



Environmental Impact Assessment Report

Volume 4

Appendix 17.2 Representative Scenario and Limits of Deviation Assessment





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APPENDIX 17.2 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 CO₂ 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.

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- 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 Aviation, Military and Radar this analysis for construction and operation and maintenance (O&M) phase impacts is presented in **Table 1** and **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.
- 11. 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.
- 12. 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.
- 13. 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 : Potential impact on Dublin Airport Instrument Flight Procedures (IFPs) due to	Generating station (including WTGs, inter- array cables (IACs), interconnectors)	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
presence of wind turbines.	Permanent infrastructure Installation of WTGs Temporary infrastructure Use of construction infrastructure (e.g. cranes) to install WTGs Offshore export cables Temporary infrastructure Use of construction infrastructure (e.g. cranes) to install offshore export cables	75 wind turbines with maximum tip height up to 288 m above lowest astronomical tide (LAT) Up to 288 m above LAT	60 wind turbines with maximum tip height up to 314 m above LAT Up to 314 m above LAT > 90 m above el (amsl) in	The temporary disturbance relates to use of construction infrastructure (e.g. cranes) that could conceivably extend beyond the maximum turbine tip height during WTG installation. It should be noted however that, in accordance with the Project Description, it is not planned to use cranes, or any other lifting systems, that will extend above the maximum blade tip height of the WTGs. WTG Option B forms the representative scenario as this represents the greatest level of effect on aviation, and therefore WTG Option B forms the presentational basis of the assessment for Impact 1: Potential impact on Dublin Airport Instrument Flight Procedures (IFPs) due to presence of wind turbines. WTG Option A (despite having an increased number of WTGs) as the option with the lower height of potential structures would result in a lower level of disturbance and would not introduce new impacts, or an impact of greater magnitude. The offshore export cable routes will only have an effect on aviation if any of the construction structures (e.g. cranes) are > 90 m amsl in height. However, in accordance with the Project Description, it is not planned to use cranes, or any other offshore cable route	 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. Are there infrastructure layout options (permanent or temporary) which may introduce a materially different magnitude of impact? Are there infrastructure layout options (permanent or temporary) which may introduce a material change in the sensitivity of the receptor(s) (greater or lesser)? Are there alternative installation methods which may introduce a materially different magnitude of impact? Are there alternative installation methods which may introduce a materially different magnitude of impact? Are there alternative installation methods which may introduce a materially different magnitude of impact? Are there alternative installation methods which may introduce a materially different magnitude of impact? Are there alternative installation methods which may introduce a materially different magnitude of impact? Are there alternative installation methods which may introduce a materially different magnitude of impact? 	 No, WTG Option A proposed mitigation m appropriately, immate Therefore, WTG Option assessment with WTG No, WTG Option A magnitude for Impact to Table 17.10 in Cha 90 m amsl in height w charts and reported to three months prior to of database of tall structu than 90 m in height is route operation of airc Option A results in the Option B. Furthermore, the prop significant effects app forward. Therefore, W for the assessment wi different. No, WTG Option A receptor that is being a sensitivity considers the influenced by details of WTG Option B forms to with WTG Option A construction height of the WTGs be installation of the offsh introduce new impact accordance with the P cranes, or any other life maximum blade tip he installation of the offsh Description changes in construction phase wite the service of the with the period output of the offsh Description changes in construction phase wite the service of the with the period output of the offsh Description changes in construction phase wite the service of the wite of the offsh Description changes in construction phase wite the service of the wite of the offsh Description changes in construction phase wite the service of the wite of the offsh Description changes in construction phase wite the service of the wite of the wite of the offsh Description changes in construction phase wite the service of the wite of th

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would not introduce any new impacts. The neasures address likely significant effects erial of the layout brought forward. on B forms the presentational basis for the G Option A conclusions being no different.

would not give rise to a materially different 1. This can be demonstrated by reference **apter 17** which shows that all structures > *i*Il need to be charted on aeronautical to the Irish Aviation Authority (IAA) at least construction, for input into the IAA's ures in Ireland. Any object which is higher considered to have significance for the encraft in Irish airspace; consequently, WTG e same magnitude of impact as WTG

bosed mitigation measures address likely propriately, immaterial of the layout brought /TG Option B forms the presentational basis ith WTG Option A conclusions being no

will not influence the sensitivity of the assessed. As set out in **Section 17.4**, he value of the receptor, which is not or characteristics of the project. Therefore, the presentational basis for the assessment onclusions being no different.

mpact 1, if the construction infrastructure e to extend above the maximum blade tip eing installed, or > 90 m amsl during hore export cables, this could potentially receptor pathways. However, in Project Description, it is not planned to use ifting systems, that will extend above the eight of the WTGs or > 90 m amsl during hore export cables. If the Project in this regard, the use of cranes during the ill require this new impact to be assessed.



Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)	
						 5. No, unless the conswere to extend above being installed, or > 9 export cables; (see ab 6. No, sensitivity consinfluenced by details of a sensitivity construction)
Impact 2: Potential impact on low flying (including Irish Coastguard (IRCG) SAR	Generating station (including WTGs, inter- array cables (IACs), interconnectors)	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
helicopter operations) due to presence of obstacles	Permanent infrastructure			The temporary disturbance	1. Are there infrastructure	1. No, WTG Option A
(cranes, stationary wind turbines, offshore substation structure (OSS))	Installation of WTGs	75 wind turbines with maximum tip height up to 288 m above LAT	60 wind turbines with maximum tip height up to 314 m above LAT	relates to use of construction infrastructure (e.g. cranes) that could conceivably extend beyond the maximum turbine tip height during WTG installation.	layout options (permanent or temporary) which may introduce new impacts? Note - this could be a new impact entirely or the introduction of an existing	proposed mitigation m appropriately, immate Therefore, WTG Optio assessment with WTC 2. No, WTG Option A
	Temporary infrastructure			that, in accordance with the	receptor.	to Table 17.10 in Cha
	Use of construction infrastructure (e.g. cranes) to install WTGs	Up to 288 m above LAT	Up to 314 m above LAT	Project Description, it is not planned to use cranes, or any other lifting systems, that will extend above the maximum	2. Are there infrastructure layout options (permanent or	90 m amsl in height w charts and reported to three months prior to database of tall struct
	Offshore export cables			blade tip height of the WTGs.	temporary) which may introduce a materially different	than 90 m in height is
	Temporary infrastructure			WTG Option B forms the representative scenario as this	magnitude of impact?	route operation of airc
	Use of construction infrastructure (e.g. cranes) to install offshore export cables	All structures > mean sea leve height	> 90 m above el (amsl) in	represents the greatest level of effect on aviation, and therefore WTG Option B forms the presentational basis of the assessment for Impact 2: Potential impact on low flying (including IRCG SAR helicopter operations) due to presence of obstacles (cranes, stationary wind turbines, OSSs) in this chapter. WTG Option A (despite having an increased number of WTGs) as the option with the lower height of potential structures would result in a lower level of	 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? 	Option B. Furthermore, the prop significant effects app forward. Therefore, W for the assessment with different. 3. No, WTG Option A receptor that is being sensitivity considers t influenced by details WTG Option B forms with WTG Option A co 4. Yes, in relation to I
						height of the WTGs be

struction infrastructure (such as cranes) the maximum blade tip height of the WTGs 00 m amsl during installation of the offshore bove).

siders the value of the receptor, which is not or characteristics of the project (see above).

a would not introduce any new impacts. The neasures address likely significant effects erial of the layout brought forward. on B forms the presentational basis for the G Option A conclusions being no different.

a would not give rise to a materially different 2. This can be demonstrated by reference **apter 17** which shows that all structures > vill need to be charted on aeronautical to the Irish Aviation Authority (IAA) at least construction, for input into the IAA's tures in Ireland. Any object which is higher a considered to have significance for the encraft in Irish airspace; consequently, WTG the same magnitude of impact as WTG

posed mitigation measures address likely propriately, immaterial of the layout brought VTG Option B forms the presentational basis ith WTG Option A conclusions being no

will not influence the sensitivity of the assessed. As set out in **Section 17.4**, the value of the receptor, which is not or characteristics of the project. Therefore, the presentational basis for the assessment onclusions being no different.

mpact 2, if the construction infrastructure e to extend above the maximum blade tip eing installed, or > 90 m amsl during



Impact Relevant	nt project details	Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)	
		introduce new impacts, or an impact of greater magnitude. The offshore export cable routes will only have an effect on aviation if any of the construction structures (e.g. cranes) are > 90 m amsl in height. However, in accordance with the Project Description, it is not planned to use cranes, or any other offshore cable route infrastructure > 90 m amsl.	6. Are there alternative installation methods which may materially alter the sensitivity of the relevant receptor(s) (greater or lesser).	installation of the offs introduce new impact accordance with the F cranes, or any other I maximum blade tip he installation of the offs Description changes construction phase w 5. No, unless the con were to extend above being installed, or > 9 export cables; (see al 6. No, sensitivity cons influenced by details

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 : Potential impact on Dublin Airport ATC radar due to presence of wind	Generating station (including WTGs, inter- array cables (IACs), interconnectors)	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
turbines.	Permanent infrastructure			Adverse effects on ATC radar are	1. Are there infrastructure	1. No, WTG Option A
	Operation of WTGs	75 wind turbines with maximum tip height up to 288 m above LAT	60 wind turbines with maximum tip height up to 314 m above LAT	only possible if the wind turbine blades are moving; therefore, this impact is applicable to the operational phase only. ATC radars are primarily looking to identify moving targets; consequently, rotation of the wind turbine blades mimics the movements of real aircraft resulting in unwanted radar clutter which can confuse air traffic controllers making it difficult to differentiate between aircraft and those radar returns resulting from the detection of wind turbines. Furthermore, the appearance of multiple false targets in close proximity can generate false aircraft tracks and seduce those returns from real aircraft away from the true aircraft position.	 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 	proposed mitigation m appropriately, immate Therefore, WTG Option assessment with WTC 2. No, WTG Option A magnitude for Impact to the fact that, as Op than Option A's WTG less visible to the Dub smaller). Consequent less, magnitude of im WTG Option B forms with WTG Option A co 3. No, WTG Option A receptor that is being sensitivity considers t

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shore export cables, this could potentially t receptor pathways. However, in Project Description, it is not planned to use lifting systems, that will extend above the eight of the WTGs or > 90 m amsl during shore export cables. If the Project in this regard, the use of cranes during the *i*ll require this new impact to be assessed.

estruction infrastructure (such as cranes) the maximum blade tip height of the WTGs 00 m amsl during installation of the offshore bove).

siders the value of the receptor, which is not or characteristics of the project (see above).

a would not introduce any new impacts, the neasures address likely significant effects erial of the layout brought forward. on B forms the presentational basis for the G Option A conclusions being no different.

a would not give rise to a materially different 1. This can be demonstrated by reference biton B's WTGs blade tip height are higher as, it follows that Options A's WTGs will be blin Airport ATC radar (due to being tly, WTG Option A results in the same, or pact.

the presentational basis for the assessment onclusions being no different, or less.

will not influence the sensitivity of the assessed. As set out in Section 17.4, the value of the receptor, which is not



Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Representative scenario(s) and notes / assumptionsRationale for representative scenario(s)	
				WTG Option B forms the representative scenario as this represents the greatest level of effect on aviation, and therefore WTG Option B forms the presentational basis of the assessment for Impact 1: Potential impact on Dublin Airport ATC radar due to presence of wind turbines in this chapter. WTG Option A would result in a lower level of disturbance and would not introduce new impacts, or an impact of greater magnitude.	change in the sensitivity of the receptor(s) (greater or lesser)?	influenced by details WTG Option B forms with WTG Option A c
Impact 2: Potential impact on Met Eireann Dublin Airport meteorological radar due	Generating station (including WTGs, inter- array cables (IACs), interconnectors)	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
to presence of wind turbines.	Permanent infrastructure			Adverse effects on meteorological	1. Are there infrastructure 1. No, WTG C	1. No, WTG Option A
	Operation of WTGs	75 wind turbines with maximum tip height up to 288 m above LAT	60 wind turbines with maximum tip height up to 314 m above LAT	radar are only possible if the wind turbine blades are moving; therefore, this impact is applicable to the operational phase only. Impacts to meteorological radar can occur in several ways ranging from contamination of the quality of the radar data to loss of meteorological data altogether. More specifically, the presence of WTGs can create significant types of interference to weather radar data; namely, blockage, reflectivity, multi-path scattering and clutter. WTG Option B forms the representative scenario as this represents the greatest level of effect on radar, and therefore WTG Option B forms the presentational basis of the assessment for Impact 2: Potential impact on Met Eireann Dublin Airport meteorological radar due to presence of wind turbines in this chapter. WTG Option A would result in a lower level of disturbance and would not introduce new impacts, or an impact of greater magnitude.	 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)? 	proposed mitigation in appropriately, immate Therefore, WTG Optia assessment with WTG 2. No, WTG Option A magnitude for Impact to the fact that, as Op than Option A's WTG less visible to the Met radar (due to them be results in the same, o WTG Option B forms with WTG Option A c 3. No, WTG Option A receptor that is being sensitivity considers t influenced by details WTG Option B forms with WTG Option A c

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or characteristics of the project. Therefore, s the presentational basis for the assessment conclusions being no different.

A would not introduce any new impacts; the measures address likely significant effects erial of the layout brought forward. tion B forms the presentational basis for the G Option A conclusions being no different.

A would not give rise to a materially different at 2. This can be demonstrated by reference ption B's WTGs blade tip height are higher Gs, it follows that Options A's WTGs will be et Eireann Dublin Airport meteorological eing smaller). Consequently, WTG Option A or less, magnitude of impact.

s the presentational basis for the assessment conclusions being no different, or less.

A will not influence the sensitivity of the g assessed. As set out in **Section 17.4**, the value of the receptor, which is not or characteristics of the project. Therefore, s the presentational basis for the assessment conclusions being no different.



4 Limit of Deviation Assessment

- 14. 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.
- 15. 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.
Inter array cables (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.
Landfall	The offshore export cable control (OLCC) outside of the array site.
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

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- 16. For the purposes of the EIAR, the main chapter for aviation, military and radar 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.
- 17. For aviation, military and radar 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.

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Table 4 Limit of deviation assessment - construction phase impacts

Impact	Relevant project element	Limit of deviation	Questions to demonstrate assessment has considered all scenarios	
Impact 1: Potential impact	Generating station		1. Does the proposed LoD (locational flexibility) introduce new	1. No, the implementa impact receptor pathy as part of the assess
on low flying (including IRCG SAR helicopter operations) due to	WTGs	100 m from the centre point of each WTG location	impacts? (i.e. the introduction of an existing impact pathway to a new receptor).	
presence of obstacles (cranes, stationary wind	OSSs	100 m from the centre point of each OSS location	^{tt} 2. Does the proposed LoD (locational flexibility) introduce a materially greater magnitude of impact?	2. No, potential impace based on the upper li cranes), which is una
turbines, OSSS)	Offshore export cables (including cable protection)	250 m either side of the preferred alignment within the array site.		
		The offshore export cable corridor (OECC) outside of the array site.		

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 : Potential impact on Dublin Airport ATC radar due to presence of wind turbines.	Generating station WTGs	100 m from the centre point of each WTG location	 Does the proposed LoD (locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor). Does the proposed LoD (locational flexibility) introduce a materially greater magnitude of impact? 	 No, the implementation impact receptor pathwas part of the assessance of the assessance of the assessance of the assessment of the assessment.

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tation of the LoD does not introduce any new ways that have not already been considered sment.

act on aviation receptors has been calculated limit for construction infrastructure (e.g. affected by the proposed LoDs.

tation of the LoD does not introduce any new ways that have not already been considered ment.

ct on the Dublin Airport ATC radar has been the upper limit of WTGs within the offshore therefore, the proposed LoD for these automatically taken into account as part of