



Environmental Impact Assessment Report

Volume 4

Appendix 6.2 Representative Scenario and Limits of Deviation Assessment





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APPENDIX 6.2 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 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 CWP Project, significant and rapid progression in wind farm technology development, potential changes in environmental conditions and in policy and legislation, CWPL 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, 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.

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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 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 marine geology, sediments and coastal processes this analysis for construction and 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 scena	rio(s)	
Impact 1: Temporary disturbance of the seabed resulting from pre-installation methods and	Array site (including WTGs, OSSs and offshore export cables within the array site), offshore export cables (including transition zone)	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Respons	
effects, cable and monopile	Installation methods and e	effects		The temporary disturbance of the seabed can	1. Are there infrastructure layout	1. No, W	
installation leading to increases in	Boulder clearance: array site seabed clearance area (m ²)	2,556,000 - 2,934,000	2,494,000 - 2,772,000	increase local suspended sediment concentrations during pre-installation methods and effects, cable and monopile installation (source); the sediments liberated during construction are transported in the	options (permanent or temporary) which may introduce new impacts? Note - this could be a new impact	impacts part of th	
suspended sediment concentrations, and associated deposition.	Boulder clearance: OECC seabed clearance area (m ²)	2,220,000 - 2,616,000	2,220,000 - 2,616,000	direction of the prevailing tidal flow (pathway) and are then deposited on the seabed (receptor).	entirely or the introduction of an existing impact pathway to a new receptor.	2. No, W materiall can be d assessm	
	Pre-lay grapnel run along IAC (m ²)	1,911,000 - 2,214,000	1,791,000 - 2,079,000	Offshore, WTG Option A forms the representative scenario as this represents the greatest level of temporary seabed disturbance and therefore the greatest volume of liberated sediment. Therefore WTG Option A forms the presentational basis of the assessment for Impact 1 in this chapter. It should be noted that the pre-lay grapnel run along IAC and OECC footprint is equivalent to the IAC and OECC cable installation footprint. For boulder clearance, the use of a displacement plough forms the presentational basis of this assessment as this represents the greatest level of temporary sediment disturbance. The use of a subsea grab is typically used for relocating larger boulders or boulders located on a slope and thus would result in a lower level of disturbance and would not introduce new impacts, or an impact of greater magnitude. For cable installation, the use of jetting forms the presentational basis of this assessment as it typically results in greater sediment suspension, introducing the potential for distribution of greater volumes of material over a larger spatial area than other cable laying techniques which may be employed during construction. The use of other methods would result in a lower level of disturbance and would not introduce new impacts, or an impact of greater magnitude. Similarly, within the transition zone, the shallow water wheeled jet trenching system will form the presentational basis of this assessment.	2. Are there infrastructure layout options (permanent or temporary)	chapter) surficial the total	
	Pre-lay grapnel run along OECC (m ²)	1,890,000 - 2,187,000	1,890,000 - 2,187,000		greatest volume of liberated sediment. Therefore WTG Option A forms the presentational basis of the	which may introduce a materially different magnitude of impact?	Option A the asse
	IAC and interconnector cable installation: Total seabed disturbed (m ²)	1,911,000 - 2,214,000	1,791,000 - 2,079,000		3. Are there infrastructure layout options (permanent or temporary) which may introduce a material	be lower 3. No, W	
	Offshore export cable installation: Total seabed disturbed (m ²)	1,890,000 - 2,187,000	1,890,000 - 2,187,000		change in the sensitivity of the receptor(s) (greater or lesser)?	sensitivit As set or chapter, consider	
	Total area of seabed in transition zone affected by installation of cables using either open cut trenching or a shallow water trenching tool (m ²)	108,000	108,000		 temporary sediment disturbance. The use of a subsea grab is typically used for relocating larger boulders or boulders located on a slope and thus would result in a lower level of disturbance and would not introduce new impacts, or an impact of greater magnitude. For cable installation, the use of jetting forms the presentational basis of this assessment as it methods which may introduce impacts? 5. Are there alternative installation impacts. 6. Are there alternative installation. 	 4. Are there alternative installation methods which may introduce new impacts? 5. Are there alternative installation methods which may introduce a 	adaptabi influence project. presenta
	Total area of disturbed sediment for offshore construction activities (m ²)	10,059,000	9,762,000			materially different magnitude of impact? 6. Are there alternative installation	5. No, in
	Total volume of WTG monopile drill arisings (m ³)	24,516	23,220		methods which may materially alter the sensitivity of the relevant receptor(s) (greater or lesser).	methods materiall	
	Boulder clearance methods	Displacement plough and subsea grab	Displacement plough and subsea grab		methods would result in a lower level of disturbance and would not introduce new impacts, or an impact		6. No, in methods alter the
	Cable installation options	Ploughing, trenching, jetting including open cut for landfall	Ploughing, trenching, jetting including open cut for landfall				

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WTG Option B would not introduce any new s that have not directly been considered as the assessment.

WTG Option B would not give rise to a ally different magnitude for Impact 1. This demonstrated by reference to the baseline sment (**Section 6.6** of the main EIAR r) which show homogeneity in terms of al sedimentology across the Array site, as al area of disturbed sediment is larger for A, it will form the presentational basis for sessment with WTG Option B anticipated to er in terms of magnitude of impact.

WTG Option B will not influence the vity of the receptor that is being assessed. out in **Section 6.4.3** of the main EIAR r, receptor sensitivity is determined by ering a combination of value, tolerance, bility, and recoverability, which is not ced by details or characteristics of the the therefore, WTG Option A forms the tational basis for the assessment.

in relation to Impact 1, where alternative ds were used these would not introduce new receptor pathways.

in relation to Impact 1, where alternative ds were used these would not introduce a ally different magnitude of impact.

in relation to Impact 1, where alternative ds were used these would not materially e sensitivity of the receptor.



Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)		
				For monopile installation activities WTG Option A forms the representative scenario as this represents the anticipated greatest volume of disturbed sediment. Therefore Option A forms the presentational basis of the assessment for Impact 1 monopile installation activities in this chapter. The total volume of disturbed sediment (drill arisings) for monopile installation activities based on this representative scenario is calculated to be 24,516 m ³ .			
				The total area of disturbed sediment for construction activities based on this representative scenario is calculated to be 10,059,000 m ² . The total volume of drill arisings is 24,516 m ³ .			
Impact 2: Temporary disturbance of the seabed resulting from pre-sweeping /	Array site (including WTGs, OSSs and offshore export cables within the array site), and offshore export cable corridor	WTG Option A	WTG Option B	The temporary disturbance of the seabed can increase local suspended sediment concentrations during pre-sweeping / sand wave levelling and subsequent dredge disposal activities (source); the sediments liberated during these activities are transported in the direction of the prevailing tidal	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	1. No, W impacts part of th 2. No, W materiall	
sand wave levelling	Installation methods and e	effects		 seabed (receptor). WTG Option B forms the representative scenario as this represents the greatest level of temporary seabed disturbance. WTG Option A would result in a lower level of disturbance. Therefore Option B forms the presentational basis of the assessment for Impact 2 in this chapter. For Pre-sweeping / sand wave levelling, the TSHD method forms the presentational basis of this assessment as this has the potential to liberate greater volume of sediment during dredging and disposal activities compared to the use of mass flow excavation and therefore would result in a lower 	receptor.	can be d	
activities leading to increases in suspended sediment	Pre-sweeping / Sand wave levelling: array site sand wave clearance total area (m ²)	205,250 - 259,250	220,000 – 277,500		 WTG Option B forms the representative scenario as this represents the greatest level of temporary seabed disturbance. WTG Option A would result in a lower level of disturbance. Therefore Option B forms the presentational basis of the assessment for Impact 2 in this chapter. For Pre-sweeping / sand wave levelling, the TSHD method forms the presentational basis of this assessment as this has the potential to liberate greater volume of sediment during dredging and disposal activities compared to the use of mass flow excavation and therefore would result in a lower level of disturbance and would not introduce new 	2. Are there infrastructure layout options (permanent or temporary) which may introduce a materially different magnitude of impact?	assessm chapter) surficial the total Option B
concentrations, and associated deposition.	Pre-sweeping / Sand wave levelling: OECC sand wave clearance total area (m ²)	198,550	198,550			3. Are there infrastructure layout options (permanent or temporary)	the asse be lower 3. No, W
	Total area disturbed during pre-sweeping / sand wave levelling (m ²)	457,800	476,050			change in the sensitivity of the receptor(s) (greater or lesser)?	sensitivit As set of chapter, consider
	Pre-sweeping / sand wave levelling methods	(TSHD) and mass flow excavation	(TSHD) and mass flow excavation			methods which may introduce new impacts?	adaptabi influence project. 7 presenta
		s t	The total area of disturbed sediment for pre- sweeping / sand wave levelling activities based on this representative scenario is calculated to be $476,050 \text{ m}^2$.	5. Are there alternative installation methods which may introduce a materially different magnitude of impact?	4. No, in pre-swee used the receptor		
					6. Are there alternative installation methods which may materially alter the sensitivity of the relevant	5. No, in pre-swee would no magnitue	

WTG Option A would not introduce any new ts that have not directly been considered as the assessment.

WTG Option A would not give rise to a ially different magnitude for Impact 2. This e demonstrated by reference to the baseline sment (**Section 6.6** of the main EIAR er) which show homogeneity in terms of al sedimentology across the Array site, as tal area of disturbed sediment is larger for n B, it will form the presentational basis for sessment with WTG Option A anticipated to ver in terms of magnitude of impact.

WTG Option A will not influence the vity of the receptor that is being assessed. out in **Section 6.4.3** of the main EIAR er, receptor sensitivity is determined by ering a combination of value, tolerance, ability, and recoverability, which is not ced by details or characteristics of the t. Therefore, WTG Option B forms the tational basis for the assessment.

in relation to Impact 2, where alternative veeping / sand wave levelling methods were hese would not introduce new impact tor pathways.

in relation to Impact 2, where alternative veeping / sand wave levelling methods these not introduce a materially different tude of impact.



Impact	Relevant project details	i		Representative scenario(s) and notes / assumptions	Rationale for representative scena	rio(s)
						6. No, in pre-swe these we the rece
Impact 3: Alteration to seabed morphology during seabed preparation	See Impact 2 for relevant	project details		 During seabed preparation, pre-sweeping / sand wave levelling (source) will directly impact upon seabed morphology (receptor). WTG Option B forms the representative scenario as this represents the greatest area of seabed level alteration. WTG Option A would result in a lower level of disturbance as it has a smaller area of seabed alteration. Therefore Option B forms the presentational basis of the assessment for Impact 3. For Pre-sweeping / sand wave levelling methods, the TSHD and mass flow excavation methods are anticipated to have the same impact on the seabed morphology and therefore a representative scenario is not required. The total area of altered seabed for Pre-sweeping / Sand wave levelling activities based on this representative scenario is calculated to be 476,050 m². 	 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 new impacts? 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 materially alter the sensitivity of the relevant receptor(s) (greater or lesser). 	 No, W impacts part of the 2. No, W material Option E assessing the total Option E No, W sensitivity As set of chapter, consider adaptab influence project. Presenta No, in of altern impacts No, in of altern material No, in of altern material No, in of altern sensitivity
Impact 4: Localised alteration to the hydrodynamic, wave and sediment	WTGs, OSSs and offshore export cables within the array site), and offshore export cable corridor		During construction, specifically during the installation of WTG structures, OSS, scour protection, cable installation and installation of cable protection, anchoring of vessels and deployment of jack up vessels on site and the use of temporary structures at the landfall (source) has the potential to alter the hydrodynamic, wave and	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.	 No, W impacts. anchorir regardle No, W 	
regimes and coastal	Temporary infrastructure			sediment regimes with potential downstream effects		material Option A
processes.	Vessel anchoring parameters: Total impact area for WTG and OSS installation (m ²)	280,800	237,600	on local coastal processes (receptors). WTG Option A forms the representative scenario for the design parameters assessed for vessel	2. Are there infrastructure layout options (permanent or temporary) which may introduce a materially different magnitude of impact?	assessm wave an processe

in relation to Impact 2, where alternative veeping / sand wave levelling were used would not materially alter the sensitivity of ceptor.

WTG Option A would not introduce any new ts that have not directly been considered as f the assessment.

WTG Option A would not give rise to a fally different magnitude for Impact 3. WTG on B forms the presentational basis for the sment of sand wave clearance activities as tal area of disturbed sediment is larger for on B.

WTG Option A will not influence the ivity of the receptor that is being assessed. tout in **Section 6.4.3** of the main EIAR er, receptor sensitivity is determined by dering a combination of value, tolerance, ability, and recoverability, which is not need by details or characteristics of the t. Therefore, WTG Option B, forms the intational basis for the assessment.

in relation to Impact 3, as described, the use rnative methods will not introduce new ts.

in relation to Impact 3, as described, the use rnative methods will not introduce a ially different magnitude of impact.

in relation to Impact 3, as described, the use rnative methods will not materially alter the ivity of the receptor.

WTG Option B would not introduce any new ts. The impacts associated with vessel ring requirements remain the same fless of the infrastructure layout options.

WTG Option B would not give rise to a ially different magnitude for Impact 4. WTG on A forms the presentational basis for the sment of alterations to the hydrodynamic, and sediment regimes and coastal sses.



Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)		
	Vessel anchoring parameters: Total impact area for inter array and interconnector cable installation (m ²)	371,520	280,800	hydrodynamic, wave and sediment regimes and coastal processes this represents the greatest total impacted area, and therefore WTG Option A forms the presentational basis of the assessment for Impact 4 in this chapter.or we content of the assessment for Impact 4 in this chapter.At the landfall, cable ducts will be installed by open cut.or we cut.The total impacted area based on this representative scenario is calculated to be 1,296,040 m².5 	3. Are there infrastructure layout options (permanent or temporary) which may introduce a material change in the sensitivity of the	y) As set out chapter, r considerir	
	Vessel anchoring parameters: Total impact area export cable installation (m ²)	630,720	630,720		Impact 4 in this chapter. 4. Are there alternative installa	<i>4. Are there alternative installation methods which may introduce new</i>	adaptabili influenced project. T presentat
	Total impacted area due to vessel anchoring for array site and offshore export cable corridor (m ²)	1,283,040	1,149,120		impacts? 5. Are there alternative installation methods which may introduce a materially different magnitude of impact?	4. No, in r installation introduce have not a assessme	
	Landfall	Open cut			6. Are there alternative installation	5. No, in r methods materially	
	Installation method and ef	ffects			methods which may materially alter		
	Total seabed disturbed by cofferdam (m ²)	6,100			the sensitivity of the relevant receptor(s) (greater or lesser).	6. No, in r	
	Total area of seabed in transition zone affected by support structures (m ²)	6	5,900			of alterna sensitivity	
	Total impacted area for landfall construction activities (m ²)	13,000					

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: Localised alteration of hydrodynamic	Array site (including WTGs, OSSs and offshore export cables within the array site), and offshore export cable corridor	WTG Option A	WTG Option B		Questions to demonstrate assessment has considered all scenarios	Response
and wave conditions	Permanent infrastructure			The alteration of hydrodynamic and wave conditions across the site and indirect effects on the sediment transport regime and coastal processes due to the presence of permanent windfarm infrastructure (source) has the potential to directly alter the hydrodynamic, wave and sediment regimes including	 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 	1. No, WTG Option B
across the site and effects on the sediment	Total WTG monopile seabed area take (with scour protection) across the array site (m ²)	273,000	218,400			have not directly been of 2. No, WTG Option B w magnitude for Impact 1 basis for the assessme and wave conditions a sediment transport regi
transport regime and coastal processes	Total OSS monopile seabed area take (with scour protection) across the array site (m ²)	10,920	10,920			
	Total area of seabed covered by cable protection (m ²)	208,600	208,600			receptor.

WTG Option B will not influence the vity of the receptor that is being assessed. out in **Section 6.4.3** of the main EIAR r, receptor sensitivity is determined by ering a combination of value, tolerance, bility, and recoverability, which is not ced by details or characteristics of the the therefore, WTG Option A, forms the tational basis for the assessment.

in relation to Impact 4, the two cable duct ation methods at the landfall would not ice any new impact receptor pathways that ot already been considered as part of the sment.

in relation to Impact 4, where alternative ds were used these would not introduce a ally different magnitude of impact.

in relation to Impact 4, as described, the use mative methods will not materially alter the vity of the receptor.

B would not introduce any new impacts that en considered as part of the assessment

B would not give rise to a materially different at 1. WTG Option A forms the presentational ment of localised alteration of hydrodynamic across the site and indirect effects on the egime and coastal processes.



Impact	Relevant project details			Representative scenario(s) and notes / assumptionsRationale for representative scenario(s)		
	Total area of seabed covered by export cable protection (m ²)	105,000	105,000	effects on local coastal processes (receptor).	2. Are there infrastructure layout options (permanent or temporary) which may	3. No, WTG Option receptor that is being a main EIAR chapter,
	Total seabed area take (m ²)	597,520	542,920	For permanent infrastructure	introduce a materially different	considering a combination
	Onshore substation		·	offshore and at the onshore	magnitude of impact?	recoverability, which is of the project. Therefo
	Permanent infrastructure			substation WTG Option A forms the representative scenario as	3. Are there infrastructure	basis for the assessm
	Onshore substation: length of combi-wall below the HWM (requiring marine piling) (m)	150		this represents the greatest total seabed area take. Therefore Option A forms the	layout options (permanent or temporary) which may introduce a material change in the sensitivity of the receptor(s)and sed	and wave conditions a sediment transport reg4. No, in relation to Imp these would not introduced
	Onshore substation: Total length of new revetments (m)	150		presentational basis of the assessment for Impact 1 in this chapter.		
	Total length of perimeter structures (m)	300		The total impacted area based	4. Are there alternative installation methods which may	5. No, in relation to Imp these would not intro
	Area of reclaimed land at onshore substation (m ²)	1,800		on this representative scenario is calculated to be 599,620 m ² .	introduce new impacts?	impact.
				At the onshore substation, the total length of perimeter structures based on this representative scenario is calculated to be 300 m.	 5. Are there alternative installation methods which may introduce a materially different magnitude of impact? 6. Are there alternative installation methods which may 	6. No, in relation to Imp these would not materi
					materially alter the sensitivity of the relevant receptor(s) (greater or lesser).	

n B will not influence the sensitivity of the g assessed. As set out in **Section 6.4.3** of the er, receptor sensitivity is determined by bination of value, tolerance, adaptability, and n is not influenced by details or characteristics efore, WTG Option A forms the presentational sment of localised alteration of hydrodynamic is across the site and indirect effects on the regime and coastal processes.

mpact 1, where alternative methods were used oduce new impact receptor pathways.

mpact 1, where alternative methods were used ntroduce a materially different magnitude of

mpact 1, where alternative methods were used terially alter the sensitivity of the receptor.



Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative so	enario(s)
Impact 2: Scour around installed structures and associated sediment transportation and deposition leading to changes in seabed composition, structure, or morphology.	See Impact 1 for relevant project de	etails.		Scour around implemented scour protection systems (e.g. edge scour) and scour around other seabed infrastructure (e.g. cable protection) and associated sediment transportation and deposition (source) can lead to changes in seabed composition, structure, and morphology (receptor). For permanent infrastructure offshore and at the onshore substation WTG Option A forms the representative scenario as this represents the greatest total seabed area take. Therefore Option A forms the presentational basis of the assessment for Impact 1 in this chapter. The total impacted area based on this representative scenario is calculated to be 599,620 m ² . At the onshore substation, the total length of perimeter structures based on this representative scenario is	 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? 	 No, WTG Option B whave not directly been of a second dire
Impact 3 : Operation and maintenance	Array site (including WTGs, OSSs and offshore export cables within the array site), and offshore export cable corridorWTG Option AWTG OTemporary Infrastructure		WTG Option B	 calculated to be 300 m. Vessel anchoring (source) can lead to scouring which directly impacts the seabed composition, structure and morphology and can lead to the 	 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. Are there infrastructure layout options (permanent or temporary) which may introduce new impacts? Note - this could be a new impact entirely or the 	these would not materia A single representative as the number of vesse under Option A and B.
	JUVs Peak vessel numbers	2	2	redistribution of liberated sediments via tidal currents	introduction of an existing	
	Service Operation Vessel Peak vessel numbers	1	1	(receptor).	impact pathway to a new receptor.	
				Both WTG Options require the		

B would not introduce any new impacts that en considered as part of the assessment

B would not give rise to a materially different at 2. WTG Option A forms the presentational ment of scour around installed structures and t transportation and deposition leading to composition, structure, or morphology.

h B will not influence the sensitivity of the g assessed. As set out in **Section 6.4.3** of the er, receptor sensitivity is determined by ination of value, tolerance, adaptability, and is not influenced by details or characteristics fore, WTG Option A forms the presentational ment of scour around installed structures and it transportation and deposition leading to composition, structure, or morphology.

npact 2, where alternative methods were used duce new impact receptor pathways.

npact 2, where alternative methods were used roduce a materially different magnitude of

npact 2, where alternative methods were used erially alter the sensitivity of the receptor.

ive scenario has been adopted for impact 3, ssels required for maintenance are the same B.



Impact	Relevant project details			Representative scenario(s) and notes / assumptions		Rationale for representative scenario(s)	
	Cable maintenance vessels Peak vessel numbers	2	2	representative	,	a 2. Are there infrastructure is layout options (permanent or	
	Auxiliary vessel Peak vessel numbers	3	3	ir	temporary) which may introduce a materially different magnitude of impact?		
	JUVs annual rounds	3	3]			
	Service Operation Vessel annual rounds	26	26			3. Are there infrastructure layout options (permanent or temporary) which may	
	CTVs annual rounds	1152	1152	1		introduce a material change in	
	Cable maintenance vessels annual rounds	1	1		the sensitivity of the receptor(s) (greater or lesser)?		
	Auxiliary vessel annual rounds	27	27		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).	



4 Limit of Deviation Assessment

- 14. As described in **Section 2** of this document, locational flexibility of permanent and temporary infrastructure is described as a Limit of Deviation (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.

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 cable200 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 offshore export cable corridor (OECC) outside of the array site				
Landfall					
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				
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				

Table 3 Defined limits of deviation.

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- 16. For the purposes of the EIAR, the main chapter for marine geology, sediments, and coastal processes assess 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 marine geology, sediments and coastal processes 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	Response
Impact 1: Temporary	Offshore cables		1. Does the proposed LoD	1. No, the implementati
disturbance of the seabed resulting from pre- installation methods and effects, cable and monopile	IACs and interconnector cables	100 m either side of the preferred alignment of each IAC and interconnector cable200 m from the centre point of each WTG location	(locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new	impact receptor pathwa as part of the assessme 2. No, temporary distur
installation leading to increases in suspended sediment concentrations, and associated deposition.	Offshore export cables	250 m either side of the preferred alignment within the array site.The offshore export cable corridor (OECC) outside of the array site	receptor). 2. Does the proposed LoD (locational flexibility) introduce	in suspended sediment has been assessed interconnector, and ex proposed LoD for these
	WTG monopile and scour protection	100 m from the centre point of each WTG location	a materially different magnitude of impact?	the LoD does not there impact.
Impact 2: Temporary	Offshore cables		1. Does the proposed LoD	1. No, the implementat
disturbance of the seabed resulting from pre-sweeping / sand wave levelling activities leading to	IACs and interconnector cables	100 m either side of the preferred alignment of each IAC and interconnector cable200 m from the centre point of each WTG location	(locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new	impact receptor pathwa as part of the assessme
activities leading to increases in suspended sediment concentrations, and associated deposition.	Offshore export cables	250 m either side of the preferred alignment within the array site. The offshore export cable corridor (OECC) outside of the array site	receptor). 2. Does the proposed LoD (locational flexibility) introduce a materially different magnitude of impact?	2. No, temporary distu sweeping / sand wave based on the upper limit export cable lengths wh project elements. The therefore alter the assig
Impact 3: Alteration to	Offshore cables	·	1. Does the proposed LoD	1. No, the implementat
seabed morphology during seabed preparation	IACs and interconnector cables	100 m either side of the preferred alignment of each IAC and interconnector cable200 m from the centre point of each WTG location	(locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new	impact receptor pathwa as part of the assessme 2. No, alteration to seal
	Offshore export cables	250 m either side of the preferred alignment within the array site The offshore export cable corridor (OECC) outside of the array site	receptor). 2. Does the proposed LoD (locational flexibility) introduce a materially different magnitude of impact?	on the upper limit for the cable lengths which fac elements. The impleme the assigned magnitude
Impact 4: Localised	Generating station		1. Does the proposed LoD	1. No, the implementat
alteration to the hydrodynamic, wave and sediment regimes and	WTG, monopile and scour protection	100 m from the centre point of each WTG location	(locational flexibility) introduce new impacts? (i.e. the introduction of an existing	impact receptor pathwa as part of the assessme
coastal processes.	OSS, monopile and scour protection	100 m from the centre point of each OSS location	impact pathway to a new receptor).	2. No, localised alter sediment regimes and
	Offshore cables		2. Does the proposed LoD	based on the upper infrastructure which fac
	IACs and interconnector cables	100 m either side of the preferred alignment of each IAC and interconnector cable200 m from the centre point of each WTG location	(locational flexibility) introduce a materially different magnitude of impact?	elements. The implementer the assigned magnitude

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

turbance of the seabed leading to increases ant concentrations and associated deposition d based on the upper limit for IAC, export cable lengths which factors in the ese project elements. The implementation of erefore alter the assigned magnitude of the

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

turbance of the seabed resulting from preave levelling activities has been assessed nit for the Array site, IAC, interconnector, and which factors in the proposed LoD for these he implementation of the LoD does not signed magnitude of the impact.

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

abed morphology has been assessed based he array site, IAC, interconnector, and export actors in the proposed LoD for these project nentation of the LoD does not therefore alter ide of the impact.

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

teration to the hydrodynamic, wave and nd coastal processes has been assessed er limit of the temporary and permanent actors in the proposed LoD for these project nentation of the LoD does not therefore alter ide of the impact.



Impact	Relevant project element	Limit of deviation	Questions to demonstrate assessment has considered all scenarios	Response
	Offshore export cables	250 m either side of the preferred alignment boundary within the array site The offshore export cable corridor (OECC) outside of the array site		
	Landfall	Landfall		
	Intertidal cable ducts (and associated offshore export cables within the ducts)	The OECC		
	Intertidal offshore export cables (non-ducted sections)	The OECC		

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: Localised	Generating station		1. Does the proposed LoD	1. No, the implementati
alteration of hydrodynamic and wave conditions across the site and effects on the	WTG, monopile and scour protection	100 m from the centre point of each WTG location	(locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor).	impact receptor pathwa as part of the assessment2. No, localised alteratacross the site and ir
sediment transport regime and coastal processes	OSS, monopile and scour protection	100 m from the centre point of each WTG location		
	Offshore export cables		2 Doop the proposed LoD	regime and coastal pro upper limit for the arra
	IACs and interconnector cables	100 m either side of the preferred alignment of each IAC and interconnector cable200 m from the centre point of each WTG location	2. Does the proposed LoD (locational flexibility) introduce a materially different magnitude of impact?	lengths, and onshore su for these project eleme not therefore alter the a
	Offshore export cables	250 m either side of the preferred alignment within the array site The offshore export cable corridor (OECC) outside of the array site		
	Onshore substation			
	Location of onshore substation revetment perimeter structure	Defined LoD for sheet piling at toe of the revetment		
Impact 2: Scour around	Generating station		1. Does the proposed LoD	1. No, the implementati
installed structures and associated sediment transportation and	WTG, monopile and scour protection	100 m from the centre point of each WTG location	(locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor).	impact receptor pathwa as part of the assessm
deposition leading to changes in seabed	OSS, monopile and scour protection	100 m from the centre point of each OSS location		2. No, scour around ins transportation and de
	Offshore export cables			composition, structure,

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

ration of hydrodynamic and wave conditions indirect effects on the sediment transport processes has been assessed based on the array site, IAC, interconnector, export cable e substation which factors in the proposed LoD ments. The implementation of the LoD does e assigned magnitude of the impact.

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

installed structures and associated sediment deposition leading to changes in seabed re, or morphology has been assessed based



Impact	Relevant project element	Limit of deviation	Questions to demonstrate assessment has considered all scenarios	Response
composition, structure, or morphology	IACs and interconnector cables Offshore export 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 250 m either side of the preferred alignment within the array site The offshore export cable corridor (OECC) outside of the array site 	2. Does the proposed LoD (locational flexibility) introduce a materially different magnitude of impact?	on the upper limit for the cable lengths which fac elements. The impleme the assigned magnitude
Impact 3: Operation and maintenance	n/a		n/a	n/a

the array site, IAC, interconnector, and export factors in the proposed LoD for these project mentation of the LoD does not therefore alter ude of the impact.