount of cut or fill. The

author at ES Vol 1 sections 10.6 and 10.9 acknowledges that silt laden run off from exposed surfaces is a potential impact during and post construction. Steep embankments plus associated permanent drainage works such as swales and culverting require extra land take with further exposed surfaces. ES Vol 2 fig 1.6 'Culvert Design Details' shows embankments will be 45⁰ or steeper. Difficulty in establishing permanent vegetation on these slopes and drains will result in exposed surfaces well beyond the construction stage of one year.

- 6.3.4 Culverting will be over watercourses at high risk of flooding, see Appendix C, Proposed Hendy Wind Farm (P/2014/0672): Surface Water Flood Risk. Not only will construction, particularly during winter months, risk causing downstream sedimentation but vegetated or poorly vegetated embankments will exacerbate that risk. The culvert between T3 and T4, the culvert to the south of T3 plus the borrow pit track with unknown culverting all affect Nant Brook which has direct links to the Wye SAC/SSSI approx. 1 km south of the study area. All other culverting affects flow into the River Edw which becomes the River Wye SAC/SSSI further downstream.

6.4 Borrow pit and track

- 6.4.1 ES Vol 1 3.9.1 states *"Approximately 23,530m³ of stone will be required..... An existing disused quarry on the site (south of turbine T3) will be used as a source of aggregate"* but hydrology ES Vol 1 10.4.8 says approx. 26,000m³ will be required.
- 6.4.2 The only plans in the ES that show this borrow pit and track in its proper context are ES Vol 2, figs 7.3 and 7.4. Fig 7.4 shows that the borrow pit has peat of approx. 1m to 1.24m deep immediately to the SW corner of the old quarry and that going North the track passes through and adjacent to mire before crossing Nant Brook. There are also several watercourses in this area of proposed works that feed into Nant Brook. ES Vol 1 10.4.9 establishes that this area is within a Secondary A Aquifer.
- 6.4.3 Definition of Secondary A Aquifer - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important

source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

- 6.4.4 In summary the developer plans to quarry up to 26,000m³ of stone from a disused quarry beside peat habitat, turn it into aggregate somewhere unknown within the study area, then lug it on an undescribed track through priority habitat and across the Nant Brook and its tributaries which feed directly into the Wye SAC whilst apparently maintaining a 20m buffer zone. ES Vol 1 10.6.6 states potential impacts from quarrying “could lead to short term drainage of surrounding soils, particularly if the soils are saturated” plus “silt laden water from exposed ground and migration through preferential channels into controlled waters..... and potentially the site groundwater.” Mitigation (ES Vol 1 10.7.6) will include silt traps “as necessary” and possibly “pumping of groundwater” which will be eventually discharged to “surrounding watercourses or into vegetated ground” and where necessary battening can prevent slumping or drainage of surrounding soils. Long term residual effects are not discussed. It is not known whether this quarry will be backfilled with surplus construction materials.
- 6.4.5 **It is noted that the ES offers no explanation why it is considered a cliff face from quarrying may only temporarily drain surrounding soils which are all critical to the integrity of the adjacent peat areas or why it is appropriate to discharge to a Secondary A Aquifer and watercourses connected to a SAC a short distance away.**

7 Access tracks to wind farm site

- 7.1 The access tracks to the wind farm site are outside the ownership boundary and these parts of the development have not been assessed in the hydrology report. The description of works and any environmental impacts for the northern access track are not in the ES. Construction planned for the southern route along the U1574 and BOAT CR127 is shown in figures ES Vol 2, 1.2.1 to 1.2.4. These plans show that the proposal is for cut and fill to even out gradient, to build embankments up to 3.25m high either side of the track from Pye Corner residence onto the common land in order to allow AILs access, to culvert the

Byeway Open to All Traffic (BOAT) in two places and create a small area of new track close to the wind farm site entrance.

7.2 The only description of works for the northern access track is in the s38 commons application, (deemed invalid by PINS 18.7.2014), and from that it is clear the intention is for further engineering works to enable widening and reprofiling of the track. The northern track will run alongside watercourses which issue, via the proposed culverting at the wind farm site entrance, into the River Edw.

7.3 A site visit will show that the plans for embankments and culverting adjacent to Pye Corner residence are almost certainly underestimated in ES Vol 2, figs. 1.2.1 to 1.2.3. This is major engineering that will require works within a tributary of the River Edw and close to the River Edw itself. See Appendices F & G: photograph looking west from Pye Corner, and photograph looking east from the common. Both are shown as high risk from surface water flooding. See Proposed Hendy Wind Farm (P/2014/0672): Common Land Surface Water Flood Risk (Appendix H)

7.4 At the western end of the common land adjacent to the wind farm site entrance the River Edw is culverted with simple field drain piping, close to, but outside the ownership boundary. This culverting clearly results in flooding from backed up water flow as can be seen by the flood debris on the hurdle in the photographs at Appendices I and J. Works to build a new piece of track to join the wind farm site are close to this culverting, as are all the construction works at the wind farm site entrance. Clearly no consideration has been given to the flood risk at this location or the need for construction buffer zones.

7.5 The common is one of the significant areas of semi natural vegetation within the wider area. Lack of assessment of the common land with proposed development around three sides results in failure to note any possible impacts on the watershed on the common or the water dependant habitats.

8 **Conclusion**

8.1 The critique of the ES shows that the consideration of hydrology and hydrogeology falls short of EIA requirements and those requested in the NRW Scoping Opinion. In particular, vital information including plans is missing, there is failure to consider all parts of the project and assessment is generic rather than site specific. Statutory consultees, including NRW, failed to notice critical omissions in information.

8.2 At 10.4.13 the author states: *“Hydrological systems are nominally in a state of constant flux. However potential influences on the future hydrology of the site has been identified as changes to land use and climate change.”* **But the author has failed to recognise that the proposed development is itself a change of land use with “potential influences on the future hydrology of the site”.**

8.3 The ES recognises at Vol 1 10.4.7 that the soils are slow draining, at 10.4.4 that the development could increase flood risk downstream and at 10.10.8 that possible residual hydrological effects of the development are silt laden run off and altered flow paths. It is of great concern that there is no proper assessment of how and where the highly engineered development will increase the likelihood of altered flow paths or how all the embankments will increase risk of sedimentation and landslip or how culverting watercourses of high flood risk may cause ponding or flash flooding elsewhere. The wind farm is sited on undulating but generally sloping ground halfway down a hillside. Latterly weather patterns have been for heavier or continuous rainfall events. Climate change predictions consider this to be a trend, as reiterated at ES Vol 1 10.4.13. Locally, during such rainfall events hillsides become a sheet of running water, culverts become blocked with stony sediment and vegetation debris and then overflow, watercourses break their banks and there is flash flooding. Based on site visit evidence during 2018 it is hard to believe the same would not happen at this development site. Of particular concern is the wind farm site entrance with its highly engineered works adjacent to several controlled waters and their direct link to the River Wye SAC/SSSI.

8.4 The hydrology chapter failed to consider the pollution risk to fisheries despite flagging them up as a key issue at 10.1. That the author failed to recognise the direct link to the River Wye SAC/SSSI is all the more negligent. In the 1990s a major sediment pollution

incident from this site is discussed in Powys White Clawed Crayfish Action Plan (Appendix K). The endangered Native WCC are a primary species in the River Wye SAC citation (Appendix L). These crustaceans, along with other aquatic species in the citation depend on water with little sedimentation or diffuse pollution.

8.5 The document Severn River Basin Management Plan 2015 Part 1 (Appendix M), which includes the River Wye catchment, states at Part 1, 1.1 (page 7): *“Water is essential for life and livelihoods. It allows the natural environment to flourish, and businesses, agriculture and the economy to grow and prosper.”* and *“It is critical that this precious resource is managed properly to ensure that the needs of society, economy and wildlife can be met and maintained over the long-term. The purpose of a river basin management plan is to provide a framework for protecting and enhancing the benefits provided by the water environment. To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning.”* And at part 2, 3.1. *“The WFD is focused on establishing an integrated approach for the protection and sustainable use of the water environment. This requires a holistic approach to managing waters, looking at the wider ecosystem and taking into account the movement of water through the hydrological cycle.”*

8.6 Welsh Water consultation response of 22.9.2014 says: *“We consider it ESSENTIAL that Natural Resources Wales are satisfied that the proposals will not have any adverse effect on any aquifer, or other water resource, in terms of both water quality and quantity.”* (original emphasis)

8.7 It is contended that failings in the ES mean that NRW cannot establish beyond reasonable doubt that there is no downstream flood risk, risk to aquifers or PWS and no significant effects on the River Wye SAC and SSSI.

8.8 Overall, the omissions and lack of professional assessment of hydrology and hydrogeology at the proposed development site leads to the conclusion that a robust decision based on statutory duties with regard to environmental legislation, Welsh Government and Powys planning policy, best practice construction guidance and habitat management guidance, should be one of refusal.