YELLOW RIVER WIND FARM

An Bord Pleanála Reference 19.PA0032

RESPONSE TO SUBMISSIONS RECEIVED BY AN BORD PLEANÁLA

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YELLOW RIVER WIND FARM

An Bord Pleanála Reference 19.PA0032

RESPONSE TO SUBMISSIONS RECEIVED BY AN BORD PLEANÁLA

1.0 INTRODUCTION

Jennings O'Donovan & Partners Limited submitted an application for planning permission, under the Strategic Infrastructure Development process, for development of a 32 turbine wind farm, on a site, in the townlands of Derryarkin, Derryiron, Coolcor, Coolville, Ballyburly, Greenhills, Bunsallagh, Derrygreenagh, Knockdrin, Wood, Killowen, Corbetstown, Carrick, Garr and Dunville, in a location just north of Rhode, on November 28th 2013, on behalf of Green Wind Energy (Wexford) Ltd. The period for submissions/observations ceased on January 31st 2014. A total of 94 submissions/observations were received by An Bord Pleanála. By letter dated 13th March 2014, An Bord Pleanála invited Jennings O'Donovan & Partners Limited to respond to the submissions.

The format of this response is in two sections. The first section is a response to the issues and comments in the submissions of both the Statutory Consultees and the Third Parties in the context of the project as submitted.

A winter bird survey for 2013/2014 has been carried out and the report outlining the survey findings can be found in Appendix A.

The second section of this response is dealing with suggestions in the comprehensive Report of the Offaly County Manager that recommended:

1. The omission of a small number of turbines

2. The relocation of other turbines within the landholding

3. The reduction in height of turbines particularly to the east of the R400 and some to the north of the Garr Road.

4. To consider the implementation of 40 dB limit proposed in the revision of the Planning Guidelines currently at public consultation phase

5. To consider the implementation of the no shadow flicker at any house within 10 rotor diameters as again proposed in the Planning Guidelines

The following would meet these concerns and the result is detailed in the Second Section of this Reponse:

- Reduce the number of turbines from 32 to 29 by omitting T20, T23 and T28
- Relocate 2 x Turbines (T22 and T24) and
- Reduce the maximum Tip-Height of the remaining 11 turbines from T13 to T25 by 10m to 156m

All of these adjustments would ensure:

- Reduction in the perception of 'visual clutter'
- No shadow flicker issues for any houses within 10 rotor diameters of the YRWF, as suggested in the revised Draft Guidelines that are currently in the Public Consultation phase.
- A noise limit of 40dB at all receptors/houses, again as suggested in the revised Draft Guidelines (in addition to the power noise turbine settings as proposed in the Adjusted Noise Report in Appendix A to Section 2).

The Applicant is not seeking to substitute the application made in accordance with the above. However, should An Bord be mindful to require it, the project will be developed accordingly.

2.0 FIRST SECTION OF RESPONSE

2.1 Format

The First Section of the response is as follows:

Response to Statutory Consultees

Response to Third Parties – Common Issues

Response to Third Parties – Individual issues

These are included below.

2.2 RESPONSES TO STATUTORY CONSULTEES

2.2.1 Offaly County Council

The opening pages of the Report set out the context of the development proposal and describe the site, the development, the interfaces with the public road network, the specification and description of the turbines and the planning history of the site. We would comment on this section as follows:

- The Yellow River Wind farm has been designed to fully comply with the with the 2km buffer zone around Croghan Hill as required by the Co Offaly Development Plan 2009 – 2014.

- The site characteristics of the Northern section of the YRWF (T24 – T32) would be more appropriately described as 'primarily flat improved grassland, forest and cut-over bog' rather than 'gently undulating agricultural land and tillage' and should therefore be categorised with the lands to the west of the R400 (T1 – T12).

- The reference to 10 watercourse crossings in the Non-Technical Summary of the EIS is not correct – there are 9 crossings as stated in the EIS. We apologise for this error.

- We confirm that all internal cabling, both linking the turbines and connecting to the sub-station identified in the application, will be underground.

The next sections of the Report detail the relevant National, Regional and County Renewable Energy, Climate Change and Planning Policies. Here, the Report states that the YRWF site is predominately located in a low sensitivity landscape area and

that the nearest protected view in Co Offaly is V8 "*Views towards Croghan Hill and Boglands"* from the Southern Side of the Hill. In undertaking the design of the project, the Applicant was fully cognisant of and sensitive to the requirements of the County Development Plan and ensured that our development would not negatively impact on this area. This is exemplified by both our ensuring that the development did not impact on the view of Croghan Hill and Boglands from the Southern side of the hill (See Photomontage Ref. DR4) and our full compliance with the 2km buffer zone requirement.

Offaly County Council's report is comprehensive and thorough, and although, the principle of the proposed development is acceptable, the Council have recommended An Bord Pleanála to issue a request for Further Information to facilitate a final recommendation. Therefore issues set out in the Council's report are addressed as follows:

2.2.2 Roads

The Roads and Area Office elements of the report outline their primary functions and general concerns that are central to their consideration of the YRWF application and detail their specific concerns and issues that they state GWE need to address.

In relation to their general comments the Applicant in advance of any works, will liaise and discuss the proposals and programme for same with the Roads Department/Area Office as appropriate and will comply with all statutory obligations in this regard. The Applicant will undertake to minimise damage to the public road network and any such damage will be made good to the satisfaction of the Local Authority with the minimum of delay. In addition the Applicant commits to maintain adequate traffic safety standards and minimise disruption for road users during the construction and operational phases of the wind farm.

In relation to their specific concerns we respond as follows and all Drawings referred to can be found in Appendix J of this Section:

1. *The applicant has stated in the submitted EIS that 5,916m of existing site roads will require upgrading. The applicant has not provided any detailed information as to what upgrading measure they intend carrying out. Furthermore, the applicant shall carry out a detailed structural analysis to the satisfaction of the*

Local Authority of these existing roads, and proposals to upgrade same, to facilitate Haul Route Traffic, shall be submitted (Ref Vol 1/2 EIS page 17).

Response: As an integral element of the detailed design phase, the Applicant will liaise with Offaly County Council (OCC) and will discuss and agree site-investigation, sampling and surveying requirements, together with the programme for same, in respect of the R400.

The 5,916m of existing site roads relates primarily to private roads on private lands. However, approx. 720m of the Greenhills Road and 535m of Carrick Lane (both public roads) will be upgraded.

Prior to commencement, and following consultation and agreement with Offaly County Council, a detailed structural survey of existing roads will be carried out to the satisfaction of the Local Authority. The following would be typical of such a survey and consequent detailed design activities. Pavement Management Systems Ltd. (PMS) will be engaged to carry out a Pavement Condition Survey to Irish Pavement Asset Group (IPAG) Standards. The Condition Survey and Rating will be in accordance with "WP4- Condition Surveying and Rating (including Drainage)". This will be carried out using a Road Surface Profiler Multi-function Survey Vehicle. The pavement condition will be evaluated and rated on a scale of 1-10 using the Primary Rating Indicators and Secondary rating indicators as may be applicable. Based on the overall rating score, the Treatment Method will be determined. The Treatment Method can be one of the following:

- Routine Maintenance
- Resealing & Restoration of Skid Resistance
- Surface Restoration
- Structural Overlay
- Road Reconstruction

Where "Structural Overlay" or "Road Reconstruction" is required, a geotechnical investigation will be undertaken. This may be in the form of boreholes and trial pits

together with in-situ and laboratory testing. Geophysical testing will also be undertaken. The locations of Boreholes and Trial Pits will be selected based on traffic safety and will be carried out under a Road Opening Licence from the Local Authority. Trial pits will only be carried out in verges. Traffic Management for such investigations will be in accordance with Chapter 8 of the Traffic Signs Manual as published by the Department of Transport, November 2010. Based on the geotechnical results, a detailed design for the road improvements will be carried out and the proposed measures will be submitted to the Local Authority for approval.

The Applicant is aware that roads in the area are subject to regular repair due to the nature of the underlying sub-soil and that the repairs / upgrading works at the pre-construction stage may be greater than any works which may be perceived as being required at this stage.

The extent of proposed widening of roads is considered in Appendix G of the EIS.

Where roads have to be widened, the following works will be carried out:

- The extent of existing services and utilities will be confirmed on the ground

- Based on the Pavement Condition Survey, the method of upgrading for the existing sealed width of road will be decided and the upgrading works to the required width will be designed in detail and submitted to the Local Authority for approval. The design will be in accordance with the relevant provisions of the Design Manual for Roads and Bridges as published by the National Roads Authority.

- A Risk Assessment and a Method Statement will be developed for the road upgrade works such that the extent an sequencing of particular sections of road can be determined having regard for traffic safety. Traffic Management for works will be in accordance with Chapter 8 of the Traffic Signs Manual as published by the Department of Transport, November 2010.

- Applications will be submitted to the Local Authority for Road Opening licences.

- Should there be a need for road closures, applications will be made to the Local Authority.

- Parts of the verge(s) will be dug out to suitable formation and reconstructed using, geotextile and layers of compacted stone (Clause 803 and 804) and geogrid. The layers will be benched into the existing road. A full width layer of geogrid and Clause 804 material will be placed across the entire road width prior to sealing using two coats of tar spray and chips.

- Quality Control testing (e.g. CBR, plate bearing tests etc) will be carried out as work progresses

- Road drainage will be built as an integral part of the road widening and will tie into existing drainage.

- Where required, services e.g. watermains, will be reconstructed as part of the works. Temporary by-pass pipelines may be required until such time as the permanent service has been restored.

- Entrances to dwellings, fields etc. will be reinstated.

- Road markings will be applied and signage will be erected.

- Top-soiling and seeding will be carried out.

- The works will be inspected jointly with personnel from the Local Authority and any snags identified will be remedied.

All construction works will be carried out in accordance with the relevant provisions of the Specification for Road Works and the Road Construction Details as published by the National Roads Authority.

2. *The applicant has stated in the submitted EIS that 18275mts of new site roads will require construction. Details of Construction Materials and Haul Routes associated with same shall be submitted to the Local Authority. A Structural Assessment Analysis and Survey shall be submitted to the satisfaction of the Local Authority on all Haul Routes proposed. (Ref Vol 1/2 EIS Page 17)*

Response: The 18,275m of new roads will be constructed on private lands and will remain in private ownership. The proposed haul routes are set out in Appendix G to the EIS. The method of construction of the new roads on private lands is described in Section 3.2.5 of the EIS. The method of strengthening of the haul route is as outlined in Response 1 above. As set out in Response 1 above, a structural survey of the relevant public roads will be carried out prior to commencement.

3. *The applicant has stated that approximately 10.4HA of existing plantation forestry will be felled to allow for development. Details and Structural Assessments of the capacity and ability of all Haul routes to facilitate same shall be submitted to the Local Authority. (Ref Vol 1/2 EIS Page 24 and Page 77).*

Response: The same haul routes will be used for removal of wood as for the construction of the wind farm. As set out in Response 1 above, a structural survey of the relevant public roads will be carried out prior to commencement.

4. *Proposed road widening design details associated with L-50112-1 Greenhills and L-10081-1 Carrick Lane shall be submitted to the LA for the purposes of proper analysis. The applicant shall ensure that all local services and drainage systems are maintained, and will demonstrate proper legal agreements with the landowners of the lands concerned. (Ref Vol 1/2 EIS Page 38) Ref Vol 2/2 EIS Chapter 6.13 Haul Route Assessment).*

Response: The proposed widening works associated with the L-50112-1 Greenhills Road is described in Section 6.10 of Appendix G to the EIS which outlines the requirement to widen a 1,450m length of this road primarily on its eastern side. Cross-sections 8, 9 and 10 (Drawing References 4909-HRA-108, 4909-HRA-109 and 4909-HRA-110) in Appendix G to the EIS show the existing road widths. These roads will be subject to thorough investigation, structural analysis as described in Response 1 above and will then be subject to appropriate remediation. Drawing References 4909-HRA-108 Rev A, 4909-HRA-109 Rev A and 4909-HRA-110 Rev A show how this road can be widened and strengthened.

The proposed widening works associated with the L-1008-1 Garr Road is described in Section 6.12 of Appendix G to the EIS. Cross-sections 11 and 12 (Drawing References 4909-HRA-111 and 4909-HRA-112) in Appendix G to the EIS show the existing road widths. Cross section 12 is not strictly relevant as it is beyond the extent

of the affected road. Drawing 4909-HRA-111 Rev A shows how this road can be widened and strengthened.

The proposed widening works associated with the L-10081-1 Carrick Road is described in Section 6.14 of Appendix G to the EIS which outlines the requirement to widen this road primarily on its western side. Cross-section 13 (Drawing Reference 4909-HRA-113) in Appendix G to the EIS show the existing road width. This road will be subject to thorough investigation, structural analysis as described in Response 1 above and will then be subject to appropriate remediation. Drawing 4909-HRA-113 Rev A shows how this road can be widened and strengthened.

5. *The Local Authority consider that the "proposed haul routes shall be discussed and agreed with OCC prior to commencement of construction" is unacceptable. All Haul routes shall be identified and submitted to the LA with upgrading proposals to facilitate this said application. (Ref Vol 1/2 EIS Page 38).*

Response: The extent of haul routes is set out in Appendix G to the EIS. The methodology for upgrading these haul routes is set out in Responses to 1 and 2 above. The upgrading proposals are described on Drawings 4909-HRA-108Rev A, 4909-HRA-109 Rev A, 4909-HRA-110 Rev A, 4909-HRA-111 Rev A, and 4909-HRA-113 Rev A.

6. *All underground cabling details within any of the public roads and verges shall be submitted to the LA in the form of a Cable Installation Plan. These details shall include a location layout plan to a suitable scale 1/100 with cross sectional details to a suitable scale at regular intervals along the said public roads. The proposed methodology for the laying of same including chambers, draw pits etc. shall be stated, with the preferred option being directional drilling. Mitigation measures to protect the public roads especially the bog rampart public roads shall also be submitted. The applicant shall state also as to how many linear metres of underground cabling is to be laid within the public road curtilage. The applicant shall also investigate the feasibility of laying these underground cables off the public roads and perhaps in private lands adjacent Example; from turbines 1 to 12 as far as the substation (Ref Vol 1/2 EIS Page 64 & 75-76 & 111 112).*

Response: All cables will be laid underground. Prior to commencement, a Cable Installation Plan will be submitted to Offaly County Council. The majority of the haul routes will comprise new tracks on private lands and the underground cables will follow these routes. Where haul routes are proposed to follow Public Roads, the applicant will investigate the feasibility of laying the cables within private lands and will make proposals in this regard where practical and available. Where this is not possible, cables would be laid in accordance with the provisions of a Road Opening licence and preference will be given to laying cables within any areas of road to be widened. Where sections of Public Road do not have to be widened, the use of directional drilling will be proposed subject to confirmation that this method is feasible following detailed geotechnical investigations.

7. *Frequency, Volume and number of deliveries per day in terms of average and maximum shall be submitted to the LA Haul Loads, frequencies and size of loads associated with the tree felling process should be included (Ref Vol 1/2 EIS Page 65-67 & 119-126).*

Response: The estimated volumes of construction traffic are set out in Section 5 of Appendix G of the EIS. The average number of deliveries to site during the civil works construction period will be 40 loads per day with peak at 70 loads per day during concreting of turbine bases.

There are approximately 275 hectares of forestry in the vicinity of the Yellow River Wind Farm site. Four of the proposed turbines are located within forested areas: T1; T25; T26 and T27, and one turbine, T2, is partially located within forestry. Felling and thinning will be necessary to accommodate the construction and erection of these four turbines and associated works. It is acknowledged that a potentially significant volume of traffic will be incurred during these works. Felling will be carried out under licence from Forest Service.

Provision of the construction area at each turbine location will require approximately 1.5 hectares for each of turbines T1; T25; T26 and T27, and approximately 0.77 hectares for T2, which totals 6.77 hectares. These areas include all hardstanding and assembly areas. The estimated loss of forestry due to access roads is approximately 3.63 hectares based on the requirement for approximately 2,425 metres of new access road. This gives a total area for tree felling as a result of the development of approximately 10.4 hectares

An estimate of loads associated with forestry is tabulated below.

Material	Quantity	No. of truck deliveries
1. FORESTRY FELLING DELIVERIES		
Forest Felling There is approximately 10.4ha of forestry to be felled as part of the development. The current age of forestry ranges from 10-14 years. There are 2,300 trees per hectare. Assuming that it will be 16 years when felled, each tree can yield 0.07m3. This gives a total volume of 1,675m3. The density is typically 1.1m3 per tonne. Thus, 1,522 tonnes will be removed. Assuming 25tonne loads, the total number of loads required will be 61. This is rounded up to 70 to allow for some part loads at the end of a particular plot.	1,522t	70
Mobilisation This will include the delivery of some geo-textile matting for access tracks, tools, temporary fencing, temporary site cabin and storage containers and excavation plant and will constitute no more than 10 loads.		10
Demobilisation Removal of all loads identified above		10
TOTAL TRAFFIC FOR DEFORESTATION – **Full/ Partly Full Loads** **Number of Traffic Movements (including empty trucks)**		 **90** **180**

During the felling of the forestry and haulage off site, a worst case scenario estimates that the maximum number of loads to be delivered/ removed to/from site would be approximately 90 or 180 traffic movements, excluding personnel transport.

This includes mobilization deliveries along with haulage volumes to transport trees off site.

It is considered that the existing road network and proposed wind farm network is adequate to provide road infrastructure.

These haulage loads would be carried out over a period of 2 months prior to commencement of construction of the wind farm i.e. approximately 45 loads per month or an average of 2-3 loads per day or 4-6 traffic movements per day excluding weekends and bank holidays. When personnel transport is included, this value can be increased to 10 traffic movements per day.

All construction equipment and forestry haulage deliveries would be carried out using standard rigid lorries with integral loading cranes.

Care will be taken to ensure that delivery traffic does not damage the formation. Loads must not exceed legal limits and in some instances, limitation of loads below legal limits and smaller truck size may be required.

Under the Roads Act 1993, it is an offence in specific circumstances to damage a public road. Those held liable for damage to public road could be liable to both the cost of reinstatement and a fine. If there is any sign of pavement deflection or deformation then the road should not be used until examined and passed fit by an engineer.

Offaly County Council will be consulted in advance of any timber movement.

8. *All Culvert, Bridge Structures along all proposed Haul Routes shall be identified and suitably surveyed in terms of their structural ability to cater for the relevant construction traffic that is proposed.*

Response: Prior to construction, as part of detailed design, all culvert and bridge structures along all proposed haul routes will be identified and surveyed in terms of their structural ability to cater for construction traffic. Where required, strengthening measures will be proposed for agreement with the Local Authority.

9. *The applicant has stated in the EIS under Chapter 6.0, Haul Route Assessment, that 4.0km of the R400 from the M6 Motorway to the junction at Derryiron is in "Good Condition". The applicant shall clarify and state as to what Engineering/technical assessment was undertaken on this route to make this assertion (Ref Vol 2/2 EIS Chapter 6.2 Haul Route Assessment).*

Response: The statement was based on a visual assessment only. As discussed in response to Item 1 above, a Pavement Condition Survey will be carried out prior to commencement so as to provide a more scientific assessment of the R400 at that time.

10. *The applicant shall submit road widening details of the Kilmurray Access Road. The applicant shall also submit written evidence in the form of a legal agreement that he has permission to use the Kilmurray Access Road (Ref Vo 2/2 EIS Chapter 6.3 Haul Route Assessment).*

Response: The Applicant has acquired use of the Kilmurray Road as part of the legal option agreement with all of the participating landowners including Mr Kilmurray. No road widening is proposed for the Kilmurray Road nor are any widening works required.

11. *A Structural Assessment by a suitably qualified Engineer of the Yellow River Bridge Crossing on the R400 along with any other culverted bridge crossings on the R400 from the Co Boundary to Rhode Roundabout shall be submitted and any arrangements for the protect as detailed. (Ref Vol 2/2 EIS Chapter 6.4 Haul Route Assessment).*

Response: Prior to commencement and as part of the detailed design phase, a structural assessment will be carried out on all bridges/culvert crossings of the R400 from the County boundary to Rhode roundabout including the Yellow River Crossing. The results of such surveys together with details of any proposed strengthening / remedial works will be submitted to the Local Authority for approval.

12. *The applicant proposes to alter and encroach onto the R400 roundabout in Rhode. This shall be avoided and the applicant shall submit proposals that should design around this option. The applicant shall also clarify as to why temporary lighting is required at this location as this roundabout is already illuminated by public lighting. Any alteration to the existing design layout of this roundabout's capacity to cater for a fourth arm junction off same (Ref Vol 2/2 EIS Chapter 6.6 Haul Route Assessment).*

Response: The proposed arrangement has been clarified so as to avoid encroachment onto the central island of the R400 roundabout. Details are shown on Drawing 4909-HRA-202 Rev A.

13. *Proposed Road Widening Details of Coolville Road (Private Road) shall be submitted (Ref Vol 2/2 EIS Chapter 6.7 Haul Route Assessment).*

Response: Details are provided in Drawings 4909-HRA-106 Rev A.

14. *Drawings as submitted within the EIS Vol 2/2 appear to contradict another set of drawings which have been submitted separately with this application. The applicant shall clarify exactly as to what sections of the public road are to be widened and what sections of private road are due to be constructed, and their interaction with each other with reference to the section of road from "Coolville Lane" twds "Greenhills Road" and onwards twds "the Wood" (Ref Vol 2/2 EIS Chapter 6.8 and 6.9 Haul Route Assessment).*

Response: The interfaces between the public road network in the Coolville to Greenhills area are solely of the Garr Road Roundabout at the R400 and a crossing point of the Greenhills Road to avoid difficult turning points along the Greenhills Road. A section of new road parallel to the Greenhills Road will be built in private lands as shown on Drawing Number 4909-PL-110.

15. *Proposed Road Widening details of L 50122-1 by 3.0mts shall be submitted (Ref Vol 2/2 EIS Chapter 6.10 Haul Route Assessment).*

Response: Please see revised text for Sections 6.9 and 6.10 of Appendix G of the EIS which describe this section of the haul route as follows:

"6.9 Private Lands to L50122-1

From where it crosses the L50122-1 at Tooreen, the new access road will be over private lands for a distance of 735m before it rejoins the L50122-1. Details of the proposed new junction where it rejoins the L50122-1 at Greenhills are shown on Drawing 4909 – HRA – 206.

6.10 L50122-1 to Wood

The access route will follow the L50122-1 northwards for a distance of approx. 740m until the end of the public road. Over this length, the road will be widened to 4m as shown on Drawings 4909 – HRA – 108 Rev. A and 4909 – HRA – 109 Rev. A. It

then follows a private road over a length of approx. 650m to reach private lands at Wood Townland as shown on Drawing 4909 – PL - 111. This private road can be widened as shown on Drawing 4909 – HRA – 110 Rev. A. At the end of the road at Wood, the haul route will split into three branches within private lands. One branch will serve turbine T16, another will serve turbines T18, T19, T20 and T21 while the third branch will be the main route serving turbines T17, T22 and T23 and the northern part of the proposed wind farm. Details of the proposed new junction at the northern end of the private road are shown on Drawing 4909 – HRA – 207 Rev. A."

16. *Proposed Road Widening details of L-1008-1 by 2.3mts Garr Road shall be submitted (Ref Vol 2/2 EIS Chapter 6 12 Haul Route Assessment).*

Response: The Garr Road (L-1008-1) will be crossed over a length of approx. 60m. Please see Drawing 4909 – HRA – 111 Rev. A which shows how this road will be widened to achieve a minimum width of 4m.

17. *Drawing No 4909 HRA 100 appears to contradict Drawing No 4909-PL-100 is the haul route crossing or bypassing Corbetstown Bridge? Details of the proposed interaction and sightlines with the private haul route and Existing Public Road shall be submitted (Ref Vol 2/2 EIS Chapter 6.12 Haul Route Assessment) (Ref Vol 1/2 EIS Page 100).*

Response: The haul route will bypass Corbetstown Bridge as shown on Drawings 4909 – PL – 100 and 4909 – PL – 114. Drawing 4909 – HRA -100 has been corrected (see Drawing 4909 – HRA – 100 Rev. A).

18. *Detailed designs of all proposed junctions to be provided, including sight distances.*

Response: Prior to Commencement, detailed designs for all junctions will be submitted to the Local Authority for their approval.

19. *An independent Road Safety Audit to be provided for the project.*

Response: Prior to commencement and as part of the detailed design of the project, independent Road Safety Audits will be carried out for all new or modified junctions.

20. *Drawing HRA 105, photo appears to be facing the opposite direction to the one indicated.*

Response: This has now been corrected – please see Drawing HRA 105 Rev A enclosed.

21. *A Traffic Management Plan is to be submitted to cover all proposed construction and operational traffic movements within the development (to include proposals for leaving, entering and traversing the public road networks. This plan should address the proposal to provide traffic lights at all junctions as opposed to stop/go signs or other methods.*

Response: Prior to construction, a detailed Traffic management Plan will be submitted to cover all construction and operational movements within the development. The proposals will involve the use of temporary traffic lights rather than Stop/Go manual methods. All traffic signage will be in accordance with Chapter 8 of the Traffic Signs Manual as published by the Department of Transport, November 2010.

2.2.3 Environment and Water Services Further Information

The developer proposes to use a holding tank for sewage effluent, the tank being emptied every three months to a waste water treatment works such as Rhode wastewater treatment works. It is preferable for an on-site waste treatment and disposal system to be designed for the site.

Response:

The wastewater holding tank proposed in the EIS is a sealed tank similar in specification to Klargester Sealed Cesspool to BS 6297:1983 and this would be surrounded by 225mm thickness of concrete or Silotank equivalent. The tank will be fitted with an ultrasonic level measurement system with signal connected to the SCADA system of the wind farm operator. Once the liquid level attains a pre-determined level, the tank will be scheduled for emptying and the contents will be taken to an approved sewage works. This work will be done under a contract with one of the Contractors who have a permit to transport Septic Tank Waste to a Wastewater Treatment Plant.

A storage tank provides a reliable solution for locations without mains drainage, where the discharge of treated effluent is not permissible due to unsuitable ground conditions, or where infrequent use, would prevent the successful functioning of a packaged treatment plant. The frequency of use of the substation welfare facilities will be very sporadic.

Should the option of using the main foul sewer be available in future, we propose that a rising main and small pumping station be constructed to connect to the main sewer or alternatively if the falls allow that a gravity sewer be constructed.

Section 2.9.11 It is stated that the attenuation ponds are to be removed on completion of construction which seems to indicate that the proposed ponds are settlement ponds for construction dewatering. Details are requested on what attenuation is required for the site.

As the hardstandings will be topsoiled and grassed following construction, the settlement ponds will be reinstated and revegetated to allow the site to revert to it's historic drainage regime. However, swales along roadways will be maintained during the operational phase of the development, the swales will incorporate filtration flow check dam which will provide attenuation. These are shown on drawing *4909/PL/504*.

Section 2.9.14 No detail is given for the proposed drainage of this site {-20ha} by swales, e.g. swale dimensions, infiltration rates, attenuation capacity etc.

Runoff from large hardstanding areas such as the site compound, turbine hardstandings, and substation will be attenuated to mimic natural runoff patterns. Attenuation will utilise shallow primary and secondary settlement ponds to aid removal of suspended solids. Calculations for the determination of storage requirements have been undertaken and are as follows:

- A 1 in 100 year rainfall return design.

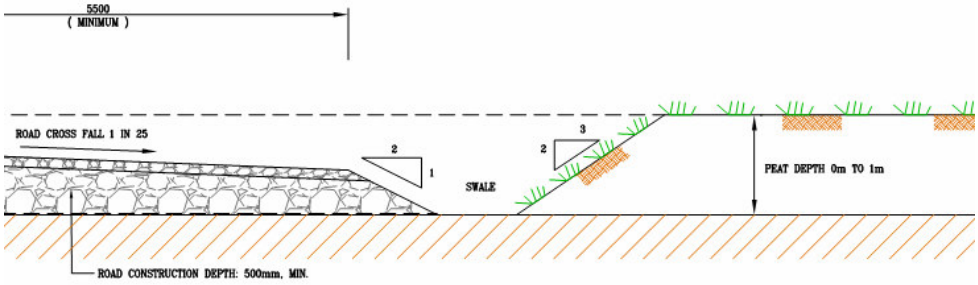
- The largest hardstanding area of 0.0025 hectares.

- The rational method1 is subsequently applied to calculate the flow volumes into the settlement pond over these respective periods

- An initial outlet weir overflow rate is applied of 5l/s which approximate to Greenfield run-off rates.

To capture runoff generated within the development footprint it is proposed to use swales. The hard standing infrastructure for the turbines will be constructed of compacted rock fill founded on the bedrock. An initial open 2 in 3 side slope 0.5m wide ditch will be excavated a minimum of 0.75m into the subsoil along the up and down slope edge of the excavation to bedrock for the development infrastructure for the turbines.

This will act as a conduit for any rainfall during the emplacement of the rock fill base for the hard standing infrastructure for the turbines. Pumps will be used to transfer any accumulations of runoff to the attenuation ponds.



The Figure above shows a diagrammatic cross section through this open ditch as it will be when completed.

It is noted that the largest flow in any of the swales proposed as part of the development will be 0.209m3/s. This is based on a 1 in 100 year rainfall event occurring over the largest development area contributing to the attenuation ponds. Please refer to ***Table 2.8*** of the Environmental Impact Statement for a tabulation of these values.

[1] Rational Method is expressed by the formula $V = 2.78 \cdot C \cdot A \cdot I \cdot t$, where V is the volume of water generated in the stilling pond, C is the run-off co-efficient which is assumed to be 0.95 across all hardstanding areas, A is the area of the hardstanding / catchment, I is the rainfall depth and T is the duration of rainfall occurance.

The Dimensions of the swale have been assessed using the Chezy - Manning formula such that the depth of flow within the swale is calculated not to exceed the following values during a 1 in 100 year intensity storm:

- A velocity of 2.33m/s
- A flow area of 1.24m2
- A flow perimeter of 2.0m
- A flow depth of 0.41m.

A roughness coefficient of 0.2 is used for grassed swales along with a longitudinal gradient of 2 degrees.

Therefore it can be concluded that the swales are capable of receiving and transferring development run-off.

As a worst case for flow capacity design purposes and which would occur during the construction phase, the effects of infiltration, evapotranspiration and attenuation have been ignored.

In respect of the swales, no values for infiltration, evapotranspiration or attenuation have been applied. It is assumed that the swales will channel 100% of the receiving flow into the attenuation ponds. Therefore the site has been designed for a worst case scenario.

At the end of the construction period, the construction compound and each of the turbine hardstandings will be covered with topsoil and re-vegetated. At that stage, the temporary settlement ponds will be decommissioned and re-vegetated.

Section 3.2.3 The applicant should be requested to provide further detail of the proposed concrete washdown facility Plans, details and throughput capacity should be addressed.

Introduction

A suitable "Big pHil" Concrete Washout Unit (or equivalent) will be present on site during the construction phase of the project and particularly during the concrete base pour. Please refer to the attached specification which can be found in Appendix B.

This unit is designed to cope with larger quantities of wash-off as associated with concrete handling and the re-use of wash water rather than disposal. The unit has been designed to separate the aggregate from the wash water and then treat the wash water prior to re-use. As the reception hopper is only 700mm from the floor and accessible from 3 different sides, the unit can be used to clean a range of concrete equipment including skips, pumps, tremmie pipes, concrete trucks often at the same time.

It is by making wash water safe & re-usable that the need to discharge the treated water off-site is also avoided along with its associated transport and disposal costs.

Washout of concrete trucks will only be undertaken in the designated areas. A designated wash out area will be located on the hardstanding area. No surface run-off from within the wash out area will be permitted to leave the area and directly enter any drain or water course. Each wash out area will be located away from main construction traffic area or access areas to prevent disturbance or tracking. A sign will be installed adjacent to the washout facility to inform concrete equipment operators to utilise only this designated washout area.

The Siltbuster "Big pHil" Process is described below.

Big-pHil comprises of a Concrete Wash Water Treatment Unit designed to provide an environmentally sustainable method of cleaning concreting equipment such as: -

- Drum Mixers.
- Volumetric Mixers.
- Drum Mixer Chutes.
- Concrete Pumps.
- Concrete Skips.

- Concrete Agitators
- Batching Plants
- Tremmie Tubes.
- Various other concrete handling tools

The unit has been specifically designed to provide a self-contained treatment system which, once initially charged with water, does not rely on an external water source for wash down purposes. The system has been expressly designed to treat the wash water to a standard suitable for re-use by: -

- Separating the aggregate and most of the cement particles from water.
- Treating the wash water with carbon dioxide (CO2) to reduce the highly corrosive
- pH and thereby mitigate the associated pollution and health risk issues.
- Minimising water usage by storing the water ready for re-use via the booster
- Pump and hoses on the unit.

To achieve this, the unit comprises of the following treatment stages: -

- Reception Hopper - into which the wash water and associated solids are discharged
- Integral Treatment and Storage Water System that comprises of: -
  - Solids/liquid separation stage
  - pH adjustment stage.
  - Fine suspended solids removal stage.

– Storage

The unit is capable of handling wash water flow rates of up to 10m 3/hr on a continuous basis, which should be ample to cope with the concrete truck mixer/chute washing requirements for even the largest of jobs.

Treated Water Stage Tank and Wash Water System

Prior to commencement of operation the treated water storage tank and the water treatment plant are filled with approximately $7m^3$ (ie 7000 litres) of clean water which will be recirculated around the unit so as to allow the washing off of concreting equipment prior to treatment and re-storage.

Once the unit is powered (ie 400V 3phase 16Amp neutral plus earth supply) the wash pump is automatically started by the opening the hose nozzle.

Reception Hopper

The front end of the unit (into which the wash water and associated concrete solids are discharged) comprises of a steel lined reception hopper measuring circa 3m by 2.4m wide by 0.7m deep.

For: -

- Truck Mixers - and other large items of wheeled plant are parked adjacent to the unit and the wash water/concrete fines discharged directly into the reception hopper.

- Concrete Pumps - and other, 'low to the ground', items the unit can be supplied with either an access ramp or a suitable approach ramp built from hard-core.

- Crane Skips - the unit is supplied with a dedicated skip support system, and the skip washed by the operator accessing railed platform using the top mounted hose reel.

- Smaller Items of Plant - can be placed on an access grating placed across the top of the reception hopper and washed off.

The gravel and sand fraction along with a proportion of the cement fines settle out in the Reception Hopper whilst the wash water and a proportion of the finer particles pass on through a slotted screen into a pump sump from where it is forwarded on in to the water treatment plant.

Once full of accumulated solids the reception hopper can either be mucked out using a backhoe/excavator fitted with a, 'non-toothed', grading bucket or the end door of the unit lifted off and the material within is either dragged out or end tipped (after emptying the unit of water) using either a crane or a hook-lift.

Solids Liquid Separation Stage

The supernatant water collected within the reception hopper is pumped into a primary settlement tank where any fine aggregate (i.e. sand sized particles) are allowed to settle prior to the water overflowing into the pH adjustment stage.

The settlement tank is lined with a standard builders bulk bag which once full of solids can be lifted out using a telescopic forklift/crane/or HIAB and either emptied or replaced.

pH Adjustment Stage

The wash water overflows by gravity from the primary settlement tank into the pH adjustment tank where the pH of the water is automatically adjusted to an operator defined set point (usually circa pH 7) using Carbon Dioxide.

The use of CO2 has a number of distinct advantages over mineral acid (such as hydrochloric or sulphuric acid), namely: -

Little risk of overdosing – Theoretically it is impossible to reduce the pH below 5.6; however in the field it is difficult to lower the pH to less than 6.1.

Non Corrosive - CO2 is much safer and easier to handle and store then mineral acids.

Readily Available - CO2 is readily available through the UK either as 34 kg cylinders, or in bulk cryogenic storage tanks.

Inexpensive - Carbon Dioxide costs are typically less that costs associated with the purchase and storage of mineral acid. It does not burn as a vapour there is no risk of exposing operators to acid burns.

The unit has been designed to minimise the use of CO_2 by the use of: -

- An automatic controller to stop the gas flow once water has reached the required pH

- Using a top mounted mixer and carbon dioxide injection sparge plate to create very small gas bubbles which due to their large surface area rapidly dissolve thereby minimising the amount of gas lost to atmosphere.

Fine Solids Removal

Once neutralised the pH water then flows into the final treatment stage prior to being discharged back into the treated water holding tank for re-use. The final treatment tank comprises of a Siltbuster Lamella Clarifier Unit designed to remove any residual solids which could be detrimental to the wash water system.

Decommissioning

On completion of the project, the water within Big pHil can be treated to a suitable standard ready for discharge subject of course to the necessary prior approvals (ie discharge consent criteria).

Typical Big-pHil Performance

The treatment capacity of Big-pHil is limited by the space available about the periphery of the unit, i.e. 3 truck mixers to be washed at any one time.

Gas consumption depends on the nature of the concrete wash water being treated, but typically varies from 0.2kg/m3 for cement fines free wash water to up to 1.5kg/m3 of wash water heavily contaminated with cement fines. The unit is capable of storing

2No CO_2 cylinders, each containing 34kg of CO_2 vapour. Depending on the application, the unit is capable of theoretically operating on a continual for between 4 and 30 hours before gas cylinders need replacing.

Other Concrete Mitigation Measures

The following cement/ concrete containment measures will also be put in place in order to prevent the discharge of waste cement/ concrete into nearby surface waters:

- Concrete pours will only take place during dry conditions and will not be undertaken in wet weather.

- Accidental spillage and potential burst-out of concrete is a potential risk during pouring of concrete for the turbine bases. However as foundation excavations are generally below the level of the surrounding ground, the risk of concrete spills exiting the base area is considered to be low. However the drainage regime will be installed before the concrete base pour in order to channel potential spillages and run-off water to suitable collection areas (i.e. the pre – constructed surface water drain containing a pair of stilling ponds and buffered outfall).

- Pollution abatement equipment will be maintained on site for use in the event of an emergency. In the event of a spillage, material will be contained using this equipment which includes straw bales, clean stone, containment booms, absorbent materials, sandbags and waterproof covers. Please refer to the Pollution Contingency Plan enclosed

- Where a pollution incident has occurred as a result of construction works, the Contractor will immediately contact the client representative and environmental consultant. The Environmental Protection Agency shall be consulted to determine sampling requirements and any additional ecological survey requirements where potentially significant impacts are identified. The results of any monitoring or survey work undertaken shall be made available to the Local Authority, the Owners Engineer and the Environmental Protection Agency and copies of all correspondence and test certificates shall be retained on site.

- All concrete wash out will be contained within the designated wash out area. When temporary concrete washout facilities are no longer required for the work, any hardened concrete will be removed and disposed of. Materials used to construct temporary concrete washout facilities will be removed from the site of the work and disposed of. Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities will be backfilled and repaired.

Section 4.3.4 The applicant should be requested to detail the calculations and assumptions made in calculating the predicted reduction in greenhouse gas emissions due to the development.

Wind studies indicate that the capacity factor of the site for a range of turbine models will be greater or equal to 30% taking account of the full range of wind speeds likely to be experienced at the site. This means that the output from the proposed project will be equivalent to the turbines being at full production for greater or equal to 30% of the time.

For 32 No. ≈ 3MW turbines, the total annual output will be at least 252,288MWh (32x3x24x365x0.3) or 252,288,000kWh.

Reference is made to the SEAI Report, 2012 titled "Energy in Ireland 1990 – 2011". According to Figure 15, Section 2.8 of that report, the carbon intensification of electricity has dropped to a new low of 489g CO_2/kWh in 2011.

The reasons given in the report for the increase in generating efficiency and decrease in carbon intensity of electricity in 2011 are:

- A 56% increase in wind generation
- A 18% increase in hydro generation
- A 4.2% increase in electricity imports
- A 17% decrease in gas generation
- A 60% decrease in oil and 2.1% decrease in peat generation.

Thus, the positive contribution of increased wind energy generation to decreasing carbon intensity is evident.

In Section 4.3.1 of the same report, in 2011, the "average" dwelling consumed a total of 19,875kWh of energy based on climate corrected data. This was 14,858kWh in the form of direct fossil fuels and 5,016kWh as electricity.

Using this data, the proposed Yellow River Wind Farm will generate enough electricity to supply up to **50,297** households (252,288,000/5,016) and will save the discharge of some **123,369** tonnes of carbon dioxide (CO_2) per year (252,288,000 x 489/1,000,000).

Section 7.3.5 The applicant lists access roads which are in the flood plain. The applicant states that downstream flood risk will not be affected as the roads will not occupy flood storage. The applicant should be requested to verify whether, in this case, it is proposed to allow the access roads to flood and how these turbines may be accessed in an emergency.

"This chapter [Chapter 7] notes that no proposed turbines are located in the 100 year flood zones but that some of the proposed (internal) access roads are. However these are considered less vulnerable as per the DECLG'S flooding guidelines for local Authorities. The Environment and Water services report recommends further information in relation to these access roads."

Response:

During the construction stage if a prolonged period of wet weather occurs, construction activities in areas that have potential to be isolated during a >1in 100 year event [between T8 – T11, T9 – T12, met mast and T18-T19] with be demobilised and the works area will be made safe from a health and safety perspective and an environmental perspective. Long term storage of construction materials or stock piling of subsoils will not be permitted in these areas. Short or long term storage of potential pollutants such as hydrocarbons will not be permitted in these areas also. Flooding of a major river such as the Yellow River would not be instantaneous and would require a prolonged wet period to do so. This would give sufficient time for the construction areas to be secured prior to the forecasted flood. Works will only recommence in these areas after the flood event subsides. [Please

note that the R400, local road, exist within the mapped 100 year flood zone, and issues of access during flood events already apply].

It is noted that the road finished levels within private lands will be at existing ground level in so far as is practicable and the sub base construction will be porous and so will permit the free passage of water. Therefore, no damming of flood water will occur as a result of the road construction.

During the operational phase if a turbine has an operational issue during a flood event, and cannot be accessed directly, it will be shut down remotely using the SCADA control system. The affected turbine will only be accessed for repairs flowing recession of the flood event.

These issues will be dealt with in the Construction and Environmental Management Plan and the Operational Plan for the wind farm. Both documents will be submitted to Offaly County Council prior to commencement of construction.

Chapter 7 – Water Drainage of each area is described but no detail is given of the drainage requirements for the access roads, hard standings etc. which will affect the natural drainage of the areas. The drainage philosophy described in 2.9.5 should be detailed so that it is shown what storm water flows are conveyed, attenuated and discharged.

Response:

Section 7.5.1.1 states that the temporary settlement ponds will be designed to attenuate 1 in 100 year 6 hours flows. The conveyance of the drainage system will be designed to match this pond design criteria, and discharge from the site will be controlled by the Greenfield runoff rate, as per the Greater Dublin Drainage Strategy (2005)[2], and Cawley & Cunnane[3] (2003).

Section 2.9.11 of the Environmental Impact Statement provides temporary pond sizes for development surface runoff from the largest hardstanding area of 2,500m2 contributing to a set of ponds.

[2] Reference: Greater Dublin Strategic Drainage Study, Volume 1, Dublin City Council (March, 2005).
[3] Reference: Cawley & Cunnane - "Comment on Estimation of Greenfield Runoff Rates" from National Hydrology Seminar 2003.

The following is an extract from Section 2.9.11:

Attenuation will utilise shallow primary and secondary settlement ponds to aid removal of suspended solids. Calculations for the determination of storage requirements have been undertaken and are as follows:

- A 1 in 100 year rainfall return design.
- The largest hardstanding area of 0.0025 hectares.
- The rational method[4] is subsequently applied to calculate the flow volumes into the settlement pond over these respective periods.
- An initial outlet weir overflow rate is applied of 5l/s which approximate to Greenfield run-off rates.

The largest residual volume requirement is 57.1 m^3. It is to be noted that ponds will be removed on completion of the construction phase of the project.

A set of dimensions of approximately 9m in length, 3m in width and 1m in depth for the primary and secondary settlement ponds are derived which account for the storage and attenuation of the residual volume. The Length: Breath ratio of the ponds must be a minimum of 3:1 as recommended by COFORD[5]. Please refer to Figure 2.17 - Settlement Pond Detail.

Chapter 9 – Noise - There are a number of instances where the predicted turbine noise exceeds background +5 ds based on the calculated curves, vis, H41, H66 rep by H210, H87, H138, H182 rep by H226, H192, H207 rep by H210, H207 rep by H210, H210, H226. The applicant should be invited to comment on this notwithstanding that absolute limits of 45 and 43 db for day and night time are not exceeded on the receptors examined. The applicant should also comment on the

[4] Rational Method is expressed by the formula $V = 2.78 \cdot C \cdot A \cdot I \cdot t$, where V is the volume of water generated in the stilling pond, C is the run-off co-efficient which is assumed to be 0.95 across all hardstanding areas, A is the area of the hardstanding / catchment, I is the rainfall depth and T is the duration of rainfall occurance.

[5] Mulqueen and Others. 1999. Forest Drainage Manual. COFORD, National Council for Forest Research and Development.

proposed limit of 40 db in the draft guidelines for wind development as this limit would be exceeded in over 30 locations according to the predictive model.

The Wind Energy Development Guidelines, 2006 (which are the current guidelines) are based on a 'lower fixed limit' or 'background +5dBA' whichever is the highest. In the referred to houses the 43dBA and 45dBA 'lower fixed limit' is higher than the background + 5dBA and accordingly becomes the limit.

The 40dBA limit proposed in the Proposed Revisions to the Wind Energy Development Guidelines can be adopted by some changes to turbine layout and reducing the sound power output setting on a number of turbines.

An adjusted noise report takes cognisance of the 40dBA limit in the Proposed Revisions to the Wind Energy Development Guidelines, 2006, can be found in Appendix A to Section 2 of this response.

All wind speeds in the noise report are for units of m/s. The tables with the background noise levels and derived noise limits are in wind speed units of m/s.

Section 9.3.3 The report suggests that the applicant consider the permitted waste facility and power plant in this area when considering cumulative noise affects.

The permitted power plant at Derrygreenagh is a combined cycle gas turbine unit (CCGT) of c. 430MW and a reserve peaking open cycle gas turbine unit (OCGT) of c. 170MW. The CCGT will run for 24 hours/day for certain periods depending on demand while it is expected that the OCGT will have a much lower load factor and will run for approx. 500 hours/annum during the hours 06.00 to 09.00 hrs and 17.00 to 19.00 hrs coinciding with peak demand.

The closest sensitive receptor to the permitted power plant is approximately 1,100m away (section 9.2 of the Derrygreenagh Power Plant EIS). The highest predicted noise levels from the Power Plant at the nearest receptor is 34dBA with the CCGT unit operating, while at peak with the CCGT and OCGT operating at c. 600MW, the predicted maximum level is 37dBA.

The power plant is NW of the nearest houses while the nearest turbines are south of those group of residents. When the wind is downwind from the power plant it will be

almost up wind to the nearest group of wind turbines. The difference between up-wind and down-wind from a noise source at 800 to 1000m would be in excess of 10dBA. The predicted down-wind turbine noise at this location (H147) is 38.2 dBA.

In down wind conditions from the wind farm the noise emissions will be up-wind to the power plant (600MW) resulting in a noise level at H147 of 38.2 + (37-10) = (38.2 + 27) = 38.5dBA.

In down-wind conditions from the power plant (600MW) the noise emissions from the nearest turbines will be up-wind resulting in a noise level at H147 of 37 + (38.2-10) = 37.4dBA.

The cumulative effects of the Power plant (600MW) on the predicted wind turbine noise levels would be negligible at less than 0.5dBA.

The permitted Biomass Plant at Coolcor is small at 15MW compared to the permitted power plant in Derrygreenagh, which has a maximum capacity of 600MW - no noise reports could be located for Biomass Plant at Coolcor, however an 18MW biomass plant outside Newbridge in Kildare was assessed by An Bord Pleanála Inspector (PL09. 237777) and noise emissions were not considered an issue which would give rise to an impact even though the nearest house to boundary of plant was at 190m. In the noise impact assessment for the facility the prediction modelling states that the noise levels will be lower than 23dba at the nearest NSL.

The nearest houses to the wind turbines in the Coolcor/Coolville area are H62, H82, H151, H69, H63, H58, H18, H81 and H65. These houses are located between the biomass plant and the nearest turbines (T13 and T14).

When the wind is downwind from the Biomass plant it will be upwind from the nearest turbines (T13 & T14). The nearest turbine (T13) is 565m from the nearest dwellings. The predicted noise levels from the wind turbines downwind is 39.1dBA. The upwind noise levels from the nearest turbines (T13 being nearest at 565m) would be less than 34dBA. Irrespective of wind direction the cumulative impacts of the biomass plant would be negligible.

The cumulative noise impacts of the Biomass pant and wind turbines would be less than 40dBA.

The noise limits given for EPA licensed sites throughout the country) are:

Daytime (08.00 to 22.00hrs) L_{ArT} 55dBA

Night-time (22.00 to 08.00hrs) L_{ArT} 45dBA

Derrygreenagh & Coolcor before coming into operation would become EPA licensed sites.

Chapter 10 – Shadow Flicker The applicant should be requested to justify the use of the reduction factor of 61% for non-directional orientation of the turbine. The applicant should also be invited to comment on the requirement in the draft guidelines for no shadow flicker to be experienced at any house within ten rotor diameters.

Response:

The predicted values of shadow flicker assume that the wind direction is always the same direction as the angle of the sun to the receptor window. Wind turbines operate at right angles to the wind, therefore, the predicted value assumes a worst case scenario where the turbine is always facing directly into the sun. This will not always be the case.

Input Data

Wind Data

To calculate a reduction factor it is necessary to assess the wind rose. This data was collected from the meteorological mast at the site. A wind rose is a frequency distribution of the directionality at the site. This data is provided below in Table 1.

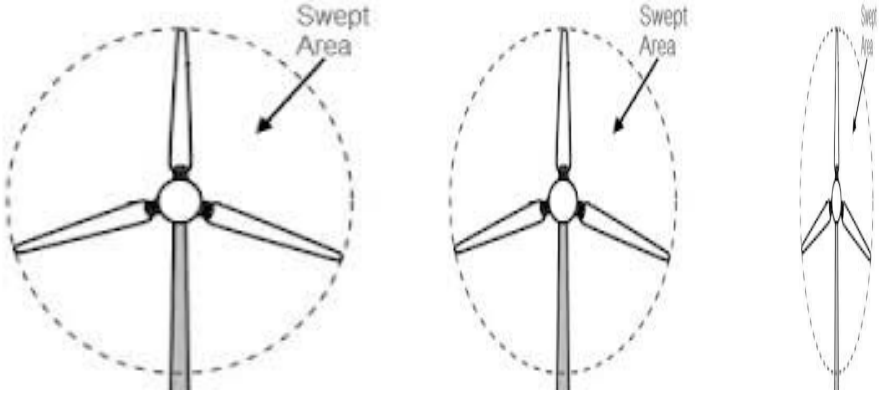
		N	*NNE*	*ENE*	*E*	*ESE*	*SSE*	*S*	*SSW*	*WSW*	*W*	*WNW*	*NNW*	
Bin start	*Bin end*	*0*	*30*	*60*	*90*	*120*	*150*	*180*	*210*	*240*	*270*	*300*	*330*	*Total*
0	*4*	*1.09%*	*0.93%*	*1.22%*	*1.62%*	*1.58%*	*1.42%*	*1.13%*	*1.43%*	*0.97%*	*0.83%*	*1.11%*	*0.91%*	*14.23%*
4	*8*	*4.42%*	*1.77%*	*2.98%*	*4.36%*	*4.30%*	*3.73%*	*3.75%*	*5.39%*	*4.25%*	*3.92%*	*5.96%*	*5.05%*	*49.88%*
8	*12*	*1.58%*	*0.79%*	*0.94%*	*1.56%*	*2.78%*	*1.37%*	*2.04%*	*2.94%*	*3.73%*	*4.77%*	*5.03%*	*2.09%*	*29.63%*
12	*16*	*0.15%*	*0.10%*	*0.17%*	*0.18%*	*0.47%*	*0.11%*	*0.36%*	*0.57%*	*0.90%*	*1.14%*	*0.90%*	*0.26%*	*5.30%*
16	*20*	*0.01%*	*0.00%*	*0.01%*	*0.00%*	*0.01%*	*0.00%*	*0.02%*	*0.10%*	*0.21%*	*0.26%*	*0.17%*	*0.06%*	*0.85%*
20	*24*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.01%*	*0.09%*	*0.01%*	*0.00%*	*0.11%*
24	*99*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Total:		*7.25%*	*3.58%*	*5.32%*	*7.72%*	*9.13%*	*6.63%*	*7.30%*	*10.43%*	*10.08%*	*11.01%*	*13.18%*	*8.37%*	*100.00%*

Turbine Surface Area

These areas are a flat projection of the turbine rotation surface area visible from the receptor. When the turbine is orientated at right angles to the receptor the entire surface area id visible. See Figure below. As the turbine turns less of the surface area is visible.

The following turbine rotation surface areas are noted:

9852m2	*Surface Area of Rotor orientated at right angles between the sun and the receptor*
8244m2	*Surface Area of Rotor orientated 30% from perpendicular*
4398m2	*Surface Area of Rotor orientated 60% from perpendicular*
1000m2	*Assumed Surface Area of Rotor orientated parallel to the wind*



Calculation

For receptor located due north of a turbine. The following table of effective surface areas for different wind directions are relevant.

N	*NNE*	*ENE*	*E*	*ESE*	*SSE*	*S*	*SSW*	*WSW*	*W*	*WNW*	*NNW*
9852	*4398*	*8244*	*1000*	*8244*	*4398*	*9852*	*4398*	*8244*	*1000*	*8244*	*4398*

Each of these surface areas are subsequently weighted against the wind rose and the direction frequency (Table X).

Wind Direction	N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW
Surface Area (m2)	9852	4398	8244	1000	8244	4398	9852	4398	8244	1000	8244	4398
Percentage Occurrence of Wind Direction	0.07	0.04	0.05	0.08	0.09	0.07	0.07	0.10	0.10	0.11	0.13	0.08
Weighted Value	714.27	157.45	438.58	77.20	752.68	291.59	719.20	458.71	831.00	110.10	1086.56	368.11

The weighted surface area is 6005.436m2. Therefore the average surface area visible from the receptor is 6005.436m2. When this is considered as a percentage of the overall blade sweep surface area of 9852m the resultant percentage is 61%.

As shadow flicker occurrence is linearly proportional to the swept area of the blades of the turbine. It is considered that worst case calculated values should be reduced to 61% of their original value based on the rotation of the turbine swept area during the different wind directions.

Assessment under the Water Framework Directive and associated regulations. The environment and Water Services section has recommended further information in relation to surface water having reviewed the EIS.

Response:

Details regarding water body status and WFD Objectives for surface water and groundwater bodies are provided in Sections 7.3.10 to 7.3.12 of the EIS. With respect to WFD the developer or its agents cannot change the baseline status or protection objectives for any water unit.

In terms of potential for altering the qualitative and quantitative status of the local water bodies (groundwater and surface water) by the development this is already evaluated in the comprehensive impact assessment provided at Section 7.4 of the EIS.

2.2.4 Comments on the adequacy of the EIS submitted

The EIS submitted with the application adhered to the applicable legislation and guidelines. An Bord commented on the considerable amount of detail contained in the application. However, some errors were found in the submitted EIS. These errors have been rectified in the Schedule of Errors sheet, which can be found in Appendix C. The following section addresses the comments made by Offaly Co Co.

Non-Technical Summary – Noise

Response: Please refer to Appendix D for the Noise Non-Technical Summary.

"The EPA Guidelines on information to be contained in Environmental Impact Statements (2002) advise that the exports who carry out the relevant sections (and in particular their qualifications and experience) be identified. This doesn't appear to have been forthcoming in chapters 5, 6, 7, 8 and 10."

All Sub-Consultant Statements of Authority can be found in Appendix E of this document.

Chapter 2 – Figure 2.14

Response: Figure 2.14 has been amended to reflect the revised turbine layout and the crossing points and bridges to be upgraded are now shown on the map.

Chapter 5 – Flora & Fauna

Commentary on whether this subsequent total of 28 hrs 40mins survey for the Whooper Swans is adequate would most likely be received in the report so the Board from the National Parks and Wildlife Service (NPWS).

Response: A full winter bird survey was carried out for the season of 2013/2014, which concentrated on the Whooper Swan in Derryarkin, to collate more detailed

baseline data. The report outlining the findings of this survey can be found in Appendix A of this document.

Aquatic Species

The EIS states that no turbine will be built closer than 50 metres to a watercourse. The EIS doesn't appear to specifically assess the effectiveness of the actual preventative measures as detailed in these figures and drawings PL504 & PL504. On p. 267 it states "The specific measures by which suspended solid discharges will be prevented from exceeding 30 mg/l is a matter for detailed engineering design".

For clarity the complete paragraph contained in section 5.14.1 is:

Release of suspended solids to all watercourses should be kept to a minimum. Total suspended solids in discharges should not exceed 30 mg/l in the case of all EPA mapped watercourses (i.e. streams shown on Figure 5.7). This limit should apply to direct discharges to these waters. Non-salmonid drains receiving runoff should not exceed 30 mg/l suspended solids at the point where they join the salmonid watercourses.

The following additional recommendations are made from the Aquatic Ecological perspective and it is recognised that the specific means by which suspended solids in discharges to streams will be prevented from exceeding 30 mg/l is a matter of detailed engineering design.

It is noted that no direct discharge from new swales to natural watercourses is proposed, therefore, all development run-off will be discharged through buffered outfalls (incorporating overland flow) or through existing drains.

It is concluded that the 30mg/l limit applies to:

- The receiving EPA mapped watercourses immediately downstream of the development and

- The existing on site drainage channels to which the swales discharge, where they outfall to the mapped EPA watercourses.

During the construction phase of the project, monitoring of TSS will be carried out at all applicable locations daily to ensure that the TSS limits are not exceeded. Please refer to Figures 1 – 5 for an illustration of these relevant monitoring locations.

Monitoring will be carried out by a competent person during the construction phase:

- A minimum of daily
- At monitoring locations where works are being carried in their catchment area.
- Testing will be also undertaken using a hand held turbidity meter which will give an immediate understanding of the TSS content.

If the 30mg/l limit is exceeded, then works within the sub-catchment of the monitoring location will be immediately ceased and will not recommence until TSS levels have dropped below 30mg/l.

The effectiveness of the drainage and mitigation measures will be visually assessed by a competent Engineer and redesigned and adjusted if deemed to be necessary.

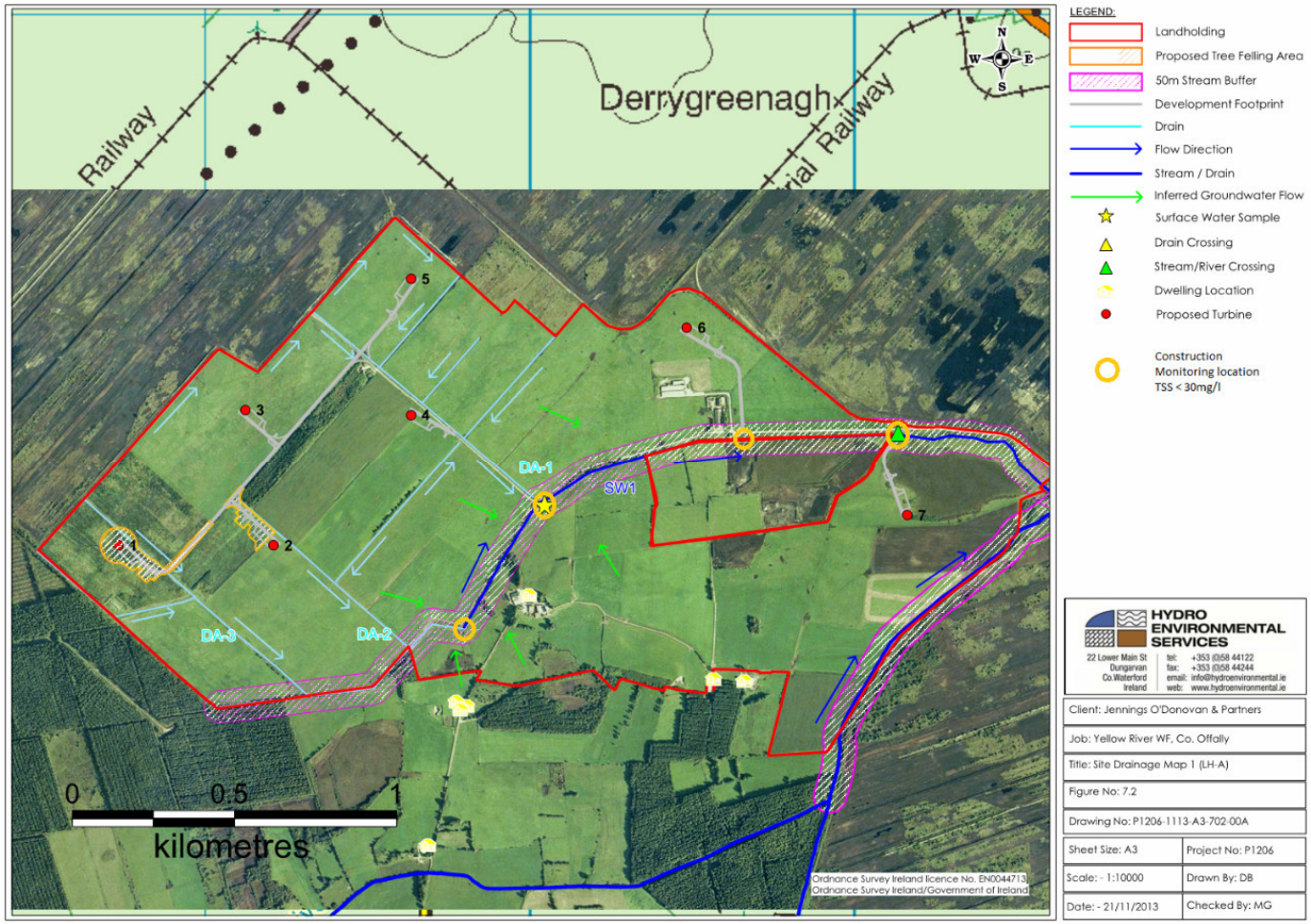


Figure 1 – TSS Construction monitoring Locations #1

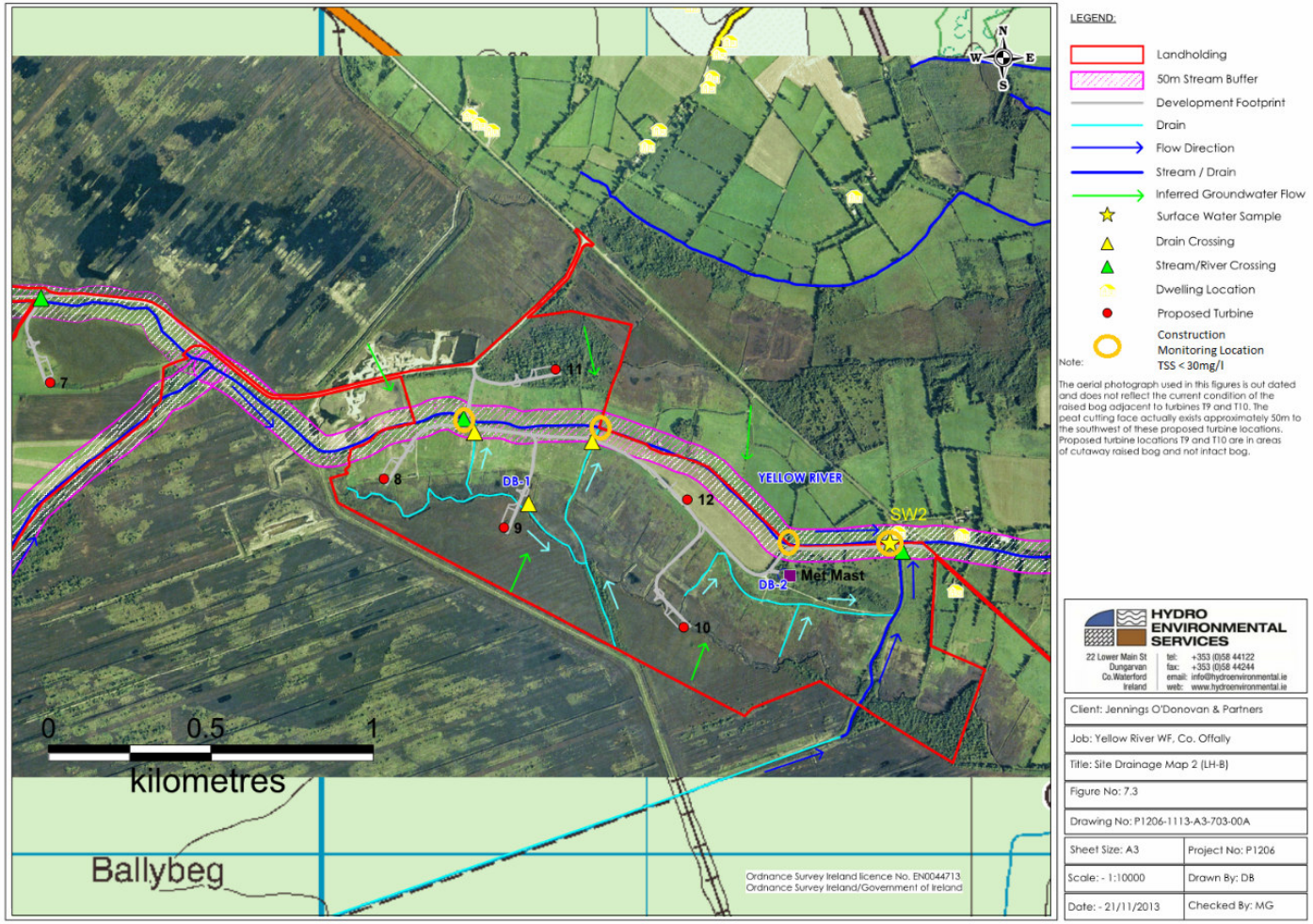


Figure 2 – TSS Construction Monitoring locations #2

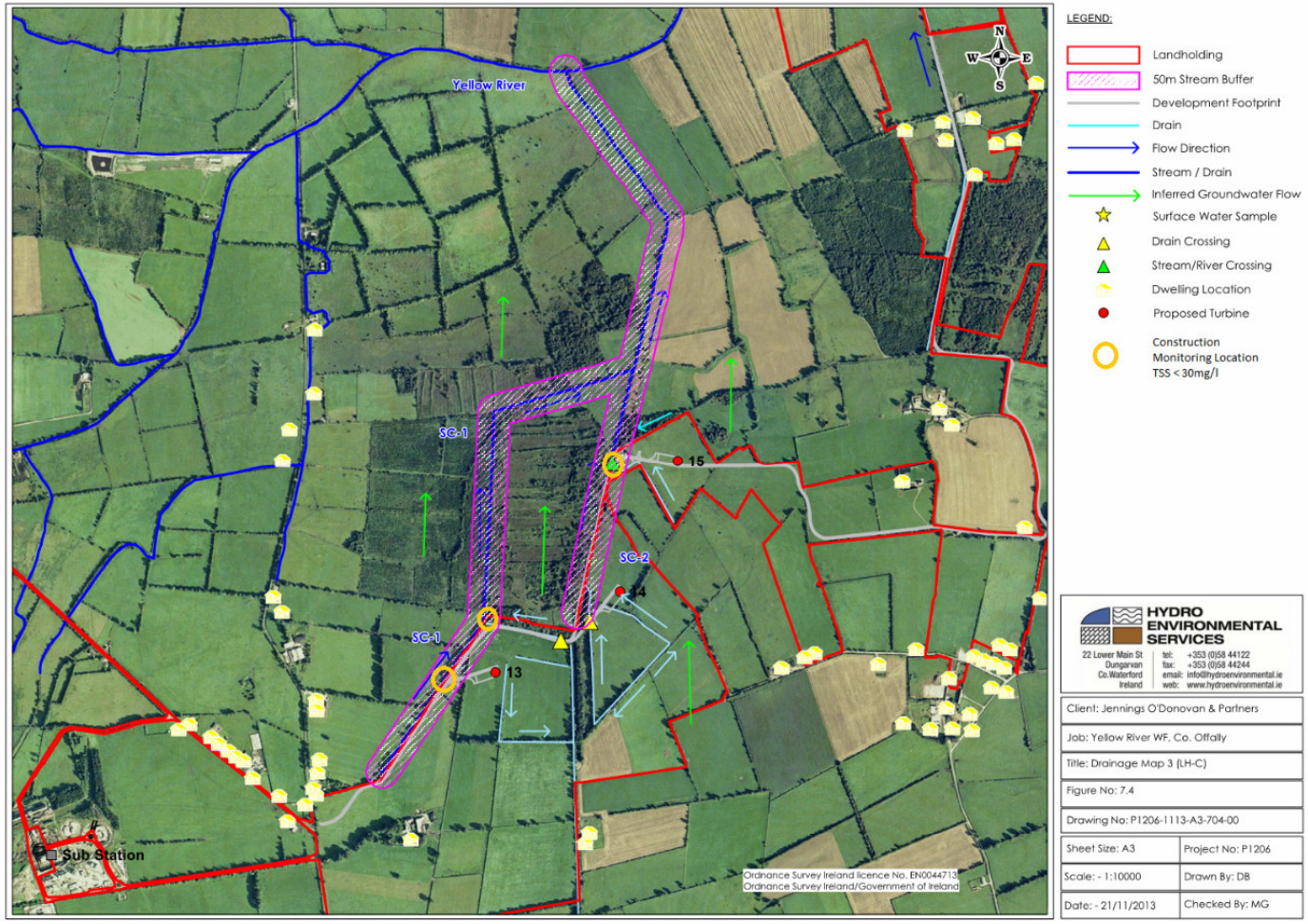


Figure 3 – TSS Construction Monitoring Locations #3

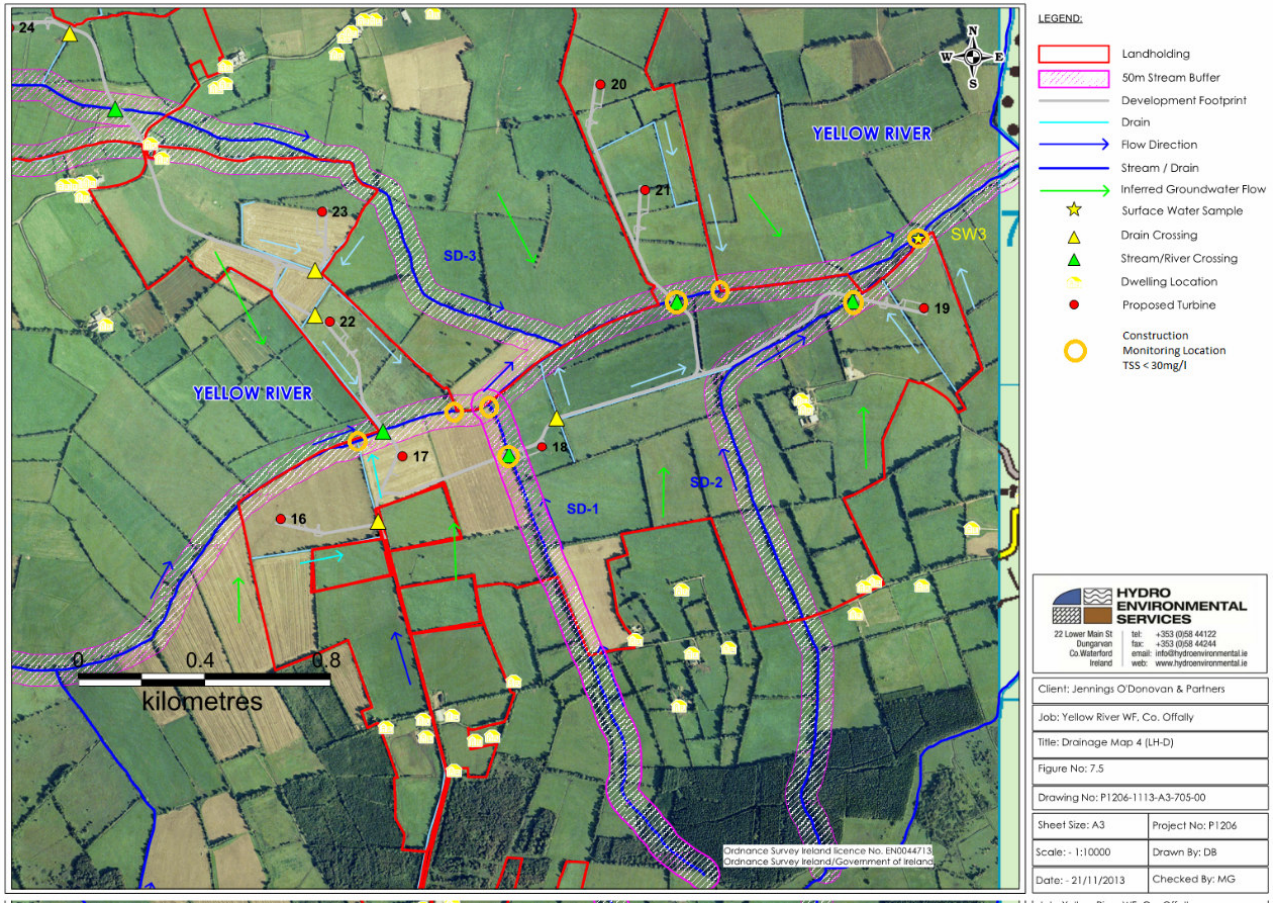


Figure 4 - TSS Construction Monitoring Locations #4

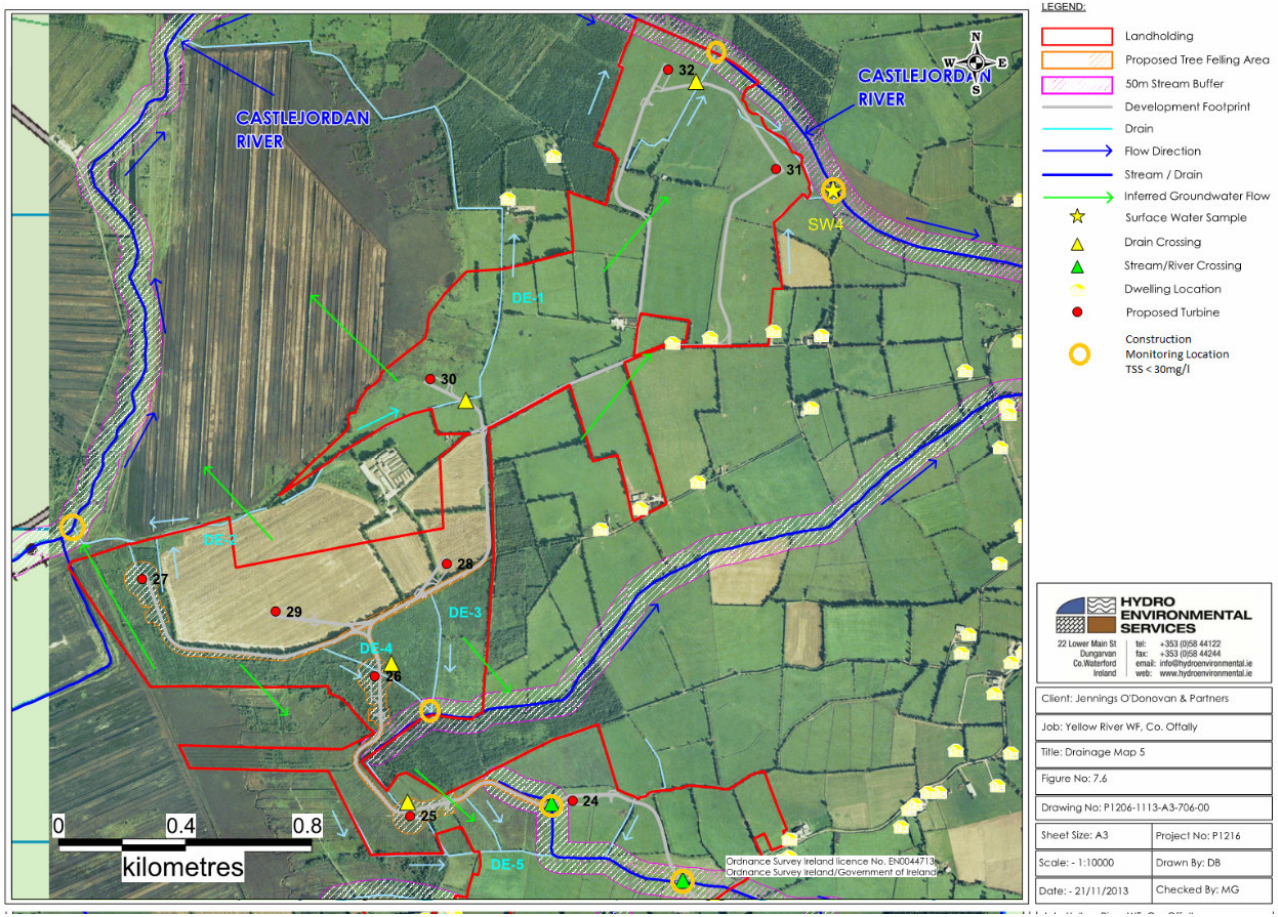


Figure 5 - TSS Construction Monitoring Locations #4

Birds

Bird surveys during winter 2012-2013 indicated that a population of Whooper Swans (*Cygnus cygnus*) winters in the Derryarkin sector of the development site. Survey visits became more frequent during the second half of the 2012/2013 season as a result of this finding. A full survey of the 2013/2014 winter season was undertaken to collate more detailed baseline data, especially in regard to the numbers of swans involved and their movements in the Derryarkin area. The submission from the Department of Arts, Heritage and the Gaeltacht recommends that all mitigation measures, including post construction monitoring, as outlined in the EIS and NIS are a condition of any permission granted, particularly with regard to water quality, bats and whooper swans. The Applicant will fully comply with any such conditions.

Chapter 6 – Soils & Geology

There are nine river crossings proposed as part of the project, not ten as stated incorrectly in the Non-Technical Summary.

The stated consultation with the 'Water Service of Ireland' (p. 289) is queried as to what this organisation consists of.

Response: The statement "*Consultation with the Water Service of Ireland to identify water supply sources in the vicinity of the proposed wind farm*" was included in this report by error. Details relating to water wells in the report were obtained through GSI database.

Whitefords statement of authority can be found in their Peat Stability Risk Assessment report in Appendix K of the EIS and also in Appendix E of this document.

Chapter 7 – Water

"***There appears to be an error on page 354 and 355 in that a reference to Turbines 8 and 10 on cutaway raised bog is missing."***

Response:

Potential Impact no. 7 (i.e. Impacts on Peatland Hydrology) of Table 7.11 of the EIS is supposed to assess the potential impacts of turbines on nearby remnant raised bog. There is an error in the first and second paragraph of impact no. 7, in that a reference to turbines T8 and T10 have been omitted.

The first paragraph (i.e. page 354) should be worded as follows:

"Proposed turbines T8, T9 & T10 are located in an area of cutaway raised bog. The remnant intact raised bog is undesignated; however potential impacts on the local peat hydrology could occur as result of the following".

The second paragraph (i.e. page 355) should be worded as follows:

"Proposed turbine T8, T9 and T10 are located in an area of cutaway raised bog (i.e. close to the peat cutting face) and therefore the potential to further impact on the peatland hydrology (which has already been impacted on to some extent) of the section of bog in question is low. There are a number of existing significant drains in the area and therefore the proposed wind farm infrastructure will only have a very subdued impact on the peat hydrology (i.e. water levels) immediately adjacent to the proposed turbines and access roads."

The omission of T8 and T10 was unintentional. However, the overall residual impact as reported in Table 7.11 remains unchanged (i.e. Direct, adverse, negligible, high probability impact on peat land hydrology).

Chapter 8 – Air

The EIS states that the development will cause no greenhouse gases and will contribute to a reduction in Ireland's emissions. The Environment and Water Services section has requested calculations and assumptions in relation to same.

Response: The calculations in relation to greenhouse gases have been updated as per Chapter 4 – Section 4.3.4 (page 26 of this document).

Chapter 9 – Noise

Table 9.5 gives the baseline background noise levels, based on the noise survey undertaken, however it doesn't state what scale the wind speed stated refers to. Table 9.6 states the derived background noise limit from the baseline noise survey for day and night, again the units of wind speed are not stated.

Response: Where wind speed is referred the units are in (m/s).

It should be noted that the survey does not appear to have included those houses granted planning permission but not yet constructed.

Response: Houses granted planning permission but not yet constructed that were omitted from the original Noise Impact Assessment, have been assessed and the results are outlined in the table below. The noise impact on house 237 will not exceed 43 dB.

House No.	Easting ING (m)	Northing ING (m)	Altitude (m)	Nearest Turbine	Distance (m)	Noise (db)
237	254470	238988	77	23	585	42.14

There are a number of instances where the predicted turbine noise exceeds background +5 dB based on the calculated curves, viz, H41, H66 represented by H210, H87, H138, H182 represented by H226, H192, H207 represented by H210, H207 represented by H210, H210 H226. The applicant should be invited to comment on this notwithstanding that absolute limits of 45 and 43 dB for day and night time are not exceeded on the receptors examined.

Response: This issue has been addressed on page 29 & 30 of this document.

The applicant should also be requested to comment on the proposed limit of 40 dB in the draft Guidelines for Wind Developments as this limit would be exceeded in over 30 locations according to the predictive model. From Table 9.10, approx. 19 houses would have predicted noise levels of between 30 & 40 dB(A) ($L_{eq,\ 10min}$) at wind speeds of 6m/s and greater (that is very close to the draft new limit of 40 dB(A)) and approx.. 31 would have predicted levels <u>above</u> 40 dB (A), against wind speeds of 6m/s and greater.

Response: This issue has been addressed in a revised Report for an Adjusted Layout. This Adjusted Layout Report can be found in Appendix A of Section 2 of this response document.

An explanation of the statement which reads (p. 385) 'The predicted turbine noise has been adjusted by subtracting 2 dB (A) to give the equivalent L90 dBA level as suggested in ETSU-R-97'. The applicant should be asked to comment on whether this should be explained in the non-technical summary.

Response: For wind turbine noise the descriptor LA90, which allows reliable measurements to be made without corruption from relatively loud transitory noise events from other sources, should be used for assessing both the wind energy development noise and background noise (Ref; Wind Energy Development Guidelines, 2006). It should be borne in mind that the L_{A90}, 10min of a wind farm is likely to be about 1.5-2.5dBA less than the L_{Aeq} measured over the same period (Ref: ETSU-R-97). For assessments of wind farm noise the relationship is normally given as $L_{A90} = L_{Aeq} – 2dBA$.

An explanation as to why most of the approx. 31 houses with predicted noise between 40 and 43 dB(A) in Table 9.10 are shown <u>outside</u> (i.e. lower than) the predicted 40 dB(A) noise contour on figures 9.31 – 9.34.

Response: Please note that an error was made in the mapping of the noise contours. This is listed in the Schedule of Errors in Appendix C. The mapping has been rectified and can be found in Appendix D.

Further details in relation to the assumption made by the EIS (p.382) that 'tonal emission characteristics such that no clearly audible tones are present at any wind speed'.

Response: In any contract to procure wind turbines the following will be written into the contract of procurement; 'a guarantee of no clearly tonal components should be audible at distances greater than 500m from any turbine'.

The conformity of the statement in the non-technical summary which reads 'The effect of the wind farm on local residences should be no more than a marginal

impact' in the context of Section 5.14 of the DECLG Environment Impact Assessment: Guidelines for Planning Authorities.

The adequacy of the section regarding noise in the non-technical summary. It is considered that there is insufficient detail in the non-technical summary.

Response: A revised Non-Technical Summary for Noise can be found in Appendix D.

Clarification on the sentence on page 404 which reads 'The following are the local council environmental health office maximum allowable noise limits:' in particular what standards are referred to.

Response: The local council environmental health maximum limits referred to the Northern Ireland Health Office. Alternatively the National Road Authority (NRA) have the following guidelines for treatment of noise and vibration for road construction and these are:

Days and Time	Mon-Friday	Mon - Friday	Saturday	Sunday
	07.00-19.00	19.00-22.00	08.00-16.30	08.00-16.30
Leq 1hour	70dBA	60dBA	65dBA	60dBA
Lmax	80dBA	65dBA	75dBA	65dBA

Most of the construction works will relate to foundations works around the base of the turbines and access roads.

The nearest turbines are in excess of 500m from any residents

At 500m the predicted typical noise levels are in the region of 35-48dB L_{Aeq}

At 500m the predicted typical maximum noise levels are in the region of 52dB L_{Aeq}

At 250m the aforementioned noise levels would be increased by in the region of 6dBA. The predicted construction noise levels are of a temporary nature and will be orders of magnitude below the guidelines given by the NRA and there will be no Sunday works.

The potential cumulative noise impact taken in conjunction with the permitted power station and waste recycling facility in the vicinity.

Response: This issue has been addressed on page 31 of this document.

Chapter 10 – Shadow Flicker

The chapter would benefit from a statement regarding who prepared the study and their expertise and experience of same. It would also benefit from a map of the results similar to that in respect of noise, if possible.

Statements of Authority for all sub-consultants can be found in Appendix E.

Map of Shadow Flicker Occurrence

Shadow flicker contour maps, Figures 10.1 – 10.4, have been created and are included in Appendix F. The maps illustrate the projected shadow flicker occurrence from the proposed Yellow River wind farm development.

The area shaded in blue shows areas that will experience 30 hours or greater of shadow flicker in a year. There are no dwellings in this area.

Explanation of 12.68% Reduction Factor

The 12.68% reduction factor used to calculate the projected shadow flicker occurrence was calculated by combining the following reduction factors to obtain an overall factor:

- Reduction of Shadow Flicker due to absence of Sunlight
- Reduction of Shadow flicker due to non-operation during low wind conditions
- Reduction of Shadow flicker due to non-operation as a result of technical issues

- Reduction of Shadow flicker due to non-directional orientation of the turbine

These individual factors were then multiplied out to obtain the overall reduction factor:

26% (Absence of sunlight) x 86% (Non operation of turbines due to low wind) x 93% (non-operation due to technical issues) x 61% (Non-directional orientation of the turbines) = 12.68%

Consented housing developments

One additional consented house has been added to the list of those assessed in the shadow flicker chapter. The results of this assessment with reference to the consented house is outlined in the table below. House 237 would experience less than 30 hours of shadow flicker occurrence per year.

House No.	Easting ING (m)	Northing ING (m)	Nearest Turbine	Distance (m)	Days per year (worst case)	Max hours per day (worst case)	Mean hours per day (worst case)	Total hours (worst case)	Projected Hours Based on 12.68% reduction factor
237	254470	238988	23	585	211	0.71	0.55	115.1	14.59

Justification of 61% reduction factor for non-orientation of the turbines

Response: This issue has been addressed on pages 32 to 34 of this document.

Correction of labelling of headings

Please note that the labelling on Table 10.1 has now been corrected as requested.

Practicality of turbine shut down and Visual Appearance of Same and Real-time Sunlight Monitoring

In the unlikely event that shadow flicker does occur, the developer proposes to install a Shadow Flicker Management System, as a component of the turbine's SCADA (Supervisory Control and Data Acquisition) software, in addition to photocells (Light

Sensor) mounted on top of the turbine nacelles. In brief, where adverse shadow flicker has been identified the monitoring / remediation procedure as agreed with Offaly Co Co will be implemented and the impacted turbines will be shut down for the period of shadow flicker incidence. Although the applicant has yet to appoint a turbine supplier, a key aspect of the tender is the inclusion of a Shadow Flicker Management System. For further information, we have enclosed details of the 'Shadow Control Description' employed by Siemens in their wind turbines. As the turbine supplier has yet to be selected for the proposed Yellow River Wind Farm, this is an example only.

Chapter 11 – Landscape & Visual

It is considered that the photomontages submitted are not reflective of the significance of this landscape and cultural feature (Croghan Hill), however. It is considered that its local, historical and geological significance requires a much stronger investigation and assessment than what has been given in the EIS. The EIS also states (p. 462) that the Offaly County Development Plan….. "limits protection (of features) to a 2km buffer from wind farm development". However, the aforementioned 2km buffer (around landscape features, settlements, protected areas, etc.) was a <u>tool</u> in the preparation of the Wind Strategy in 2008. Areas which had fewer or no instances of this buffer were selected as areas where wind energy development might, in principle, be acceptable subject to all other requirements of the plan. Therefore to treat this 2km buffer around Croghan Hill as absolute is not considered acceptable in the context of its significance noted above.

Response: There is general agreement between MosArt and Offaly County Council that Croghan Hill represents the most important landscape feature in this area. The pivotal question is what should be considered an appropriate separation buffer for wind energy development from this feature. Having used a 2km buffer around sensitive landscape features as a 'tool' to determine suitable areas for wind energy development in the Offaly Wind Energy (2009) the County Council now appears to be questioning the validity of this approach. The south-western boundary of ***Site 1 – Area North of Rhode*** is clearly defined by this 2km buffer emanating from the base of Croghan Hill rather than any other form of constraint. If Offaly County Council did not intend for this buffer to be absolute this is not stated anywhere in the Wind Energy strategy. Furthermore, the fact that this area is zoned suitable for "large scale

wind farms" provides desirably little ambiguity as to the form of wind energy development that is considered appropriate in this area.

One of the main purposes of a wind energy strategy is to direct developers to parts of a county which are deemed to be suitable for wind energy development and away from those areas that are not. Having determined such areas through appropriate constraints mapping and subjected the strategy to the public consultation process it does not seem reasonable thereafter, to suggest that the constraints boundaries may not be generous enough. A more flexible approach employed by many County Councils is to use a range of suitability classifications beyond simply 'suitable and not suitable'. The fact that Offaly County Council have opted for a more prescriptive approach is not being criticised, but the apparent degree of surety being provided to developers who locate their schemes in suitably zoned areas is undermined by the Councils submission.

MosArt contend that the 2km buffer distance from Croghan Hill is appropriate. This is reflected in the assessment of views both from Croghan Hill and of Croghan Hill in the EIS, which are not considered to give rise to significant visual impacts. A valid concern expressed by Offaly County Council during consultation meetings was the interruption of the Croghan skyline by turbine blades rotating beyond. This occurred in one instance over the eastern shoulder of the hill as viewed from the designated View 8 located to the south. The turbine in question was subsequently moved to avoid this effect. If the turbines were too close to Croghan hill this undesirable effect would have been more prevalent. Instead the scheme is screened from designated view 8 by Croghan Hill and from the other view 8 location to the west the turbines are oblique to the view of Croghan Hill. Two additional VRPs have been selected from this area in order to examine potential impacts on Croghan Hill in more detail (see the assessment of VRP3 and VRP3a under the item 5 response below).

The EIS states that, using the DECLG wind guidelines, the site is most characteristic of a "Flat Peatland" landscape but with "some elements of Hilly and Flat Farmland" (p.445, 496). Also that the "flat and open nature is most characteristic of the Flat Peatland landscape type while only the land cover characteristics are reflective of Hilly and Flat Farmland" (p.498). It states the "sinuous organic layout"…"responds to the irregular shape of the peatlands and marginal scrub areas that provide a transition to the more regular patterns of farmland". The Council would query this statement given most of the turbines

are actually located on farmland. In terms of design response, the guidelines indicate that taller turbines would be generally suited to the peatland while turbines tent not to be tall within a farmland landscape. The guidelines state, with particular reference to farmland, that "it is important that wind energy development is never perceived to visually dominate" this is an important issue, as the EIS acknowledges that only 3 of the turbines are on cutaway peatland with a further 20 on improved grassland. It is considered that all of the turbines east of the R400 (20 number) are located in an area which looking at the topography, field pattern, road pattern and settlement pattern is best described as an agricultural landscape it is therefore considered that a design response is required.

Response: The DoEHLG Wind Energy Guidelines (drafted by MosArt) use 6 different landscape types as the basis for design guidance. These landscape types cannot hope to cover the full spectrum of landscapes that occur in Ireland and particularly the transitions zones between them. More often than not, MosArt use the guidance from a combination of 2 and sometimes 3 of the landscape types where elements of each occur within the central study area of a wind farm proposal. This is not a case of picking and choosing guidance which suits the proposed scheme. Instead, it requires a clear understanding of the principles behind the guidance for each landscape type and when this might be entirely appropriate or not applicable at all. In the case of the Yellow River Wind Farm MosArt contend that relevant guidance should be sourced from both the 'Flat Peatland' and 'Hilly and Flat Farmland' landscape types from the Guidelines as the proposal site and central study area is considered to have characteristics of both. The rationale as to which aspects of the guidance are most applicable are provided in the EIS and reiterated below:

"It is considered that the flat and open nature of the site is most characteristic of the 'flat peatland' landscape type, whilst only the land cover characteristics are reflective of the 'Hilly and flat farmland' landscape type. Thus, for most of the criteria it is the flat peatland guidance that is most applicable. The design of the proposed wind farm is in general accordance with this, particularly in respect of the spatial extent of the development and the height of turbines. The sinuous organic layout of the scheme is somewhat in contradiction to both the peatland and farmland sets of guidance, which suggest a more formal arrangement. However, this layout responds to the irregular shape of the peatlands and the marginal scrub areas that provide a transition to the more

regular patterns of farmland. This is considered to be an appropriate response that acknowledges the intent of the guidelines, but adapts to the site specific factors".

MosArt stand by this approach with regard to the design of the scheme. Notwithstanding, it is accepted that within the more rural aspects of the site there is a greater potential for the tall turbines to dominate the underlying landscape pattern of fields and hedgerows than for the peatland and peatland fringe areas. The rural area to the east of the R400 and south of the Garr Road is also the more populated part of the site in terms of residential visual receptors. Therefore, by way of further mitigation, those turbines that occur within this part of the site could be reduced from 166m to 156m (turbines 13 - 25 inclusive) in accordance with the Adjusted Landscape and Visual Report contained in Appendix C of Section 2 of this document. Those that occur within the bog and bog fringes at the western and northern parts of the site, where large field sizes and forest plantations provide a broader land use pattern, should remain at a proposed height of 166m. The wind energy guidelines (2006) provide for such a solution in section 6.8 where it is stated that; *"A wind energy development comprising two distinct turbine heights may be acceptable provided the resulting composition is carefully considered, so as to achieve an aesthetic effect..."*

The Visual Impact Assessment of the proposed development goes through, comprehensively, the Viewshed Reference Points (VRP's) selected as relevant. There are 26 no. of these, therefore the spatial extent is considered adequate. It is considered that there are some significant deficiencies in a number of the photomontages generated from these VRP's. It must be noted that some of the submitted photomontages changed from those submitted at pre-planning stage and therefore much of the information sought in this regard should be freely available to submit as further information (if requested by the Board). The printing of the photomontages on ordinary paper is considered inadequate and it is suggested that printing on photographic paper, not necessarily as large as A1, would allow for more accurate reflection of the visual impact.

Response: In their submission, Offaly County Council state; *"The Visual Impact Assessment of the proposed development goes through, comprehensively, the Viewshed Reference Points (VRP's) selected as relevant. There are 26 No. of these, therefore the spatial extent is considered to be adequate. It is considered that there are some significant deficiencies in a number of the photomontages generated from*

these VRP's". It must be assumed from this comment and numerous subsequent references to the extent of panoramas that the Council feel the depicted view is not wide enough and that it is not as wide as those presented at pre-planning consultation meetings. There is a very simple explanation for this. Photomontage preparation is governed by a strict set of protocols that ensure that the depicted view represents, as closely as possible, the scene experienced by the naked eye. This is governed by the focal length of the camera used for the photography (between 50mm and 70mm according to the 2006 guidelines) as well as the included angle of the depicted view, which should generally be less than 100 degrees. This combination of factors results in a recommended viewing distance for the image, which should be in the order of 30cm to 50cm and may be different for each view. For the purpose of pre-consultation meetings with Offaly County Council planners, broad panoramic views were presented in order to show context of the VRP. Whilst suitable for this professional discussion, these images were not technically suitable for the application documents. The use of A1 sheets for the display of the photomontages was in order to show as wide a view as possible in terms of landscape context whilst remaining technically correct in terms of viewing distance and scale relationships. It is appreciated that these sheets can be cumbersome in the field and that the use of photographic paper would have made for clearer depiction of the turbines and their visual setting. Another effort that was made to aid interpretation of the photomontages was to show a technically appropriate, albeit cropped image above a broader panoramic 'context' image. The location of the cropped section was also indicated as a red box on the panoramic image for the sake of clarity. Several of the views contain proposed turbines throughout 180° or more. In order to incorporate the whole scheme it was necessary to split these photomontages into two sections. Again, this was done to ensure the photomontages were technically correct rather than to try and spread the perceived impacts across two photomontages.

It would be helpful for assessment, especially by members of the public, if the insert maps were larger and showed at least the locations of the nearby turbines.

Response: The title block of the photomontage layout is quite limited for space. The insert map is shown to give the reader an illustration of the general view the photomontage was taken from. To show turbines in this window may make the map insert illegible. An overall View Point Location Map is provided with the Landscape and Visual Booklet, showing all view points and the location of all turbines.

DR3 (Southwest of Croghan Hill) The choice of the actual location for the photomontages is questionable. It is acknowledged that vegetation is a very effective screen of wind turbines locally, especially in a landscape such as from where it was taken. However, the location of the photo could be criticised for excessive use of vegetation.

Response: Offaly County Council suggests that the precise location of this VRP is questionable as it makes excessive use of intervening vegetation to screen the turbines. This was not MosArt's intention as we always attempt to obtain the most exposed views possible whilst representing the receptor in question. In this case the large arrow on the development plan maps suggests the location of designated view 8 is at the cross roads used for the photomontage. Furthermore, a VRP selection report was prepared for this application specifically for consultation purposes. No issues regarding this VRP placement were raised at the time the Council reviewed this report and associated map. Notwithstanding, two further locations in closer proximity to Croghan Hill were selected as part of this response and these are assessed below under (NV1 and NV2).

LC1(A) (Ballintoran – east of Garr) A photomontage shown at pre-planning stage was more panoramic and reflects this impact more accurately. This should be requested.

Response: Please see comments regarding photomontages in relation to response on the Viewshed Reference Points on pages 53 and 54 of this document.

LC1(B) (Ballintoran – east of Garr) This should be more panoramic to include turbines to the south. A photomontage shown at pre-planning stage reflects the likely impact more accurately. This should be requested.

Response: Please see comments regarding photomontages in relation to response on the Viewshed Reference Points on pages 53 and 54 of this document.

LC3 (From Croghan Hill) this reflects a new "energy landscape" according to the EIS and this is acknowledged. However it indicates some visual clutter – see below.

Response: The Council acknowledge the comments in the EIS relating to the modal shift of this energy landscape from commercial peat harvesting to wind energy generation, but have concerns about some visual clutter from overlapping turbines. Presumably the clutter referred to is from the two overlapping pairs of turbines directly to the north of Croghan Hill. This was noted in the EIS in the following sentence; *"there is a minor detraction caused by the overlapping of two pairs of the nearest turbines and yet, the spacing between these pairs and the neighbouring turbines remains consistent"*. This was one of the only negative comments in relation the aesthetics of the turbines when viewed from this location. Whilst overlapping of turbines is not desirable in aesthetic terms it does not always give rise to a substantial degree of visual clutter as it might when associated with numerous turbines or other foreground structures. Ameliorating factors in this instance are that the rhythm of the spacing between turbines is maintained and that the generous spacing between the turbines and turbine pairs to the north gives a greater sense of permeability to the scheme. This reduces the sense of intrusion on the view of the landscape beyond. More so than if an even, but lesser spacing between these nearest six turbines was employed.

LC4 (A&B) (Togher) It is suggested that the colour of the turbines in these photomontages, more grey than in the others, be queried. Both indicate some visual clutter p see below. It is suggested that the developer be requested to also put LC4 (A) and (B) together as per the pre-planning submission. The turbine numbers on the left hand side of LC4 (B) are very hard to link with the proposed turbines.

Response: The Council questions the grey tone of the turbines in this image in comparison to other photomontages. This may be to do with the light source direction in the computer model or an attempt to highlight the easternmost turbines against the white sky. It is not related to the use of a grey colour for the turbines.

LC5 (Garr Road Corbetstown) it is suggested that the developer be asked to comment on the lower section of the towers which seem to be indicated as being excessively wide. Towers should be as slimline as physically possible to negate the overall visual impact. One of the features of most turbines built in Ireland so far their slender and striking nature and this is preferred to a more chunky base as appears to be suggested as a possibility by this photomontage.

Response: The Applicant concur with Offaly County Council on this point that the turbine towers should be as slim line as possible as it makes them less imposing on the scene. Please see response on page 69 of this document in relation to the same issue.

LC6(A) (Garr) It is considered that this should be more panoramic as it misses the main elements of the development proposed in this area. The centre point of the photo is northwest, however there are two close by clusters of turbines, one to the north northeast and one to the east.

LC6 (H) (Garr) it is considered that, similar to DR3 above, excessive use of vegetation is made in this photo's location.

Response: Please see comments regarding photomontages in relation to the response on the Viewshed Reference Points on pages 53 and 54 of this document. Again, there is a suggestion that excessive vegetation has been used to screen the view of turbines. MosArt reiterate that we always attempt to find the most exposed view of turbines. This can be very difficult to do where turbines occur throughout a range of viewing angles from local views and in such cases we prioritise a clear view of the nearest turbines. It is also important that the nature of the actual viewing scenario is reflected in the range of VRP's selected. In this instance there is considerable vegetative screening around parts of the site, particularly within the more rural landscape to the east in the form of hedgerows.

CPG Mount Lucas it is considered that the developer be asked to submit a photomontage form the area close to Esker cross roads (junction of R400 & R402). This area is characterised by an outer ridge and the location chosen might not be fully reflective of the potential visual impacts.

Response: Considerable effort was made to find an open view towards the proposal from the esker junction of the R400 and R402. It is MosArt's contention that the selected view represents the clearest view for at least 100m in any direction from this junction. Furthermore the selected location is immediately adjacent to this junction (< c. 40m). Given the viewing distance and degree of intervening screening this general location offers almost no potential for significant visual impacts to arise and it is not considered necessary to revisit it in an attempt to find a marginally different view.

CP7 (Clonbullogue) The developer should be requested to include Edenderry Power station on the wireframe diagram for reference.

MR2 (Overpass) at Kinnegad) The developer should be requested to include the Lagan Cement factory and tower on the wireframe diagram for reference albeit acknowledging that turbines are c.4km further away.

Response: Offaly County Council suggest that the Edenderry Power station and the Lagan cement factory be highlighted on the respective wireframes images. The photomontage sheets have been updated to reflect this request, which is a useful exercise to assist the orientation of the viewer. It also reinforces the fact that this is an area already characterised by large scale infrastructure, which is one of the reasons that the Wind Energy Strategy deems this area suitable for large scale wind energy development.

MR3 (A) & (B) (M6 Laybay at Hardwod) It is suggested that, in addition to these (A) and (B) images, the full panoramic image be produced as a separate (larger) as was submitted at pre-planning stage.

MR4 (A) (R400 Overpass, Rochfortbridge) it is considered that this photomontage, in particular the partial view makes excessive use of vegetation and a more panoramic photo should be submitted, as was the case at pre-planning stage.

MR4 (B) (R400 Overpass, Rochfortbridge) It is noted that this image indicates that the overall impact of the cluster of Turbines 1-7 would be unlikely to have a significant negative effect on the landscape setting of Croghan Hill from this vantage point. However it indicates an incidence of significant visual clutter involving turbines 4&5 which should be avoided by layout change

Response: See comments regarding photomontages in relation to response on the Viewshed Reference Points on pages 53 and 54 of this document.

In the interests of thoroughness, MosArt took the unusual step of selecting two slightly different locations at the same receptor to ensure that we captured the clearest view of the turbines to the west of the R400 and those to the east. Offaly County Council suggest that this receptor has not been well represented and that excessive

use of screening vegetation has been employed. As previously stated, MosArt's intention is the opposite when selecting VRP locations.

It is also considered that further photomontages be produced on order to examine the impact on particular groups of dwellings, Rhode village and the sensitive area of Croghan Hill as follows:

1. From approx. the centre of Rhode village

2. From the Garr to Castlejordan road, taken in a south-south-easterly direction to address the impact on residences along this stretch of road.

3. From Cannakill, affectively looking over the lower reaches of Croghan Hill.

4. From the open landscape area between houses 143 & 83 in both the easterly and north-westerly directions.

5. From the rear of houses 133 & 134. These houses are in a slightly elevated area and appear very open to impacts from T14 & 15.

6. Finally, it is considered very important that photomontages be taken and produced from the R400 looking into the open landscape just under half way between house 200 and the entrance to Kilmurray's quarry (north of the Garr Rd. roundabout to allow the full local impact on the views and setting of Croghan Hill to be assessed.

Response: Offaly County Council suggested that six further photomontages be produced from various locations in the immediate vicinity of the proposed wind farm. These were duly selected on site and an assessment of each is provided below using the same format as in the EIS. The VRP numbering and descriptions relate directly to the Council's submission.

Viewshed Reference Point		Direction of View	Distance to nearest turbine:	Number of turbine nacelles visible:
View 1	From approx. The centre of Rhode Village	N	1.75km	5

Representative of:	• A centre of population		
Receptor Sensitivity	**Low**		
Existing View	This view is afforded from just to the east of the crossroads at the centre of Rhode and represents one of the only locations with a partial view of the proposed turbines from the public domain. The foreground of the view is a parking area that fronts a newly constructed playground bordered by mature deciduous trees. The view is flanked by residential dwellings to the east and west.		
Visual Impact of Yellow River Wind Farm	Three of the proposed turbines are substantially visible in a window of view that occurs between trees and houses in the north-easterly aspect of this view. The blade sets of several other will also be visible beyond. The nearest turbines are seen at a relatively prominent scale but compete for a viewers attention with the busy foreground context. The visual presence of the turbines is considered to be in the order of co-dominant to sub-dominant in this street scene. There is some visual clutter associated with turbines overlapping with each other and blades rotating in silhouette against intervening vegetation. This is fairly minor issue in the context of the visual complexity of the urban foreground and overall the view of the turbines is not ambiguous. For these reasons the magnitude of visual impact is deemed to be Low.		
Summary	Based on the assessment criteria and matrices outlined in chapter 11 of the EIS the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	Significance of Visual Impact
	Low	**Medium**	**Slight**

Viewshed Reference Point		Direction of View	Distance to nearest turbine:	Number of turbine nacelles visible:
View 2	Garr to Castlejordan Road	S	0.81km	5

Representative of:	• Local Community Views
Receptor Sensitivity	**Low**
Existing View	This is a typical view from within the lowland farmed landscape to the east of the site. The foreground comprises of pastoral fields and hedgerows and is contained at a relatively short distance.
Visual Impact of Yellow River Wind Farm	Despite the close proximity of the nearest turbines they are not visually dominant within this vista due to the degree of hedgerow screening. This allows a view of only the upper sections of some of the turbines. Given that this is a relatively homogenous rural view the turbines will draw attention particularly due to the moving blades. On balance the visual presence is deemed to be co-dominant.

	Aesthetically, the view of turbines blades sets rising above foreground vegetation throughout various parts of the view may cause some visual ambiguity. However the turbines do not spatially dominate the landscape pattern in terms of scale and they are not incongruous in this productive rural setting. Overall, the visual impact magnitude is deemed to be Medium.		
Summary	Based on the assessment criteria and matrices outlined in chapter 11 of the EIS the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	Significance of Visual Impact
	Low	**Medium**	**Slight**

Viewshed Reference Point		Direction of View	Distance to nearest turbine:	Number of turbine nacelles visible:
View 3 and 3a	Cannakil	NE	3.46 & 3.27km	0

Representative of:	• A designated view • Local community views		
Receptor Sensitivity	**Medium**		
Existing View	This assessment should be read in conjunction with the assessment for the adjacent DR3 viewpoint from the EIS. View 3 and 3a are taken from closer locations to Croghan Hill travelling towards Cannakil. They both have a similar viewing context of foreground fields and hedgerows with Croghan Hill providing a distinctive focal point to the vista directly to the east.		
Visual Impact of Yellow River Wind Farm	These views reinforce the assessment provided in the EIS that; "*.....intervening hedgerow vegetation screens all of the turbines from view. A veiled view of turbine blades within the branches of these trees might be afforded during winter months, but they would remain difficult to discern. Nonetheless, the distinctive profile of Croghan hill would be unaffected by the proposal.* *For these reasons the visual impact magnitude is deemed to be negligible."* In addition to the above it should also be noted that as the viewer approaches Croghan Hill the turbines become more oblique to the view of the hill with less chance of impacting on its distinctive profile. This could occur in theory if the turbines were closer than 2km to the hill. Instead these photomontages vindicate the 2km separation buffer employed by Offaly County Council in relation to Croghan Hill.		
Summary	Based on the assessment criteria and matrices outlined in chapter 11 of the EIS the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	Significance of Visual Impact
	Medium	**Negligible**	**Imperceptible**

Viewshed Reference Point		Direction of View	Distance to nearest turbine:	Number of turbine nacelles visible:
View 4	Srah	E	0.82km	8
Representative of:	• Local community views			
Receptor Sensitivity	**Low**			
Existing View	This is a relatively open vista due to the large fields of regenerating pasture in the foreground. However, the view is then contained by a conifer plantation immediately beyond. More sporadic hedgerows occur at either end of the conifer plantation and these are the main elements of this simple vista.			
Visual Impact of Yellow River Wind Farm	Three of the proposed turbines will rise in silhouette above the conifer plantation at a relatively short viewing distance. They will be the most prominent feature of this simple and contained vista and consequently their visual presence is deemed to be dominant. Although there are other turbines visible to the northeast they are comparatively much further away and will be less noticeable. This is a clear and unambiguous view of the three nearest turbines rising above the dark plinth of conifer forest with an even spacing. Although they are considered to have a dominant visual presence they are not spatially dominant in relation to the underlying land use pattern. The more distant turbines to the northeast are less well displayed and add to the lateral extent of development. On the basis of these reasons the impact magnitude is deemed to be High.			
Summary	Based on the assessment criteria and matrices outlined in chapter 11 of the EIS the significance of visual impact is summarised below.			
	Visual Receptor Sensitivity	Visual Impact Magnitude	Significance of Visual Impact	
	Low	**High**	**Moderate-slight**	

Viewshed Reference Point		Direction of View	Distance to nearest turbine:	Number of turbine nacelles visible:
View 5	Ballyburley	NW	??	??
Representative of:	• Local community views			
Receptor Sensitivity	**Medium**			
Existing View	This is a relatively open and expansive view from the slightly elevated area of Ballyburley (represented in the original LVIA by LC7). This view is from private land to the rear of dwelling 133 and 134 and although it is slightly more open view than LC7 it was acknowledged in the original assessment that; *"in this vicinity the slight increase in ground level in comparison to the basin landscape to the north results in more panoramic views from the surrounding dwellings. Thus there is an increased degree of receptor sensitivity in comparison to most of the other Local Community (LC) views assessed. As well as the slightly increased elevation there is also a low level of screening in the foreground, which also contributes to the extent of available views"*. The land cover in view consists of large pastoral fields that			

	stretch into the distance. A band of vegetation runs just below the flat horizon and consists of forest plantations and hedgerows stacked in perspective.		
Visual Impact of Yellow River Wind Farm	Three of the proposed turbines can be seen in proximity to this receptor, whilst a number of other turbines are also visible in the background in several clusters. By comparison these more distant clusters are much less noticeable than the nearest turbines which are spaced relatively evenly across the north-westerly aspect of this vista. The three nearest turbines add distinct verticality to this otherwise horizontal vista and are easily the most prominent landscape elements in view. Even though this is an extensive vista, the proposed turbines are considered to be dominant in terms of visual presence. The proposed turbines are not considered to be incongruous within this view over a productive rural landscape and the fully exposed view of the nearest turbines avoids visual clutter and ambiguity. Whilst the nearest turbines represent a visual intrusion on the vista rather than a visual obstruction they tend to draw the viewer's attention away from the wider landscape to some degree and alter the horizontal nature of the vista by introducing verticality. On balance of the reasons outlined above, the magnitude of visual impact is judged to be high.		
Summary	Based on the assessment criteria and matrices outlined in chapter 11 of the EIS the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	Significance of Visual Impact
	Medium	**High**	**Major-moderate**

Viewshed Reference Point		Direction of View	Distance to nearest turbine:	Number of turbine nacelles visible:
View 6	R400 at Derryiron	W		
Representative of:	• A major route			
Receptor Sensitivity	**Low**			
Existing View	This is an open view to the west from the R400 as it passes through a flat landscape in transition between cutaway peatland and marginal farmland. Scrubby areas at the fringe of the peatland can be seen at the right-hand side of the view and in the central middle ground. Rough grazing occupies the left hand side of the view and the large fields are defined by sporadic hedgerows and tree lines. Croghan Hill can be seen through a veil of winter branches in the centre of the view.			
Visual Impact of Yellow River Wind Farm	This is a very close view of the turbines to the west of the R400 when approaching Rhode from the north. At this distance and within this open viewing context the nearest cluster of turbines will be by far the most noticeable feature in the view. However, given the broad nature of the vista and the fact that the turbines are not considered to be spatially overbearing the visual presence is deemed to be dominant rather than highly dominant. Aesthetically, this is a dramatic view of the western turbines due to the perspective generated between the nearest and furthest of the turbines. There is little ambiguity associated with the view of the turbines, which trickle away from the viewer in a pleasant organic pattern. The scale of the turbines is not excessive in this landscape			

	of large fields and bog fringe and they are relatively condensed in terms of lateral extent. The turbines will intrude to a minor degree on the view of Croghan Hill, but they will not obstruct it. Due to relative distance and screening, Croghan is not a defining feature of this vista in any event. Based primarily on the visual presence judgement rather than any particularly adverse aesthetic effects, the magnitude of visual impact is deemed to be high.		
Summary	Based on the assessment criteria and matrices outlined in chapter 11 of the EIS the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	Significance of Visual Impact
	Low	**High**	**Moderate**

Viewshed Reference Point		Direction of View	Distance to nearest turbine:	Number of turbine nacelles visible:
View 7	Knockdrin	E	1.3km	14

Representative of:	• Local community views		
Receptor Sensitivity	**Medium**		
Existing View	This is a slightly elevated and broadly panoramic vista from the hill at Knockdrin in the central study area. This view was not requested by Offaly County Council, but by local resident Louise Kennedy who lives in this locality. This is similar in nature to the view from Togher on the eastern side of Croghan Hill (represented by LC4 in the original LVIA). To the left-hand side of this particular view is an open expanse of cutaway peatland with pastoral fields on the foreground slopes of Knockdrin. A more pastoral landscape setting can be seen to the right-hand side albeit through mature tree line in the foreground.		
Visual Impact of Yellow River Wind Farm	Approximately 10 turbines can be seen at a prominent, but not dominating scale rising above the peatland context to the left-hand side of the view. They are fully revealed in silhouette against the sky due to the absence of a terrain backdrop in this aspect of the view. The turbines to the right-hand side of the view will be less noticeable through the intervening winter vegetation. The visual presence of the turbines is deemed to be co-dominant in the context of this vista. Aesthetically, the open view of turbines above the peatland context is clear and unambiguous. The scale of the turbines is well assimilated within the underlying broad landscape pattern. Although the turbines represent an intrusion on this open vista, the spacing characteristics and the slender form of the turbines ensure that they do not limit the extent of the view. Nor do they draw attention away from the wider landscape to an excessive degree. There is some minor visual clutter associated with the overlapping of three turbines, but there is a sense that their close association allows for broader gaps between turbines in this section of the view. Overall the magnitude of visual impact is deemed to be Medium.		
Summary	Based on the assessment criteria and matrices outlined in chapter 11 of the EIS the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	Significance of Visual Impact

	Medium	**Medium**	**Moderate**

It is suggested that the sentence stating "this development is more likely to have positive consequences for additional developments by establishing wind farms as a characteristic feature of the receiving landscape" may be excessively subjective in the context of an EIS.

Response: This statement needs to be read in its full context which is provided below from the cumulative impact section summary;

> *"In terms of the cumulative effect on the overall landscape character of the study area wind farms will no longer be a novel landscape feature. Instead, there will be a sense that they are becoming a familiar form of development in and around the cutaway peatland areas of County Offaly. At the present levels of development this is more likely to have positive consequences for additional developments by establishing wind farms as a characteristic feature of the receiving landscape. More so than negative consequences in terms of cumulative impacts".*

In essence the above paragraph is describing the temporal scenario in which a new form of development (wind farms in this case) crosses a familiarity threshold. They may go from being a new and uncharacteristic form of development, where the effect on landscape character can be most noticeable, to a familiar form of development and then to such a regular form of development that cumulative impacts can become the more significant concern. The paragraph was not intended to suggest that each wind energy development makes the next one more acceptable as may have been construed by the council.

From an analysis of the photomontages, notwithstanding the requirements for revisions to same, it is considered that there are a number of instances where visual clutter (i.e. turbines overlapping in a view) would occur. Turbines, when viewed in an uncluttered scene can be considered by many people as elegant structures, notwithstanding their size. However, where there is excessive overlap of moving parts in short or medium distance views, they can give rise to annoyance, distraction and a sense of clutter. This is expressed in the wind energy guidelines as an issue to be considered, primarily from sensitive viewpoints. While some of this is unavoidable, particularly in long distance

views, it is considered in relation to the current proposals that amendments would be required to mitigate against this clutter. While this is based on a simple visual examination of the photomontages and wireframes, it can be seen that there are particular clusters of turbines which are more likely to give rise to this effect.

Response: Offaly County Councils comments with regard to the occurrence of visual clutter are balanced and reasonable, particularly as they note that in an uncluttered scene turbines *"can be considered by many people as elegant structures, notwithstanding their size"*. It is accepted that from most visual receptors with a view of a reasonable number of the proposed turbines there is likely to be some degree of turbine overlap. This is almost unavoidable for a wind farm with a three dimensional layout and receptors throughout 360°. Whilst any turbine overlapping is less desirable in an aesthetic sense than well-spaced turbines, the degree to which overlapping contributes to an overall sense of visual clutter is dependent on a number of factors. Some of these include;

- The number of overlapped turbines in any particular instance
- The number of overlapping turbine clusters in a particular view
- The relative distance between stacked turbines i.e. so that a sense of spatial separation may still be apparent
- The complexity of the existing scene and degree of foreground clutter
- The overall spacing characteristics of the wind energy development in view and whether a recognisable rythym occurs regardless of overlapping

MosArt believe that the degree of visual clutter caused by overlapping turbines in the case of the proposed Yellow River Wind Farm is not excessive and does not contribute to significant visual impacts from any of the selected VRP locations. As noted by Offaly County Council, the Wind Energy Guidelines (2006) make specific reference to overlapping of turbines being of most concern when viewed from sensitive viewpoints. In this instance the most sensitive viewpoint with any potential for significant visual impacts to occur is Croghan Hill (represented by LC3). MosArt

have addressed the Council's specific concerns regarding turbine overlap from this location in our response to item 4 above.

Notwithstanding the above comments it is accepted that any reduction in the number of proposed turbines will mitigate visual clutter to some degree. MosArt undertook an analysis of the photomontages in order to identify any particular turbines or groups of turbines that might be responsible for a disproportionately high degree of turbine overlap. However, given the necessary minimum spacing between individual turbines and the 360° array of receptors, none stood out. In terms of the overall scheme, it is apparent that the easternmost cluster of turbines is responsible for the majority of turbine overlap. This is due to its more three dimensional layout in comparison to the more sinuous linear layout of the western end of the scheme.

The Adjusted Landscape and Visual Report in Appendix C of Section 2 of this response, reduces the number of turbines by three, relocates two further turbines and reduces the overall maximum height from 166m to 156m in this eastern cluster. This measure would serve to significantly reduce the degree of turbine overlap and the visual clutter associated with this effect.

Chapter 13 – Cultural Heritage

A Neolithic track way/wooden walkway is identified at Derryarkin. It is not clear whether this is referred to as 'APP 1 and further information is suggested on this point. Confirmation that the trackway/wooden walkway identified Ballybeg is well outside the development area is suggested also.

The Neolithic trackway identified in Derryarkin Bog, is located within AAP 1. This designation has been applied to the landscape that the proposed development is located within to highlight the overall archaeological potential.

The archaeological sites identified at Ballybeg Bog, including a number of trackways, are also well outside of the proposed development area.

There are 86 Records of Monuments and Places within 2km according to the EIS. These are listed in a table on p564 which gives distances from turbines. These should be plotted on a map together with the locations of the proposed turbine access roads.

There are 15 buildings or groups of buildings included in the Record of Protected Structures (RPS) within 2 km and the EIS lists a total of 22 buildings (or groups of buildings) of built heritage significance within 2km. These should be mapped in a similar fashion also.

The Records of Monuments and Places and Record of Protected Structures (RPS) have been plotted on 2 separate maps and can be found in Appendix G of this document.

Prior to the commencement of construction GWE will compile a photographic record of the former demesnes at Cooleville, Greenhills and Ballyburley.

2.2.5 Planning Authority's Assessments and Views

In this section of the Report the Authority's principal planning issues are detailed. Some of these issues have already been raised in the Roads/Area Office and Environment/Water Services sections of the Report and the applicant has addressed them earlier in this response.

Grid Connection

The applicant continues to be engaged in the Grid Application process with Eirgrid Whilst at this stage in the connection process there is still a level of uncertainty, regarding the connection method, costs and timelines, the applicant confirms their expectation that the Derryiron 110kV substation has the capacity to take the 96MW that will be generated by YRWF.

Duration of Planning Permission

Response: In relation to Offaly County Council's suggestions in relation to the 15year planning permission and an operational life of 30 years sought, the applicant notes the issues that raises for the Authority and would therefore accept the suggested 10 year planning permission. In relation to the operational life of wind farms, it is noted that 25 years is now standard having regard to commercial considerations and more robust technology. In addition, a 2/3 year decommissioning/wind-down period should be provided for.

Given the scale of wind turbines, their design while constrained by technical requirements is nonetheless important. On page 69 it is indicated that turbine towers are generally white/grey, typically RAL 7035 (light grey). On page 212 light grey is specified. It is considered that further information is required as to whether RAL 7035 is the 'normal' (off-white) colour that is mostly used in Ireland. These are visible around the country a number of instances of more deep grey tower colours, but it is considered that these can be more visible against a white sky. The same would obviously apply to nacelles, hubs and blades as well. Given the site is the part of a larger area where wind energy development is open to consideration. It is considered that consistency in colour and design is important to achieve from the outset. A wind farm development is already underway in Mount Lucas.

Response: The most common turbine colours used are 'pure white' (RAL 9010) and 'light grey' (RAL 7035). Light grey, RAL 7035, is the colour listed on Siemens specification brochures. It is also the colour of the Siemens turbines erected in Mount Lucas Wind Farm, Co Offaly.

Regarding the physical design of the turbines, the Planning Authority requests that five further issues be formally raised and clarified in the event of a permission being granted.

Firstly in relation to the towers, a slimline design, with only very slight tapering is preferable within this site to minimise impact and maximise the striking slender nature of the structures. This would appear to mitigate against the lower sections being constricted in concrete as suggested as an option in the EIS (p.69), because concrete towers sections <u>may</u> be considerably wider at the base than steel. The developer might be in a position to elaborate on this concern however.

Response: The Applicant concur with Offaly County Council on this point that the turbine towers should be as slim line as possible as it makes them less imposing on the scene. The Applicant included the option of concrete towers in response to national discussions on maximising the employment potential and potential spin-off from the Renewable Energy industry. The suggestion was that the towers would be constructed in Ireland using Irish materials. It may not be an option, but if it is and is commercially neutral, the applicant would consider using them.

Secondly, in relation to the nacelle, there are two main types emerging in Ireland namely the more typical rectangular or tubular type and a more tapering cylindrical type. In relation to consistency in approach it would appear that the rectangular or tubular design would be more applicable in this area. The developer could be asked to comment on this, as one of the three options for turbine choice relates to the latter design, as does drawing PL301.

Response: The nacelle houses the generating components of a wind turbine. The shape of the nacelle depends on the type of turbine used. Each turbine manufacturing company have their own distinctive nacelle design shape, for example:

Vestas

Seimens

GE

Thirdly, it is considered important that no livery, stripes etc. whatsoever are painted or attached to the turbines in order to keep them as visually clean as possible.

Response: The Applicant accepts the suggestion that turbine towers and nacelles would not be painted with livery, stripes etc.

Fourthly further information is required on the nature and intensity of the proposed hazard lights "on the hubs" of Turbines 1-7 (assuming this approach is acceptable to the NPWS and An Bord Pleanala).

This approach is acceptable to NPWS, as paragraph 1of the response from the Department of Arts, Heritage & the Gaeltacht, under Nature Conservation notes '*The Department recommends that all mitigation measures, including post construction monitoring, as outlined in the EIS and NIS are a condition of any permission granted, particularly with regard to water quality, bats and whooper swans.*'

The type of light required is a standard strobe light as used on communication towers etc. to warn aircraft.

Finally notwithstanding the height concerns above, the ratio as proposed of tower height to rotor diameter at 1.1 is considered acceptable. When the rotor diameter exceeds the hub height, the entire structure can become excessively dominant and chunky in views. This ratio or less, should be retained in any grant.

Response: The EIS proposal is for maximum hub height of 110m and maximum diameter of 113m. Note that in the Adjusted Landscape and Visual Booklet for Section 2 of this response a maximum hub height of 100m and a maximum diameter of 113m is detailed for turbines T13 to T25.

Micrositing, being where the position of turbines is moved slightly in response to pre-commencement surveys is mentioned summarily on pages 24 & 69. Given the potential for impact on residential property with regard to noise, flicker and general proximity, the maximum scope of this micrositing should be specified.

Response: The maximum expected micro-siting requirement is 20m.

The monitoring mast should be limited to the duration of any permission (developer has applied for a permanent structure) and the developer should be asked to contribute to sharing of information to minimise the need for such masts in the area.

Response: The sharing of wind data gathered from the permanent anemometer should not be required of the Applicant as such data is commercially sensitive and valuable.

The EIS states that the development will attract visitors for general interest and educational purposes. Further information is requested as to whether it is proposed to provide for public access, viewing area, walks etc. Details/drawings/assessment would be required. This is recommended on amenity grounds as is an assessment of or proposals for linking with any existing amenity or similar such amenities that may emerge on adjacent landholdings in the future.

Response: Whilst there are difficulties creating open access to turbines because these are centred on private lands, the suggestion for the development of a visitor attraction policy centred on educational and general interest is worthwhile and laudable. The Applicant would be willing to discuss options with local groups such as North Offaly Development Group and the structure set up by the community for the administration of community gain funds.

2.2.6 Planning Authority's view on community gain conditions

Given the scale of the proposed Strategic Infrastructure development it is considered appropriate to attach such a condition. The Planning Authority considers that a detailed scheme should be included within any permission granted rather than leaving it for agreement later. One reason for this to be tied down and included in the permission is the eventuality that the applicant is not the developer who actually constructs the wind farm, if permitted. A percentage sum, related to the total project cost is suggested. It is recommended that the Board examine the possibility of dividing the community gain into categories for example (i) for general grant aid to community groups, (ii) an economic development investment fund and (iii) a greener homes scheme. It is also suggested that there could be a weighting given where by a larger proportion of the funds be allocated within the 'local area' (to be decided) with lesser amounts available for community gain outside this area. This is to avoid the potential for an unequal bias in the funding of some sports groups or community groups to the detriment of others in the general community.

The Applicant recognises the importance of a meaningful community engagement to the YRWF project and is committed to funding a long-term Community Benefit Fund should An Bord Pleanála grant planning permission for the YRWF project .The developer acknowledges a role for OCC in developing a concept for the structure and management of a local community benefit programme and will, following the grant of planning permission, engage with them and the wider local community to develop such a proposal. We believe that a well-planned, direct community engagement project between the developer and the community will enhance social acceptance in the area over the lifetime of the project. It is important that the developer interacts with the local community management of the fund in order to shape a scheme that will deliver maximum benefit to the area in which the YRWF will operate. It is also important to the long-term success of the YRWF business that any goodwill

payments paid are seen to come from the YRWF owners and not filtered through third parties. Therefore the developer believes that whatever scheme is implemented would need to have the flexibility for the developer to interact directly with the community. It is our belief that the expenditure should be both area and project specific and that, in the best practise of community engagement, the impacted community should decide on the optimum structure for the administration of funds. The developer confirms its commitment to support the Community Benefit Fund to a value of €1,000 /MW installed capacity per annum, index-linked for the lifetime of the YRWF project.

2.3 Department of Arts, Heritage and the Gaeltacht

The following are the responses in respect of the issues raised by the Department of Arts, Heritage and the Gaeltacht

The applicant will implement in full the archaeological mitigation strategy as detailed in S. 13.7.1 of the EIS. Any archaeological test excavations will be undertaken in advance of commencement of construction.

In relation to Underwater Archaeological Assessment and regarding the mill race, it should be noted that there is no standing water at any of the three locations where the mill race site will be crossed by access roads. The feature has been almost completely filled in. Therefore assessment of the sections of the mill race to be impacted upon should be included with the archaeological testing strategy associated with the proposed scheme. It would not be possible to carry out underwater assessment at any of these three locations.

Access roads associated with the proposed scheme will cross the Yellow River at three separate locations within the townlands of Derryiron, Wood/Garr and Killowen/Corbettstown. At all three locations it was clear from the historical mapping analysis and field inspections of the locations that these locations had been heavily impacted upon by the canalisation of the water course. In the case of the Wood/Garr crossing location, the original river channel was completely bypassed by a new channel. For the most part, the river channel now resembles a large drainage ditch. As such, no adverse impact was anticipated on the archaeological resource as it is likely that any such remains that did survive at the three locations have since been removed.

The applicant will fully implement the Department's recommendations contained in their submission that are required by An Bord in respect of

- Archaeological Testing and Recording
- Narrow Gauge Railway
- Archaeological Monitoring

In relation to Nature Conservation, the applicant will fully comply with all mitigation measures, including post-construction monitoring, as detailed in the EIS and NIS, particularly with regard to water quality, bats and whooper swans.

In relation to whooper swans, the 2012/2013 winter survey that is part of the EIS is now augmented by a further survey for the 2013/2014 winter and the findings are included with this response in Appendix A. This shows more detailed coverage than the previous winter but overall the findings are similar.

2.3.1 Health Service Executive

The Health Service Executive (HSE) raised the following issues:

Water Response:

"The source of the Rode Regional Water Supply is springs at Toberdaly 2km southwest of Rode.

EIS states –"none of the proposed development or any of its ancillary activities lie within the ZOC to the spring. There can be no impact on this water source as a result of the proposed wind farm development."

[1] There are a number of houses in the vicinity of some turbine locations. It is not known if all or any of these houses are served by private wells, depth of wells etc. Engagement/consultation with local community should have sought this information.

[2] The EIS indicates that no samples of groundwater were undertaken.

[3] The EIS states that houses near all turbine location are not within "inferred"/"assumed" groundwater flow direction and therefore there is not likely to be any negative impacts on wells."

[HSE] Recommendation 1:

[4] Should the development during the construction stage have any negative impacts on the Toberdaly springs, mitigation measures must be put in place in agreement with Offaly County Council/Water Authority.

[5] Consideration should be given to surveying and monitoring wells in the vicinity of turbines, for quality and flow/volume to provide baseline information prior to commencement of the construction phase.

[6] Appropriate mitigation measures must be undertaken for any deterioration in water quality/supply as a result of the development.

Response:

The potential for impact on groundwater and groundwater wells/sources/users in terms of quality and quantity is dealt with comprehensively within the EIS at Sections 7.3.14 and 7.5.1.10, at pages 335 to 338 and page 358.

Wind farms, by their nature, are near surface construction activities, and as such have much greater potential to impact on surface water than groundwater. That is why there is far extensive mitigation proposed in the EIS regarding protection of surface water quality.

[1] & [3] There is no requirement to map all local wells. Such an approach would only be undertaken if widespread dewatering was proposed, such as for a deep bedrock quarry development which may operate over 10 to 20 years. The excavations proposed for the wind farm construction are shallow, and while they may intercept the groundwater table, the construction period is short in nature, in the order of 2-3 months for each base, and this will not impact on the wider shallow water table, or the underlying bedrock aquifers. Also the required setback distances from houses are 500m, and this is generally in a low-lying flat landscape. Private dwellings and associated water supplies are assessed in Section 7.3.14 and this provides a detailed

breakdown of house locations and inferred groundwater flow directions (based on the orientation of the local surface water systems). It is reasonable to assume groundwater flows towards local surface water features in this way, and this method is used by the Geological Survey of Ireland when determining source protection areas for water supply wells (Geological Survey of Ireland - Source Protection Delineation Course Guidelines, 2007).

Therefore, using the following:

- The shallow nature of the proposed construction at each turbine bases;
- The short duration of the construction period at each turbine base;
- The setback distances of turbine bases from houses and their associated water sources (wells, springs etc); and,
- The direction of groundwater flow at each turbine base.

It is reasonable to conclude that there is negligible potential for impact on local private wells.

[2] It is not common practice to complete groundwater sampling for wind farm developments. HES did consider whether such sampling and analysis was required for this development. But based on the reasons provided for response items [1] & [3] above we concluded that groundwater sampling was not required to define the baseline environment.

It should be noted that HES did provide water quality data from Toberdaly Spring in Table 7.9 of the EIS.

[4], [5] & [6] HES are confident that based on our conservative groundwater assessment, as outlined in Sections 7.3.14 and 7.5.1.10 of the EIS, there is no potential pathway for impact to occur to local water supplies from any aspect of the proposed wind farm development. Therefore the mitigation required under HSE recommendation 1 will not be required. However, Greenwind Energy Ltd will comply with these recommendations from the HSE, if they were to form part of any planning condition for the proposed development.

Noise and Shadow Flicker Response:

The YRWF as submitted for planning permission was designed having regard to, and is in full compliance with, the DoEHLG Planning Guidelines (2006) including the Noise and Shadow Flicker provisions therein. These are the Guidelines that are currently in place and to which regard should be had by An Bord Pleanála in the normal course when considering this application.

However, as stated elsewhere in this document, currently, a Public Consultation process is in place in respect of a review of the 2006 Guidelines. This review deals specifically with Noise and Shadow Flicker. In response to the submission by Offaly Co. Co. and in particular to their suggestions in relation to the revised Noise and Shadow Flicker limits, the applicant has submitted a revised layout for consideration by An Bord Pleanála that fully complies with suggestions in the Draft Revised Guidelines in relation to compliance with a 40dB Noise Limit and a 'No Shadow Flicker for any houses within 10 rotor diameters' requirement. If required by An Bord the applicant will develop the wind farm in accordance with this revised layout.

The applicant will ensure compliance on an on-going basis with the limits approved in the planning permission and will, in the Operational Phase of the project, and following discussion with Offaly Co. Co., put in place a documented procedure for monitoring, recording, reporting and handling of any complaints in relation to Noise and Shadow Flicker.

Air Quality Response:

The Mitigation Measures in relation to Dust Control detailed in Section 8.4 of the EIS will be fully implemented during the construction stage.

Waste Response:

All waste arising from/at the wind farm will be dealt with in accordance with the relevant Waste Management legislation.

Environmental Management Plan Response:

An Outline Environmental Management Plan was submitted as Appendix I of the EIS. A detailed Environmental Management Plan will be finalised and agreed with Offaly County Council on completion of detailed design and appointment of Civil Works Contractor. The Final EMP will address all planning conditions, should An Bord Pleanála grant planning permission.

2.3.2 Inland Fisheries Ireland

In response to the issues raised by Inland Fisheries Ireland (IFI) the applicant would like to make the following comments.

Conservation Services - Ecological & Environmental Consultants were commissioned by Biosphere Environmental Services on behalf of the applicant to carry out a freshwater ecological assessment for the proposed wind farm. Conservation Services consulted with IFI on several occasions throughout the environmental assessment process (31/7/12, 9/5/13 and 17/5/13) and received the IFI Wind Farm Scoping Document (draft) at the early stages of the process. (Please refer to Appendix H for a copy of the IFI Wind Farm Scoping Document (draft)). The scoping document was adhered to, with mitigation measures proposed to safeguard water quality and aquatic ecology outlined in Chapter 5 of the EIS. The applicant will implement in full the mitigation measures as detailed in Section 5.14 of the EIS.

It was intended to carry out an electrofishing survey as part of the present EIS and a Section 14 permit was obtained to electrofish the potentially affected sections of the Yellow River and Mongagh/Castlejordan River. It was however found that the potentially affected main channels of the Yellow River and Mongagh/Castlejordan River (arterially drained channels) are too deep for the backpack electrofishing method. Inland Fisheries Ireland were consulted in this regard and responded: "*IFI have no requirement for electrofishing as we will assume that in the absence of electrofishing the precautionary principle would be applied and mitigation measures put in place on the assumption that salmonid fish are present.*" (N. McGloin e-mail of 17/5/13).

Prior to construction, consultation will take place with IFI regarding the details of bridge construction. All nine river crossings will be constructed by way of free span reinforced concrete bridges with no instream structures, in order to protect fish and

macroinvertebrate habitat and passage. No stream or river crossings will take place without the prior agreement of Inland Fisheries Ireland.

A 50m buffer zone has been adopted from turbine bases and hardstandings to major and minor watercourses, with a 10m buffer around manmade drainage channels. However, works are proposed in the vicinity of watercourses including access roads and river crossings. Where such works are proposed appropriate mitigation measures are identified to prevent the pollution of these watercourses, for example, the use of silt traps and avoiding construction near streams in wet weather, whenever possible, to minimise the entrainment of sediments. Please refer to Section 2.9 of the EIS, Yellow River Drainage Design.

Eroded sediments will be retained using erosion and sediment control structures such as swales, check dams, silt fences and settlement ponds. Please refer to Figure 2.12 Road Construction Detail & Swales, Figure 2.16 Check Dam Detail, Figure 2.17 Settlement Pond Detail of the submitted EIS. It is noted that no direct discharge from new swales to natural watercourses is proposed, therefore, all development run-off will be discharged through buffered outfalls (incorporating overland flow) or through existing drains.

Construction in the vicinity of salmonid nursery habitat, will not take place between the beginning of October and the end of June, as outlined in IFI's submission. Specifically this would refer to works in the vicinity of Section Y1 of the Yellow River main channel, the Corbetstown Bridge stream downstream of Corbetstown Bridge and in the vicinity of Killowen Stream.

The applicant will fully implement IFI's recommendations contained in their submission that are required by An Bord Pleanála in terms of aquatic habitat and species protection.

2.3.3 Irish Aviation Authority

The applicant will fully implement the Irish Aviation Authorities recommendations to,

a) Agreed a scheme of aviation obstacle warning lighting for the wind turbines,

b) Supply coordinates and elevation details of the built turbines to the Authority for charting purposes, and

c) Notify the Authority at least 30 days prior to the erection of the development.

2.4 RESPONSE TO THIRD PARTY – COMMON ISSUES

2.4.1 General Health Impacts

In response to concerns raised in numerous third party submissions in relation to impacts to human health, the following publication on the subject is summarized.

The National Health and Medical Research Council (NHMRC), Australia's leading medical research body, have concluded that there is no reliable or consistent evidence that wind farms directly cause human health problems as part of their Systematic Review of the Human Health Effects of Wind Farms published in December 2013.

The review was commissioned to determine whether there is a direct association between exposure to wind farms and negative effects on human health or whether the association is casual, by chance or bias.

Objectors to wind farms often refer to 'Wind Turbine Syndrome' as a condition that can be caused by living in close proximity to wind farms. The symptoms allegedly include sleep deprivation, anxiety, nausea and vertigo. That wind turbines cause these sort of symptoms has been rejected by the industry and is further refuted by the review carried out by the NHMRC.

The review began in late 2012 and included a literature and background review of all available evidence on the exposure to the physical emissions produced by wind turbines. These emissions were noise, shadow flicker and electromagnetic radiation produced by wind turbines.

The review concludes that the evidence considered does not support any direct association between wind farms and human health problems and that bias and confounding could be possible explanations for any reported association.

2.4.2 Noise

In response to concerns raised in third party submissions in relation to Noise:

Calibration Certification of noise instruments

All the noise measuring equipment used on site and field calibrator was of Class/1/Type 1 precision standards and all noise monitoring systems have independent calibration to manufacturers specification carried out no longer than 2 years prior to the noise survey completion (one year for calibrators) as recommended in section 2.4 in 'Institute of Acoustics' *A good practice guide to the application of ETSU-R-97 for the Assessment and rating of wind turbines*. The summary details of instrument calibration certificates was contained within Table 9.3.

All microphones were located/supported at a height of 1.2 – 1.5 metres above ground as recommended by the Institute of Acoustics' *A good practice guide to the application of ETSU-R-97 for the Assessment and rating of wind turbines*, section 2.4

The background noise levels employ wind speed levels up to 10 m/s and that is considered adequate considering that the wind turbines being proposed reach their maximum sound power level output at 7m/s.

All the data relating to the noise survey and photographs of monitoring locations were submitted in the Appendices. Monitoring was carried out at 10 locations over a period from 12th to 30th May 2014.

Low Frequency Sound (20 to 200Hz) and Infrasound (below 20Hz)

Wind turbines do produce low frequency sound and infra sound but at a low level which is not audible at 300 metres. The frequency range of the human ear is 16 to 16000 Hz and typically frequencies below 20 Hz are not audible to the human ear unless at very high levels. An examples of low frequencies (3 to 10Hz) being readily observed is air overpressure/air blasts from quarry blasting or blasting in road works where blasting may be carried out at close distances to residents. I have recorded sound pressure levels from air-blasts / air overpressure of 100 to 130dB (linear down to 2Hz) from quarry blasting and up to 135dB from road cuts being made by blasting at 35 metres from a receptor. Low frequency sound of the aforementioned magnitude

will rattle windows and loose objects, however there was no allegation of negative effects of damage to a person's health relating to such activity.

The low frequency sound levels from a wind turbine at 100 metres is less than 70 db.

Examples of low frequency (and infra sound) with high levels in our homes and in our everyday life are given below

Extraction fans in our kitchen, extraction fan in toilets, refrigerators, indoor heat pump, indoor boiler, computer, music playing on radio or television,

Examples of very low level low frequency sound that is inaudible: water flowing in our heating systems, water flowing in our taps, (low frequency sound generated footsteps on a wooden or concrete floor or by climbing stairs- the higher frequencies generated by this activity is audible, while the lower frequencies are in-audible).

Examples of low frequencies sound in the outside environment: road traffic from a motorway at 2-5 km (the M6 motorway which generates components of low frequency which is audible in the Yellow River area. The motorway a 'line source' of noise and will attenuate at a rate of 3db per doubling of distance, unlike a point source which attenuates at 6db per doubling of distance). Wind in the trees (a wind speed of 9m/s is equivalent to an air blast of 133dB, the difference being that the air-blast is sudden and will rattle objects), rivers and streams. The waves crashing on to our shores are a good example of low frequency-at 200m the levels from low frequency sound generated by wave action are above the low frequency levels generated by a wind turbine at 200m. Many people find the crashing of waves soothing and relaxing.

An Australian Senate Committee, looking into alleged health effects from wind turbines, concluded the following in November 2012:

'The committee concludes that, while it is possible that the human body may detect infrasound in several way, there is no evidence to suggest that inaudible infrasound (either from wind turbines or other sources) is creating health problems. In contrast, there is an established literature confirming the existence of psychogenic, or nocebo, effects in general, and at least one study suggesting they may be responsible for symptoms in some wind turbine cases'.

Peter Seligman on Infrasound

Professor Peter Seligman is a biomedical and acoustic engineer who directed the development of seven generations of sound processor for the Cochlear Implant. In personal communication which was a revision of his submission to the Senate inquiry into Social and economic impact on rural wind farms (NO. 353) he stated that:

'The hearing and vestibular systems are subjected to very high levels of body generated noise. these include, walking, breathing, heartbeat, chewing and head movement. Body noises generated in this way were a problem in the Cochlear Ltd project to develop a fully implantable cochlear implant. In this case the microphone was implanted subcutaneously behind the ear. The level of infrasound picked up from the body by the microphone was a major problem and far exceeded all sound from external sources. In fact turning the head or chewing were some ten times louder than external sounds we are trying to pick up'.

So it is being held that levels that cannot be heard are problematic. In contrast, everybody is subjected to far higher internally self-generated natural infrasound levels which clearly, are not a problem.

Simon Chapman on Wind farms and health

Attached is a Summary of conclusions reached in 17 reviews of the research literature on wind farms and health as Compiled by Prof Simon Chapman, School of Public Health and Therasa Simonetti, Sydney University Medical School.

The South Australia EPA

The Environment Protection Authority (EPA) carried out a study on low frequency noise at two locations near wind farms and other environments, issued May 2013.

Some of the findings of the study were;

'Overall, the study demonstrates that low frequency noise near the wind farms in the study are no greater than levels in urban areas or at comparable rural residences away from wind farms.'

'The levels of low frequency noise at the two wind farm locations were low in comparison to the urban areas, but were not noticeable higher than the two other rural areas.'

There is no evidence that animals are affected by noise from wind turbines (including horses). In fact many animals live quite close to busy roadways with much higher levels of noise (including low frequency) than from wind farms without any apparent effects.

Response to other Observations

The methodology used in the prediction of wind turbine noise was according to the 'Institute of Acoustics' *A good practice guide to the application of ETSU-R-97 for the Assessment and rating of wind turbines. The following conservatism was used in the prediction of the turbine wind noise*

- down-wind propagation is modelled for all turbines so predicted values are over-estimated, upwind and cross wind. In practice dwellings in this development cannot be down-wind of all turbines simultaneously.

- although in reality the ground is predominately porous it has been modelled as mixed (50% porus) corresponding to a ground absorption coefficient of 0.5

- trees and other topography features have not been considered

- all dwellings were modelled at a receptor height of 4m. Using a 4m receptor height results in a more conservative result than using a 1.5m receptor height with the difference being more than 1dBA at 500m.

- A value of 1dB was added to the SPL of the turbines for uncertainty of measurement

The propagation of sound from the wind turbines is 'spherical propagation'. The wind turbine as a noise source could not be assumed to be a 'line source' and the layout of the turbines could not be described as 'in rows'.

All noise predictions for the wind turbines are made in the descriptor L90 dBA (The use of Leq is a typing error).

The noise survey was continuous over the monitoring period from 12th to 20th May 2014, however the data for day time periods Monday to Friday from 7am to 6pm was excluded from analysis, data from 7am to 1pm on Saturday was also excluded. On my visits to the site I did not hear any noise at any of the monitoring locations from harvesting.

Wind shear – wind shear was calculated for each 10 minute period over the entire monitoring period from 12th to 30th May 2014. The wind shear was calculated from two different height anemometers on the wind mast and applied to the wind speed data to derive the 10 minute wind speed at 110 metre hub height. The hub height wind speed was then standardised back to 10m height wind speed as recommended in Institute of Acoustics' *A good practice guide to the application of ETSU-R-97 for the Assessment and rating of wind turbines.*

There are people who object to wind farm for a variety of reasons sometime based on objectivity and there are other people base there objections on laboratory based research /experiments who appear to have little knowledge of the low frequency sounds that are encountered in everyday living in ones homes.

2.4.3 Shadow Flicker

Response: Please refer to pages 32 -34 and 48 – 50 for responses to shadow flicker issues.

2.4.4 Flora & Fauna

Issues raised relating to terrestrial ecology are as follows:

Local Bird Species Assessment

The submission states:

'A more accurate list of bird species recorded and confirmed in the Croghan/Derrygreenagh/Corbetstown area has been compiled below and directly

***challenges the EIS on the ground that a large number of bird species have been deliberately omitted from the statement to undermine the biodiversity and conservation concerns*.'**

A Table of 21 species is given in Table 1.1 of submission, which is apparently based on a 2011 study of the Croghan area by John Feehan.

Response: Notwithstanding that the two study areas are different, the EIS (section 5.4 Birds) study for the Yellow River wind farm recorded all of these species, other than Mute Swan, Pochard, Coot and Ringed Plover (which all occur at the Roadstone quarry pond and not within the wind farm site).

Further, the EIS recorded additional species of conservation importance that were not listed in the Feehan study – namely Stock Dove, Sand Martin, Swallow, Wheatear, Starling and Linnet.

It is considered that the EIS bird study established an accurate baseline evaluation of the bird species of the area using standard survey methods and that the statement made in the submission '*that a large number of bird species have been deliberately omitted from the statement to undermine the biodiversity and conservation concerns'* is totally out of order.

Direct Impact on Local Bird Population

The submission states:

'Turbines T1 to T11 are located on confirmed feeding and roosting grounds for Whooper Swans and constitute a direct threat to the species in the area.'

Response: The occurrence of Whooper Swan in the area and potential threats to the swans by the wind farm is discussed in detail in the EIS and the NIS Screening report.

It is noted that swans were recorded feeding and roosting only in the vicinity of T1 to T7 and not in the area of T8 to T11 as indicated in the submission.

Direct Impact on Mammals

Otter

The submission states:

The development '*constitutes a direct ecological threat to the Otter population on the ground that the pollution arising from the large quantity of concrete/cement mix necessary for the base/foundation of each and every single of the afore identified proposed turbines will inevitably and directly impact water quality and the local aquatic and ecological balance of the area by way of sipping through the soils and into the waterbodies*.'

Response: The EIS highlights the conservation importance of otter (section 5.4.3 Evaluation of Conservation Importance of Study Area). A thorough aquatic assessment informed the design of the wind farm layout to ensure that all turbines are located at distances from the various watercourses so that there would be no direct impacts on the rivers, fish and associated aquatic life. Strict measures will be implemented to ensure that potential pollutants from construction sites do not enter any of the watercourses. Taking into account the sensitive layout and the proposed mitigation measures for aquatic ecology, it can be concluded with certainty that the local otter population will not be affected, directly or indirectly, by the proposed wind farm.

Bats

The submission includes a section with various information on bats. It concludes

'*Wind Turbines are proven to harm and kill bats, and therefore under Irish and European laws they should not be sited where bats are known to live, roost or forage for food. The proposed lands for the Yellow River Wind Farm Project is one of these sites where bats live, roost and forage for food therefore it should not be given planning permission.*'

Response: A thorough assessment of the bat fauna of the area was carried out for the EIS (section 5.3.5 Bats). In the impact assessment section, it is concluded

'*Nevertheless, risks to bats from wind turbines have to be acknowledged and it is possible that some bat mortality may occur due to the planned development.*

Mitigation measures are therefore recommended to reduce the likelihood of adverse impacts on local bat populations.'

It is noted that all mitigation measures recommended by the bat specialist are accepted by the developer, which will minimise any adverse impact on the local bat population.

Mammal species of conservation concern which have been omitted or undermined in the EIS

The submission notes that the Irish Stoat, Mink and Pine Marten have been sighted by local residents on numerous occasions throughout the season but is not mentioned in the EIS.

Response: The EIS study was focused on the larger mammals, especially badgers and otters, which build permanent, large dwellings which could be affected by construction works. It is acknowledged that the three above-mentioned species could occur in the study area.

The Irish Stoat is indeed likely to occur in the area as it is widespread throughout the country (Hayden & Harrington – Exploring Irish Mammals). However, it is an elusive species and chance observations are usually the means by which stoats are seen. As stoats are found mainly in woodland, hedgerows and dry stone walls, the local population is unlikely to be affected by the proposed development.

The Mink is an introduced species that is not of any conservation importance. It is considered as a pest species as it causes adverse impacts on breeding wetland bird species.

The distribution of the Pine Marten has spread in recent years and it may now be found in many parts of Ireland (though mainly in western Ireland). Its main habitat is woodland and scrub. As the proposed wind farm development will have minimal effects on local woodlands, it is considered that the local pine marten population will not be affected.

The submission also refers to a local population of Fallow Deer. This is the most widespread deer species in Ireland. While protected, it is designated as a quarry

species and may be hunted. During the day, deer mostly keep to the cover of woodlands and graze in marginal areas and fields in darkness. The proposed wind farm development is not expected to have any adverse impacts on the local deer population.

TERRI B. CAREY & GRAINNE DEMPSEY

While these are separate submissions, the ecology objections appear identical. The following responses therefore apply to both.

Objection One on Ecology Grounds – Insufficient Habitat Survey

'In the absence of full habitat survey coverage of the site there can be no confidence in the conclusions reached that no annex listed habitat or red listed species occur within the development footprint, buffer zone or are likely to be impacted through residual shifts in hydrology as a result of turbine excavation and related ancillary works'.

Response: As stated in the methods section of EIS site surveys for habitats were made in the appropriate season and followed standard methods. Taking into account that the majority of the development land is active agricultural land (with no annexed habitats), the level of survey undertaken is considered fully acceptable to establish baseline conditions.

The survey identified the raised bog at Derryiron as being of importance (despite active turbary) and this was avoided in the layout of the wind farm.

It is considered that there is no basis to suggest that the habitat survey was not adequate or incomplete.

Objection Two on Ecology Grounds – Insufficient Survey and Assessment for Impacts on Birds

The submission makes a range of points critical of the bird surveys carried out for the EIS. These mainly refer to insufficient time given to survey for target species. .

Response:

Breeding birds

As noted in the methods section of the EIS, surveys for breeding birds were carried out in the appropriate season, with visits made over 3 separate years. Due to the layout of the development over a large area of mainly agricultural lands, the approach of using a focused walk-over survey at each turbine location is considered the most suitable method of survey to provide baseline data for the affected areas.

As there are no designated sites for birds in the vicinity, and as desk review indicated that no target species (such as breeding Hen Harrier, Merlin etc) were known or expected from the study area, the use of the vantage point methodology during summer was not considered a requirement.

Wintering birds

It is noted that prior to the winter 2012/13 survey, there was no previous information (such as from the I-WeBS monitoring programme or NPWS personnel) that wintering Whooper Swans frequented the Derryarkin area. When it became obvious that the Derryarkin sector of the development site was being used by significant numbers of Whooper Swans weekly site visits were conducted between mid January and early April 2013. As the early part of the winter was missed, the recommended time allocation of 36 hours from a vantage point location was not achieved. However, with a total of 28 hrs and 40 minutes of systematic vantage point observations carried out, the size of the swan population and patterns of movements could be established.

Owing to the absence of observations in the early part of the 2012/13 winter, a second winter of observations between October 2013 and March 2014 has now been carried out and is presented to the Board as part of the submission. This second year of surveys supports the findings from the 2012/13 winter survey.

Objection Three on Ecology Grounds – Impacts on a Nationally Important Whooper Swan and Golden Plover Population

Response: The submission indicates that the Derryarkin area supports nationally important populations of Whooper Swan and Golden Plover.

As clearly indicated in the EIS, the relevant thresholds for national importance were not reached for either of the species.

- For Whooper Swan, the threshold is 130, with highest number recorded on site being 82 (and 108 in winter 2013/14)

- For Golden Plover, the threshold is 1,700, with highest number recorded on site being 1,200.

(see Boland & Crowe 2012, *Irish Wetland Bird Survey: Waterbird Status and Distribution 2001/02 – 2008/09* for details of national threshold levels for wetland birds)

Also, in the submission it is noted '*The proposed Yellow River Wind Farm is located on a traditional foraging and roosting site supporting a nationally important Whooper Swan population*'

This is clearly an incorrect statement as there is no history of swan usage in this area of County Offaly (see attached Whooper Swan Report for winter 2013/14 for reference material). It has to be assumed that the swan population is of relatively recent origin and seems to be availing of suitable grassland feeding habitat in proximity to the recent development of cutaway bog and quarries which provide for roost sites.

Objection Four on Ecology Grounds – Impacts on Bats

The submission suggests that the bat evaluation survey as carried out was inadequate.

Response: The bat survey was carried out by an experienced surveyor according to standard methods.

It is noted that all mitigation measures recommended by the bat specialist are accepted by the developer, which will minimise any adverse impact on the local bat population.

2.4.5 Visual Impacts (Height, Density, Proximity)

Response: Please refer to pages 50 – 67 of this document for the response to Landscape and Visual comments.

2.4.6 Property Value

Section 12.10 of the YRWF EIS states that "whilst any new developments can lead to a temporary fluctuation in house prices", the five major studies reviewed in the EIS conclude "that there is no statistical evidence of a drop in property prices nor do they support the case that proximity to wind farms result in a decline in property values"

Since Autumn 2013, when the YRWF EIS was submitted, there has been one London School of Economics (LSE) Blog which received some UK & Irish newspaper commentary, a relevant determination by the UK Advertising Standards Association, a new study done by the University of Connecticut and Lawrence Berkeley National Laboratory (LBNL) and 2013 property and agricultural land values for Co.Offaly.

LSE Blog of November 2013 by Stephen Gibbons "Gone with the wind: valuing the local impacts of wind turbines through house prices" - Preliminary Draft, following an interview with the author this blog "paper" received newspaper publicity in UK & Ireland. The Blog is 30 pages long. It lays out a methodology and statistical approach to the subject matter. Pages 28 through 30 of "the paper" has estimated the effects of visible wind farm turbines on housing prices in England and Wales. Prices are estimated to reduce, for an average wind farm by "5-6% for housing within 2km., falling to 3% within 4km, to 1% or less by 14km". For larger wind farms by, "3% at 8-14 km and by up to 12% within 2km". There is no evidence of the standard academic requirement of peer reviewed research in this blog/paper, neither has there been any response or comment from the UK Government or Renewables UK.

Anti-wind campaigners were banned from distributing leaflets stating "that home values will fall" by the British advertising watchdog ASA. The ASA ruled that it was misleading to state that house prices would fall when a local wind farm was built. It also noted that the current guidance of the Royal Institute of Chartered Surveyors gives no definitive answer on the question of whether or not wind farms effect property prices.

Relationship between Wind Turbines and Residential Property Valuations in Massachusetts is a new joint report by University of Connecticut and LBNL. It builds on the LBNL report referenced in the YRWF EIS Section 12.10.2 which found "no statistical evidence" of effects on home sales near wind turbines in 27 counties in nine US states. For this new work the researchers zeroed in on Massachusetts, a state with a much greater population density of 416 persons per square mile .The study concludes; "The results of this study do not support the claim that wind turbines affect nearby house prices - no net effects due to the arrival of turbines - weak evidence suggests that the announcement of the wind facilities had an adverse impact on home prices, but these effects were no longer apparent after turbine construction and eventual operation commenced - no unique impact on the rate of home sales near wind turbines".

Residential Property/Farmland Sale Statistics for 2013; CSO and Daft.ie report continuing house price falls in Co. Offaly for 2013. By far the greatest impact on residential property values in Co. Offaly has been the post 2007 recession with falls of 49% (CSO) to 61% (Daft) to date. Whilst farmland suffered an initial greater fall 70% (Farmers Journal 2013 Price Review) prices have recovered by up to 40% since 2009. Indeed the perception is that wind farming has enhanced the land values in Offaly.

In conclusion we see no new statistical evidence to support the case that proximity to wind farms results in a decline in property values.

2.4.7 Roads & Traffic

Response: Please refer to pages 4 – 16 of this document for responses to road and traffic issues.

2.4.8 Flooding, Natural Drainage Patterns and Placement of Concrete Turbine Bases

Concerns regarding flooding and disruption of natural drainage patterns were raised in the following submissions:

Gerard Dunne & Olive Dunne; Gerard M. Reidy; Grainne Dempsey; John & Mary Darby; Una Quinn; Mr. Noel & Paula Bennett; Stephanie Heffernan; Paschal Cooney; Sheila O'Brien & Sheila O'Meara; Paddy & Kathleen Mooney; Mary

Smullen; Martin & Adele Kierans; Laura & Patrick Lenihan; Thomas Hutchinson; and Derek Owens.

Response:

An assessment regarding potential for flooding from the proposed development is contained in the EIS at Section 7.3.5. Access roads and turbine bases will be placed at existing ground level, therefore there is limited potential for reducing flood plain volume, and increasing flood risk potential.

It is to be noted that no turbines are located within predicted 1 in 100 year flood areas. Please refer to Environmental Impact Assessment Figures 7.7, 7.8 and 7.9 for an illustration of these areas.

Where concrete is placed in the ground, it will replace the existing soils and subsoils material, which has limited porosity. For example, each turbine base is *circa* 18m diameter, and will have approximately 2m of placed reinforced concrete, this is a volume of 420m^3 per base. Not all of the proposed turbines are located near the rivers or their associated floodplains. 12 no. of the bases are along the Yellow River. Using these 12 no. bases, this gives a total placed volume of 5,040m^3. The average soil porosity is expected to be approximately 5% for alluvium deposits[6]. This means that the below ground void space filled by the placed concrete for these 12 no. turbines 252m^3. This does not account for the fill that will be backfilled around the turbine bases which will have a higher porosity than the natural material. The approximate length of the development along the Yellow river is spread over ~10km. Assuming that the river is on average approximately 7m wide along this length, the estimated maximum increase in surface water level as a result of placement of the concrete is ~3.6mm. Given that there will be additional storage volume created by the development, in the way of swales during the operational phase, this volume and associated increase in flood depth is not considered significant.

In respect of potential for disruption of groundwater drainage patterns, the bases are separated by significant distances and therefore do not have potential to act as a continuous barrier to groundwater flow in the shallow soils/subsoil deposits. For example the 12 turbines along the Yellow River will have a combined width of 216m over 10,000m of river. In the absence of a significant continuous barrier to flow,

[6] Reference "Hydrogeology Principles and Practices", Author Kevin Hiscock

groundwater will just simply flow [locally] around the placed turbine bases and continue on its natural pathway towards the local streams and river.

In respect of disruption of surface water drainage patterns, it is not the intention to alter or re-route any watercourse during construction of the development. All existing drainage systems will be maintained. Where river crossings are proposed these will be completed in-line with IFI Guidance, and under Section 50 licence, as required.

When the concrete is placed in the shuttering it will take less than one day to cure. During this time it will be in a dry excavation and not in contact with surface water or groundwater. Once the concrete is cured and in solid state it has very limited potential to affect groundwater or surface water quality, much the same as a foundation for a house or a slatted tank. Once the base is complete the excavation will be backfilled and the local groundwater and surface water will then revert to its natural state. The main potential impacts on water quality are during the construction stage and these will be managed using the controls outlined in the EIS in Table 7.11.

In Mr. Hutchinson's submission in respect of flooding it is suggested that the 1 in 100 year design criterion is not representative of recent weather patterns. The 1 in 100 year design criteria is conservative for a development of this nature, and exceeds the standard criterion as defined in CIRIA (Construction Industry Research and Information Association) guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006), which suggests a design criterion of 1 in 10 years (pg 133).

Mr. Noel & Paula Bennett refer to the potential for a rise in groundwater levels resulting from deforestation arising from the proposed development. Generally, the low-lying land locally is poorly drained with an existing high water table. Runoff rates are also likely to be high due to the prevailing soils conditions across the low-lying areas of the site. While the forestry in itself may cause some interception of rainfall, the areas where forestry exists tend to be heavily drained with mound drains and deep perimeter collector drainage from the forestry compartments. This drainage system is not natural to the area and has been imposed by the forestry development. When the trees are cut the drainage system will remain in place and will continue to drain the lands as before. Any potential effects on drainage patterns would be local to the forestry areas, and will not cause any significant widespread rise in the current water table level.

It is proposed to replant the felled areas with slow growing indigenous species including willow, alder, hawthorn and birch. These species will encourage biodiversity, the evapotranspiration rates for these species will be equal if not greater than the felled conifer trees thus mitigating any temporary local.rise to the water table.

2.4.9 Potential Impacts on Water Table, Water Wells and Water Supplies

Concerns regarding potential impacts on the water table, water wells and water supplies were raised in the following submissions:

Thomas Hutchinson; Christine Maguire & Residents of Danville Lane; Irene Brazil; and Gerry Hickey & Others.

Response:

Several local shallow wells are identified in these submissions (The Pope's Well, Finneenashark Holy Well, Fooran Holy Well, St Brigid's Well, and concerns are raised about local water supplies and the Toberdaly water supply source.

These wells are up-gradient, across gradient or remote from the proposed development. As a result no pathway [for potential impact] or connection to these wells can be defined. HES have assessed the groundwater resources of the area in Section 7.3.14 of the EIS, and we have concluded that the development cannot have any significant impact on local wells, the local water table, or local water quality. For the same reasons as outlined above (Section 3 of this submission) it is reasonable to conclude that there is negligible potential for impact on local private wells.

The Pope's well is identified in Christine Maguire's submission. This is reported to be within 100-150m of Turbine T13. At T13 groundwater will flow to the northwest towards stream SC-1. No well was noted to exist between T13 and stream SC-1 during the site walkover survey. In addition, the construction phase for the turbine base will be of short duration, so any potential to affects groundwater volumes is negligible, and potential for impacts on groundwater quality are negligible as discussed above in Section 7.8 of this document.

The submission by Thomas Hutchinson also implies that an assessment of impacts on the water table has not been completed within the EIS. A comprehensive assessment on all aspects of the development that have potential to impact on the water table and hydrogeology of the area was included in the EIS in Sections 7.3.14 and within Table 7.11.

2.4.10 Potential Impacts from Proposed Water Crossings

Concerns regarding river crossing and potential impacts on surface water quality an fisheries were raised in the following submissions:

Inland Fisheries Ireland; John & Mary Darby; Stephen Carroll; and Michael Neary.

Assessment of the potential impacts of proposed river crossings on water quality is provided within the EIS at Table 7.11 - Item 8.

The EIS states the following:

"The proposed stream crossings over the Yellow River will be clear spanning and the existing banks will remain undisturbed. No in-stream works are proposed and therefore there will be no impact on the Yellow River at the proposed crossing locations.

Any guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland will be incorporated into the design of the proposed crossings.

As a further precaution near stream construction work will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites", that is, May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses.

During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas.

All river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent."

The issues raised in the IFI letter are dealt with above and as such are already included in the EIS. Stream and river crossings are common on wind farm and motorway developments. The procedure for stream and river crossings are proposed in a manner that comply with IFI requirements, and will have negligible short or long term potential for impacts on water quality within the local sensitive watercourses.

2.4.11 Lack of Adequate Consultation

Concerns regarding lack of public consultation were raised in several third party submissions.

Response:

Section 1.11 in the EIS outlines the consultation that took place with the public and Statutory Consultees throughout the planning process. A public consultation was held in Rhode Community Centre between 12pm and 7.30pm on December 10th 2012. Notification of this event was given in the local press (Topic Newspapers, December 6th 2012and in two parish newsletters (December 2nd 2012, with reminder in December 9th 2012). The wording of the notifications printed in both the local press and parish newsletters read:

"*Green Wind Energy Ltd, a wholly Irish owned and based Renewable Energy Company, is holding a Public Consultation and Exhibition of their Yellow River Wind Farm proposal in the Rhode Community Centre from 12 noon to 7.30 pm on Monday 10th December 2012. All interested persons are invited to attend*".

The reminder published in the Mass newsletter of December 9th 2012 read:

"*<u>REMINDER</u>: - The Public Consultation and Exhibition of the Yellow River Wind Farm proposal is being held from 12 noon to 7.30 pm tomorrow (Monday) in the Rhode Community Centre"*.

Apart from the open public consultation day referred to above, on an on-going basis, on request, meetings were held by GWE on an individual basis with interested parties, eg, an informal meeting was held on June 13th, 2013, in Ballyburly, with several concerned locals. Representatives of Green Wind Energy and Jennings O'Donovan & Partners Ltd gave details of the project, showed the up-to-date layout proposal and clarified the Applicants processes in relation to distance from dwellings; noise; shadow flicker and access.

2.4.12 Communications, Broadband, WiFi

Consultations with the major telecommunication providers have indicated that they have no issues with the proposed turbine locations. The turnkey construction contract will include the requirement to undertake a pre-construction interference survey of the site for TV / broadband / telecoms, when the as built dimensions and geography of the turbines has been defined. Furthermore the standard protocol agreement was signed between 2RN and the Applicant to ensure mitigation measures are implemented should any interference arise during operational phase of the wind farm.

2.4.13 Croghan Hill

On the final page of the submission from Gerry Hickey et al it is asserted that the proposed development would adversely impact on Croghan Hill, which should be considered as a national monument, due to the visual impact.

It should be noted that Croghan Hill is not a national monument. The hill itself is located outside of the defined receiving environment of the proposed turbines (over 2km to the south of T1-10). Due to the distance of the turbines from the hill, there is no predicted operational impact on the recorded church, graveyard and mound located on the summit of Croghan Hill. The distance of the turbines means that the public understanding of the sites will not be impacted upon. In addition the proposed development will not impact on any theorised alignments between the hill and landmarks within the wider environment (such as the Hill of Uisneach in Co. Westmeath).

On page 10 of Joanne Addie's submission, first paragraph, an assertion is made that Croghan Hill should be considered to be a UNESCO world heritage site and a buffer of 20km imposed against development in order to prepare for this designation.

It should be noted that Croghan Hill is not a UNESCO world heritage site and does not appear on the list of candidate sites currently being considered for submission to UNESCO. A development buffer under this designation can only be established once a site has been classed as a world heritage site by UNESCO.

2.4.14 Slí Mór

In the submission by Gerard M. Reidy the objector notes in point 9 that much of the area (of development) lies along the path of the Sli Mor, which deserves to be preserved as close as possible to its original state.

No recorded sites that may represent the route are located within the receiving environment of the development area. In addition, the potential route way (as illustrated in Geissel's 2006 book on the route) is located over 1km to the south of the proposed development. Furthermore, Geissel states on pg 49 of the publication the following:

"No impressive landscape features mark the course of the old Slí to Rhode (from Monasteries to Rhode), nor does the modern road look like it followed the ancient track. We were able to conclude in rather general terms that the Via Magna ran parallel to and south of the modern road. There is reasonably good high ground there, with a prehistoric mound and a medieval castle en route and an old graveyard with church ruins, probably of early Christian origin, nearby. No obvious landscape element would have forced the route into a bottleneck" (Geissel 2006, 49).

2.4.15 Landscape & Visual

General Themes

Intrusion on the landscape/ effects on landscape character/ Croghan Hill

A number of the submissions refer to the turbines as an intrusion or blight on this landscape and then go on to expound the virtues of this area particularly the importance of Croghan Hill. This is entirely understandable as local landscapes are important to local people who often have longstanding associations with it and know it intimately. This is the same across the country. Therefore, MosArt must try to identify the important aspects of the landscape in question, what is valued about it and how sensitive it is to the changes proposed. This requires an approach that is consistent across the country and must apply value in terms of the national, regional and local context. In this regard the landscape of the study area is generally highly modified and has been used for primary production, energy production, industry and transport infrastructure. It has broad landscape patterns and is a productive rural landscape. MosArt feel that this area is appropriately zoned for large scale wind energy developments in the Offaly Wind Energy Strategy. Furthermore, it is considered that the 2km buffer around Croghan Hill that was used in the formulation of the wind energy strategy provides due reverence to this important landscape feature by ensuring that turbines will not visually dominate it or interrupt its profile.

Visually Dominant/Excessive scale

Many of the objections refer to the dominating scale of the turbines and compare them to other height comparators such as the spire in Dublin, skyscrapers or in a more local context to churches and houses. There is no question that the proposed turbines are tall structures, however, in visual impact assessment it is important to consider a structure in its proposed context and not to be overly influenced by numerical dimensions. In this respect the turbines are slender structures that are in no way comparable to bulky constructions such as high rise buildings. Furthermore, perception of scale is aided by scale comparators in the immediate context of the turbine. If there were intricate field patterns, dwellings and church steeples beneath turbines of this dimension, the turbines would undoubtedly dominate them in terms of scale. This is not the case for this predominantly flat landscape with its broad land use patterns. The reverse is also true. If the Dublin spire was placed into this landscape context, except for it shiny finish it would have a visual presence not much greater than a meteorological mast.

Perceived height of turbines also reduces exponentially with increasing distance because a doubling of viewing distance equates to a halving of perceived height (see figure 1 below). This is reflected in the conclusion of the EIS chapter, which accepts

that the highest level of effects are likely to be experienced within close proximity to turbines (<2km) thereafter the effects fall away quickly due to terrestrial screening and perceived scale reduction. The minimum 500m setback from dwellings and the sinuous linear layout of this development ensures that there are seldom more than a couple of turbines that might be considered to have a dominant visual presence within a particular view. There are also very few locations that afford a view of the entire scheme and where this does occur from the likes of Croghan Hill, the furthest turbines are distant background features.

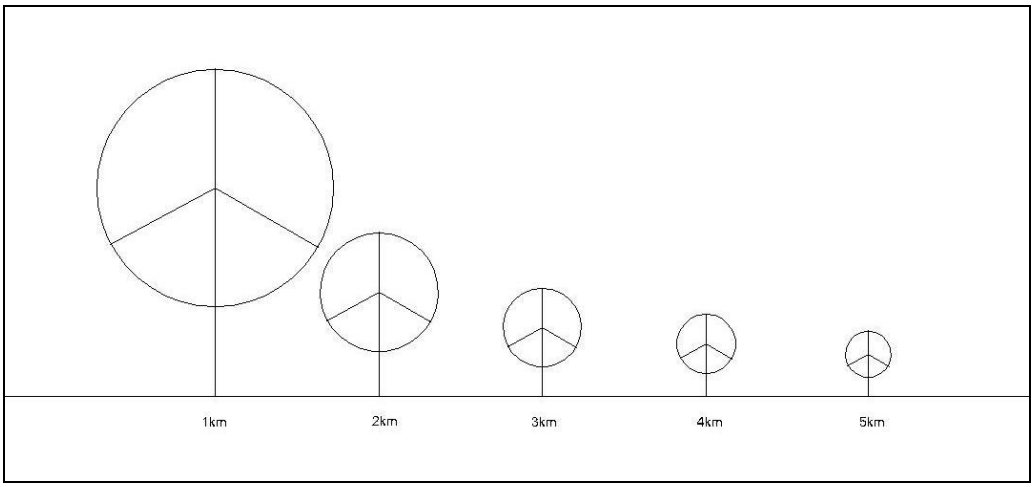


Figure 1 – Exponential perceived scale change in relation to viewing distance

It is accepted that the moving blades of turbines will draw the eye to a greater extent than static objects. However, these factors are accounted for in the EIS submitted with the planning application because this aspect is considered as part of the visual presence judgement, which in turn informs the magnitude of visual impact.

Subjective nature of the Landscape and Visual Assessment

A number of the submissions suggest that landscape and visual impacts are subjective and underestimated. With regard to visual receptor sensitivity judgements and impact magnitude judgements, which are the key component of the overall visual impact assessment, MosArt employs a semi-quantitative and transparent methodology. This is clearly explained in the EIS and must be consistent from county to county and across all receptor types. Landscape and Visual Assessment will always be more subjective than the more scientific EIA disciplines. It is with this in mind that MosArt have developed a coherent impact classification system that is consistent with the

LVIA Guidelines (2013) and allows third parties to trace the sequence of judgements, which make up the summary impact.

It is accepted that the LVIA methodology may appear complex to those unfamiliar with it. In truth it is complex because it must deal with both landscape and visual impacts, which could be prepared as separate chapters in the EIS. It is also necessary in order to counter criticism that judgements are purely subjective and seemingly 'plucked out of nowhere'. To this end there are numerous transparent steps in the process so that the reviewer can follow the assessor's logic and decision making process. Finally, the methodology framework has been established over the last 2 decades by practitioners and the Landscape Institute and is set out in the third edition of the GLVIA (2013), which has been closely followed for this project.

The project LVIA does not purport to be definitive, but it is undertaken by qualified and affiliated landscape professionals with a vast amount of experience in the assessment of wind farms in Ireland. The assessment was undertaken in an independent and transparent manner that encourages critique from decision makers, stakeholders and the public alike. It also provides the structure and terminology within which counter arguments can be framed.

2.4.16 Community Benefit

The development of wind farms in rural areas provides important economic gains for local communities. Long term income flow for landowners, which can be substantial and dispersed in the case of developments of scale, enhances the overall economic base of the communities in which they are located. Local Authority income benefits from the expansion of the rate base, thus providing additional resources for the provision of essential public services to the wider community. The investment and construction stage directly creates significant economic and business activity in the locations concerned, including substantial employment.

Notwithstanding the substance of these factors, it is essential that communities who facilitate the development of wind farms in their midst are convinced that the companies involved recognise and respect the role that the local community plays in the long term success of the industry. For this reason it is vital that developers and operators are committed to active participation with them and that they strive to

contribute in a wider way to community life, on the basis of goodwill and interdependency.

Green Wind Energy is committed to such an approach and will create a long-term

Community Benefit Fund should An Bord Pleanala grant permission for the Yellow River Wind Farm project. The company will engage widely with the local community and with Offaly County Council to develop a coherent policy and activation strategy for the implementation and ongoing management of a local community benefits programme. Consistent with the concept outlined in paragraph two above, the overall objective will be to develop a scheme that optimises the benefits to the community in which the Yellow River Wind Farm will operate. It is crucial that the programme is centred on the local community in order to enhance engagement between the wind farm operators and local people and to build a relationship based on trust and cooperation over the long-term.

For this reason, Green Wind Energy is convinced that the core of the structure for the disbursement of goodwill payments and decisions on the various activities to be funded should be based on the Wind Farm operator/local community axis. The local community must play the key role in the decisions on the administration of funds, and must be seen to do so.

In terms of scale of funding Green wind Energy confirms its commitment to support the Community Benefit Fund to a value of €1,000 /MW installed capacity per annum, index-linked for the lifetime of the YRWF project.

2.5 RESPONSE TO THIRD PARTIES – INDIVIDUAL ISSUES

2.5.1 Relocation of T31

Laurence and Thomas Coyne (father and son) are owners of the two separate parcels of land on which T32 and T31 are proposed and GWE has formal Options for Lease with both of them. From the outset, the scheme design incorporated separate construction accesses and cabling connection for both turbines (from Carrick Lane) and the Options and application for planning permission still provide for this.

During our pre-planning discussions with the Roads Department of Offaly County Council GWE were asked to minimise where feasible interface with the local road network and particularly the necessity for public road widening and public road opening for the purposes laying cables. GWE reviewed the then design accordingly.

Mr Michael Conlon, who lives in the house identified as H111 in the application, owns the lands to the west, north and east of the T31 lands. In the weeks prior to finalising the planning application, GWE approached and discussed with Mr Conlon the possibility of acquiring an easement across his lands for construction purposes. This easement would have resulted in reducing the construction interface with Carrick Lane by 300m.

The discussions with Mr Conlon continued over a number of meetings, all of which were very cordial, at the last of which in early November 2013 it was agreed to defer further discussion on the matter until the following April. From those meetings GWE were of the view that a formal legal Easement Agreement, drafts of which had been provided to him, would be forthcoming. GWE accordingly finalised the location of T31 based on this anticipation and included the easement as an additional construction option.

GWE were surprised when Mr Conlon's objection to the development was received from An Bord and again contacted Mr Conlon. A further number of meetings, again cordial, were held but in recent days, following these meetings Mr Conlon stated that he did not wish to enter into the agreement at this time. GWE fully respect that decision and further informed him that we would formally request An Bord to allow the removal of his lands, including the Easement, from the site (See attached the separate letter from the applicant in this regard).

Removing Mr Conlon's lands from the application has no implications for access to the turbine sites but does require that the T31 would be again sited as per prior to endeavouring to create the direct Easement connection from T32 for the purposes outlined above. The reason for this re-siting is in order to comply with the 2R Guideline in respect of the lands to the north of the turbine site. It should be noted that approval to this amendment is being requested even though those lands cannot be used for Wind Energy purposes because of the width of the lands and the adjoining Mongagh River. The re-siting requires moving the turbine 56m in a West/North West direction and the revised location is shown on Drawing Number 4909-PL-S2-116

attached. Mr Conlon's lands which now need to be excluded from the landholding are outlined in Drawing Number 4909-PL-116 Rev A in Appendix K.

2.5.2 Michael & Muriel Murphy's Right of Way

Response: Mr and Mrs Murphy through their solicitor, brought to our attention in January 2014 that lands, including the lands on which Mr and Mrs Murphy's house is built, were included in the landholding map for Yellow River Wind Farm that was submitted with the planning application. The applicant and the consultant, Jennings O'Donovan & Partners Ltd, having investigated the matter, responded without delay, apologising for the mapping error. (See attached letters in Appendix I). This error has been listed in the Schedule of Errors sheet (Appendix C) and the lands as detailed in Figure 4909-PL-111 Rev A (Appendix I). The applicant requests An Bord to accept this revision.

In relation to the concerns of Mr and Mrs Murphy regarding the roadway outside their house, the applicant confirms that they will only be using public road and lands owned by one of their participating landowners for the purposes of access between the Greenhills Road and the Yellow River.

2.5.3 Wind Take

1. Pat Murphy, Killowen; T16 & 17 are in excess of 2R (113m) from Mr. Murphy's lands thus are in compliance with industry practise and DoEHLG Wind Farm Planning Guidelines. The developer is unaware of any public plans or design for a wind farm on this isolated plot of land. The "pass way" that Mr Murphy refers to is a shared roadway through a participating farmers property, servicing Mr Murphy's lands and two participating landowners. Resurfacing & tree trimming will be required to facilitate access. The developer will ensure there is no access on Mr. Murphy's property and provide an adequate water supply to all farmers on this lane during construction.

2. Tony Bracken: T14 & 15 are in excess of 2R (113m) from Mr. Bracken's lands thus are in compliance with current industry practises & DoEHLG Wind Farm Planning Guidelines. The developer is unaware of any public plans or designs for an export wind farm project on these isolated lands. The concept of developing large

wind farms for electricity export has no regulatory, planning or contractual basis, indeed recent Government announcements state that such timelines are premature.

3. Pat Lowry: T15 is in excess of 2R (113m) from Mr. Lowry's lands thus is in compliance with current industry practises & DoEHLG Wind Farm Planning Guidelines. The developer is unaware of any public plans or design for a wind farm on these lands.

4. William Mulligan, Toberdaly: T11 & 12 are in excess of 2R (113m) from Mr. Mulligan's lands thus are in compliance with current industry practises & DoEHLG Wind Farm Planning Guidelines. The developer is unaware of any public plans or design for a wind farm on these lands.

Please note that Objections 2 & 3 above from Anthony Bracken & Pat Lowry have recently been withdrawn.

2.5.4 Bord na Mona Wind Take

BNMs intention to develop adjacent lands.

In its submission dated 30 January 2013 having accepted that the development of wind energy is "a key element of the countries renewable energy targets" and that the development of wind farms in the midlands … "is to be welcomed" BNM goes on to say that it has identified this "potential use of wind energy" …. decades ago.

Members of Greenwind Energy (Wexford) Limited (GWE), as far back as early 2012 met with Cement Roadstone Holdings (CRH) concerning lands adjacent to the Yellow River site to discuss possible options for them and GWE in the context of GWE's proposed Yellow River Wind Farm and their nearby lands and quarry. CRH indicated its willingness, in principle, to participate in a development but indicated that as BNM were the site owners, GWE would have to initiate discussions with them. A number of telephone conversations with BNM personnel followed in which GWE outlined its Yellow River development proposals. BNM personnel explained that due to vacation constraints and business commitments they were unable to meet with GWE until the late summer of 2012. GWE arranged this meeting and at it outlined its development proposals and displayed drawings of the then current Yellow River site design.

Subsequently in the Autumn of 2012, following a number of phone calls from GWE, BNM indicated that they would not consider any cooperation with GWE at that time, due to impending "strategic partnership discussions". During the discussions GWE made it perfectly clear to BNM that the planning process, the SID application, was proceeding. This planning process was initiated with An Bord Pleanala in September 2012.

As part of the planning process GWE published advertisements in the local newspaper and in the 2 local parish newsletters on consecutive weeks of its intent to hold an Open Public Consultation and Information Day in Rhode Community Centre on 10th December 2012. At this Open Consultation Day the YRWF plans as then developed were on display and information brochures were freely available to all. The Exhibition/Consultation was well attended by local residents, local public representatives and officials, land owners and other interested parties. So far as we are aware BNM did not attend that consultation process and certainly did not comment directly to GWE on the proposals.

BNM's current process

In its submission to the Bord BNM asserts that it has been considering the construction and operation of wind farms since 1992 and it has projects on-going since October 2013 and that it is "currently running a process" that has invited interested adjacent land owners to make their sites available to the project. It continues that "when the footprint of the project is fully defined direct engagement in the formal planning application process will be activated".

BNM further submits that the Yellow River application adjoins BNM land and that consequently its submission "addresses the impact of the proposed turbine layout of the Yellow River wind farm on the proposed development of BNM lands for the clean energy hub project or other wind farm developments that BNM may pursue.

Whilst BNM may have a strategic intent to develop wind farms on some of its thousands of hectares of land, they have no specific public plan or detailed design to develop a wind farm on its lands adjacent to the Yellow River Wind Farm (YRWF). The concept of developing Mega Wind Farms for electricity export currently has no regulatory, planning or contractual basis. Indeed recent Government announcements indicate that the timeline for such a concept is premature. Currently the activity

on lands adjacent to YRWF indicates that BNM/CRH are still actively harvesting / extracting / transporting peat and gravel. Consequentially GWE wish to make the following points:

a) It is unreasonable of BNM to expect An Bord Pleanala to accept its submission which is based on the speculation that they may, sometime in the future, make a planning application on their lands.

b) That BNM have shown no significant commitment to develop a wind farm on the margins of their lands adjacent to the YRWF.

c) The attached Table 1 indicates that all adjacent turbines are in excess of 2R (113Mtrs.) from BNM lands. This is in compliance with Irish wind industry design practices and with DOEHLG Wind Farm Planning Guidelines, 2006 which advise in Ch. 5 S5.13:

d) "a distance of not less than two rotor blades from adjoining property boundaries …." .

Wind Prospect Ltd., the YRWF design consultants, advises that this 2R guideline is in excess of the UK planning guideline of 1R. The trade association IWEA states that two rotor diameters should be "considered", "where significant commitment has been made to developing a neighbouring wind farm ", but this is clearly not the case here.

In summary the YRWF has been publically under development for over the last three years. The developer GWE has expended considerable funds and expertise in assembling a landholding in excess of 2,000 acres owned by 22 local families and in completing all of the technical studies and designs necessary to seek planning approval for such a development. The BNM assertion of undocumented development rights over all of its lands in the Midlands is without substance and grossly unfair to all of its adjacent small landowners. In particular, it attempts to obstruct the opportunity for the 22 landowners in the YRWF to gain legitimate additional income, to the long term benefit of their families, farming enterprises, local business communities and a sustainable rural community.

2.5.5 Proximity Issues

In response to concerns of proximity to third party lands

1. The McPadden Family, Garr: T16 & 17 are in excess of 2R (113m) from McPadden boundary.

   The adjustments in Section 2 of this response provides for the elimination of T20 and T23, and the relocation of T22 to a position which is over 2R distance from Mc Padden's lands.

2. Conal Glynn, Garr: T21 is in excess of 2R (113m) from Glynn's land.

   The adjustments in Section 2 of this response provides for the elimination of T20 and T23, and the relocation of T22 to a position which is over 2R distance from Mr Glynn's lands.

3. McKeever Families, Garr: There are no turbines within 2R of the McKeever family's lands. The adjustments in Section 2 of this response provides for the elimination of T20 and T23, and the relocation of T22 and T24, the positions of these houses (139, 140 & 141) will have increased to the nearest turbine to 553m (T22), 549m (T22), 615m (T22) respectively.

2.5.6 Horses, Livestock

Concerns were raised in third party submissions as to the potential impact the proposed development could have on horses and livestock. No conclusive evidence is available to suggest that wind farms do cause an impact to horses or livestock, however, horses and wind farms are known to co-exist in many locations without any signs of impact.

The currently operational Mace Upper wind energy scheme in Co. Mayo (planning reference 00/1954 and 06/2476) is on an estate that operates an equestrian centre. An appeal to An Bord Pleanála (PL16.221313) was made in which the issue of the interaction of horses and wind turbines was raised. Section 10.8 of the Inspectors Report dismissed this point as it did not represent a significant issue.

Upon speaking with one of the owners of the Mace Upper Equestrian Centre, Mr. Noel Walsh, his experience of the three wind turbines on his land has been very positive. The three turbines are within approximately 200m, 280m and 450m of the equestrian centre buildings. Plate 14.1, a photograph taken from the hub of one of the wind turbines shows the main indoor equestrian arena in the foreground and the various fields in which outdoor equestrian events are held next to the other wind turbines.

Plate 14.1 – Mace Upper Wind Farm and Equestrian Centre, Co. Mayo

Mr Walsh stated that horses routinely graze the fields in close proximity to the turbines and equestrian events are also held in these fields.

2.5.7 R400 Roundabout

Response: Please refer to item 12 on page 13 of the responses to Offaly Co Co roads issues.

2.5.8 Whooper Swans

Concerns were raised in numerous third party submissions to the potential impact to Whooper Swan by the proposed development

Bird surveys during winter 2012/2013 indicated that a population of Whooper Swans (*Cygnus cygnus*) winters in the Derryarkin sector of the development site. Survey visits became more frequent during the second half of the 2012/2013 season as a result of this finding. A full survey of the 2013/2014 winter season was undertaken to collate more detailed baseline data, especially in regard to the numbers of swans involved and their movements in the Derryarkin area. The submission from the Department of Arts, Heritage and the Gaeltacht recommends that all mitigation measures, including post construction monitoring, as outlined in the EIS and NIS are a condition of any permission granted, particularly with regard to water quality, bats and whooper swans. The Applicant will fully comply with any such conditions.

2.5.9 Wild Geese

Response: While neither of the submissions identify which species of wild goose or approximate numbers, it is considered likely that the geese referred to are Greylag Geese which have a 'feral' population in the area. These geese are present all year round and are derived from escaped birds from collections and parks. The present writer has observed up to 10 Greylag Geese in the vicinity of the Roadstone quarry pond since the time of submission of the EIS.

The true 'wild goose' of the boglands is the Greenland White-fronted Goose, which formerly occurred throughout the Bog of Allen. While Ruttledge & Ogilvie (1979) do not list any sites relevant to the study area in the 'Deserted Irish Haunts' section of their exhaustive review of the present and past distribution of the Greenland White-fronted Goose in Ireland, an earlier (and the first modern) review of goose sites in Ireland by Ruttledge and Hall Watt (1958) lists Rhode, Co. Westmeath as a Greenland White-fronted Goose site (site B5). Site B5 was included as part of the Lough Iron population, which at the time totalled up to 500 birds. No previous or further reference to the Rhode site has been located. There is a strong linkage between industrial harvesting of peat bogs and desertion of traditional goose sites.

Lough Ennel is the only site in the wider study area frequented by a population of Greenland White-fronted Goose (Ruttledge & Ogilvie 1979, Fox *et al*. 1994, NPWS GWFG Inventory).

References for geese

Fox, A.D., Norriss, D.W., Stroud, D.A. & Wilson, H.J. (1994). Greenland White-fronted Geese in Ireland and Britain, 1982/83-1993/94. The first twelve years of international conservation monitoring. Greenland White-fronted Goose Study and National Parks & Wildlife Service, Dublin.

Ruttledge, R.F. and Hall Watt, R (1958) The distribution and status of wild geese in Ireland. *Bird Study* 5: 22-33.

2.5.10 Planning Search, Sites, etc

Denise McCann, Stonehouse, Castlejordan:

Ms Mc Cann states that her plan is to build her future home on a plot that is currently occupied by a shed that can be seen in the photographs she submitted. The applicant confirms that there are no applications in the townland of Stonehouse for Denise McCann and that there are no applications in the name of Denise McCann (or any Mc Cann) in the Castlejordan area as per Offaly County Council eplan.

In relation to Ms McCann's current home, the Yellow River Wind Farm application complies with all of the requirements of the 2006 DoEHLG Guidelines and the house is 690m from the closest turbine, T20. However, in the adjusted layout in Section 2 of this response T20 and T23 are being omitted and the nearest turbine then would be T21 at 915m.

Darren Cahill: as per file reference 071149 as amended by file reference 09356, planning permission was granted to Mr Cahill for a dwelling house at the Garr Road.

The applicant has undertaken a review of the noise and shadow flicker impacts on this location and have included this amendment in the Schedule of Errors in Appendix C.

In relation to Mr Cahill's site, the Yellow River Wind Farm application complies with all of the requirements of the 2006 DoEHLG Guidelines and the site is 585m from the closest turbine, T23. In the adjusted layout in Section 2 of this response T20 and T23 are being omitted and the nearest turbine then would be T22 at 623m.

Terri B Carey, Stonehouse, Castlejordan :

Ms Carey's house is located greater than 1.13km from the nearest turbine, at a distance of approximately 1.45km. Accordingly she has not been included in the noise and shadow flicker assessments.

Louise Kennedy:

Ms Kennedy's house is located greater than 1.13km from the nearest turbine, at a distance of approximately 1.56km. Accordingly she has not been included in the noise and shadow flicker assessments.

In relation to the visual impact, an additional photomontage from the Knockdrin area has been included in the Landscape and Visual Booklets for both Section 1 and Section 2 of this response.

Mr Paddy and Mrs Kathleen Mooney, Corbetstown, Castlejordan.

The applicant would like to clarify a mapping error on EIS House Locations Map 9.28 and 9.29 in which H227 and H147 were incorrectly numbered. The location of H227 and H147 are correctly illustrated on EIS House Locations Map 9.27 and 9.26.

Paddy and Kathleen Mooneys House is in fact H171 rather than H227 and the results in the noise and shadow flicker reports for H171 apply for their house.

To clarify, their house is located at a distance of:

- 528 metres from T23 for the original layout.
- 701 metres from T22 for the adjusted layout.

One other house adjacent to Paddy and Kathleen Mooney is in fact H179 rather than H147 and the results in the noise and shadow flicker reports for H179 apply for their house.

To clarify, this house is located at a distance of:

- 626 metres from T23 for the original layout.
- 748 metres from T22 for the revised layout

Please refer to updated Figures 4909/EIA/9.28 Rev A and 4909/EIA/9.29 Rev A in Appendix D.

The correction of the distance in the EIS has been included in the Schedule of Errors.

2.5.11 Bees - Pat Rodgers, Fahy & Brian Coffey , Ballinabracky , Rhode.

In response to the concerns raised that proximity of wind turbines could have "a negative effect on bee behaviour", could impact on "the flight path of pollinating queens" and could "disrupt bee communication" the applicant examined current research and consulted with a leading Irish beekeeper, author and zoologist. Whilst world-wide honey bee population is increasing, this is not so in Europe & the US (reference 2010 paper in Journal of Invertebrate Pathology, "A historical review of managed honey bee populations in Europe & US and factors that may affect them"). A conclusion of this report is that the cause or causes are "ambiguous or inconclusive". Among the causes postulated are combinations of; disease, parasites, pesticides, herbicides, environment, weather occurrences, overwork, transportation, etc. There is no academic papers or published research which ties the presence of wind turbines to this major issue. Indeed the most frequent article referenced on line stems from a "paper" purporting to correlate the incidence of bee hive reduction with the spread of wind farms in the US. This "paper" was published on a US blog UFO Digest. We believe the content of the blog does not constitute evidence.

2.5.12 Grid Access

The applicant continues to be engaged in the Grid Application process with Eirgrid Whilst at this stage in the connection process there is still a level of uncertainty, regarding the connection method, costs and timelines, the applicant confirms their expectation that the Derryiron 110kV substation has the capacity to take the 96MW that will be generated by YRWF.

2.5.13 Garr Road Crossing

Response: Please refer to item 16 on page 15 of the response to Offaly Co Co roads issues.

2.5.14 Landscape & Visual

NUI Maynooth

NUI Maynooth raise a number of concerns regarding the importance of Croghan Hill to the geological record, but also its heritage importance as a prominent hill within the within the surrounding landscape and its relationship to other important iron age hills such as the Hill of Uisneach in Westmeath. MosArt accept these comments in relation to the value of Croghan Hill and that much of this value relates to its presence within the surrounding landscape context. Without prejudice to the heritage assessment associated with this proposal, MosArt would make the point that the Wind Energy Strategy's 2km buffer around the base of Croghan Hill has been adhered to in the design of this scheme. Furthermore, as slender structures the proposed turbines represent a permeable form of development rather than a visual obstruction or barrier between Croghan Hill and the landscape beyond.

BCC Wind Action Group

As part of their submission the BCC Wind Action Group have submitted a landscape and visual impact assessment prepared by doyle + o'troithigh landscape architecture.

This report begins by suggesting that the EIS has "*failed to assess the visual impact of the Yellow River Wind Farm and adequately demonstrate that the scale and number of turbines proposed are acceptable in such a vast and open landscape, particularly adjacent to existing settlements" ...* and that *"locating the development as proposed would have an adverse impact when viewed from the surrounding residential areas and therefore would not be in accordance with proper planning and sustainable development"*.

In relation to the first comment, a visual impact assessment was undertaken from no less than 29 Viewshed Reference Points covering a range of receptor types including local community views (11 No.) and centres of population (8No.) in the vicinity.

Regardless of whether the author disagrees with the predicted levels of impact, MosArt strongly refutes the suggestion that an assessment was not undertaken from these receptors. Furthermore, the assessment was undertaken in close accordance with the GLVIA (2013) and concludes that the level of impact that is likely to occur is Moderate in EIA terms and by implication is not considered to give rise to significant impacts. The fact that the proposal is located in a 'vast and open landscape' is considered to be one of the most ameliorating factors for this wind energy development not a constraint.

With regard to the second comment, there is no argument that the proposal will have an adverse impact on surrounding residential areas and this is reflected in the assessed levels of impact, which range between slight and major-moderate significance for local receptors. Causing an adverse effect is not sufficient in its own right to consider that a proposal is not in accordance with proper planning and sustainable development. Instead, it is the responsibility of the assessor to determine if the level of adverse effect is significant or not. Again, MosArt contends that the effects arising from this wind energy proposal are no more than moderate when expressed in EIA terms.

The first part of the submitters report deals with planning policy and attempts to show that the wind energy strategy is not in accordance with general policies relating to residential amenity in settlements in the core strategy of the development plan. To reinforce the point it is suggested that the wind energy strategy is *"a separate document to the Development Plan"*. This is not the case as the county wind energy strategy is considered to be part of the county development plan. There are no specific contraventions of the development plan policies identified, only the implication that significant effects on landscape character and residential amenity would result in a contravention of core strategy policies. MosArt do not consider this to be the case for this proposal.

The second part of the report is a critique of the project LVIA contained within the EIS. It should be noted that the report continually refers to a 10X rotor diameter buffer of 1.13km employed by the shadow flicker and noise consultants and the number of houses contained within this buffer zone (194). This extent of 'buffer zone' is not directly related to the visual assessment, it is not required by any visual assessment guidance documents nor has such a precedent been set in Ireland. Unlike the more scientific disciplines of shadow flicker and noise assessment with regulated

limits at all residential receptors, the visual impact assessment undertakes representative assessments from a sample of locations that reflect the range of receptors within the study area, not an exhaustive assessment from every local residence. This approach is consistent with the GLVIA (2013).

The submitter describes the tables provided in the LVIA methodology section (Tables 11-1 to 11-5 inclusive) and comments that the textual classification system for determining the sensitivity of receptors and the magnitude of effect are *"very useful in assessing the impact ..."*. However, by contrast, the lack of textual description used in the significance matrices makes it difficult to understand the significance of impact. By way of response MosArt note that the significance matrices simply provide summary impact levels that are reached through the decisions that are made based on well described sensitivity and impact magnitude factors. In alternative terms, the significance of impact does not require an additional judgement - it is the result. It is not considered appropriate to provide alternative descriptions for impact significance to those already provided in the EIA Guidelines (2002).

The critique questions how the assessment could arrive at significance judgements of Major-moderate, Moderate-slight and Slight-imperceptible for local receptors. Unfortunately they do not elaborate on the grounds for this disagreement. Instead, they revert to the shadow flicker chapter and the number of houses inside a 1.13km buffer (MosArt would comment that we deliberately use a transparent and semi-quantitative assessment methodology so that others are able to review and challenge our decision making sequence, whilst couching their arguments in common terms). Once again, the critique suggests that no assessment has been made in respect of local dwellings and settlements and that this is a *"Major failing of the EIS"*. For the reasons provided earlier, this statement is unfounded and erroneous and can only arise from a misinterpretation of the LVIA. There are now assessments from 11 local community receptors and 8 centres of population in the vicinity. Some more clarity as to the submitter's argument is provided in later text where they question how the judgement of Major-moderate impact can be arrived at using only 2 VRP's (now 3 VRP's) in close proximity. The simple answer is that it is not necessary to provide endless reiteration of the same level of impact at numerous similar receptors. The VRP's are representative not exhaustive and repeating a visual impact does not make it greater. Furthermore, the number of visual receptors (people) likely to experience a particular view is taken account of in the sensitivity judgement.

The submitter intends to query the cumulative impact assessment of Low, but goes on to summarise unrelated assessment tables from the EIS. This appears to be because table 11-10 is a summary impact table that includes all assessments made within the LVIA including cumulative impact. It may have appeared that the cumulative impact was derived from the visual impacts indicated above it in that summary table (this is not the case). There is a later reference to cumulative impact with less ambiguity. This queries the cumulative impact of the proposal in conjunction with the Mount Lucas development when viewed from Croghan Hill. This is one of the areas that the EIS acknowledges will have a view of both developments. However, to suggest that there will be *"little or no visual relief from wind turbines when the surrounding countryside is viewed from this location"* is a gross overstatement. Vast 360° panoramic views over the countryside are afforded from the top of Croghan Hill. The view of two wind energy developments, albeit sizeable, in different aspects of the vista (northeast and south-southeast) with a separation of 10km between them only reaffirms the Low level of cumulative impact estimated in the EIS. Furthermore, this is one of the only locations in the study area that would afford combined views of these developments.

The submitter cites the recent planning precedent where An Bord Pleanála overturned the Offaly County Council decision by refusing permission for the Cloghan Wind Farm largely on visual impact grounds. MosArt consider that it is important that any development proposal is considered on its own merits and that this is a different proposal in a different location.

YELLOW RIVER WIND FARM

An Bord Pleanála Reference 19.PA0032

RESPONSE TO SUBMISSIONS RECEIVED BY AN BORD PLEANÁLA

SECTION 2

3.0 EXPLANATORY NOTE ON THE SECOND SECTION OF THE RESPONSE..... 1

3.1 SHADOW FLICKER.....2
3.2 NOISE.....2
3.3 DRAWING SCHEDULE.....3
3.4 LANDSCAPE AND VISUAL.....4

Appendix A Adjusted Noise Impact Report

Appendix B Adjusted Shadow Flicker Report

Appendix C Adjusted Landscape and Visual Report

Appendix D Statements of No Additional Impact

3.0 Explanatory Note on the Second Section of the Response

Many of the submissions/observations, including submissions from some of the statutory bodies, cited the Draft Revisions to the Wind Energy Development Guidelines (2006), published on December 11th 2013 (after the date of submission and advertisement of this project under the SID process) and which focused on the issues of Noise and Shadow Flicker. The Report of the County Manager is among those submissions that raised this issue and it is included in a number of primary recommendations therein that are as follows:

1. The omission of a small number of turbines

2. The relocation of other turbines within the landholding

3. The reduction in height of turbines particularly to the east of the R400 and some to the north of the Garr Road.

4. To consider the implementation of 40 dB limit proposed in the revision of the Planning Guidelines currently at public consultation phase

5. To consider the implementation of the no shadow flicker at any house within 10 rotor diameters as again proposed in the Planning Guidelines

As a result of reviewing the above recommendations and the comments in the other submissions/observations, the Applicant has identified possible adjustments to the proposed Development, which could be given effect to by way of condition if deemed appropriate by An Bord and should An Bord be minded to grant permission. These adjustments as follows:

Due to the presence of two distinct landscape types within the project area, viz., (i) flat peat-land and (ii) hilly and flat farmland, the height of turbines 13 – 25 can be reduced by 10m to 156m to blade tip (which is similar to the consented height for Mount Lucas Wind Farm, An Bord Pleanala Ref. PL19.237263), while maintaining a height of 166m for turbines 1 – 12 and turbines 26 - 32. This would reduce the visual impact in the most densely populated area.

3.1 Shadow Flicker

In the proposal as submitted for planning permission, the closest house to non-associated residents was T28 and this turbine is omitted in this adjustment (see previous paragraph). The closest turbines to non-associated resident clusters would now be T20, T23 and T24. By omitting T20 and T23 and relocating T22 and T24, impacts of shadow flicker would be reduced. In brief, where adverse shadow flicker has been identified the monitoring / remediation procedure as agreed with Offaly Co Co will be implemented and the impacted turbines will be shut down for the period of shadow flicker incidence. A supplementary Shadow Flicker Report forms part of this response and can be found in Appendix B.

3.2 Noise

In order to comply with the noise limit (day and night) of 40 decibels (dB) in the revised Wind Energy Development Guidelines and to improve visual amenity, three turbines (T20, T23 and T28) are omitted and 2 turbines would be relocated (T22 and T24). 6 other turbines (Turbines T4, T14, T22, T24, T30 and T31) would also be programmed to run in a restricted mode so as to have a reduced noise output at wind speeds up to and including 11m/s. A supplementary Noise Report forms part of this response and can be found in Appendix A.

In summary, all of these adjustments would ensure:

- Significant reduction in 'visual clutter'
- No shadow flicker issues for any houses within 10 rotor diameters of the YRWF, as suggested in the revised Draft Guidelines that are currently in the Public Consultation phase
- A noise limit of 40dB at all receptors/houses, again as suggested in the revised Draft Guidelines in addition to the power noise turbine settings as proposed in the Adjusted Noise Report in Appendix A to Section 2.

Planning drawings are provided to reflect the possible adjustments to the proposed Development such that An Bord can be in a position to consider them fully. The drawings included are as follows:

3.3 DRAWING SCHEDULE

Drawing No.	Drawing Name
4909/PL/S2/100	Overall Site Location Map – Scale 1:25,000
4909/PL/S2/101	Overall Site Index Plan – Scale 1:20,000
4909/PL/S2/102	Overall Site Location Plan – Sheet 1 of 2 - Scale 1:10,000
4909/PL/S2/103	Overall Site Location Plan – Sheet 2 of 2 - Scale 1:10,000
4909/PL/S2/104	Site Layout Plan – Sheet 1 of 13 - Scale 1:2,500
4909/PL/S2/105	Site Layout Plan – Sheet 2 of 13 - Scale 1:2,500
4909/PL/S2/106	Site Layout Plan – Sheet 3 of 13 - Scale 1:2,500
4909/PL/S2/107	Site Layout Plan – Sheet 4 of 13 - Scale 1:2,500
4909/PL/S2/108	Site Layout Plan – Sheet 5 of 13 - Scale 1:2,500
4909/PL/S2/109	Site Layout Plan – Sheet 6 of 13 - Scale 1:2,500
4909/PL/S2/110	Site Layout Plan – Sheet 7 of 13 - Scale 1:2,500
4909/PL/S2/111	Site Layout Plan – Sheet 8 of 13 - Scale 1:2,500
4909/PL/S2/112	Site Layout Plan – Sheet 9 of 13 - Scale 1:2,500
4909/PL/S2/113	Site Layout Plan – Sheet 10 of 13 - Scale 1:2,500
4909/PL/S2/114	Site Layout Plan – Sheet 11 of 13 - Scale 1:2,500
4909/PL/S2/115	Site Layout Plan – Sheet 12 of 13 - Scale 1:2,500
4909/PL/S2/116	Site Layout Plan – Sheet 13 of 13 - Scale 1:2,500
4909/PL/S2/201	110kV Electrical Compound & Substation Layout- Site Layout Plan & Site Section - Scale 1:200
4909/PL/S2/202	Client Control Building - Plan & Details - Scale As Shown
4909/PL/S2/203	Client Control Building - Elevations & Details - Scale As Shown
4909/PL/S2/204	TSO Control Building - Plan & Details - Scale As Shown
4909/PL/S2/205	TSO Control Building - Elevations & Details - Scale As Shown
4909/PL/S2/206	110kV Electrical Compound – Wastewater Holding Tank – Not to Scale
4909/PL/S2/301	Turbine Detail – Scale 1:300
4909/PL/S2/302	Meteorological Mast Details – Scale As Shown
4909/PL/S2/303	Freespan Concrete Bridge Crossing Detail - Scale As Shown
4909/PL/S2/401	Site Entrance Detail No.1 - Existing Junction at Kilmurray's Road & R400 – Scale 1:500

4909/PL/S2/402	Site Entrance Detail No.2 - Upgraded Junction at Wind Farm Access Road (T8 -12) - R400 – Scale 1:500
4909/PL/S2/403	Site Entrance Detail No.3 - Off Roundabout on R400 - Coolville Road – Scale 1:500
4909/PL/S2/404	Site Entrance Detail No.4 - Proposed Junctions on Garr Road – Scale 1:500
4909/PL/S2/501	Wind farm Access Road Construction Details – Scale 1:25
4909/PL/S2/502	110kV & 33kV Underground Cable Trench Details – Not to Scale
4909/PL/S2/503	Drainage Details - Sheet 1 of 2 - Scale 1:50
4909/PL/S2/504	Drainage Details - Sheet 2 of 2 - Scale 1:25

3.4 Landscape and Visual

Photomontages have been produced (38 original plus 3 ZVI) to reflect the possible adjustments to the proposed Development such that An Bord can be in a position to consider them fully, along with additional locations outlined in Offaly County Councils submission (6) and one from Knockdrin, close to the residence of Louise Kennedy. The supplementary 44 photomontages and accompanying ZVIs can be found in the Landscape & Visual Booklet for Section 2.

Signed on behalf of Jennings O'Donovan & Partners Limited

Date: