codling wind park

Environmental Impact Assessment Report

Volume 4

Appendix 13.2 Representative Scenario and Limits of Deviation Assessment


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APPENDIX 13.2 REPRESENTATIVE SCENARIO AND LIMITS OF DEVIATION ASSESSMENT

1 Introduction

1. Complex, large-scale infrastructure projects with a terrestrial and marine interface such as the CWP Project, are consented and constructed over extended timeframes. The ability to adapt to changing supply chain, policy or environmental conditions and to make use of the best available information to feed into project design, promotes environmentally sound and sustainable development. This ultimately reduces project development costs and therefore electricity costs for consumers and reduces CO_2 emissions.

2. Case law recognises that the plans and particulars submitted with planning applications can allow for a certain limited flexibility, where this is applied reasonably and, in a context-specific way. In addition, section 287A of the Planning and Development Act (PDA) (as inserted by the Planning and Development, Maritime and Valuation (Amendment) Act 2022) has expanded the flexibility available and allows planning applications to be made and decided before the Applicant has confirmed certain details of the project.

3. Due to the complexity of the Codling Wind Park (CWP) Project, significant and rapid progression in wind farm technology development, potential changes in environmental conditions and in policy and legislation, the Applicant considers that consenting a degree of design flexibility is appropriate and legally compliant.

4. In this regard the approach to the design development of the CWP Project has sought to introduce flexibility where required to enable the best available technology to be constructed, whilst at the same time to specify project boundaries, project components and project parameters wherever possible, whilst having regard to known environmental constraints.

2 Approach to presenting the project design

5. The approach to the design development of the CWP Project considers permanent infrastructure, temporary infrastructure and installation methods.

6. In general, the CWP Project has sought to specify the location, scale and extents of permanent and temporary infrastructure, however in some cases a degree of design flexibility is required. Subject to the detail concerned, this flexibility is presented in three ways:

   - **Options**: Consent is sought for up to two options for certain permanent infrastructure details and layouts, for example, wind turbine generator (WTG) Layout Option A (250 m rotor diameter) or WTG Layout Option B (276 m rotor diameter). Each design option is described in detail in **Chapter 4 Project Description**, which provides the details associated with each option.
   - **Dimensional flexibility**: Dimensional flexibility is described as a limited parameter range i.e. upper (maximum) and lower (minimum) values for a given detail such as cable length.
   - **Locational flexibility**: Locational flexibility of permanent infrastructure is described as a Limit of Deviation (LoD) from a specific point or alignment.

7. Installation methods for permanent infrastructure have been identified and described in full, however, as with the design of permanent infrastructure, a degree of flexibility is required as final decisions on

methods and techniques to be employed will not be made until the appointment of the primary contractors closer to the time of construction.

8. Where required, flexibility concerning installation methods is presented by means of options. The details associated with the installation methods are specified, where possible, or otherwise described as a limited parameter range i.e. upper (maximum) and lower (minimum) values for a given detail.

3 Representative Scenario Assessment

9. The CWP Project Environmental Impact Assessment Report (EIAR) will identify, describe and assess all of the likely significant effects of the proposed development on the environment. To achieve this for all options and dimensional flexibility, and at the same time to produce application documents that are concise and readable, each chapter of the EIAR will assess a selection of representative scenarios, rather than assessing every possible scenario. A “representative scenario” is a combination of options and dimensional flexibility that has been selected to represent all of the likely significant effects of the project on the environment. Some topics may require several representative scenarios to be identified to ensure all impacts are identified, described and assessed.

10. For offshore bats this analysis for construction and operation and maintenance (O&M) phase impacts is presented in **Table 1** and

11. **Table** 2, respectively. Each table identifies one or more representative scenarios for each impact with supporting text to demonstrate that no other scenarios would give rise to new or materially different effects; taking into consideration the potential impact of other scenarios on the magnitude of the impact or the sensitivity of the receptor(s) that is being considered.

12. Where the potential for a new or materially different impact is identified, then further representative scenarios must be assessed in full within the main chapter.

13. This is distinct from the approach to assessing locational flexibility, where differences in impacts are assessed in this Appendix. The difference in approaches arises because there is a much higher degree of confidence in the locations and alignments assessed in the main chapter than there is for the final options and dimensions.

14. Overall, this approach will ensure that the EIAR will identify, describe and assess:

- Every impact type that could arise from the proposed development, taking account of the full range of options and dimensional flexibility;
- Every materially different magnitude of impact that could arise from the proposed development within the proposed options and dimensional flexibility; and
- Every materially different sensitivity of receptor that could arise from the proposed development within the proposed options and dimensional flexibility.

Table 1 Representative scenario assessment - construction phase impacts

Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)	
Impact 1: Disturbance	Generating station (including WTGs, inter-array cables (IACs), interconnectors) and OfTI (including offshore substation structures (OSSs) and offshore export cables)	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
	Permanent infrastructure			Bats are at risk of disturbance when roosting or when moving through the area. Disturbance will occur within the area of works and vary depending upon the number of structures in place during the bat active season and number of vessel movements required during the season. Differences in the amount of works at night would affect the amount of disturbance during flight. WTG Option A with the greater number of turbines, offshore structures and greater number of vessel movements will therefore have a greater potential for disturbance as such WTG Option A is the basis of the assessment.	*1. Are there infrastructure layout options (permanent or temporary) which may introduce new impacts?* *Note - this could be a new impact entirely or the introduction of an existing impact pathway to a new receptor.* *2. Are there infrastructure layout options (permanent or temporary) which may introduce a materially different magnitude of impact?* *3. Are there infrastructure layout options (permanent or temporary) which may introduce a material change in the sensitivity of the receptor(s) (greater or lesser)?* *4. Are there alternative installation methods which may introduce new impacts?* *5. Are there alternative installation methods which may introduce a materially different magnitude of impact?* *6. Are there alternative installation methods which may materially alter the sensitivity of the relevant receptor(s) (greater or lesser).*	1. No, WTG Option B would not introduce any new impacts. Therefore, WTG Option A forms the presentational and representative basis for the assessment with WTG Option B conclusions being no different. 2. No, WTG Option B would not give rise to a materially different magnitude for Impact 1 – Disturbance than Option A. Therefore, WTG Option A forms the representative scenario basis for the assessment with WTG Option B impacts having no material differences. 3. No, WTG Option B will not influence the sensitivity of assessed receptors. Receptor sensitivity to this impact is not influenced by array site design option choices. Therefore, WTG Option A forms the representative scenario basis for the assessment with WTG Option B impacts. It is considered that no alternative installation method would result in materially different impacts. 4. No, in relation to Impact 1, there are no alternative installation methods proposed that would introduce new impact receptor pathways. 5. No, in relation to Impact 2, there are no alternative installation methods proposed that would result in differing impact magnitudes. 6. No, in relation to Impact 1, there are no alternative installation methods proposed that would influence the sensitivity of the receptor that is being assessed.
	Number of WTGs	75	60			
	Number of OSSs	3				
	Temporary infrastructure installation vessels			Both WTG Option A and WTG Option B would require an indicative peak of 38 vessels on site simultaneously with 17 in the nearshore, however WTG Option A would require more round trips in total. As such WTG Option A would result in the highest potential for disturbance as it provides the higher number of potential roosting / resting opportunities for bats at sea, which could then be disturbed.		
	Indicative peak number of vessels on site	38				
	Number of vessels simultaneously within the nearshore	17				
	Number of vessel movements – round trips	2,409	2,387			

Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)	
Impact 2: Lighting	Generating station and OfTI	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
	Permanent infrastructure			Lighting affects different bat species in different ways, with more common species typically benefitting or being less negatively affected, though at increased risks of disturbance, than rarer species. The greater the level of lighting, particularly within 10 km of the shore (where bats are known to forage) the greater the potential for impacts. WTG Option A will require high number of vessel movements (higher number of anticipated round trips) and therefore result in higher potential occurrences of artificial lighting, the number of WTGs is not anticipated to alter the number of artificial lights required.	*1. Are there infrastructure layout options (permanent or temporary) which may introduce new impacts?* *Note - this could be a new impact entirely or the introduction of an existing impact pathway to a new receptor.* *2. Are there infrastructure layout options (permanent or temporary) which may introduce a materially different magnitude of impact?* *3. Are there infrastructure layout options (permanent or temporary) which may introduce a material change in the sensitivity of the receptor(s) (greater or lesser)?* *4. Are there alternative installation methods which may introduce new impacts?* *5. Are there alternative installation methods which may introduce a materially different magnitude of impact?* *6. Are there alternative installation methods which may materially alter the sensitivity of the relevant receptor(s) (greater or lesser).*	1. No, WTG Option B will have fewer number of vessel movements and would not introduce any new impacts. Therefore, WTG Option A forms the presentational and representative basis for the assessment with WTG Option B conclusions being no different. 2. No, it is considered unlikely that WTG Option B would give rise to a materially different magnitude for Impact 2 – Lighting than WTG Option A. Therefore, WTG Option A forms the representative scenario basis for the assessment with WTG Option B impacts having no material differences. 3. No, WTG Option B will not influence the sensitivity of assessed receptors. Therefore, WTG Option A forms the representative scenario basis for the assessment with WTG Option B conclusions being no different. 4. No, in relation to Impact 2, there are no alternative installation methods proposed that would introduce new impact receptor pathways. 5. No, in relation to Impact 2, there are no alternative installation methods proposed that would result in differing impact magnitudes. 6. No, in relation to Impact 2, there are no alternative installation methods proposed that would influence the sensitivity of the receptor that is being assessed.
	Number of WTGs	75	60			
	Number of OSSs	3				
	Temporary infrastructure installation vessels					
	Indicative peak number of vessels on site	38				
	Number of vessels simultaneously within the nearshore	17				
	Number of vessel movements – round trips	2,409	2,387			

Table 2 Representative scenario assessment - operational phase impacts

Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)	
Impact 1: Disturbance	Generating station and OfTI	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
	Permanent infrastructure			Bats may roost on any objects out to sea, being encountered on vessels or offshore turbines / associated infrastructure, when roosting they are at risk of disturbance. The greater the number of turbines, offshore structures and greater number of vessel movements will therefore have a greater potential for disturbance. WTG Option A has the greatest number of offshore structures and therefore the highest potential for roosting and subsequent disturbance.	*1. Are there infrastructure layout options which may introduce new impacts?* *Note - this could be a new impact entirely or the introduction of an existing impact pathway to a new receptor.* *2. Are there infrastructure layout options which may introduce a materially different magnitude of impact (greater or lesser)?* *3. Are there infrastructure layout options which may introduce a material change in the sensitivity of the receptor(s) (greater or lesser)?*	1. No, WTG Option B would not introduce any new impacts. Therefore, WTG Option A forms the presentational basis for the assessment with WTG Option B conclusions being no different. 2. No, it is considered unlikely that WTG Option B would give rise to a materially different magnitude for Impact 1 - disturbance. WTG Option B is anticipated to result in the same magnitude of impact. Therefore, WTG Option A forms the presentational basis for the assessment with WTG Option B impacts having no material differences. 3. No, WTG Option B will not influence the sensitivity of the receptor that is being assessed. As set out in **Chapter 13 Table 13-7**, sensitivity considers the conservation value of the receptor, which is not influenced by details or characteristics of the project. Therefore, WTG Option A forms the presentational basis for the assessment with WTG Option B conclusions being unlikely to be different.
	Number of WTGs	75	60			
	Number of OSSs	3				
	Temporary/methods					
	Annual round trips (vessels)	Peak vessels	Round trips			
	JUVs	2	3			
	Service Operation Vessel (SOV)	1	26			
	CTVs	6	1152			
	Cable maintenance vessel	2	1			
	Auxiliary vessel1	3	27			
Impact 2: Collision	Generating station	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
	Permanent infrastructure			Bats are known to collide with onshore wind turbines as such they are considered at risk of collision with offshore turbines. The greater the amount of area being swept by the rotors the greater the potential for bats to collide. WTG Option A with 75 WTGs each with a rotor diameter of 250 m would have	*1. Are there infrastructure layout options which may introduce new impacts?* *Note - this could be a new impact entirely or the introduction of an existing impact pathway to a new receptor.*	1. No, WTG Option B (60 WTGs with 276 m rotor diameters) has a smaller swept area and would not introduce any new impacts. Therefore, WTG Option A forms the presentational basis for the assessment with WTG Option B conclusions being no different. 2. No, it is considered unlikely that WTG Option B would give rise to a materially different magnitude for Impact 2 - collision. WTG Option B is anticipated to result in the same magnitude of impact. Therefore, WTG Option A forms the presentational basis for the

Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)	
	Total rotor swept area of project (m^2)	3,681,554	3,589,710	the highest number of turbines and has the highest total rotor swept area of 3,681,554 m^2 and therefor the highest potential for impact.	*2. Are there infrastructure layout options which may introduce a materially different magnitude of impact (greater or lesser)?* *3. Are there infrastructure layout options which may introduce a material change in the sensitivity of the receptor(s) (greater or lesser)?*	assessment with WTG Option B conclusions having no material differences. 3. No, WTG Option B will not influence the sensitivity of the receptor that is being assessed. As set out in **Chapter 13 Table 13-7**, sensitivity considers the conservation value of the receptor, which is not influenced by details or characteristics of the project. Therefore, WTG Option A forms the presentational basis for the assessment with WTG Option B conclusions being unlikely to be different.
Impact 3: Lighting	Generating station and OfTI	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
	Aviation lighting of the WTGs	See **Lighting and Marking Plan** submitted with the planning application.		The offshore lighting requirements are to be confirmed, the impacts of offshore aviation lighting on bats is debated while impacts on foraging bats within 10 km of the shore are anticipated to align with impacts onshore. Some bat species utilise well-lit areas for foraging while avoid lighting, benefitting those light tolerant, and typically more common, species. WTG Options A and B will require the same number of vessel trips for maintenance, as such WTG Option A is considered to have the highest potential lighting requirements due to the higher number of WTGs.	*1. Are there infrastructure layout options which may introduce new impacts?* *Note - this could be a new impact entirely or the introduction of an existing impact pathway to a new receptor.* *2. Are there infrastructure layout options which may introduce a materially different magnitude of impact (greater or lesser)?* *3. Are there infrastructure layout options which may introduce a material change in the sensitivity of the receptor(s) (greater or lesser)?*	1. No, WTG Option B would not introduce any new impacts. Therefore, WTG Option A forms the presentational basis for the assessment with WTG Option B conclusions being no different. 2. No, it is considered unlikely that WTG Option B would give rise to a materially different magnitude for Impact 3 - lighting. WTG Option B is anticipated to result in the same magnitude of impact. Therefore, WTG Option A forms the presentational basis for the assessment with WTG Option B conclusions being no different. 3. No, WTG Option B will not influence the sensitivity of the receptor that is being assessed. As set out in **Chapter 13 Table 13-7**, sensitivity considers the conservation value of the receptor, which is not influenced by details or characteristics of the project. Therefore, WTG Option A forms the presentational basis for the assessment with WTG Option B conclusions being unlikely to be different.
	Annual vessel trips for maintenance (round trips)	1,209				
	Peak number of vessels any one time	6				

4 Limit of Deviation Assessment

15. As described in **Section 1** of this document, locational flexibility of permanent and temporary infrastructure is described as a LoD from a specific point or alignment.

16. The project components for which a LoD has been defined are presented in **Table 3**. These are further described in EIAR Chapter 4 Project Description and have been presented on the planning drawings that accompany the planning application.

Table 3 Defined limits of deviation

Project component	LoD
Offshore project components	
WTGs	100 m from the centre point of each WTG location
WTG monopile locations	Same as WTGs
WTG monopile scour protection	Same as WTGs
OSSs	100 m from the centre point of each OSS location
OSS monopile locations	Same as OSSs
OSS monopile scour protection	Same as OSSs
IACs and interconnector cables	100 m either side of the preferred alignment of each IAC and interconnector cable 200 m from the centre point of each WTG location
Offshore export cables	250 m either side of the preferred alignment within the array site. The OECC outside of the array site
Landfall	
Transition joint bays (TJBs)	0.5 m either side (i.e. east / west) of the preferred TJB location
Landfall cable ducts (and associated offshore export cables within the ducts)	Defined LoD boundary with 30 – 55 m horizontal width
Intertidal cable ducts (and associated offshore export cables within the ducts)	The OECC
Intertidal offshore export cables (non-ducted sections)	The OECC
Onshore substation	
Location of onshore substation revetment perimeter structure	Defined LoD boundary

17. For the purposes of the EIAR, the main chapter for offshore bats assesses the specific preferred location for permanent infrastructure. However, this document provides further analysis to determine

if the proposed LoD for permanent infrastructure may give rise to any new or materially different effects, taking into consideration the potential impact of the proposed LoD on the magnitude of the impact.

18. For offshore bats this analysis for construction and O&M phase impacts is presented in Table 4 and Table 5 respectively. Where the potential for a LoD to cause a new or materially different effect is identified, then this is noted in the tables below and is considered in full within the main chapter.

Table 4 Limit of deviation assessment - construction phase impacts

Impact	Relevant project element	Limit of deviation	Questions to demonstrate assessment has considered all scenarios	Response
Impact 1: Disturbance	Generating station Note – includes WTGs, IACs and interconnectors		*1. Does the proposed LoD (locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor).* *2. Does the proposed LoD (locational flexibility) introduce a materially different magnitude of impact?*	1. No, the implementation of the LoD is not anticipated to introduce any new impacts or impact pathways which have not already been assessed within the chapter which assesses Option A. 2. No, the magnitude of direct effects on offshore bats is not anticipated to be materially affected by WTG or OSS micro-siting choices or implementation of the LoD as set out in **Table 3**.
	WTGs	100 m from the centre point of each WTG location		
	OSSs	100 m from the centre point of each OSS location		
Impact 2: Lighting	Generating station Note – includes WTGs, IACs and interconnectors		*1. Does the proposed LoD (locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor).* *2. Does the proposed LoD (locational flexibility) introduce a materially different magnitude of impact?*	1. No, the implementation of the LoD is not anticipated to introduce any new impacts or impact pathways which have not already been assessed within the chapter which assesses Option A. 2. No, the magnitude of direct effects on offshore bats is not anticipated to be materially affected by WTG or OSS micro-siting choices or implementation of the LoD as set out in **Table 3**.
	WTGs	100 m from the centre point of each WTG location		
	OSSs	100 m from the centre point of each OSS location		

Table 5 Limit of deviation assessment - operational phase impacts

Impact	Relevant project element	Limit of deviation	Questions to demonstrate assessment has considered all scenarios	Response
Impact 1: Disturbance	Generating station Note – includes WTGs, IACs and interconnectors		*1. Does the proposed LoD (locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor).* *2. Does the proposed LoD (locational flexibility) introduce a materially different magnitude of impact?*	1. No, the implementation of the LoD is not anticipated to introduce any new impacts or impact pathways which have not already been assessed within the chapter which assesses Option A. 2. No, the magnitude of direct effects on offshore bats is not anticipated to be materially affected by WTG or OSS micro-siting choices or implementation of the LoD as set out in **Table 3**.
	WTGs	100 m from the centre point of each WTG location		
	OSSs	100 m from the centre point of each OSS location		
Impact 2: Collision	Generating station Note – includes WTGs, IACs and interconnectors		*1 Does the proposed LoD (locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor).* *2. Does the proposed LoD (locational flexibility) introduce a materially greater magnitude of impact?*	1. No, the implementation of the LoD is not anticipated to introduce any new impacts or impact pathways which have not already been assessed within the chapter which assesses Option A. 2. No, the magnitude of direct effects on offshore bats is not anticipated to be materially affected by WTG or OSS micro-siting choices.
	WTGs	100 m from the centre point of each WTG location		
	OSSs	100 m from the centre point of each OSS location		
Impact 3: Lighting	Generating station Note – includes WTGs, IACs and interconnectors		*1 Does the proposed LoD (locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor).* *2. Does the proposed LoD (locational flexibility) introduce a materially greater magnitude of impact?*	1. No, the implementation of the LoD is not anticipated to introduce any new impacts or impact pathways which have not already been assessed within the chapter which assesses Option A. 2. No, the magnitude of direct effects on offshore bats is not anticipated to be materially affected by WTG or OSS micro-siting choices or implementation of the LoD as set out in **Table 3**.
	WTGs	100 m from the centre point of each WTG location		
	OSSs	100 m from the centre point of each OSS location		