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**CB/16/01389/FUL – Checkley Wood Wind Turbine**

**Installation of a single wind turbine with a maximum tip height of 143.5m (hub height 100m and rotor diameter 87.0m), substation, hardstanding area, access track, underground cabling and associated infrastructure.**

Dear Debbie,

Mr Roberts of Stop Checkley Wood Turbine (SCWT) submitted an objection document on behalf of the group in June of this year. Reading through the document we are concerned that there are a number of inaccuracies which may be interpreted incorrectly especially given that approximately 610 objections submitted to the Council state that the SCWT document summarises their principle objections. As such, this letter seeks to address these inaccuracies.

May I request that this letter is kept with the SCWT document so that the reader can understand where we have concerns regarding the factual accuracy of the submission.

I appreciate that the situation has changed since SCWT submitted their objection document due to the amendment of the turbine dimensions. Some of their concerns have been addressed through this amendment.

I will deal with each of the topics separately, highlighting the key points raised for each.

**Introduction**

- It is claimed that the Applicant wishes Central Bedfordshire Council (CBC) to make decisions on the basis of the single Checkley Wood Wind Turbine, whilst the impact is of the two turbines combined. This is not the case. The application documentation considers the effects associated with the addition of the Checkley Wood Wind Turbine into the existing baseline (which includes the Double Arches machine). All reports consider the cumulative effects with a particular focus on the cumulative noise and landscape effects.
- SCWT state *‘Many wind farm developers have tried to argue that national Energy Policy trumps every other planning consideration. This is a misrepresentation of the truth. Moreover it is one that has been rejected in the High Court by its ruling that the planning process in the UK remains “plan-led, that the Local Development Plan is not subordinated by National Policy.’*

No claim has been made within any part of the application document that national energy policy “trumps” every other planning consideration. We would like to highlight, however, Section 3 of the Planning Appraisal which discusses the Local Policy Framework (LP). Here, it is highlighted that the emerging Development Strategy (2014) was withdrawn in November 2015 and that to date there are no emerging policies to which weight can be given. There are also few saved policies from the former Bedfordshire Local Plan Review (2004) which remain relevant to the proposal.

Where local policies are absent, silent or out of date with the NPPF, paragraph 14 of the NPPF states that planning permission should be granted unless doing so would significantly and demonstrably outweigh the benefits when assessed against the policies in the Framework taken as a whole.

The absence of a specific policy relating to renewable energy indicates that the determination of the application should be in accordance with paragraph 14 of the NPPF, although other policies in the LP will have some influence on the decision depending on their consistency with the Framework. Paragraph 14 will be the overarching context of assessing this proposal.

### **Quantum of Electricity Production**

- Comments from the CEO of RenewableUK, extracted from the Telegraph, were provided. I understand that Hugh McNeal, CEO of RenewableUK, has written to you separately to clarify his remarks.
- SCWT then state: *‘...the turbine will be produced overseas and we understand there will be limited local input into construction work given the specialised nature of the erection of wind turbines.’*  
No evidence has been submitted by SCWT to confirm this statement. At Double Arches, over half the investment was spent with British firms, to include construction of the access tracks and foundation, the grid connection, the provision of security and professional consultants.
- SCWT state the importance of collecting wind data so that a production estimate can be accurately produced. They state that *‘there is no evidence to suggest that the Applicant has considered other locations and, specifically, measured average wind speeds at these competing locations to assess benefit v dis-benefit.’* It is also stated that *‘We contend that the proposed site of the Checkley Wood wind turbine is sub-optimal. It has been chosen because it is available rather than because it provides the right solution’.* We would like to stress that there is no obligation on the developer to test the wind speeds at alternative sites, or to consider alternative sites within the application. In addition, the wind speeds and corresponding output data at Double Arches have been monitored for 22 months, at the 100m hub height. There is nothing suboptimal about the data and no evidence has been presented to think otherwise.
- *‘Energy will be consumed and carbon footprint created in building and delivering the massive turbine’.* In response, please see Paragraph 604 of the Environmental Report. This found that the energy used in the entire life cycle of the turbine (manufacture, development, installation, operation and decommissioning) will be offset within 5 to 6 months of operation (Note: an amendment has been made to this figure following the change of turbine dimensions – please see below).

## National Planning Policy Framework (NPPF) Requirement

- SCWT claim that the NPPF states that applications should be 'refused' where 'any adverse impacts of doing so would significantly and demonstrably outweigh the benefits'. As stated within our response above, Paragraph 14 of the NPPF actually states that planning permission should be granted unless doing so would significantly and demonstrably outweigh the benefits when assessed against the policies in the Framework taken as a whole.
- The group continue to make the claim that the site is 'sub-optimal' on the basis that the impacts would be better mitigated by installing the turbine at a windier location. Again, no evidence has been put forward to substantiate this claim. Unlike most wind turbine applications, we are able to draw from real production data from the neighbouring installation at Double Arches. Last year, the Double Arches was the most productive Vensys VE87 wind turbine in the world – as verified by the attached letter from the wind turbine manufacturer. SCWT therefore can make no valid claim with respect to turbine performance.
- SCWT then highlight statements made by Ministers, in particular the Government's aim to target only the most cost effective onshore wind development. Whilst economic return is clearly not a planning consideration, given the estimated production levels for Checkley Wood (based upon real data at Double Arches) we are pleased to say that this development does meet the Government's aims. We would also point out that this scheme will not be supported through the Renewables Obligation, which is now closed to new entrants (as stated in Paragraph 606 of the Environmental Report).

## Turbine Wake Separation

- SCWT make several comments regarding the turbine wake separation and that the separation distance between the Double Arches and Checkley Wood Wind Turbines is "too tight". However, SCWT fail to quote the entirety of the relevant paragraph (2.7.7) of National Policy Strategy EN3. This actually states (underlining our emphasis):  
*'In order for wind turbines to generate electricity efficiently, the turbines must be placed at a sufficient distance from one another within the site. The spacing will depend on the prevailing wind direction and the physical characteristics of the site. A spacing of six rotor diameters is normally required in the direction of the prevailing wind direction, and four rotor diameters perpendicular to this. However, this is a matter for the applicant.'*

This is because rather than based upon a rule of thumb, turbine siting is actually a complex balance between environmental constraints, technical constraints, the localised characteristics of the wind and terrain, and the turbine make and model. In order to fully address this concern, please find attached a letter from the turbine manufacturer, Vensys. This confirms that Vensys accept the turbine spacing and will provide the appropriate warranties for the turbine.

## Quantum of Electricity Generated

In this section, SCWT have questioned the production estimate of the VE112 wind turbine. This was the candidate wind turbine at the time that the application was

submitted. The group claim that allowances should be made for unscheduled maintenance, noise mitigation and shadow flicker mitigation as well as wake separation (array losses) associated with the nearby Double Arches turbine.

- The energy prediction within the planning application conservatively reduced the predicted generation by 10% to account for overall losses. Vensys confirm in their attached letter that the loss of production associated with noise actually amounts to around 1.2% of annual production and shadow flicker effects were for only 44 hours at Double Arches last year.
- The wind turbine output calculations undertaken by the group are fundamentally flawed. For clarification, whilst the website address is similar, the online tool referred to in the SCWT document is not published by industry trade body RenewableUK. Nevertheless, the calculations themselves are based upon incorrect input data, and it is irrelevant to make comparisons between the average wind speed at Checkley Wood and those that are experienced on the highest parts of Orkney and Shetland (12m/s to 13m/s). The online tool also does not apply the manufacturers warranted power curve data to the wind speed distribution based upon average wind speed. No practical information or reliance can be placed on these calculations.
- The expected electricity production levels reported within the Environmental Report was based upon the Vensys VE112 wind turbine. Following the change of turbine, to match that installed at Double Arches and using the actual production data from the Double Arches Wind Turbine it is predicted that the Checkley Wood Wind Turbine will generate an annual average of 4,999,000kWh. The benefits of this renewable energy generated are as follows:

	<b>Environmental Report Reference</b>	<b>Amended Figure</b>
Electricity Production	Paragraphs 37, 587	<b>4 999 000kWh</b>
Annual Average Household Equivalent	Paragraph 38	4 999 000kWh/4 473kWh = <b>1 118 households/annum</b>
Carbon Dioxide Offset	Paragraph 594	2 150 tonnes/annum
Equivalent to domestic emissions of	Paragraph 595	<b>977 average Central Bedfordshire Residents</b>
Energy Balance	Paragraphs 604, 605	<b>0.73 yrs or 8.7 months</b>

### **Turbine Wake Separation**

This section of the SCWT document largely repeats the earlier discussion on turbine wake separation. Please see our response above and the attached letter from Vensys which confirms that the turbine separation between Double Arches and Checkley Wood is acceptable.

SCWT continue, stating that '*the size of the site simply DOES NOT provide sufficient space for 2 such huge turbines*' and cite the Environmental Statement for the Double Arches wind turbine as evidence that the applicant had previously ruled out two turbines on the site due to effects on productivity, noise, landscape and heritage. This statement is incorrect and misleading.

At the time of the Double Arches application a different, smaller, land area was available. Checkley Wood was not considered at this time as the applicant did not control the land at Checkley Wood.

### **Harmful Impacts on Landscape Character**

Since SCWT drafted this section, the application has been amended such that the Checkley Wood Wind Turbine will have the same dimensions as that installed at Double Arches.

SCWT claim that the '*landscape capacity to accommodate change was fully utilised with the development of the Double Arches Wind Turbine*'. However, no professional assessment has been produced to support this statement.

The Environmental Report which accompanied the planning application for Checkley Wood contained a full Landscape and Visual Impact Assessment (LVIA). This considered the potential effects of the proposal on the character of the landscape, as well as the visual effects on receptors such as residents, motorists and walkers. The LVIA considered the effects of introducing Checkley Wood to the existing baseline, including for cumulative effects with Double Arches.

It should be noted, that the character of the landscape is not static. As stated within the LVIA, the surrounding quarry landscape is formed through a dynamic mosaic of continuous sand extraction to 2042, beyond the life of the turbine. Despite the size of the scheme, the LVIA found that significant effects of this proposed development on the character of the landscape of the site and surrounding area would be limited to approximately 1.5km to 2.0km from the turbine (Paragraph 437, Environmental Report).

The LVIA also considered CBC's Guidance Note 1 – Wind Energy Development in Central Bedfordshire. The Checkley Wood Wind Turbine is located within the Greensand Ridge LCT, however it is adjacent to the boundary with the Clay Hills LCT. As such, both LCTs are relevant when considering the proposed site in relation to Guidance Note 1.

As we point out in Paragraph 441 of the Environmental Report, this places Checkley Wood on the boundary between an area of high sensitivity to wind development and one of moderate sensitivity (for single or clusters of 1-3 turbines). The LVIA therefore concludes by stating:

*'...it is important to note that the study does not consider extensions to existing wind farms where the main landscape and visual impacts have occurred as the result of the initial introduction of the turbine(s) to the area which was not partly characterised by wind development at the time. In essence, this proposed development would be seen as an extension to the existing Double Arches turbine, would be sited in association with the quarry workings and by the boundary of two LCTs. As this assessment discusses, the potential landscape and visual impacts of the proposed Checkley Wood turbine would be limited due to the existence of the adjacent Double Arches turbine, with the two turbines viewed as one development, resulting in very limited incremental effects on landscape character and visual amenity. This type of proposed wind energy development is not considered in detail within Guidance Note 1 and so many of the conclusions attributed to the capacity of the Greensand Ridge and the Clay Hills are assuming a standalone development and are not necessarily relevant.'*

## **Damage to Heritage Assets**

The SCWT document claims that there *'would be significant adverse impact on the setting of the local parish churches, the local conservation areas and SSI's and the listed properties contained within the local villages.'*

No evidence has been supplied to substantiate this claim, and I refer you to the independent professional assessment produced by Headland Archaeology provided as Appendix 7 of the Environmental Report. This considered all heritage assets within 5km and it is found that there would be no more than a negligible effect on the significance of heritage assets (i.e. not material to the determination of the proposal) in all cases. As such there are no material effects to take forward to the planning balance.

Following feedback from Historic England, this assessment was further refined with consideration of 36 requested viewpoints across the Woburn parkland, the Church of St Mary the Virgin at Potsgrove, the Hault, and a detailed assessment of the more distant assets at Tottenhoe, Battlesden, Maiden Bower as well as the surrounding Conservation Areas. This further assessment has confirmed that only the area around Stumps Cross is likely to have visibility of the turbine and that views of the turbine from this area would not impact on the significance of the park. Further fieldwork has provided more detail on the Conservation Areas, other designated heritage assets and their landscape settings. From the majority of these assets intervisibility with the proposed turbine will not occur or will be highly unlikely. Only at the Church of St Mary the Virgin at Potsgrove will the intervisibility be potentially greater but in all cases the degree of harm to the significance of the asset will be negligible (updated Heritage Assessment, September 2016).

As stated within the Planning Appraisal (Paragraph 6.94).

*'I have had regard to the provisions of S66 and 72 of the PLBCA 1990 and attached considerable weight to the harm to the significance of heritage assets. However, the levels of material harm to the overall significance are small and, even allowing for the special weight attributed to this harm, such harm does not weigh heavily in the balance.'*

Given the lack of evidence supplied by the group, their comments on heritage should not be considered further.

Note – within this section SCWT make an additional comment with respect to *'the setting of regional and local footpaths and bridleways which are in close proximity to the wind turbine.'* There are no footpaths or bridleways in close proximity. The effects on landscape character have already been discussed above. The visual effects on users of the footpaths and bridleways are considered within the LVIA.

## **Damage to Biodiversity, Ecology and the Environment**

SCWT provide a quotation from a nearby resident who claims that since Double Arches was erected that the wildlife visiting the area has *'all gone'*.

Double Arches has been very closely monitored since first operation, as required through planning condition. In addition, the application site has also been closely monitored for the surveys undertaken as part of the application. Appendix 4 of the Environmental

Report contains the full set of ecological surveys and demonstrates an abundant range of wildlife on and around the sites.

The group raise concerns regarding the proximity of the turbine (900m) to the Kings Wood SSSI/NNR, but do not provide evidence to substantiate these concerns. Double Arches is 750m from the SSSI/NNR and no significant effects have been recorded. The Kings Wood SSSI/NNR is designated for the habitat that it provides and its floral interest. As stated in the Environmental Report, this SSSI/NNR is well separated from the proposed turbine location by the intervening fields, woodland and quarry, as well as Woburn Road. The Ecology study within Appendix 4 finds no significant effects are likely.

General statements are made by SCWT with respect to the potential for wind turbines to kill birds and bats, quoting from the Spectator magazine. The Spectator is not known as a scientific journal, so instead I wish to highlight the actual evidence submitted for Double Arches (where bat activity has been extensively monitored during turbine operation), as well as the guidance produced by Natural England and SNH which is referenced within our ecological studies. The bat work undertaken by Ecology Solutions was scoped in consultation with the Bedfordshire Bat Group.

No objections have been raised by Natural England or RSPB. The turbine separation distance from blade tip to hedgerow fully complies with the 50m separation required by Natural England's TIN051 bat guidance (see paragraph 298 of the Environmental Report).

The ecology report concluded stating '*on the basis of surveys undertaken and the background desk study, there is no evidence to suggest that the proposed development would have any significant adverse effect on any protected or notable species or habitats.*'

The author of the SCWT objection has presented no evidence to support his objection on damage to biodiversity, ecology and the environment.

### **Harmful Impacts on Residential Amenity**

SCWT discuss the 'Lavender Test'. Since the public inquiry at Enifer Downs, the Lavender Test has become the accepted methodology for the assessment of impacts on residential amenity. Within the appeal decision, Inspector Lavender described a threshold for unacceptable effects (Paragraph 43):

*'However, when turbines are present in such number, size and proximity that they represent an unpleasantly overwhelming and unavoidable presence in main views from a house or garden, there is every likelihood that the property concerned would come to be widely regarded as an unattractive and thus unsatisfactory (but not necessarily uninhabitable) place in which to live. It is not in the public interest to create such living conditions where they did not exist before.'*

The Landscape and Visual Assessment which formed Appendix 6 of the Environmental Report considered the potential effects on visual amenity within a study area of 15km from the proposed wind turbine.

The LVIA considered both the single and cumulative effect of the wind turbine with the existing Double Arches wind turbine. The LVIA considered the potential effects of the proposal on the visual amenity of residents in settlements and individual dwellings, and followed the assessment methodology 'Guidelines for Landscape and Visual Impact Assessment 3' (GLVIA 3) set by the Landscape Institute. It found that in terms of the Lavender Test that *'no overbearing impacts on residential views are expected.'*

### **Harmful Impacts on Recreational Amenity**

SCWT raise concerns regarding the enjoyment of the countryside. Again, this was fully assessed within the Visual Amenity assessment of the LVIA in accordance with GLVIA 3. The limit of significance for high/medium sensitivity receptors such as users of the local public rights of way network was found to be where clear views are available within 1.5km of the turbine.

The group confuse visual effects with effects on the character of the landscape. In this case significant effects on the Wooded Greensand Ridge LCT and Clay Hills LCT are limited to within 1.5km to 2.0km from the wind turbine.

As stated within the LVIA:

*'Where visible, the proposed turbine would consistently be viewed in association with the operational Double Arches turbine where the two turbines together would be viewed as one wind energy scheme. The introduction of the Checkley Wood turbine would have an incremental effect on landscape character and visual amenity, but this would be limited by the presence of the Double Arches turbine which currently characterises the local landscape and views within the vicinity of the site.'*

### **Noise**

SCWT question the validity of ETSU R-97, The Assessment and Rating of Noise from Wind Farms, and state that it is *'seriously out of date'*.

Unlike the noise standards before it, ETSU R-97 specifically addresses the dynamic noise environment and how that changes with wind speed. NPPG specifically requires developers and planning authorities to assess the noise impacts of wind turbines using a combination of ETSU R-97 and the more recent Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise:

Paragraph: 015 Reference ID:5-015-20140306

*The report, 'The assessment and rating of noise from wind farms' (ETSU-R-97) should be used by local planning authorities when assessing and rating noise from wind energy developments. Good practice guidance on noise assessments of wind farms has been prepared by the Institute Of Acoustics. The Department of Energy and Climate Change accept that it represents current industry good practice and endorses it as a supplement to ETSU-R-97*

The noise assessment for Checkley Wood (presented as Appendix 5 to the Environmental Report) produced by leading wind farm acousticians Hayes McKenzie, correctly applies ETSU R-97 and the IoA GPG to the Checkley Wood site. This includes



for the wind shear correction required to reflect the difference between the height at which wind measurements were undertaken, and the hub height at 100m.

SCWT ask why the assessment assumes that no tonal correction is necessary. This is because the turbine noise levels are based upon noise levels established through independent noise test reports which form part of the wind turbines certification and warranty. There is no audible tone associated with the Vensys VE87. Guidance Note 3, which is attached to the sample planning conditions, provides a methodology for applying a tonal penalty to the turbine should a tone be measured during compliance tests. A warranty will therefore be sought from the manufacturer such that the wind turbine shall not produce an audible tone.

SCWT then make reference to the noise limits set for Double Arches within planning permission CB/14/04463/VOC. The limits within this consent were set through the proper application of ETSU R-97, accounting for the IoA Good Practice Guide. There have been no noise complaints associated with Double Arches, and these operational limits are therefore a success.

These limits remain for Double Arches, and also for the addition of Checkley Wood. However specific limits have been calculated for Checkley Wood in order to ensure that the overall cumulative limits are not exceeded and so that enforcement action can be taken against Checkley Wood if they are. These limits were established through the logarithmic subtraction of the Double Arches noise levels from the Double Arches limits to calculate the remaining noise budget. This is outlined in the explanatory note which accompanied the proposed noise condition.

In order to meet the daytime amenity limit, it is necessary to reduce the rotor speed of the turbine for wind speeds between 3 and 5m/s (referenced to 10m height) when the wind is blowing from the north-east sector. The excess noise levels asserted by SCWT do not, therefore, exist.

As with Double Arches, should the noise limits set by the proposed condition be breached, then the turbine would be switched off until the breach is remedied.

Through site design, and through the application of the proposed conditions, we have therefore demonstrated that this proposal is in full accordance with Paragraph 123 of the NPPF.

### **Amplitude Modulation**

As stated within the Noise Impact Assessment submitted alongside the Environmental Report, research commissioned by RenewableUK has established that the predominant cause of Amplitude Modulation is likely to be from individual blades going in and out of stall as they pass through regions of higher wind speed at the top of their rotation under high wind shear conditions.

We have stated within our various responses to MAS that in the case of Checkley Wood, there is no identified need for an AM condition. AM has not been reported at the adjacent Double Arches turbine, which is the same wind turbine model as proposed for Checkley Wood. In addition, the Development Control Committee at CBC have considered the

request from MAS for an AM condition at Double Arches on two separate occasions and have concurred that such a condition was not necessary.

### **Shadow Flicker**

SCWT comment on the Shadow Flicker report which is contained within Appendix 9 of the Environmental Report.

They recognise that where a dwelling is not screened by intervening vegetation that it will be necessary to turn off the turbine when the conditions for shadow flicker exist. As stated within the report these conditions are:

- clear skies and good visibility;
- the sun needs to be low in the sky and in a specific position with respect to a turbine and the window of a property;
- the wind must be blowing sufficiently to turn the wind turbines; and
- the wind must be blowing in a direction such that the rotor is rotating in a plane perpendicular to an imaginary line drawn between the wind turbine, the sun and the property window.

The original shadow flicker report, based upon the larger 112.5m rotor diameter, found 25 dwellings within ten rotor diameters of the turbine or 29 dwellings within ten rotor diameters plus 10%, not 249 dwellings (note this may have been picked up from a typographical error in the original assessment). Of these properties 24 had the potential to experience shadow flicker effects. Such effects would be for no more than 44 minutes in any one day. Potentially shadows would be cast for a maximum of 254 days over a year, or a maximum of 91 days at any one property. However the turbine would only shut down if the correct weather conditions (wind speed, wind direction, sunshine) exist at the time of the predicted effect.

An updated Shadow Flicker report was submitted for the amended scheme at Checkley Wood, based upon the 87m rotor diameter. We note that SCWT have not commented on this amended report. The number of dwellings within ten rotor diameters has decreased to 13, and shadows may be cast on a maximum of 152 days of the year, or a maximum of 79 days at any one property for no more than 34.2 minutes on any one day. This equates to a total of 89.6 hours per annum. Again, should the conditions above exist at the calculated time for shadow flicker to occur, then the turbine will be switched off.

A comparable assessment was produced for Double Arches, when the planning conditions were discharged. This predicted a maximum shutdown of 86 hours per year. The predicted times for shadow flicker events to occur were programmed into the turbine controller, along with the positions of all houses within 10 rotor diameters of the turbine where flicker was predicted to occur. The turbine at Double Arches automatically shuts down as proposed for Checkley Wood. As confirmed by the appended letter from Vensys, last year shut down was only actually required for a total of 44 hours across the year resulting in a very limited effect on turbine production.

## **Public Health**

It is inappropriate to compare the effects of tobacco on human health with the effects of wind turbines. In addition, no evidence (scientific, peer reviewed) has been produced by SCWT to allow this comparison to be made.

SCWT reference 249 dwellings within 1,237m of the turbine. As stated above, the correct figure is 29. We have established within our assessments and application that there will be no effects from shadow flicker and no noise levels above the permitted limits. No evidence has been produced by SCWT regarding low frequency infrasound or sleep deprivation. However, work produced for the DTI by Hayes McKenzie in 2005 found that *'infrasound associated with modern wind turbines is not a source which will result in levels which may be injurious to the health of a wind farm neighbour.'*

Further to this, Paragraph 2.7.60 of National Policy Statement NPS EN3 (referred to within Footnote 17 of Paragraph 97 of the NPPF as the approach Planning Authorities should follow in assessing the likely impacts of potential wind energy development) states:

*'There is no evidence that ground transmitted low frequency noise from wind turbines occurs at a sufficient level to be harmful to human health. Therefore, the IPC is unlikely to have to give any weight to claims of harm to human health as a result of ground transmitted low frequency noise.'*

## **Aviation and Air Safety**

No objections have been received from any aviation body to the proposed scheme. In addition, the site is adjacent to the operating Double Arches wind turbine.

As with Double Arches, Checkley Wood will be marked on aviation charts and fitted with a red or infrared (not visible to the naked eye) aviation light.

## **Public Opinion**

SCWT state that they have been given a "mandate" by local people, through their Parish Councils, to oppose this proposal. As stated at the beginning of this response, given the inaccuracies in the SCWT document, we are concerned that objections based upon this document have been established against incorrect information.

We note, for example, that the text present in the SCWT document is also within the Woburn Parish Council objection, and the document is referred to within the Heath and Reach Parish Council objection.

It should also be recognised that a significant number of local people have expressed their support for the scheme through both our own consultation and also directly to Central Bedfordshire Council.

In June 2015, the Government issued a Written Ministerial Statement alongside changes to PPG. The changes to PPG are reproduced within Paragraph 75 of the Environmental Report. As stated within Paragraph 6.111 of the Planning Appraisal, the WMS did not

introduce any changes to the NPPF or NPS's and the provisions of the NPPF Paragraphs 97, 98, and 14 have primacy over the PPG.

In order to assist with its interpretation, the Environmental Report also contains a flow diagram (Plate 8 on Page 17). Paragraphs 77 to 93 of the Environmental Report discuss the flow diagram in the context of Checkley Wood. Through each consultation process the planning impacts identified by the local community have been fully addressed. This is further demonstrated in Table 15 of the Environmental Report.

As stated within the Planning Appraisal

*...impacts relating to noise, shadow flicker, electro-magnetic interference (including TV reception) and aviation have all been fully addressed provided conditions are imposed on a planning permission. The studies relating to issues on nature conservation and cultural heritage have not identified any impacts that would be of sufficient scale to be material to the determination of the proposal. These matters must also be considered to be fully addressed.*

*This leaves the matter of landscape and visual amenity which are subjective judgements for each individual person. Some people strongly object to wind turbines, other people don't mind them and still others like them in the landscape. In this respect, it is pertinent to note that consultation exercises ensured that all residents within 2km of the proposed wind turbine were given the opportunity to comment. 10% of this "affected community" sought to raise concerns about the perceived impacts and a substantial proportion of these did not raise issues about landscape or visual amenity. This raises the question as to how to take into consideration the other 90% of the "affected community" in any assessment relating to the WMS.*

*In landscape and visual amenity terms it is important to note that the Council's own guidance (Guidance Note 1) on wind energy specifically states that extensions to existing wind energy development provide the least damaging option. Moreover, Table 2 of GN1 identifies a range of factors that are considered to be accommodating of wind energy development. The Checkley Wood proposal compares very well with these factors. In this respect, it is clear that this proposal provides one of the best options for wind energy development in the Council area. It must be concluded that the matter of landscape and visual amenity has also been fully addressed.*

Further to this, three recent decisions have been issued by the Secretary of State, granting planning consent to wind turbine projects, despite acknowledged impacts on landscape character and the presence of objections. The Inspector to a Secretary of State decision relating to an appeal of a 77m to tip turbine near Liskeard, Cornwall (APP/D0840/W/15/3097706) concluded that '*... in the circumstances set out the proposal can be deemed to have the backing of the affected local community...*'

Last week, within a consent notice for a single wind turbine scheme in Cumbria (APP/H0928/W/15/3132909), the Secretary of State said:

*'...while acknowledging that there would be some minor, localised harm to the character and appearance of the area he considers that this would be outweighed by the economic benefit to Low Abbey Farm and the contribution of the proposal to wider policy objectives to reduce reliance on non-renewable sources of energy. The Secretary of State agrees*

*with the Inspector that, notwithstanding the presence of objections to the proposal at application and appeal stages, in the circumstances set out the proposal can be deemed to have the backing of the affected local community.'*

If you require any clarification on the points addressed above, then please do not hesitate to contact me.

Yours sincerely,



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Enc: Letter from Wind Turbine Manufacturer Vensys

## Checkley Wood Turbine

### 1/ Introduction

This report has been written to clarify some statements made and questions raised by members of the public as a result of the planning application for a new wind turbine at Checkley Wood Farm which will be identical to the existing turbine at Double Arches i.e. a Vensys 87, 1.5MW turbine.

Vensys have worked with AWE Renewables Ltd on two wind turbine projects, one at Quarrendon just north of Aylesbury and the other at Double Arches, Heath & Reach. In both cases, the chosen turbine is a Vensys 87, 1.5MW wind turbine.

Both projects were ordered, delivered and commissioned in 2014 and became the 2<sup>nd</sup> and 3<sup>rd</sup> turbines that Vensys had installed in the UK.

However, globally, Vensys is a significant company in the wind industry having installed over 14,000 turbines with Vensys technology worldwide, 2480 of which are the same Vensys 87, 1.5MW model. During 2015 and 2016, Vensys have installed another 12 turbines in the UK.


Analysis for the data for the Double Arches turbine has been carried out for a 12 month period from the 19<sup>th</sup> December 2014 to the 18<sup>th</sup> December 2015 being the 1<sup>st</sup> full operation year. It should be noted that the proposed Checkley Wood turbine will be located 410m north east of the existing turbine and therefore the actual performance data of Double Arches is an extremely useful and accurate guide to what can be expected from the Checkley Wood turbine should it be commissioned.

### 2/ Analysis of actual wind data ('scada data') for Double Arches

The turbine collects and transmits data live to Vensys in Germany and to the client's office. Every ten minutes, the data is recorded to show (amongst other things):

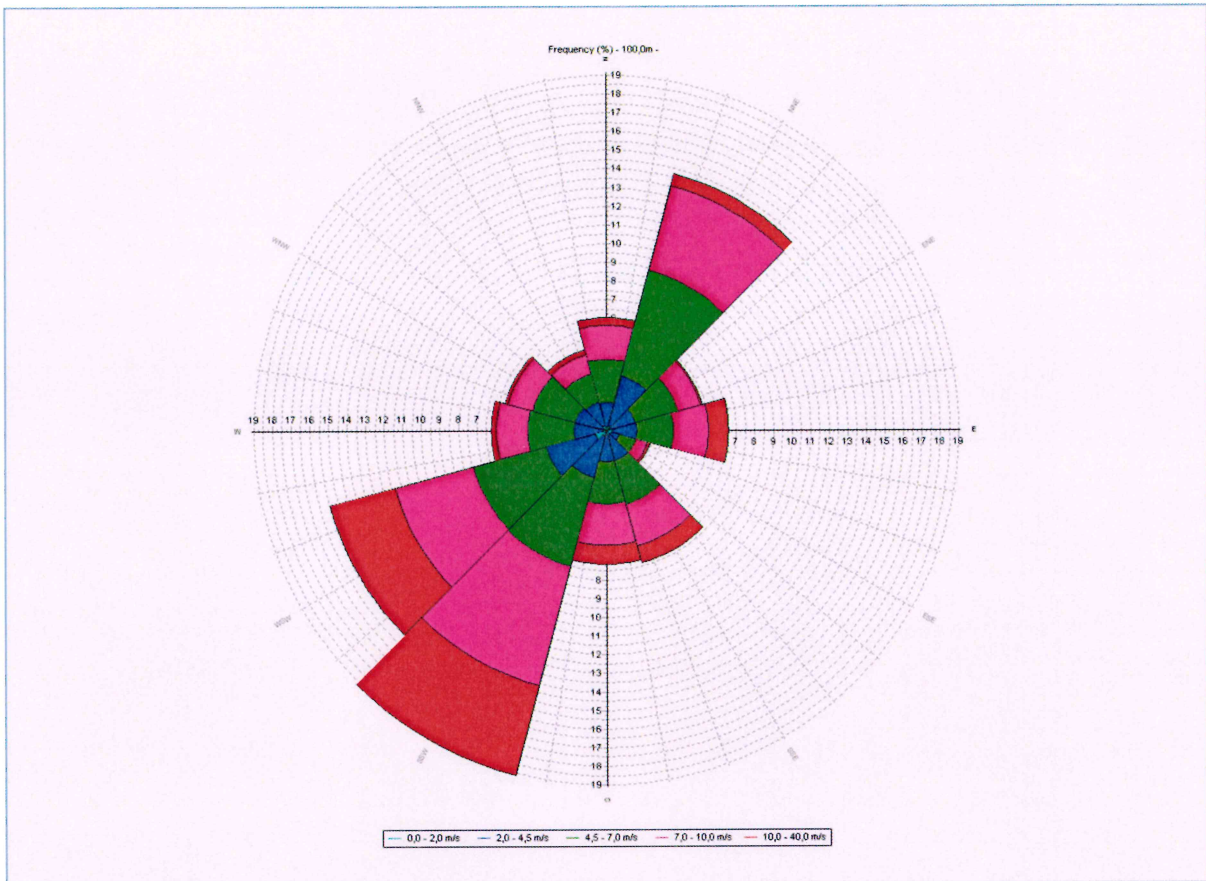
- the status of the turbine,
- average wind speed over the past 10 minutes,
- the highest recorded gust in the last 10 minutes,
- the direction of wind,
- the speed that the blades are rotating (revolutions per minute),
- the power output of the turbine and
- the actual energy generated during the 10 minute period.

This is known as the 'scada data' and it appears on the screen as shown below:

name		status	autostart	P [kW]	wind [m/s]	Gen [rpm]	nacelle north [°]	blade pos [°]	T ambient [°C]	Q [kVAr]	P limit [kW]	Gen limit [rpm]	blade limit [°]
WEA 1		power	0	112,93	4,25	8,97	234,62	0,56	21	-1,01	1500	17,3	0



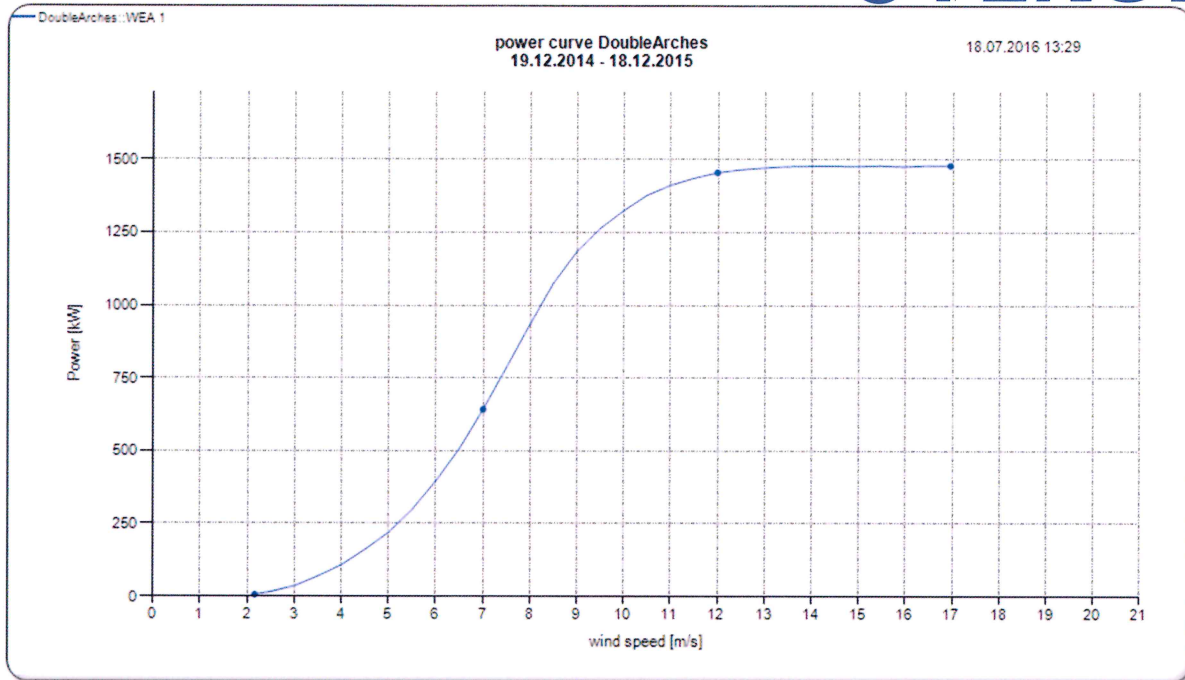
A review of the 'scada data' for the first 12 months of operations at Double Arches shows that the prevailing wind was from the south west. The prevailing wind and wind speeds are set out in the wind rose below:



It can be seen that the most productive and frequent wind is from the south west quarter of the compass amounting to 48% of all the wind between west to south. The second most frequent direction is north east accounting for 19% of all wind.

It is proposed that the Checkley Wood wind turbine will be switched off when the wind is in the north east quarter and when it is at a speed below 4.5m/s to protect property from noise thus ensuring compliance with ETSU-R-97. Analysis of the 'scada data' shows that this may occur 4.6% of the time being the equivalent of about 403 hours a year.

However, at wind speeds between 2 – 4.5m/s, the turbine generates small amounts of electricity. The amount of electricity generated rises with wind speed reaching peak output at just over 12 m/s. taking an average output (electricity generated) between the speeds of 2 and 4.5m/s of 150 kWh then the amount of electricity that won't be generated during the noise shutdown period will be about 60,450 kWh or 1.2% of total generation in a year. The power curve for Double Arches during the first 12 months of year is set out in the graph below:



Shadow flicker is something that the turbine is programmed to shut down when the specific conditions apply being; at the relevant time of year, time of day, when the light is strong enough for a shadow to be cast and the turbine is operating. It is possible to precisely calculate the theoretical maximum hours the turbine will shut down to avoid casting shadow flicker if all the conditions are fulfilled.

The existing Double Arches turbine has a theoretical maximum of 86 hours a year when shadow flicker may occur. During the first 12 months of operations, the actual shadow flicker shut down period was 44 hours. This is because not all the right conditions occur together.

The same calculation for maximum shut down for Checkley Wood turbine has been calculated at 89.6 i.e. 4 more hours than the theoretical maximum for Double Arches. So it is fair to assume that the actual shut down period is likely to be very similar to Double Arches.

The average wind speed recorded at Double Arches for its first full year of operation was 6.89m/s and given the proximity to Checkley Wind turbine, it is fair to use this data to calculate its likely performance.

### 3/ Analysis of generation data for Double Arches

Vensys have been asked to comment on the performance of the Double Arches turbine and compare it to the performance of its fleet of 2480 Vensys 87 turbines worldwide. Vensys does not have access to the output data of 100 of its Vensys 87 turbines which are operating in India and China.

However, of the remaining 2380 Vensys 87 turbines, Double Arches is the best performing turbine worldwide and it produced a total of 4,999,785 kWh in its first 12 months of operations. A table of best performing Vensys 87 turbines globally is set out below: (note the numbers are rounded down to the nearest MWh).

Country	Site	Output (MWh)
United Kingdom	Double Arches	4,999,000



USA	Otis	4,564,000
Germany	Bestwig	3,965,000
Poland	Unikowice	3,251,000
Cyprus	Alexigros	2,855,000

It should be noted that the performance of the Double Arches turbine is its actual performance over the first 12 months of operating and takes into account periods of actual shut down for servicing, repairs and shadow flicker. This is therefore a very good guide to the likely performance of Checkley Wood turbine.

There is every reason to expect that the Checkley Wood turbine is likely to be a very high performing turbine in terms of energy generated and is therefore an ideal location for an additional turbine based on the actual performance of Double Arches.

#### 4/ Separation distance between Double Arches and the proposed Checkley Wood turbine

Vensys is aware of the planning guidance in the United Kingdom which recommends separation distances between wind turbines. It also acknowledges the key point in the guidance that ultimately, the decision on separation distance is a decision for the applicant.

However, Vensys needs to satisfy itself that the separation distance between Double Arches and the proposed Checkley Wood turbine will not compromise the performance or the integrity of either of the turbines.

Vensys can confirm that it is satisfied there will be no such compromise to performance and as such, Vensys will offer its usual warranties and long term service agreement for the Checkley Wood turbine which will guarantee power curve performance and availability for 15 years.

Vensys does not expect there to be an impact on the energy generation performance of either Double Arches or Checkley Wood turbine once commissioned.

#### 5/ Current and future trends in wind turbine designs.

It may be helpful to put the dimensions of the Double Arches and Checkley Wood turbines into some context of current wind turbine design.

The key principals are to raise the nacelle (hub) for the turbine as high as possible where wind is stronger and more consistent and to fit large blades that will create a large swept path area.

In the United Kingdom, turbines have tended to be built at a smaller scale with Double Arches and Quarrendon being currently the tallest onshore turbines at 100m to hub height and 143.5m to tip.

In Germany, the most common wind turbine VENSYS build is the VENSYS 112. It has a rotor diameter of 112 m and a maximum hub height of 140 m with a rated power of 2.5 MW. In the last two years, VENSYS erected wind farms with up to eight VENSYS 112 turbines on a 140 m tower in Schiffweiler and M nnerstadt (both Germany). Currently, another wind farm with five VENSYS 112 turbines on a 140 m tower in Priesberg (Germany) is under construction.



Our newest turbine is the VENSYS 120 with a rated power of 3 MW and a rotor diameter of 120 m with a maximum hub height of 140 m. Two prototypes (Grevenbroich and Janneby, both in Germany) with a hub height of 90 m have already been erected.

Currently, a wind farm in Denkingen (Germany) with three VENSYS 120 is in the planning phase. The turbines will have a rotor diameter of 120 m with a tower of 140 m and a rated power of 3 MW with the height to tip at 200m.

Therefore, in wind turbine design, it is wrong to think of the Vensys 87 as being exceptional or excessive in size.

## 6/ Conclusion

→ Vensys is very pleased to have established a new market in the United Kingdom and to supply and build a growing fleet of 1.5MW wind turbines. The scale of the Vensys 87 is not exceptional and the size of turbines in the future is likely to be much bigger as demonstrated by what is being built in Germany today.

The performance of Double Arches is exceptional making it the lead performer of the current fleet where Vensys has access to the generation data. Therefore, Checkley Wood is highly likely to be another high performance site.

Overall periods of shut down to protect property from shadow flicker and noise will make very little difference to overall performance.

→ The proximity of 410 metres between the Checkley Wood turbine and the existing Double Arches turbine is perfectly acceptable, will not compromise the performance of either turbine and Vensys will stand behind all its usual warranties and long term service standards that its customers enjoy.

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