Environmental Impact Assessment Report

Volume 3

Chapter 7 Marine Water Quality

codling wind park

Table of contents

7.1 Introduction 10
7.2 Consultation 11
7.3 Legislation, policy and guidance 12
7.4 Impact assessment methodology 13
7.5 Assumptions and limitations 25
7.6 Existing environment 25
7.7 Scope of the assessment 40
7.8 Assessment parameters 42
7.9 Primary mitigation measures 51
7.10 Impact assessment 53
7.11 Cumulative impacts 67
7.12 Transboundary impacts 68
7.13 Inter-relationships 68
7.14 Potential monitoring requirements 69
7.15 Impact assessment summary 69
7.16 References 74

List of tables

Table 7-1 Consultation responses relevant to marine water quality 11
Table 7-2 Data sources 18
Table 7-3 Qualitative descriptors for determining good environmental status (GES) under the MSFD (DHLGH, 2020) 21
Table 7-4 Criteria for determination of receptor sensitivity 22
Table 7-5 Criteria for determination of magnitude of impact 23
Table 7-6 Impact assessment matrix for determination of significance of effect 25
Table 7-7 WFD Waterbodies within 10 km of the offshore infrastructure 28
Table 7-8 List of protected areas within the water quality study area 33
Table 7-9 Marine water quality receptors to be considered in the Impact Assessment. 39
Table 7-10 Potential impacts scoped into the assessment 41
Table 7-11 Representative scenario summary 44
Table 7-12 Limited of deviation (LoD) summary 50
Table 7-13 Primary mitigation measures 51
Table 7-14 Inter-related effects (lifetime) assessment for Marine Water Quality 69
Table 7-15 Summary of potential impacts and residual effects 71

List of figures

Figure 7-1 Marine water quality study area 15
Figure 7-2 WFD protected areas...16
Figure 7-3 Designated sites 17

Abbreviations

Abbreviation	Term in full
ABP	An Bord Pleanála
ADD	Acoustic deterrent device
AL	Action level
CEA	Cumulative effects assessment
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CMS	Construction method statement
CO_2	Carbon dioxide
CWP	Codling Wind Park
CWPE	Codling Wind Park Extension
CWPL	Codling Wind Park Limited
DBT	Dibutyl tin
DECC	Department of the Environment, Climate and Communications
DHLGH	Department of Housing, Local Government and Heritage
EC	European Commission
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental management plan
EPA	Environmental Protection Agency
EPA-CSMU	Environmental Protection Agency Catchment Science & Management Unit
EQSD	Environmental Quality Standards Directive
EU	European Union
FRA	Flood risk assessment
GES	Good Environmental Status
GIS	Geographic information system
IAC	Inter-array cable
IAM	Impact assessment matrix

Abbreviation	Term in full
IGI	Institute of Geologists Ireland
IMO	International Maritime Organisation
INNS	Invasive non-native species
JNCC	Joint Nature Conservation Committee
JUV	Jack-up vessel
LAWPRO	Local Authority Waters Programme
LoD	Limit of deviation
MAC	Maritime Area Consent
MAP	Maritime Area Planning
MAPA	Maritime Area Planning Act 2021, as amended
MARPOL	International Convention for the Prevention of Pollution from Ships
MBT	Monobutyltin
MHWM	Mean high water mark
MHWS	Mean high water springs
MMMP	Marine mammal mitigation plan
MSDA	Marine safety demarcation area
MSFD	Marine Strategy Framework Directive
NBDC	National Biodiversity Data Centre
NEQ	Net explosive quantity
NIS	Natura Impact Statement
NM	Nautical mile
NMPF	National Marine Planning Framework
NPWS	National Parks and Wildlife Services
NRA	Navigational risk assessment
NTU	Nephelometric turbidity units
OECC	Offshore export cable corridor
OEMP	Operational environmental management plan
OfTI	Offshore transmission infrastructure
O&M	Operation and maintenance
OMB	Operations and maintenance base
OREDP	Offshore renewable energy development plan
OSPAR	Oslo-Paris Convention

Abbreviation	Term in full
OSS	Offshore substation structure
PAH	Polyaromatic hydrocarbons
PCB	Polychlorinated biphenyls
PD	Project description
PINS	Planning Inspectorate (UK)
PSA	Particle size analysis
PSU	Practical salinity units
RBMP	River basin management plan
SAC	Special Area of Conservation
SFPA	Sea Fisheries Protection Authority
S.I.	Statutory Instrument
SOPEP	Shipboard oil pollution emergency plan
SPA	Special Protection Area
SPM	Suspended particulate matter
SSC	Suspended sediment concentration
TJB	Transition joint bay
TBT	Tributyl tin
UK	United Kingdom
UV	Ultraviolet
UWWT	Urban wastewater treatment
UXO	Unexploded ordnance
WFD	Water Framework Directive
WTG	Wind turbine generator
ZoI	Zone of influence

Definitions

Glossary	Meaning
the Applicant	The developer, Codling Wind Park Limited (CWPL).
array site	The red line boundary area within which the wind turbine generators (WTGs), inter-array cables (IACs) and the Offshore Substation Structures (OSSs) are proposed.
Codling Wind Park (CWP) Project	The proposed development as a whole is referred to as the Codling Wind Park (CWP) Project, comprising of the offshore infrastructure, the onshore infrastructure and any associated temporary works.
Codling Wind Park Limited (CWPL)	A joint venture between Fred. Olsen Seawind (FOS) and Électricité de France (EDF) Renewables, established to develop the CWP Project.
EIA Directive	European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU).
Environmental Impact Assessment (EIA)	A systematic means of assessing the likely significant effects of a proposed project, undertaken in accordance with the EIA Directive and the relevant Irish legislation.
Environmental Impact Assessment Report (EIAR)	The report prepared by the Applicant to describe the findings of the EIA for the CWP Project.
landfall	The point at which the offshore export cables are brought onshore and connected to the onshore export cables via the transition joint bays (TJB). For the CWP Project, the landfall works include the installation of the offshore export cables within Dublin Bay out to approximately 4 km offshore, where water depths that are too shallow for conventional cable lay vessels to operate.
Marine Strategy Framework Directive (MSFD)	EC Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy.
offshore export cable corridor (OECC)	The area between the array site and the landfall, within which the offshore export cables will be installed along with cable protection and other temporary works for construction.
offshore infrastructure	The permanent offshore infrastructure, comprising of the WTGs, IACs, OSSs, Interconnector cables, offshore export cables and other associated infrastructure such as cable and scour protection.
onshore development area	The total footprint of the onshore transmission infrastructure (OTI) and associated temporary works, including the array site and the OECC.
onshore transmission infrastructure (OTI)	The onshore transmission assets comprising the TJBs, onshore export cables and the onshore substation. The EIAR considers both permanent and temporary works associated with the OTI.
spring neap tide	A period of moderate tides when the sun and moon are at right angles to each other, occurring approximately 7 days after the spring tide. These occur approx. twice a month.

Glossary	Meaning
spring neap tidal cycle	Length of time between sun and moon alignment where the tides start and end at spring neap levels, approx. 14 days (2 per month).
spring tide	Alignment of the sun, earth and moon, resulting in the greatest gravitational pull on the sea, and higher tides. These occur approx. twice a month.
transitional zone	The section between the offshore end of installed intertidal cable ducts, approximately 350 m from the high water mark (HWM), and the limit of operability for the cable lay vessel (CLV), approximately 4 km offshore. This zone represents the section of the OECC where water depths would be unsuitable for the draft of a typical offshore CLV.
Water Framework Directive (WFD)	EC Directive 2000/60/EC establishing a framework for Community action in the field of water policy.
WFD waterbody	An individual unit of a water feature used for monitoring and planning purposes.
WFD 1 nautical mile (NM) limit	Water Framework Directive (WFD) Coastal Waterbody unit within Irish waters. According to the WFD Article 2(7) "'Coastal water' means surface water on the landward side of a line, every point of which is at a distance of 1 NM on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters."
wind turbine generator	All the components of a wind turbine, including the tower, nacelle, and rotor.

7 MARINE WATER QUALITY

7.1 Introduction

1. Codling Wind Park Limited (hereafter 'the Applicant') is proposing to develop the Codling Wind Park (CWP) Project, which is located in the Irish Sea approximately 13–22 km off the east coast of Ireland, at County Wicklow.

2. This chapter forms part of the Environmental Impact Assessment Report (EIAR) for the CWP Project. The purpose of the EIAR is to provide the decision-maker, stakeholders and all interested parties with the environmental information required to develop an informed view of any likely significant effects resulting from the CWP Project, as required by the European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) (the EIA Directive).

3. This EIAR chapter describes the potential impacts of the CWP Project's offshore and onshore infrastructure on marine water quality during the construction, operation and maintenance and decommissioning phases.

4. In summary, this EIAR chapter:

- Details the Environmental Impact Assessment (EIA) scoping and consultation process undertaken and sets out the scope of the impact assessment for marine water quality;
- Identifies the key legislation and guidance relevant to marine water quality, with reference to the latest updates in guidance and approaches;
- Confirms the study area for the assessment and presents the impact assessment methodology for marine water quality;
- Describes and characterises the baseline environment for marine water quality, established from desk studies, project survey data and consultation;
- Defines the project design parameters for the impact assessment and describes any primary mitigation measures relevant to the marine water quality assessment;
- Presents the assessment of potential impacts on marine water quality and identifies any assumptions and limitations encountered in compiling the impact assessment; and
- Details any additional mitigation and / or monitoring necessary to prevent, minimise, reduce or offset potentially significant effects identified in the impact assessment.

5. The assessment should be read in conjunction with **Appendix 7.1 Cumulative Effects Assessment (CEA)** which considers other plans, projects and activities that may act cumulatively with the CWP Project and provides an assessment of the potential cumulative impacts on marine water quality**.**

6. A summary of the CEA for marine water quality is presented in **Section 7.11**.

7. Additional information to support the assessment includes:

- **Appendix 7.2 Representative Scenario LoD;**
- **Appendix 7.3 Water Framework Directive (WFD) Assessment;**
- **Chapter 6 Marine Geology, Sediments and Coastal Processes;**
- **Appendix 6.3 Modelling Report;**
- **Appendix 6.4 Codling Wind Park Hydraulic Modelling Support;**
- **Chapter 8 Subtidal and Intertidal Ecology;**
- **Appendix 8.3 Codling Wind Park Benthic Baseline Report;**

7.2 Consultation

8. Consultation with statutory and non-statutory organisations is a key part of the EIA process. Consultation with regard to marine water quality has been undertaken to inform the approach to and scope of the assessment.

9. The key elements of this consultation to date have included EIA scoping, consultation events and ongoing topic-specific meetings with key stakeholders. The feedback received throughout this process has been considered in preparing the EIAR. EIA consultation is described further in **Chapter 5 EIA Methodology,** the **Planning Documents** and in the **Public and Stakeholder Consultation Report**, which has been submitted as part of the development consent application.

10. **Table 7-1** provides a summary of the key issues raised during the consultation process relevant to marine water quality and details how these issues have been considered in the production of this EIAR chapter.

Table 7-1 Consultation responses relevant to marine water quality

Consultee	Comment	How issues have been addressed
Scoping responses		
Environmental Protection Agency (EPA) 31 August 2021	The proposed development does not appear to be licensable by the Agency, nor does it appear to be on a site which is licensed by the Agency. In this circumstance, the Agency does not provide comments or observations.	Assessment has been produced using up-to-date data in line with relevant legislation and guidance, as provided in **Section 7.3**.
Other		
EPA 23 December 2021	Responsibility for the publication of the national River Basin Management Plan resides with the Department of Housing, Local Government and Heritage (DHLGH). At the time of the correspondence, the plan was out for public consultation until the 31 March 2022. Ireland's River Basin Management Plan 2022–2027 will be published on approval by the Minister.	The 3rd Cycle River Basin Management Plan is currently in preparation. The draft plan was consulted for production of this chapter. Resources, as recommended, were used to develop the description of the existing environment **Section 7.6**.
DHLGH Email 25 January 2022	The draft River Basin Management Plan (RMBP) was published for a six-month public consultation from September 2021 until 31 March 2022. Following the public consultation	The 3rd Cycle River Basin Management Plan is currently in preparation. The draft plan was consulted for production of this chapter.

Consultee	Comment	How issues have been addressed
	phase, the draft plan was revised, taking on board public consultation outcomes. Ireland's River Basin Management Plan 2022–2027 will be published on approval by the Minister.	Resources as recommended within the draft plan and provided in **Table 7-2** were used to develop the description of the existing environment in **Section 7.6**.

7.3 Legislation, policy and guidance

7.3.1 Legislation

11. The legislation that is applicable to the assessment of marine water quality is summarised below. Further detail is provided in **Chapter 2 Policy and Legislative Context**.

- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy (the WFD) European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003);
- The Marine Strategy Framework Directive (MSFD) (2008/56/EC) implemented through European Communities (Marine Strategy Framework) Regulations 2011 (S.I. No. 249 of 2011). Subsequently amended European Communities (Marine Strategy Framework) Amended Regulations 2017 (S.I. No. 265 of 2017). Subsequently amended European Communities (Marine Strategy Framework) (Amendment) Regulations 2018 (S.I. No. 648 of 2018);
- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No.272 of 2009). Subsequently amended, European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 (S.I. No. 327 of 2012). Subsequently amended: European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (S.I. No. 386 of 2015). Subsequently amended: European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 (S.I. No. 77 of 2019);
- European Communities (Urban Waste-Water Treatment) Regulations 2001 (S.I. No. 254 of 2001);
- European Communities (Bathing Water Quality) Regulations 2008 (S.I. No. 79 of 2008). Subsequently amended: Bathing Water Quality (Regulations Amendment) Regulations 2011 (S.I. No. 351 of 2011);
- European Communities (Quality of Shellfish Waters) Regulations 2006 (S.I. No. 268 of 2006) (Hereafter referred to as the Shellfish Water Regulations). Subsequently amended: European Communities (Quality of Shellfish Waters) (Amendment) Regulations 2009 (S.I. No. 55 of 2009). Subsequently amended: European Communities (Quality of Shellfish Waters) (Amendment) (No.2) Regulations 2009 (S.I. No. 464 of 2009);
- The Nitrates Directive (91/676/EEC);
- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003), as amended;
- The Sea Pollution Act 1991, as amended ratified MARPOL 73/78 and the Sea Pollution (Amendment) Act 1999, gives effect to the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC); and
- The Dumping at Sea Act1996, as amended, gives effect to the OSPAR Convention.

7.3.2 Policy

12. The overarching planning policy relevant to the CWP Project is described in EIAR **Chapter 2 Policy and Legislative Context**.

13. The assessment of the CWP Project against relevant planning policy is provided in the **Planning Report**. This includes planning policy relevant to marine water quality.

7.3.3 Guidance

14. The principal guidance and best practice documents used to inform the assessment of potential impacts on marine water quality is summarised below.

- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022);
- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2022);
- Guidance on Marine Baseline Ecological Assessments & Monitoring Activities for Offshore Renewable Energy Projects Parts 1 and 2. Department of the Environment, Climate and Communications (DECC, 2018a, 2018b);
- Guidance on EIS and Natura Impact Statement (NIS) preparation for Offshore Renewable Energy Projects. Department of the Environment, Climate and Communications (DECC, 2017); and
- Assessment of the Environmental Impacts of Cables (OSPAR, 2009a) and Underwater Noise (OSPAR, 2009b).

15. At present, there is no specific guidance for marine water quality assessment in Ireland for the WFD or MSFD. Therefore, reference has been made to United Kingdom (UK) guidance for assessing WFD compliance for projects, which is widely used for projects in the UK of a similar size and scale:

- Clearing the Waters for All: Water Framework Directive assessment: estuarine and coastal waters (Environment Agency, 2017); and
- Planning Inspectorate (PINS) Advice Note 18: The Water Framework Directive (PINS, 2017).

16. The assessment will be undertaken with consideration for the requirements of the WFD and MSFD, as these two directives are concerned with monitoring, preserving, and improving water quality in Ireland.

7.4 Impact assessment methodology

17. **Chapter 5 EIA Methodology** provides a summary of the general impact assessment methodology applied to the CWP Project, which includes the approach to the assessment of transboundary and inter-related effects. The approach to the assessment of cumulative impacts is provided in **Chapter 5**, **Appendix 5.1 CEA Methodology**.

18. The following sections confirm the methodology used to assess the potential impacts on marine water quality.

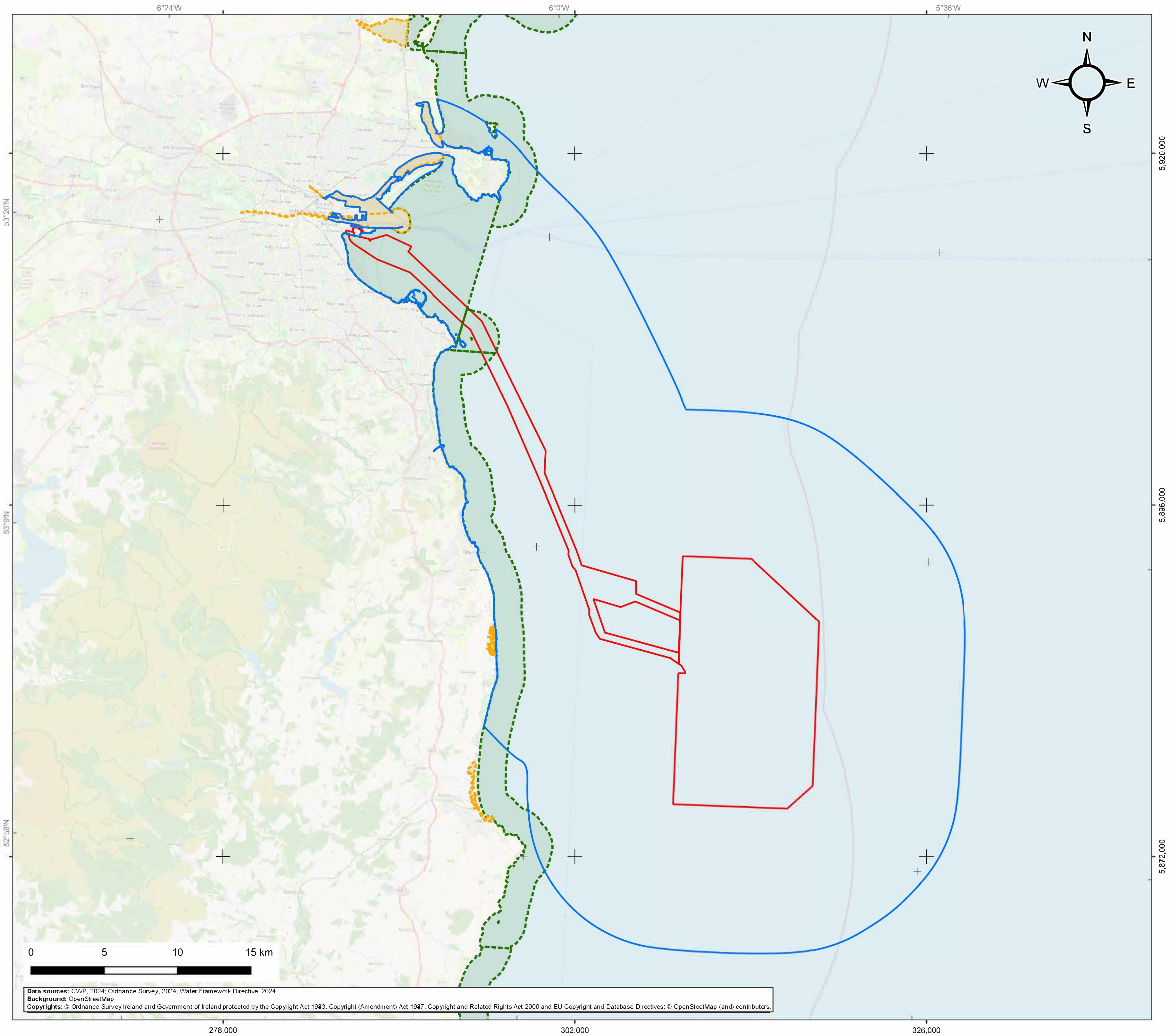
7.4.1 Study area

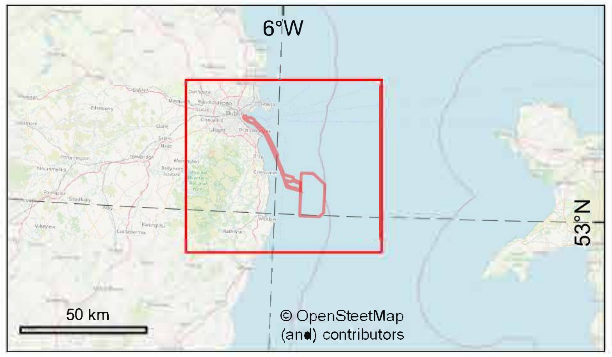
19. The study area for the marine water quality assessment has been informed by the greatest dispersion and greatest tidal excursion in modelling presented in **Appendix 6.3 Marine Geology, Sediments**

and Coastal Processes Modelling Report. Modelling was undertaken to identify the greatest extent of potential sediment plumes dispersion, level of dispersion above background levels (mg/L) and accumulated level of deposited material. The modelling identified that the greatest direction and distance of dispersion of disturbed material was 9–10 km to the east, although one scenario showed dispersion to the southeast reaching 6–7 km and to the west reaching 3–4 km. Modelling showed significant difference between tidal excursion distances during spring and neap tides. Spring tides, which generate the greatest horizontal displacement, can extend along the tidal axis for up to 10 km, whilst neap tides show a displacement of 4–6 km. Therefore, with a view to applying the precautionary principle, the study area has been defined as a 10 km radius in all directions around the array site and offshore export cable corridor (OECC) extending up to MHWS (**Figure 7-1, Figure 7-2** and **Figure 7-3**). This area is also deemed suitable for other impacts that may be distributed by hydrodynamic forces, such as pollution events.

20. The study area has been defined through reference to the offshore development area, as this represents the area in which construction and operation of the development will take place, with the marine safety demarcation area (MSDA) being used only for short-term navigation safety activities, such as deployment of buoyage.

21. Where activities of the onshore development have the potential to impact marine water quality, these potential impacts are considered within the study area and are assessed in **Section 7.10** in **Chapter 20 Hydrology and Hydrogeology**.





Legend

- Planning Application Boundary (PAB)
- 10 km study area

Water Framework Directive (WFD) waterbody

- Coastal waterbody
- Transitional waterbody

Data sources: CWP, 2024; Ordnance Survey, 2024; Water Framework Directive, 2024
Background: OpenStreetMap

codling wind park

Project: Codling Wind Park

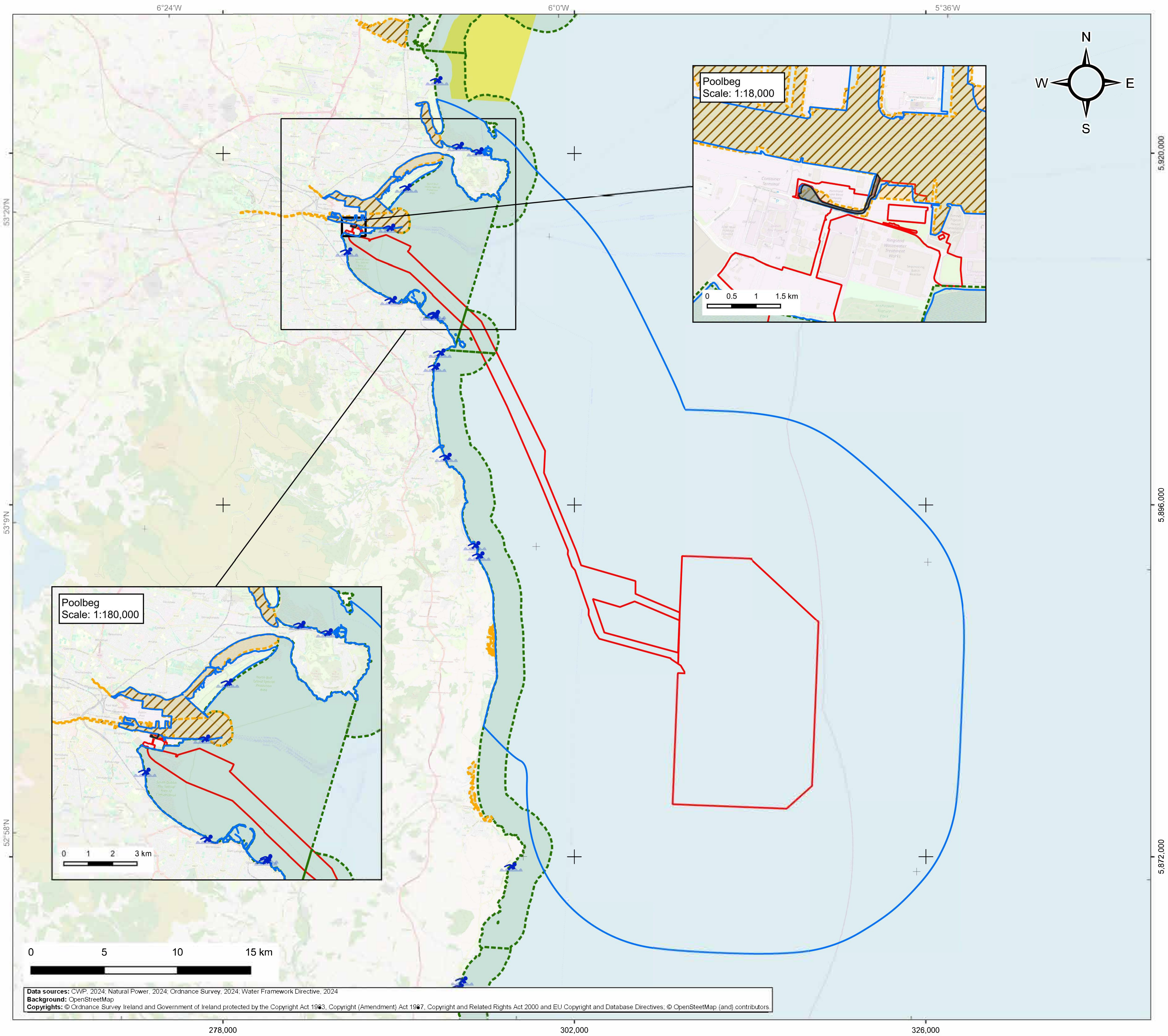
Contractor: natural power www.naturalpower.com

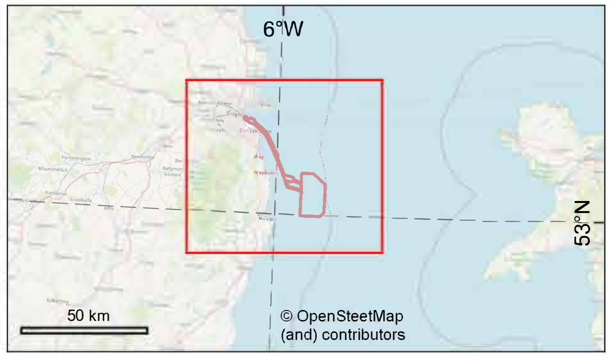
Figure 7.1
Waterbodies

CWP doc. number: CWP-NPC-ENG-08-01-MAP-0631

Internal descriptive code: WE - OFFSH.ALL.WATER.BODIES.WFD - EIAR.FIG.07.01	*Size:* A3 *Scale:* 1:250,000	*CRS:* EPSG 25830

Rev	*Updates*	*Date*	*By*	*Chk'd*	*App'd*
00	Final for issue	2024/07/18	AC	ME/EA	SM





Legend

- Planning Application Boundary (PAB)
- 10 km study area

Waste to Energy facility

- Dublin Waste to Energy (DWtE) facility

Water Framework Directive (WFD) waterbody

- Coastal waterbody
- Transitional waterbody

Water Framework Directive (WFD) protected areas

- Shellfish water
- Nutrient sensitive area (lakes and estuaries)
- Bathing water area

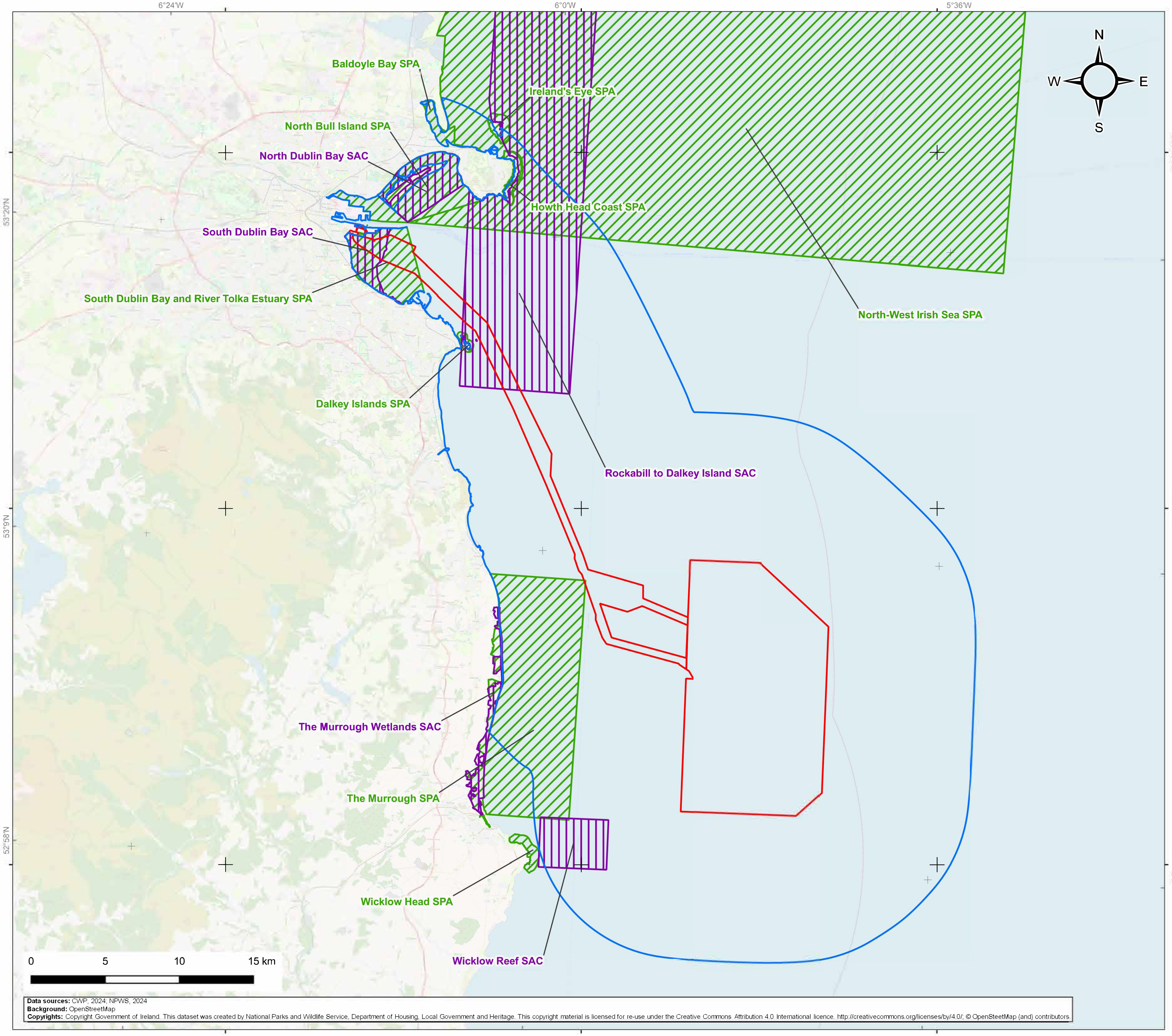
Project:	Contractor:
Codling Wind Park	www.naturalpower.com

Figure 7.2
Water Framework Directive (WFD) protected areas

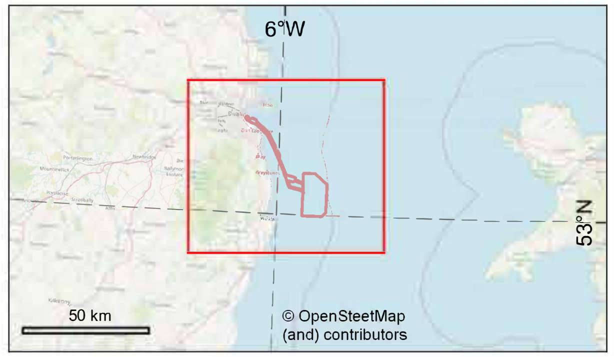
CWP doc. number: CWP-NPC-ENG-08-01-MAP-0632

Internal descriptive code:	*Size:* A3	*CRS:*
WE - PAB..BUFF.10km.S - BW..NSAs..SW..WBs.WFD - EIAR.FIG.07.02	*Scale:* 1:250,000	EPSG 25830

Rev.	*Updates*	*Date*	*By*	*Chk'd*	*App'd*
00	Final for issue	2024/07/18	AC	ME/EA	SM



Data sources: CWP, 2024; NPWS, 2024
Background: OpenStreetMap



Legend

- Planning Application Boundary (PAB)
- 10 km study area

Designated site

- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

Project: Codling Wind Park

Contractor: www.naturalpower.com

Figure 7.3
Nearshore and offshore SACs and SPAs

CWP doc. number: CWP-NPC-ENG-08-01-MAP-0721

Internal descriptive code: WE - PAB..BUFF 10km.S - SACs..SPAs - EIAR.FIG.07.03

Size: A3 *Scale:* 1:250,000

CRS: EPSG 25830

Rev.	Updates	Date	By	Chk'd	App'd
00	Final for issue	2024/07/18	AC	ME/EA	SM

7.4.2 Data and information sources

22. A comprehensive desk-based review was undertaken to inform the baseline for marine water quality. Key data sources on marine water quality in the study area were used to inform the assessment are set out in **Table 7-2**. These data sources were agreed with stakeholders through consultation of the CWP Scoping Report.

23. As agreed with stakeholders during scoping, no dedicated water quality surveys were undertaken, due to the breadth of water quality data available and given that the benthic subtidal and intertidal site-specific survey provides data on sediment quality. The survey was conducted in 2021 at 46 stations positioned across the array site, OECC and near to landfall in the intertidal area, including particle size analysis (PSA) and chemical contaminant analysis undertaken at 8 of the 46 stations. Full details are provided in **Appendix 8.3 CWP Benthic Baseline Report**.

24. Full details are provided in **Section 7.6**.

Table 7-2 Data sources

Data	Source*	Date	Notes
Environmental Protection Agency (EPA) data including WFD catchment maps, water quality	EPA (2022a) Geographic Information Service (GIS) maps online portal Catchments.ie – Water, from source to sea.	2022	All WFD data is provided here and updated by the EPA.
Water Quality in Ireland 2016–2021 Summary Report	EPA (2022b)	2022	EPA produces annual reports summarising monitoring within their remit.
3rd Cycle Draft Liffey and Dublin Bay Catchment Report (HA 09)	Environmental Protection Agency Catchment Science and Management Unit (EPA-CSMU) (2021a)	2021	Report specific to the Liffey and Dublin Bay catchment summarising the current status of the waterbodies contained within that catchment.
3rd Cycle Draft Ovoca–Vartry Catchment Report (HA 10)	EPA-CSMU (2021b)	2021	Report specific to the Ovoca–Vartry catchment summarising the current status of the waterbodies contained within that catchment.
Ireland's National Water Framework Directive Monitoring Programme 2019–2021	EPA (2021)	2021	EPA produces reports summarising monitoring within their remit during the reporting period.
Draft River Basin Management Plan for Ireland 2022–2027 (Third Cycle)	DHLGH (2021a; 2021b)	2021	Draft report. Final report is being prepared by DHLGH.

Data	Source*	Date	Notes
River Basin Management Plan for Ireland 2018–2021 (Second Cycle)	DHLGH (2018, 2021c)	2021	
Marine Strategy Framework Directive 2008/56/EC Article 17 update to Ireland's Marine Strategy Part 1: Assessment (Article 8), Determination of Good Environmental Status (Article 9) and Environmental Targets	DHLGH (2020)	2020	Initial assessment required under the MSFD. Originally published in 2013 and updated and accepted by the Irish Government in 2020.
Beaches.ie	EPA (2022c)	2022	Bathing water quality of beaches, updated annually in September.
Marine Climatology	Met Éireann (2022)	2022	Ranges of sea temperatures and water levels from Ireland's National Meteorological Service.
OSPAR Intermediate Assessment	OSPAR (2017)	2017	Background environmental quality status in the North Atlantic and North Sea.
Sea Fisheries Protection Authority (SFPA)	SFPA (2022)	2022	Description and current status of designated shellfish areas.

Links provided in ***References***

7.4.3 Impact assessment

25. The significance of potential effects has been evaluated using a systematic approach, based upon identification of the importance / value of receptors and their sensitivity to the project activity, together with the predicted magnitude of the impact.

26. The terms used to define receptor sensitivity and magnitude of impact are based on the definition of water quality status as defined by the WFD and MSFD. These criteria have been adopted in order to implement a specific methodology for marine water quality.

27. Where potential impacts are within the WFD transitional and coastal waterbodies, the assessment has drawn on the findings of **Appendix 7.3 Water Framework Directive (WFD) Assessment.**

28. With regards WFD waterbodies within the study area, a significant effect in the EIA is considered to be one that results in a deterioration of a waterbody's status, or prevention of a waterbody reaching 'Good' status as a result of the CWP Project.

29. The MSFD required that member states develop a marine strategy for sustainable use of its waters by 2020, to be reviewed every six years, and required EU member states to reach good environmental status (GES) in the marine environment by 2020 at the latest (DHLGH, 2021d).

30. Beyond the jurisdiction of WFD waterbodies, a significant effect is therefore considered to be one that affects GES, or the capacity to reach GES under MSFD.

31. Invasive non-native species (INNS) are listed as a pressure in WFD and as a GES under MSFD. The potential impact of INNS has been assessed in **Appendix 7.3 Water Framework Directive (WFD) Assessment** and in **Chapter 8 Subtidal and Intertidal Ecology** and as such is not assessed again in this chapter.

Sensitivity of receptor

32. For each effect, the assessment identifies marine water quality receptors sensitive to that effect and implements a systematic approach to understanding the impact pathways and the level of impacts on given receptors.

33. Receptor sensitivity is determined by considering a combination of value, tolerance, and recoverability.

34. In the case of marine water quality, a receptor's status is defined by a range of characteristics or descriptors which contribute to the assignment of its quality status under the WFD and MSFD.

35. WFD status is classified by the EPA and is expressed in terms of five classes (high, good, moderate, poor or bad) (EPA, 2022b). These classes are established on the basis of specific criteria and boundaries. For coastal and transitional waters, these are defined as follows:

- Ecological status or ecological potential
    - Biology;
    - Water quality;
    - Hydromorphology; and
    - Chemical status (level of harmful chemicals in the water).

36. For the purposes of this assessment the WFD parameters associated with marine water quality are:

- Water quality; and
- Chemical status (level of harmful chemicals in the water).

37. Impacts on biological receptors are considered in other relevant chapters in the EIAR, including but not limited to:

- **Chapter 8 Subtidal and Intertidal Ecology;** and
- **Chapter 9 Fish, Shellfish and Turtle Ecology.**

38. Impacts on hydromorphology are assessed within **Chapter 6 Marine Geology, Sediments, and Coastal Processes.**

39. The status of each waterbody is provided by the EPA via Catchments.ie (EPA, 2022a, 2024), and is based on most recent and complete information for each waterbody.

40. For waters outside of the jurisdiction of the WFD, environmental status is defined based on the following 11 descriptors as defined by the MSFD (DHLGH, 2020) (**Table 7-3**).

Table 7-3 Qualitative descriptors for determining good environmental status (GES) under the MSFD (DHLGH, 2020)

	Common name	MSFD annex I
D1	Biodiversity	Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.
D2	Invasive non-native species (INNS)	Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.
D3	Commercial fish and shellfish	Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.
D4	Food webs	All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.
D5	Eutrophication	Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
D6	Sea-floor integrity	Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.
D7	Hydrographical conditions	Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.
D8	Contaminants	Concentrations of contaminants are at levels not giving rise to pollution effects.
D9	Contaminants in seafood	Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.
D10	Marine litter	Properties and quantities of marine litter do not cause harm to the coastal and marine environment.
D11	Energy, including underwater noise	Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.

41. Of the 11 MSFD descriptors, only eutrophication, hydrographical conditions, contaminants (including the potential for remobilisation of contaminants in the sediment) and marine litter relate to marine water quality. Potential impacts pertaining to these descriptors will be addressed in this chapter.

42. As set out in the EIA Methodology chapter, the sensitivity of a receptor is a function of its capacity to accommodate change and reflects its ability to recover if it is affected. Sensitivity is quantified via a consideration of its tolerance, recoverability and value. **Table 7-4** sets out the criteria used in defining the sensitivity of the identified marine water quality receptors. These criteria have been derived through application of professional judgement and informed by EPA Guidelines (EPA, 2022). Four defined levels of sensitivity have been determined (high, medium, low or negligible). Where a receptor could

reasonably be assigned more than one level of sensitivity, professional judgement has been used to determine which level is applicable.

Table 7-4 Criteria for determination of receptor sensitivity

Sensitivity	Criteria
High	Value: An area where water quality supports or contributes to the designation of an international or national protected area, such as: • Shellfish protected waters; • Nutrient-sensitive area; • Designated bathing water area; or • A Natura 2000 site. Tolerance is low / none, whereby key water quality characteristics have low or no capacity to accommodate the proposed change. Recoverability is very low or low (i.e. between 10 and 25, or at least 25 years to recover key water quality characteristics).
Medium	Value: An area where water quality supports or contributes to the designation of an international or national protected area, such as: • Shellfish protected waters; • Nutrient-sensitive area; • Designated bathing water area; or • A Natura 2000 site. Tolerance is moderate, whereby key water quality characteristics have a medium capacity to accommodate the proposed change. Recoverability is medium (i.e. full recovery in 2 to 10 years).
Low	Value: An area where water quality supports or contributes to the designation of an international or national protected area, such as: • Shellfish protected waters; • Nutrient-sensitive area; • Designated bathing water area; or • A Natura 2000 site. Tolerance is high, whereby key water quality characteristics have a high capacity to accommodate the proposed change. Recoverability is high (i.e. full recovery in < 2 years).
Negligible	Value: An area where water quality does not support or contribute to the designation of an international or national protected area. Tolerance is very high, whereby key water quality characteristics are unchanged, or changes are likely undetectable in the context of the baseline. Recoverability is immediate to high (i.e. full recovery within 2 years).

Magnitude of impact

43. The scale or magnitude of potential impacts (both beneficial and adverse) depends on the degree and extent to which the CWP Project activities may change the environment, which may vary according to project phase (i.e. construction, operation and maintenance and decommissioning).

44. Each impact has been characterised in accordance with Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2022) and the guidelines on the information to be contained in Environmental Impact Assessment Reports (Environmental Protection Agency, Ireland, 2022). Magnitude is quantified via a consideration of the impact extent, duration, frequency and consequences. The duration relates to the time period over which the impact will occur, and the timescales of which have been directly informed by the EPA (2022) guidelines. The impact duration is distinct and separate from the recoverability timescales which relate to the length of time taken for a given habitat type or species to recover from an impact which has ceased.

45. Where an impact could reasonably be assigned more than one level of magnitude, professional judgement has been used to determine which level is most appropriate for the impact. For example, whilst an impact may occur constantly throughout the O&M period it may be indiscernible and immeasurable in practice. Therefore, it would be concluded to be of a negligible magnitude despite the frequency of the impact.

46. The criteria for defining magnitude of impact for the purpose of the marine water quality assessment are provided in **Table 7-5.**

Table 7-5 Criteria for determination of magnitude of impact

Magnitude	Criteria
High	Extent: Impact occurs over a large spatial extent, relevant to the waterbody or baseline area. Duration: Impact is anticipated to be permanent (i.e. over 60 years) or long term (15–60 years). Frequency: Impact occurs continuously or repeatedly. Consequences: A long-term or permanent change to one or more characteristics or descriptors relating to marine water quality, which is likely to result in a deterioration of status or prevent achievement of target status* (WFD) or relevant good environmental status (GES) (MSFD).
Medium	Extent: Impact occurs over a moderate spatial extent or moderate proportion of the waterbody or baseline area. Duration: Medium-term (7–15 years) to long-term (15–60 years) impact. Frequency: Impact occurs continuously or repeatedly. Consequences: A change to one or more characteristics or descriptors relating to marine water quality occurring over the medium term that results in a deterioration of status or prevents achievement of WFD target status or GES (MSFD).
Low	Extent: Impact occurs over a small to moderate spatial extent or small proportion of a given habitat type. Duration: Short-term (1–7 years) to medium-term (7–15 years) impact. Frequency: Impact will occur once or repeatedly.

Magnitude	Criteria
	Consequences: A change to one or more characteristics or descriptors relating to marine water quality, with short-term impacts, but is not expected to result in a deterioration of status or prevent achievement of WFD target status or GES.
Negligible	Extent: Impact occurs over a small spatial extent or small proportion of a given habitat type. Duration: Temporary (less than 1 year) to short-term (1–7 years) impact. Frequency: Impact will occur once or infrequently. Consequences: No short term and reversible change to characteristics or descriptors relating to marine water quality, which is not expected to result in a deterioration of status or prevent achievement of WFD target status or GES.

Significance of effect

47. As set out in **Chapter 5 EIA Methodology**, an impact assessment matrix (IAM) is used to determine the significance of an effect. In basic terms, the potential significance of an effect is a function of the sensitivity of the receptor and the magnitude of the impact, as shown in **Table 7-6**.

48. Although the CIEEM (2022) guidance suggests moving away from a matrix-based approach, this approach has been taken as it provides a framework for the consistent and transparent assessment of predicted effects across all technical chapters. However, it is important to note that that individual assessments are based on relevant guidance and the application of professional judgement.

49. The significance of effect can be determined by comparing the character of the predicted effect to the sensitivity of the receiving environment (EPA, 2002; CIEEM, 2022). The matrix provides levels of effect significance ranging from imperceptible to very significant / profound. For the purposes of this assessment, potential effects identified to be significant or above are considered to be significant in EIA terms and additional mitigation will be required, as CIEEM Guidance states that a significant effect is one which changes the structure or function of an ecosystem. Effects identified as less than significant are generally considered to be not significant in EIA terms.

50. The assessment of impacts takes into account primary mitigation measures that have been adopted to avoid or otherwise reduce adverse impacts on the environment (such as avoidance of adverse impacts through the design process). These primary mitigation measures are discussed further in **Section 7.9** below. Where potentially significant impacts are identified through the impact assessment, additional mitigation measures are identified and described to avoid, prevent, reduce or, if possible, offset these impacts.

51. Additionally, in some circumstances, mitigation measures may be adopted that are not assessed as necessary to avoid or reduce an identified significant adverse impact on the environment. Such measures may be adopted as a matter of good practice. Alternatively, a mitigation measure may be implemented to address a different significant adverse impact but may have collateral benefits in terms of reducing other impacts that are not assessed as significant.

Table 7-6 Impact assessment matrix for determination of significance of effect

Sensitivity of receptor	Magnitude of impact			
	High	Medium	Low	Negligible
High	Very Significant / Profound	Significant	Moderate / Slight	Slight
Medium	Significant	Moderate	Slight	Slight / Not Significant
Low	Moderate / Slight	Slight	Not Significant	Not Significant
Negligible	Slight	Slight / Not significant	Not significant	Imperceptible

7.5 Assumptions and limitations

52. It is noted that many plans, programmes and ongoing monitoring of the water environment are currently being reviewed at government level. For the purposes of this assessment, the most up-to-date data, at the time of writing, was used to inform the baseline, and data remains valid and provide an appropriate characterisation of the receiving environment at the point of application.

53. The baseline and assessment have been developed in accordance with the available information and supplemented with site-specific information where possible.

7.6 Existing environment

54. The following sections provide a description of the baseline conditions for marine water quality.

55. The CWP Project is located on the Codling Bank, which forms part of a series of banks in the Irish Sea which run parallel to the coast approximately 10 km offshore, standing in 9–33 m of water and rising to within metres of the water's surface. The banks reflect the principal tidal currents in the region, and the strong currents and sediment movements have resulted in a series of punctuated banks from north to south: Dundalk Bank, Bray Bank, Kish Bank, Codling and Greater Codling Banks, Arklow Bank, Rusk Bank, Glasgorman Bank, Blackwater and Lucifer Bank, and Long Bank (DHLGH and Marine Institute, 2013).

56. The CWP Project is adjacent to the east coastline between Wicklow and Dublin; however, only the OECC and onshore infrastructure overlap the WFD jurisdiction. The OECC intersects multiple coastal and transitional waters and one groundwater body, which are summarised in **Table 7-7** (EPA, 2022a).

57. A waterbody is a discrete and significant individual unit of a water feature used for monitoring and planning purposes, and can be terrestrial (rivers and lakes), transitional (estuaries) or coastal (inshore waters to 1 NM). Artificial waterbodies such as canals and reservoirs are also included.

58. Ireland's river basin management planning process is based on a single national River Basin District covering an area of 70,273 km^2, broken down into 46 catchment management units, 583 sub-catchments and a total of 4,842 waterbodies, with 3 to 15 waterbodies in each sub-catchment (DHLGH, 2021a).

59. The onshore infrastructure, landfall and approx. one third of the OECC lie within the WFD's jurisdiction (which concerns coastal and transitional waters out to 1 NM from the coastline). The remainder of the OECC and the array site lie outside of WFD waters.

60. There is overlap between the WFD and MSFD (which applies to all of Ireland's marine waters) in coastal areas, however for the purposes of characterising the existing environment and addressing the requirements of existing legislative jurisdictions, the study area is split into two categories:

- Offshore waters (beyond 1 NM); and
- WFD Marine and transitional waterbodies up to 1 NM from the coast.

7.6.1 Offshore waters (beyond 1 NM)

61. The Irish Sea is a relatively shallow basin up to 100 m deep that has a deep bisecting channel running north to south and a strong tidal flow which promotes the formation and movement of sand waves, (DHLGH and Marine Institute, 2013). DHLGH and Marine Institute MSFD assessments (2020) indicate that the overall quality of Ireland's marine environment is good, with almost half of the 11 qualitative descriptors for GES (D2: INNS, D5: Eutrophication, D7: Hydrographical conditions, D8: Contaminants and D9: Contaminants in seafood), achieving GES for primary criteria with remaining criteria subject to a lack of data and methodologies preventing assessment (D10: Marine litter and D11: Energy, including underwater noise). Three received partial GES (D1: Biodiversity, D3 Commercial fish and shellfish and D6: Seafloor integrity), and the status of the remaining descriptor (D4: Food webs) is currently unknown (RPS, 2013; DHLGH, 2020). However, this does not affect marine water quality and will therefore not impact the baseline.

62. Trend information from the DHLGH and Marine Institute MSFD assessments (2020), where available, suggests steady improvements in most areas. These improvements are largely attributable to the more effective management of sectors / activities through national and European legislation and other international agreements, as well as an improved ability to recognise and regulate pressures acting on the marine environment.

63. Waters around Ireland are typically well mixed, exhibiting low vertical stratification in temperature and salinity, though there is some regional variation due to topography, land runoff and seasonal changes (Simpson, 1971; Simpson and Hunter, 1974; RPS, 2013).

7.6.2 WFD marine and transitional waterbodies (up to 1 NM)

64. CWP Project's onshore infrastructure, landfall and part of the OECC lies within the Liffey and Dublin Bay catchment (HA 09), defined as the terrestrial area drained by the Liffey and all streams entering tidal waters between Sea Mount and Sorrento Point, County Dublin, covering an area of 1,616 km². The catchment is characterised by a sparsely populated, upland southeastern area underlain by granites and a densely populated (estimated at 1,255,000 people – the largest in Ireland), flat, low-lying limestone area over the remainder of the catchment basin (EPA-CSMU, 2021a), and is divided into 17 sub-catchments with 81 river waterbodies (four of which are artificial), 6 lake waterbodies, 6 transitional waterbodies, 5 coastal waterbodies and 29 groundwater bodies. There are 6 coastal and transitional waterbodies within the study area (**Table 7-7**). These are:

- Dublin Bay (EA_090_0000);
- Liffey Estuary Lower (EA_090_0300);
- Irish Sea Dublin (EA_070_0000);
- Tolka Estuary (EA_090_0200);
- Liffey Estuary Upper (EA_090_0400); and

- North Bull Island (EA_090_0100).

65. The study area also covers a small part of the Ovoca–Vartry Catchment (HA 10), which lies between Sorrento Point and Kilmichael Point draining a total area of 1,247 km^2 and is divided into 10 sub-catchments, with 71 river waterbodies, 11 lake waterbodies, 4 transitional waterbodies, 3 coastal waterbodies and 12 groundwater bodies (EPA-CSMU, 2021b). Only one waterbody lies within the study area:

- Southwestern Irish Sea–Killiney Bay (EA_100_0000).

66. In contrast to the Liffey and Dublin Bay catchment, the population density of the Ovoca–Varty catchment is much lower (estimated at 179,000 people), with the Wicklow Mountains underlain by granite to the west, and metamorphic slates and quartzites underlying the eastern coastal part of the catchment (EPA-CSMU, 2021b).

67. In general, the 'Water Quality in Ireland 2016–2021 Report' (EPA, 2022b) indicates that the Southwestern Irish Sea–Killiney Bay waterbody has high ecological status, and Dublin Bay, Irish Sea and River Liffey Upper waterbodies have good ecological status, indicating that only minor or slight changes from natural conditions were identified. River Liffey Lower and North Bull Island have moderate WFD status, which appears to be driven in the Tolka Estuary by excess nutrient levels, affecting oxygen and angiosperm / macroalgal production. The Tolka Estuary waterbody itself is at poor ecological status. The risk for meeting WFD targets by 2027 has recently been updated (EPA, 2024); Irish Sea Dublin, Dublin Bay and Southwestern Irish Sea–Killiney Bay are not at risk. North Bull Island and Liffey Estuary Upper are still under review. Tolka Estuary and Liffey River Lower are, however, at risk of failing to meet WFD targets by 2027.

68. Phytoplankton growth in Irish coastal waters is primarily driven by the seasonal change in sunlight available for photosynthesis and the vertical stability of the water column, which determines the availability of nutrients (Margalef, 1978; Legendre, 1981; Tett and Edwards, 1984; RPS, 2013). The presence of excessive or unnatural levels of nutrients (eutrophication) can cause the proliferation or accelerated growth of nuisance seaweeds or plankton blooms. Nutrients, predominantly as nitrogen and phosphorus, find their way into the sea from a variety of sources, most commonly from agriculture, wastewater treatment discharges and from unsewered domestic or industrial properties (RPS 2013). The levels of chlorophyll (a measure of phytoplankton density), opportunistic seaweeds, dissolved oxygen and organic matter in coastal and offshore areas show no indications of eutrophication and trend analysis shows no change in nutrient levels of Ireland's marine waters (DHLGH, 2020). Areas considered at risk of eutrophication are located inshore, predominantly along the eastern, southeastern and southern coasts and are within the jurisdiction of the WFD (DHLGH, 2020). The Irish Sea in general is considered to be a non-problem area for eutrophication (OSPAR, 2017). However, inshore and coastal areas experience greater levels of nutrient input from land runoff (OSPAR, 2017). This mirrors the monitoring data collected by the EPA for assignment of WFD status (2022a).

Table 7-7 WFD Waterbodies within 10 km of the offshore infrastructure

WFD water body	WB code	Waterbody type	Type	WFD ecological status 2016–2021	Chemical status 2016–2021	Hydromorph-ology or quantitative status 2016–2021	Current risk (Cycle 3)	Minimum distance to onshore infrastructure (km)	Minimum distance to offshore infrastructure (km)
Dublin Bay	EA_090_0000	Coastal	Euhaline, Mesotidal, Moderately Exposed	Good	High	Good Hydromorphology	Not at risk	0	0 (OECC)
Liffey Estuary Lower	EA_090_0300	Transitional	Meso or Polyhaline, Strongly Mesotidal, Sheltered	Moderate	Good	Moderate Hydromorphology	At risk	0	0.75* (OECC)
Irish Sea Dublin (HA 09)	EA_070_0000	Coastal	Euhaline, Mesotidal, Moderately Exposed	Good	Not provided	Not provided	Not at risk	9.4	0 (OECC)
Southwestern Irish Sea–Killiney Bay (HA10)	EA_100_0000	Coastal	Euhaline, Mesotidal, Moderately Exposed	High	Not provided	Good Hydromorphology	Not at risk	11.0	0 (OECC)
Tolka Estuary	EA_090_0200	Transitional	Meso or Polyhaline, Strongly Mesotidal, Sheltered	Poor	Not provided	Good	At risk	0.8	1.2 (2.3 around Great South Wall)

WFD water body	WB code	Waterbody type	Type	WFD ecological status 2016–2021	Chemical status 2016–2021	Hydromorph-ology or quantitative status 2016–2021	Current risk (Cycle 3)	Minimum distance to onshore infrastructure (km)	Minimum distance to offshore infrastructure (km)
Liffey Estuary Upper	EA_090_0400	Transitional	Meso or Polyhaline, Strongly Mesotidal, Sheltered	Good	Not provided	Moderate Hydromorphology	Review	3.2	2.9 (7.7 around Great South Wall)
North Bull Island	EA_090_0100	Transitional	Transitional lagoons: oligo or Polyhaline, Mesotidal, Sheltered	Moderate	Not provided	Not provided	Review	4.0 (7.3 around Bull Island)	3.9 (6.3 around Dollymount Strand)

7.6.3 Marine sediments

69. In the Irish Sea, the strong tidal flow in this region promotes the formation and movement of sand waves, resulting in accumulations off the east coast forming a series of sand banks, which include the Kish Bank, Codling and Greater Codling Banks, (Roche et al., 2007). Seabed sediments are characterised in **Appendix 8.3 Benthic Baseline Report** and are summarised as follows:

- The highest proportion of very fine sediments is found closer to shore, with coarser sediments found towards and within the array site.
- Along the cable route, site-specific surveys indicate seabed sediments composed of sand nearer to the shore. The sediment type becomes coarser, with gravelly sand and sandy gravel, further offshore, with gravel and cobbles dominating as it nears the array site. INFOMAR Seabed Substrate (2019) data indicates the sediment type along the cable route is sand near to landfall, quickly graduating to sandy mud / muddy sand in the infralittoral, followed by an area of mixed sediment then sand and coarse sediment on the approach to the array site. This is supported by EUSeamap (2021) data; however, the sandy mud / muddy sand is predicted to be mud.
- Within the array site, site-specific surveys indicate a heterogenous environment, with the sediment type samples at the majority of stations gravel and cobbles, but there are areas of boulders, sand, gravel, gravelly sand / sandy gravel and slightly gravelly sand. INFOMAR (2019) and EUSeamap (2021) data models the area as homogeneous coarse sediments or coarse sediments with a small area of mixed sediment.
- Opposite the proposed landfall location lies the proposed onshore substation location in Pigeon Park on the south bank of the River Liffey. Dublin Port Company (DPC) conducted a benthic survey at four locations in the River Liffey on 15 December 2022 and a contaminated sediments survey at 24 locations on 28 September 2022 and 21 October 2022. The sediment type at all locations was sandy mud. The benthic community was dominated by polychaete *Capitella* sp. with other polychaete, nematode and bivalve species present. Diversity was low, with the number of taxa per station ranging from 3 to 13. The dominance of *Capitella* sp. and low diversity may indicate some organic enrichment is present at these stations.

70. Chemical analysis was collected at eight stations within the array site and OECC and analysed for a range of contaminants. These are presented in full in **Appendix 8.3 Benthic Baseline Report**. The potential for toxicity was compared to Irish levels published by the EPA (Cronin et al., 2006), and UK levels published by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) (MMO, 2015) to determine the likelihood of biological impact. Levels below Irish lower action levels (ALs) or Cefas action level 1 (AL1) are generally of no concern and are unlikely to influence the licensing decision about sea disposal, whereas concentrations above Irish upper ALs or Cefas AL2 are considered unsuitable for sea disposal. When assessed against Irish guidelines, stations 28, 30 and 77 had arsenic levels above the lower AL but below the upper AL. Cadmium levels at Station 59 were also between the lower and upper AL. When assessed against Cefas guidelines, levels of cadmium, chromium and zinc at Station 59 were slightly above AL1 but below AL2. No other contaminants assessed were above Irish lower ALs or Cefas AL1.

71. Organotin compounds (tributyl tin (TBT), dibutyl tin (DBT) and monobutyltin (MBT)) were below the limits of detection and there was no exceedance of Irish or Cefas ALs at any of the sampling stations.

72. No Irish or Cefas ALs were exceeded for polychlorinated biphenyls (PCBs) or polyaromatic hydrocarbons (PAHs).

73. In the Pigeon Park area of the River Liffey, contaminated sediment results showed that no contaminants were found at levels above those of Cefas AL1 or above Irish lower action levels.

74. These results are in line with contaminant levels reported by OSPAR (2017). In general, concentrations of priority substances in water in coastal and transitional waterbodies are typically low and compliant with Environmental Quality Standards or are exhibiting a downward trend where legacy pollutants are highly persistent (DHLGH, 2020).

7.6.4 Suspended sediments

75. Suspended sediment concentration is important for water quality as it is a visual representation of the physical interaction between characteristics in the water environment, such as tolerances of local organisms, cycling of nutrients through a system and the likelihood of build-up of contaminants in certain locations. The nature of suspended sediments in the study area is dependent on the interaction of seabed sediments interacting with local hydrodynamic conditions, river inputs as well as prevailing weather conditions which are detailed in **Chapter 6 Marine Geology, Sediments and Coastal Processes**, and summarised here.

76. In general, water clarity is lower in the winter due to generally higher wind speeds and storms resulting in greater water movement, and therefore disturbance of seabed sediments, as well as greater volumes of runoff from terrestrial sources.

77. Background suspended sediment concentrations are greatest in February, with average suspended particulate matter (SPM) measured by satellite between 4 and 12 mg/L over most of the study area, highest in nearshore areas (Silva, 2016). However, this can increase by a factor of 10 in storm conditions, as observed during Storm Barra in 2021, when SSC increased from < 10 nephelometric turbidity units (NTU) to 110 NTU in storm conditions, which is estimated to be in excess of 170 mg/L[1] (RPS, 2022b). This is consistent with the site-specific metocean data (Techworks, 2021a, b, c), where background SSC was measured as < 5 NTU, slightly elevated in spring. Storm levels were not recorded during this campaign.

78. The Irish Sea is noted to have naturally high levels of suspended matter, with water clarity further reduced by strong winds (DHLGH and Marine Institute, 2013), with higher levels observed to the south off Wicklow Head (Bowers et al., 1998).

7.6.5 Protected areas

79. The study area includes several WFD protected areas, which include Natura 2000 sites, designated shellfish areas, nutrient-sensitive areas and bathing waters. These are summarised in **Table 7-8**.

80. There are several Special Protection Areas (SPAs) and SACs in the study area with features with connectivity to the marine environment. There are no WFD-designated shellfish areas within the study area; the closest to the CWP Project is Malahide, at c. 13 km north of the OECC. The Poolbeg landfall is situated within the nutrient-sensitive area of Liffey Estuary (Upper and Lower), Tolka Estuary and South Bull Lagoon.

81. There are eight bathing water areas within 4 km of the CWP Project, and five 'other' bathing waters which are locally monitored by the local council but are not designated under the Bathing Waters Directive (EPA, 2022c). Annual water quality ratings are generally calculated using monitoring results over a four-year period and are assessed against stringent bacterial limits to protect bather health (EPA, 2022c). Current status presented in **Table 7-8** represented the four-year average from 2018 to

[1] Total suspended solids (mg/l) within the approach channel to Dublin Port is estimated at 1.61 times the turbidity (NTU) (RPS, 2022b)

2021. Within the study area, the majority have bathing water quality levels of Good / Excellent, with the exception of Sandymount Strand, which is classified as Satisfactory (EPA, 2022c). Only Seapoint was awarded a Blue Flag for 2022 (An Taisce, 2022). Despite generally Good status applied overall, the bathing waters are subject to occasional swimming restrictions, typically associated with suspected pollution events from terrestrial sources that make the area temporarily unsafe to use. These restrictions can be in place for between one and four days (EPA, 2022c).

Table 7-8 List of protected areas within the water quality study area

Name	Criteria / Description	Current status	Approx. closest distance to the proposed development* (km)
Designated areas (Habitats Directive)			
Rockabill to Dalkey Island SAC (Site code: 003000)	**Qualifying interests** • Reefs [1170] • *Phocoena phocoena* (harbour porpoise) [1351]	Designated	0
South Dublin Bay SAC (Site code: 000210)	**Qualifying interests** Mudflats and sandflats not covered by seawater at low tide [1140]	Designated	0
South Dublin Bay and River Tolka Estuary SPA (Site code: 004024)	**Qualifying interests** • Light-bellied brent goose (*Branta bernicla hrota*) [A046] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed plover (*Charadrius hiaticula*) [A137] • Grey plover (*Pluvialis squatarola*) [A141] • Knot (Calidris canutus) [A143] • Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Bar-tailed godwit (*Limosa lapponica*) [A157] • Redshank (*Tringa tetanus*) [A162] • Black-headed gull (*Chroicocephalus ridibundus*) [A179]	Designated	0

Name	Criteria / Description	Current status	Approx. closest distance to the proposed development* (km)
	• Roseate tern (*Sterna dougallii*) [A192] • Common tern (*Sterna hirundo*) [A193] • Arctic tern (*Sterna paradisaea*) [A194] • Wetland and waterbirds [A999]		
Dalkey Islands SPA (Site code: 004172)	**Qualifying interests** • Roseate tern (*Sterna dougallii*) [A192] • Common tern (*Sterna hirundo*) [A193] • Arctic tern (*Sterna paradisaea*) [A194]	Designated	0.5
North Bull Island SPA (Site code: 004006)	**Qualifying interests** • Light-bellied brent goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Teal (*Anas crecca*) [A052] • Pintail (*Anas acuta*) [A054] • Shoveler (*Anas clypeata*) [A056] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden plover (*Pluvialis apricaria*) [A140] • Grey plover (*Pluvialis squatarola*) [A141] • Knot (Calidris canutus) [A143] • Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Black-tailed godwit (*Limosa limosa*) [A156] • Bar-tailed godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162]	Designated	1.3

Name	Criteria / Description	Current status	Approx. closest distance to the proposed development* (km)
	• Turnstone (*Arenaria interpres*) [A169] • Black-headed gull (*Chroicocephalus ridibundus*) [A179] • Wetland and waterbirds [A999]		
North-West Irish Sea cSPA	**Qualifying interests** • Red-throated diver (*Gavia stellata*) [A001] • Great Northern diver (*Gavia immer*) [A003] • Fulmar (*Fulmarus glacialis*) [A009] • Manx shearwater (*Puffinus puffinus*) [A013] • Cormorant (*Phalacrocorax carbo*) [A017] • Shag (Phalacrocorax aristotelis) [A018] • Common scoter (*Melanitta nigra*) [A065] • Little gull (*Larus minutus*) [A177] • Black-headed gull (*Chroicocephalus ridibundus*) [A179] • Common gull (*Larus canus*) [A182] • Lesser black-backed gull (*Larus fuscus*) [A183] • Herring gull (*Larus argentatus*) [A184] • Great black-backed gull (*Larus marinus*) [A187] • Kittiwake (*Rissa tridactyla*) [A188] • Roseate tern (*Sterna dougallii*) [A192] • Common tern (*Sterna hirundo*) [A193] • Arctic tern (*Sterna paradisaea*) [A194] • Little tern (*Sterna albifrons*) [A195] • Guillemot (*Uria aalge*) [A199]	Candidate	1.3

Name	Criteria / Description	Current status	Approx. closest distance to the proposed development* (km)
	• Razorbill (*Alca torda*) [A200] • Puffin (Fratercula arctica) [A204]		
Baldoyle Bay SPA	**Qualifying interests** • Light-bellied brent goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Ringed plover (*Charadrius hiaticula*) [A137] • Golden plover (*Pluvialis apricaria*) [A140] • Grey plover (*Pluvialis squatarola*) [A141] • Bar-tailed godwit (*Limosa lapponica*) [A157] • Wetland and waterbirds [A999]	Designated	7.0
Howth Head Coast SPA	**Qualifying interests** Kittiwake (*Rissa tridactyla*) [A188]	Designated	8.2
Ireland's Eye SPA	**Qualifying interests** • Cormorant (*Phalacrocorax carbo*) [A017] • Herring gull (*Larus argentatus*) [A184] • Kittiwake (*Rissa tridactyla*) [A188] • Guillemot (*Uria aalge*) [A199] • Razorbill (*Alca torda*) [A200]	Designated	9.0
The Murrough SPA	**Qualifying interests** • Red-throated diver (*Gavia stellata*) [A001] • Greylag goose (*Anser anser*) [A043] • Light-bellied brent goose (*Branta bernicla hrota*) [A046]	Designated	5.9

Name	Criteria / Description	Current status	Approx. closest distance to the proposed development* (km)
	• Wigeon (*Anas penelope*) [A050] • Teal (*Anas crecca*) [A052] • Black-headed gull (*Chroicocephalus ridibundus*) [A179] • Herring gull (*Larus argentatus*) [A184] • Little tern (*Sterna albifrons*) [A195] • Wetland and waterbirds [A999]		
North Dublin Bay SAC (Site code: 000206)	**Qualifying interests**** Mudflats and sandflats not covered by seawater at low tide [1140]	Designated	1.3
Wicklow Reef SAC (Site code: 002274)	**Qualifying interests** Reefs [1170]	Designated	5.5
Bathing water			
Shelley Banks	Other bathing water	Excellent	0
Half Moon	Other bathing water	Excellent	0.5
Sandymount Strand	Designated bathing water	Excellent (2023)	0.79
Forty Foot Bathing Place	Designated bathing water	Excellent (2021)	0.86
Sandycove Beach	Designated bathing water	Excellent (2021)	0.97
Merrion Strand	Other bathing water	Excellent	1.3

Name	Criteria / Description	Current status	Approx. closest distance to the proposed development* (km)
Dun Laoghaire Baths	Other bathing water	Excellent	1.4
North Bull Wall	Other bathing water	Excellent	2.2
Seapoint	Designated bathing water	Excellent (2021) Blue Flag 2022	2.24
White Rock	Designated bathing water		2.5
White Rock Beach	Designated bathing water	Excellent (2021)	2.51
Killiney	Designated bathing water	Excellent (2021)	3.27
Dollymount Strand	Designated bathing water	Good (2021)	3.49
Nutrient Sensitive Areas			
Liffey Estuary (Upper and Lower), Tolka Estuary and South Bull Lagoon (Ringsend)	Secondary treatment in place	Currently not meeting objectives	0

**Distance calculated based on travelled distance to closest point between the marine activities and the edge of the protected area, or bathing water monitoring point to reflect connectivity with water. '0' indicates overlap with the CWP Project boundary.*

***Where the data shows a clear seasonal trend over a number of seasons, different classification categories apply for different seasons.*

7.6.6 Identification of receptors

82. From the establishment of the baseline environment, the current marine water quality receptors have been identified and are provided in **Table 7-9** below.

83. Protected areas (Natura 200 sites), although included in WFD protected areas, have not been identified as receptors in this chapter, as potential impacts from the CWP Project activities on these protected areas have been assessed in detail in the accompanying **Natura Impact Statement**.

Table 7-9 Marine water quality receptors to be considered in the Impact Assessment.

Receptor type	Receptor name	Distance from offshore development area (km)
WFD Coastal or transitional water body	Dublin Bay	0
	Dublin	0
	Liffey Estuary Lower	0
	Irish Sea Dublin (HA 09)	0
	Southwestern Irish Sea–Killiney Bay (HA10)	0
	Tolka Estuary	1.2
	Liffey Estuary Upper	2.9
	North Bull Island	3.9
Bathing waters	Shelley Banks	0
	Half Moon	0.5
	Sandymount Strand	0.8
	Forty Foot Bathing Place	0.9
	Sandycove Beach	1.0
	Merrion Strand	1.3
	Dun Laoghaire Baths	1.4
	North Bull Wall	2.2
	Seapoint	2.2
	White Rock	2.5
	White Rock Beach	2.5
	Killiney	3.3
	Dollymount Strand	3.5
Nutrient-sensitive area	Liffey Estuary (Upper and Lower), Tolka Estuary and South Bull Lagoon (Ringsend)	0

7.6.7 Climate change and natural trends

84. Coastal and transitional waterbodies in Ireland have experienced an overall decline in water quality since the 2013–2018 report (EPA, 2019; EPA, 2022b). Phytoplankton and fish have been identified as key elements for determining overall ecological status of transitional waters, followed by benthic invertebrates (EPA, 2022b). These characteristics are known to be highly sensitive to pollution, specifically organic pollution (e.g. from land runoff), as well as impacts relating to climate change (EPA, 2022b; OSPAR, 2017).

85. Climate change in Ireland is in line with global trends, and is associated with an average increase in temperature, correlating with increased levels of atmospheric carbon dioxide (CO_2), a known driver of climate change originating from human activity that is increasing globally. This has been correlated with measurable changes in ocean temperature and acidity in both shallow and deep Atlantic water off the coast of Ireland in recent decades (Cannaby and Hüsrevoğlu, 2009; RPS, 2013; DHLGH, 2021a), and is predicted to increase over the coming years. This has implications for marine water quality through changes in organism health and growth, such as changes in distribution ranges and algal blooms which can affect water quality status. Ireland has also witnessed a marked increase in rainfall, as well as sea level rise (EPA, 2022e; Met Éireann, 2022). The average wave height has been increasing in recent decades, driven by the stronger and more frequent winds that are being generated by changing seasonal atmospheric pressure patterns that form over the northeastern Atlantic (DHLGH, 2021a).

86. In summary, some changes to the baseline are anticipated associated with climate change and natural trends at a broad scale which put the overall quality status of the marine environment at risk. As a result, broadscale international directives and policies have been adopted to minimise the impact, prevent deterioration and improve water quality for the coming decade.

7.6.8 Predicted future baseline

87. In the event of the CWP Project not being developed, and no other developments occurring in the Irish Sea, no change in the baseline conditions would be expected beyond those resulting from climatic factors and natural trends (as detailed above).

7.7 Scope of the assessment

88. An EIA scoping report for the offshore infrastructure was published on 6 January 2021, and the onshore infrastructure was published on 6 May 2021. The Scoping Report was uploaded to the CWP Project website and shared with regulators, prescribed bodies and other relevant consultees, inviting them to provide relevant information and to comment on the proposed approach being adopted by the Applicant in relation to the offshore elements of the EIA. Whilst the potential impact of accidental pollution events was scoped out in the original scoping consultation, the impact has been assessed in this chapter in accordance with the opinion of An Bord Pleanála.

89. Based on responses to the scoping report, further consultation and refinement of the CWP Project design, potential impacts to marine water quality scoped into the assessment are listed below in **Table 7-10**.

Table 7-10 Potential impacts scoped into the assessment

Impact no.	Description of impact	Notes
Construction		
Impact 1	Direct temporary disturbance resulting in temporary increases in SSC	The temporary increase in SSC relates to seabed preparation for foundations and cables, jack-up and anchoring operations, and cable installation.
Impact 2	Direct disturbance resulting in resuspension of contaminated sediments	Remobilisation of contaminated sediments to sediments disturbed, mobilised and deposited elsewhere, during seabed preparation for foundations and cables, jack-up and anchoring operations, and cable installation potentially containing contaminated sediments.
Impact 3	Accidental pollution events	This relates to the potential for accidental pollution, such as oil and hydraulic fluids being introduced to the environment from vessels during construction activities.
Operation and maintenance (O&M)		
Impact 1	Direct temporary disturbance resulting in temporary increases in SSC	Direct temporary disturbance resulting in temporary increases in SSC relates to maintenance activities such as cable repair, vessel jack-up operations and deployment of scour protection.
Impact 2	Direct disturbance resulting in resuspension of contaminated sediments	Direct disturbance resulting in resuspension of contaminated sediments relates to maintenance activities such as cable repair, vessel jack-up operations and deployment of scour protection.
Impact 3	Accidental pollution events	This relates to the potential for accidental pollution such as oil and hydraulic fluids being introduced to the environment from vessels during O&M activities.
Decommissioning		
Impact 1	Direct temporary disturbance resulting in temporary increases in SSC	Direct temporary disturbance resulting in temporary increase in SSC relates to the anticipated removal of CWP Project infrastructure and the end of the lifetime of the project. However, no final decision has been made regarding decommissioning yet.
Impact 2	Direct disturbance resulting in resuspension of contaminated sediments	Remobilisation of contaminated sediments relates to the anticipated removal of CWP Project infrastructure and the end of the lifetime of the project. However, no final decision has been made regarding decommissioning yet.
Impact 3	Accidental pollution events	Accidental pollution relates to the activities of offshore vessels to decommission and remove CWP Project infrastructure and the end of the lifetime of the project. However, no final decision has been made regarding decommissioning yet.

7.8 Assessment parameters

7.8.1 Background

90. 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 a 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.

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

92. **Chapter 4 Project Description** describes the design approach that has been taken for each component of the CWP Project. Wherever possible, the location and detailed parameters of the CWP Project components are identified and described in full within the EIAR. However, for the reasons outlined above, certain design decisions and installation methods will be confirmed post-consent, requiring a degree of flexibility in the planning consent.

93. Where necessary, flexibility is sought in terms of:

- Up to two options for certain permanent infrastructure details and layouts, such as the WTG layouts;
- Dimensional flexibility, described as a limited parameter range (e.g. upper and lower values for a given detail such as cable length); and
- Locational flexibility of permanent infrastructure described as limit of deviation (LoD) from a specific point or alignment.

94. The CWP Project had to procure an opinion from An Bord Pleanála to confirm that it was appropriate that this application be made and determined before certain details of the development were confirmed. An Bord Pleanála issued that opinion on 25 March 2024 (as amended in May 2024) and it confirms that the CWP Project could make an application for permission before the details of certain permanent infrastructure described in **Section 4.3** of **Chapter 4 Project Description** is confirmed.

95. In addition, the application for permission relies on the standard flexibility for the final choice of installation methods and O&M activities.

96. Notwithstanding the flexibility in design and methods, the EIAR identifies, describes and assesses all the likely significant impacts of the CWP Project on the environment.

7.8.2 Options and dimensional flexibility

97. Where the application for permission seeks options or dimensional flexibility for infrastructure or installation methods, the impacts on the environment are assessed using a representative scenario approach. A ‘representative scenario’ is a combination of options and dimensional flexibility that has been selected by the author of this EIAR chapter to represent all the likely significant effects of the project on the environment. Sometimes, the author will have to consider several representative scenarios to ensure all impacts are identified, described and assessed.

98. For marine water quality, this analysis is presented in **Appendix 7.2**, which 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.

99. **Table 7-11** below presents a summarised version of **Appendix 7.2** and describe the representative scenarios on which the construction and O&M phase marine water quality assessment has been based. Where options exist for each receptor and potential impact, the table identifies the representative scenario and provides a justification for this.

7.8.3 Limit of deviation (LoD)

100. Where the application for permission seeks locational flexibility for infrastructure, the impacts on the environment are assessed using a LoD. The LoD is the furthest distance that a specified element of the CWP Project can be constructed.

101. This chapter assesses the specific preferred location for permanent and temporary infrastructure. However, **Appendix 7.2** 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.

102. For marine water quality, this analysis is summarised in **Table 7-12**.

103. Where the potential for LoD to cause a new or materially different effect is identified, this is noted in **Table 7-12** and is considered in more detail within **Section 7.10** of this chapter.

Table 7-11 Representative scenario summary

Impact	Representative scenario details	Value	Notes / Assumptions
Construction			
Impact 1: Direct temporary disturbance resulting in temporary increases in SSC	Array site (including wind turbine generator (WTGs), offshore substation structure (OSSs) and offshore export cables within the Array Site) and OECC (WTG Layout Option A (75 WTGs))		Option A forms the representative scenario as this represents the greatest level of temporary increase in SSC, and therefore Option A forms the basis of the assessment. Option B, or any other scenario resulting in a lower level of temporary increases in SSC, would not introduce new or different impacts and would not result in a materially different effect. Greatest increases in SSC are anticipated to be caused by dredge disposal operations and cable installations, which underwent sediment plume modelling, as presented in **Appendix 6.3 Modelling Report**.
	Boulder clearance: Array site seabed clearance area (m^2)	2,556,000–2,934,000	
	Sand wave clearance: Array site volume of material disturbed by sand wave clearance (m^3)	615,750–777,750	
	Inter-array cable (IAC) and interconnector cable installation: Total volume of sediment disturbed (m^3)	2,866,500–3,321,000	
	Boulder clearance: OECC seabed clearance area (m^2)	2,220,000–2,616,000	
	OECC volume of material disturbed by sand wave clearance (m^3)	471,450–595,650	
	Offshore export cable installation: Total volume of sediment disturbed (m^3)	3,780,000–4,374,000	
	JUV operations total impact area (m^2)	240,000	
	WTGs and OSS anchoring operations total impact volume (m^3)	1,404,000	
	IAC and interconnector cable anchoring operations total seabed impact volume (m^3)	1,857,600	

Impact	Representative scenario details	Value	Notes / Assumptions
	Offshore export cable anchoring operations total seabed impact volume (m³)	3,153,600	
	Total volume of WTG monopile drill arisings (m³)	24,516	
	Landfall		
	Total seabed disturbed by cofferdam (m²)	6,100	
	Total seabed disturbed by intertidal cable duct installation (m³)	72,000	
	Total area of seabed in transition zone affected by support structures (m²)	6,900	
	Total volume of seabed in transition zone affected by installation of cables using either open cut trenching or a shallow water trenching tool (m³)	216,000	
	Onshore substation		
	Onshore substation: length of combi-wall below the High Water Mark (HWM) (requiring marine piling) (m)	150	
	Onshore substation: Total length of new revetments (m)	150	
Impact 2: Direct disturbance resulting in resuspension of contaminated sediments	Representative scenario parameters are the same as those for Impact 1, above. Coastal processes modelling indicates that spring tides, which generate the greatest horizontal displacement, can extend along the tidal axis for up to 10 km. Sediment plume modelling suggests that the greatest direction and distance of dispersion of	As above for array site, OECC, landfall, and onshore substation	Remobilisation of contaminated sediments relates to seabed preparation for foundations and cables, jack-up and anchoring operations, and cable installation. It should be noted that, where boulder clearance overlaps with sand wave clearance, the boulder clearance footprint will be within the sand

Impact	Representative scenario details	Value	Notes / Assumptions
	disturbed material was 9–10 km to the east, although one scenario showed dispersion to the southeast reaching 6–7 km and to the west reaching 3–4 km.		wave clearance footprint. Remobilisation of contaminated sediments occur as a result of temporary disturbance to the seabed. Offshore, WTG Option A forms the representative scenario as this represents the greatest level of temporary disturbance to the seabed, and therefore Option A forms the presentational basis of the assessment for Impact 2. Option B would result in a lower level of disturbance and would not introduce new impacts or an impact of materially different magnitude.
Impact 3: Accidental pollution events	Total WTG Total construction vessels (round trips)	75 2,409	Accidental pollution events relate to the oils and fluids which may be used during construction activities, including: • Grease; • Hydraulic oil; • Gear oil; • Nitrogen; • Transformer silicon / ester oil; • Diesel fuel;

Impact	Representative scenario details	Value	Notes / Assumptions
	Number of WTG and OSS locations that may require drilling	12	• SF6; • Glycol / coolants; • Batteries; and • Drill fluid. The requirement for use of oils and fluids during construction will be the same regardless of the WTG option selected. However, offshore, WTG Option A forms the representative scenario, as this represents the greatest number of locations that may require drilling.
Operations and maintenance			
Impact 1: Direct temporary disturbance resulting in temporary increases in SSC	Temporary increases in SSC during operation and maintenance of the CWP Project are anticipated to occur if one of the following is required: • Cable reburial, following movement of seabed sediments resulting in the exposure of the buried cable; • Cable repair, requiring exposure, recovery and reburial of cables; and • Use of JUVs during WTG / OSS maintenance. It is anticipated that the same or similar methodology will be required as described for the construction phase, except over a greatly reduced area. Given this it is anticipated that, for the purposes of a representative scenario, the impacts will be no greater than those identified for the construction phase.		
Impact 2: Direct disturbance resulting in resuspension of contaminated sediments	Resuspension of contaminants sediments is associated with the disturbance of seabed sediments are increases in SSC. Temporary increases in SSC during operation and maintenance of the CWP Project are anticipated to occur if one of the following is required: • Cable reburial, following movement of seabed sediments resulting in the exposure of the buried cable; • Cable repair, requiring exposure, recovery and reburial of cables; and • Use of JUVs during WTG / OSS maintenance.		

Impact	Representative scenario details	Value	Notes / Assumptions
	It is anticipated that the same or similar methodology will be required as described for the construction phase, except over a greatly reduced area. Given this it is anticipated that, for the purposes of a representative scenario, the impacts will be no greater than those identified for the construction phase.		
Impact 3: Accidental pollution events	Number of vessels on site x round trips	1,209	Accidental pollution relates to the oils and fluids which may be used during O&M activities, including: • Grease; • Hydraulic oil; • Gear oil; • Nitrogen; • Transformer silicon / ester oil; • Diesel fuel; • SF6; • Glycol / coolants; • Batteries; • Drill fluid. The requirement for use of oils and fluids during O&M will be the same regardless of the WTG option selected. Therefore, there is only one scenario for this potential impact and this represents the representative scenario.

Impact	Representative scenario details	Value	Notes / Assumptions
Decommissioning			
Impact 1: Direct temporary disturbance resulting in temporary increases in SSC **Impact 2:** Direct disturbance resulting in resuspension of contaminated sediments	It is recognised that legislation and industry best practice change over time. However, for the purposes of the EIA, at the end of the operational lifetime of the CWP Project all offshore infrastructure will be rehabilitated. In this regard, for the purposes of a representative scenario for decommissioning impacts, the following assumptions have been made: • The WTGs and OSS topsides shall be completely removed. Following WTG and OSS topside decommissioning and removal, the monopile foundations will be cut below the seabed level to a depth that will ensure the remaining foundation is unlikely to become exposed. This is likely to be approximately 1 m below seabed, although the exact depth will depend upon the seabed conditions and site characteristics at the time of decommissioning. • All cables and associated cable protection in the offshore environment shall be wholly removed. It is likely that equipment similar to that used to install the cables may be used to reverse the burial process and expose them. Therefore, the area of seabed impacted during the removal of the cables is anticipated to be the same as the area impacted during the installation of the cables. • Generally, decommissioning is anticipated to be a reverse of the construction and installation process for the CWP Project, and the assumptions around the number of vessels on site and vessel round trips is therefore the same as described for the construction phase of the offshore components. Given the above, it is anticipated that, for the purposes of a representative scenario, the impacts will be no greater than those identified for the construction phase.		
Impact 3: Accidental pollution events	For the purposes of a representative scenario for decommissioning impacts, the following assumptions have been made: • Generally, decommissioning is anticipated to be a reverse of the construction and installation process for the CWP Project and the assumptions around the number of vessels on site and vessel round trips is therefore the same as described for the construction phase of the offshore components. Given the above, it is anticipated that, for the purposes of a representative scenario, the impacts will be no greater than those identified for the construction phase.		

Table 7-12 Limited of deviation (LoD) summary

Project component	LoD	Conclusion from Appendix 7.2
WTGs / OSSs	100 m from the centre point of each WTG location. 100 m from the centre point of each OSS location.	No potential for new or materially different effects.
IACs / 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.	No potential for new or materially different effects.
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.	No potential for new or materially different effects.
Location of onshore substation revetment perimeter structure	Defined LoD boundary for sheet piling at toe of the revetment with 0.5–1.0 m horizontal width.	No potential for new or materially different effects.

7.9 Primary mitigation measures

104. Throughout the development of the CWP Project, measures have been adopted as part of the evolution of the project design and approach to construction, to avoid or otherwise reduce adverse impacts on the environment. These mitigation measures are referred to as ‘primary mitigation’. They are an inherent part of the CWP Project and are effectively ‘built in’ to the impact assessment.

105. Primary mitigation measures relevant to the assessment of marine water quality are set out in **Table 7-13**. Where additional mitigation measures are proposed, these are detailed in the impact assessment (**Section 7.10**). Additional mitigation includes measures that are not incorporated into the design of the CWP Project and require further activity to secure the required outcome of avoiding or reducing impact significance.

Table 7-13 Primary mitigation measures

Project element	Description
All offshore infrastructure (Construction)	Bedform clearance operations will be undertaken only where necessary, thereby minimising sediment disturbance and alteration to seabed morphology.
All offshore infrastructure (Construction and operation)	A Construction Environmental Management Plan (CEMP) has been prepared to provide a management framework, to ensure appropriate controls are in place to manage environmental risks associated with the construction of the CWP Project. It outlines environmental procedures that require consideration throughout the construction process, in accordance with legislative requirements and industry best practice. In summary, the CEMP includes details of: • The Environmental Management Framework for the CWP Project, including environmental roles and responsibilities (e.g. ecological clerk of works) and contractor requirements (e.g. method statements for specific construction activities); • Mitigation measures and commitments made within the EIAR, Natura Impact Statement (NIS) and supporting documentation for the CWP Project; • Measures proposed to ensure effective handling of chemicals, oils and fuels, including compliance with the MARPOL convention; • A Marine Pollution Prevention and Contingency Plan to address the procedures to be followed in the event of a marine pollution incident originating from the operations of the CWP Project; • An Emergency Response Plan adhered to in the event of discovering unexploded ordnance; • Offshore biosecurity and invasive species management detailing how the risk of introducing and spreading invasive non-native species (INNS) will be minimised; and • Offshore waste management and disposal arrangements. The CEMP will be implemented by the Applicant and its appointed contractor(s) and will be secured through conditions of the development consent. It will be a live document which will be

Project element	Description
	updated and submitted to the relevant authority, prior to the start of construction.
WTGs and OSSs (Construction)	Drill fluids, where required, will comply with industry best practice and standards to minimise risk to the environment.
WTGs and OSSs (Construction)	Grouts will comply with the relevant maritime industry specifications, which are designed for safety and are suitable for use in the marine environment.
All offshore infrastructure (Construction and operation)	In general, the CWP Project has sought to specify the location, scale and extents of permanent and temporary offshore infrastructure; however, in some cases a degree of locational flexibility is required. Locational flexibility of permanent and temporary infrastructure is described as a limit of deviation (LoD) from a specific point or alignment. LoDs, described in **Chapter 4 Project Description**, are required to: • Take account of additional ground conditions data acquired during pre-construction geotechnical surveys and results from pre-construction offshore UXO surveys; • Avoid and minimise adverse impacts on offshore ephemeral benthic habitats such as *Sabellaria spinulosa* reef, identified during pre-construction surveys; and • Take account of the confirmed position of existing subsea infrastructure and archaeological features.
Onshore Infrastructure	An Onshore Substation Site Drainage and Water Supply Design Report has been prepared to summarise the stormwater and foul water drainage proposals for the CWP Project during the O&M phase, as well as the proposed potable water supply proposals. The Onshore Substation Site Drainage and Water Supply Design Report includes details of: • Storm water network design; • Storm water collection and disposal systems; • Foul water collection and disposal systems; • Estimated potable water demand. The Onshore Substation Site Drainage and Water Supply Design Report will be implemented by the Applicant and its appointed contractor(s) and will be secured through conditions of the development consent.
All offshore infrastructure (Decommissioning)	A Rehabilitation Schedule is provided as part of the planning application. This has been prepared in accordance with the MAP Act (as amended by the Maritime and Valuation (Amendment) Act 2022) to provide preliminary information on the approaches to decommissioning the offshore and onshore components of the CWP Project. A final Rehabilitation Schedule will require approval from the statutory consultees prior to undertaking decommissioning works. This will reflect discussions held with stakeholders and regulators to determine the exact methodology for decommissioning, taking

Project element	Description
	into account available methods, best practice and likely environmental effects.

7.10 Impact assessment

7.10.1 Construction phase

106. The potential environmental impacts arising from the construction of the CWP Project are listed in **Table 7-10**, along with the parameters against which each construction phase impact has been assessed. A description of the potential effect on marine water quality receptors, provided in **Table 7-9**, caused by each identified impact is given below.

Impact 1: Direct temporary disturbance resulting in temporary increases in SSC

107. Activities associated with the construction of the CWP Project will cause a temporary increase in SSC which could negatively impact the identified receptors through increased turbidity and associated reduction in water clarity, potentially leading to a reduction in bacterial mortality through reduced UV light transmission. Additionally, increases in SSC could potentially release sediment-bound nutrients, thus making them biologically available to marine organisms such as phytoplankton, giving rise to increase oxygen demands. This would reduce levels of dissolved oxygen within the water column. Furthermore, increased turbidity can impact levels of bacteria in the water column as higher levels of light attenuation cause lower bacterial mortality.

108. The associated consequences of increases in SCC, such as changes to water clarity, oxygen levels, nutrients, phytoplankton and microbial activity, are considered in the assessment below and are also assessed in **Appendix 7.3**.

Receptor sensitivity

Offshore waters (beyond 1 NM)

109. Water quality in the offshore waters (beyond 1 NM) in the study area supports or contributes to the designation of international or national protected areas, notably a number of international designated sites. As such, the value of this receptor is deemed to be high.

110. Tolerance of the receiving environment to increases in SSC are deemed high. This is because it is considered that the enhanced SSC would in the main not be discernible above the wider natural variation that is likely to be experienced during storm events, and there are no existing SSC issues in the offshore waters. Therefore, key water quality characteristics have a high capacity to accommodate the proposed change.

111. Recoverability is deemed to be high (i.e. full recovery within 2 years).

112. Based on the above consideration and the criteria set out in **Table 7-4,** the receptor sensitivity is low.

WFD coastal and transitional waterbodies (<1 NM from coast)

113. Water quality in the WFD coastal and transitional waters (within 1NM) in the study area supports or contributes to the designation of international or national protected areas, including a number of international designated sites including SACs and SPAs, bathing waters, shellfish waters and nutrient-sensitive areas. As such, the value of this receptor is deemed to be high.

114. Tolerance and recoverability of the receiving WFD waterbodies to increases in SSC are deemed high. This is because although the predicted levels of SSC would not be discernible above the wider natural variation that is likely to be experienced during storm events and the coastal waterbodies are at Good or High WFD status water quality. Whilst the transitional waterbodies in the study area are at moderate or poor status, this is due to a combination of being highly modified waterbodies and also nutrient pressure from urban wastewater treatment works.

115. Designated bathing waters can be sensitive to increases in SSC. However, for light increases in SSC, tolerance and recoverability is deemed to be high as there will still be adequate transmission of the ultraviolet (UV) component of light to remove bacteria in the water column.

116. Based on the above, consideration and the criteria set out in **Table 7-4** receptor sensitivity is considered to be medium.

Magnitude of impact

117. The two activities that will result in the largest levels of SSC are dredging and trenching, as described in **Appendix 6.3 Modelling Report** and summarised below.

118. During dredging and dredge disposal activities, SSCs local to the release locations are predicted to be enhanced to up to a maximum of c. 150 mg \ L. During trenching activities, SSCs local to the release locations are predicted to be enhanced to up to a maximum of 80 mg / L. Enhanced SSCs are transient, and concentrations are predicted to reduce to baseline levels no more than 15 days after the release activity. All other incidences of increased SSC arising from other construction or construction preparation activities are considered to be within the values and extents over which SSC may present for dredging or trenching, as described below.

Dredging and dredge disposal

119. Suspended sediment plumes created during dredge disposal operations are predicted to enhance SSC levels in the near field (i.e. to the point of release) and far field (i.e. up to c. 10 km from the point of release).

120. The predicted transport of sediment plumes and subsequent deposition during dredge disposal activities within the offshore development area can be summarised as follows.

121. Modelled representative scenarios of dredge disposal activities within the array site indicated that the predominant direction of travel for SSC plumes is eastward (away from shore). In one scenario, a maximum transient increase in SSC of 150 mg / L was predicted to travel up to 4 km over c. 10 days. In another scenario, a maximum increase of 100 mg / L was predicted to travel up to 6 km over c. 15 days. Modelled representative scenarios of dredge disposal activities within the OECC predicted a maximum transient increase in SSC of 80 mg / L, travelling up to 4 km westward. A final scenario predicted a maximum increase in SSC of 50 mg / L, travelling up to 5 km southeastward.

Trenching

122. A consequence of cable installation will be the liberation of sediment into suspension within the water column, just above the seabed. Jetting 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, and thus is assessed as the representative scenario. This method involves fluidising the material to form a narrow trench into which the cable is laid.

123. Based upon the representative scenario, the predicted transport of sediment plumes generated during cable installation activities across the array site indicates the finest sediments will potentially be transported eastward up to 10 km at an increase of 20 mg / L. Maximum SSC values of up to 40 mg / L were predicted to be transported up to 4 km eastward. However, these plumes are transient, rapidly decreasing as sand-sized sediments deposit to the bed and finer sediments are dispersed.

124. The predicted transport of sediment plumes generated during cable installation activities across the OECC were for a maximum increase in SSC of 50 mg / L being transported for up to 7 km eastward and southward, and a maximum increase in SSC of 80 mg / L being transported for < 1 km eastward.

125. Enhanced SSC would not discernible above that of natural variation observed during storm events, with SSCs predicted, in the representative scenario, to reduce to baseline levels within c. 15 days following trenching operations.

126. Background levels of SSC are considered to be between 5–15 mg / L within the offshore development area. Parameters associated with the representative scenario for this impact are provided in **Table 7-11.**

127. Regarding onshore infrastructure, construction of a coastal wall and revetment placement will take place in part in the marine environment. The resulting hydromorphological changes and SSC resulting from these works is predicted to be negligible, as the only construction activity will be installation of the combi-wall, which is not predicted to increase the SSC above already-experienced levels within the local area. This is within the Dublin Port limits and is regularly exposed to increases in SSC arising from maintenance works, as well as natural river and estuarine processes.

128. For landfall works, use of a cofferdam as part of installation methodology is expected to isolate landfall and onshore works (open-cut trenching, vehicle movements and SSC from runoff of onshore construction activities) from contact with the marine environment; therefore, no impact is expected from these activities. Whilst the installation of a temporary cofferdam has the potential to result in hydromorphological changes, the cofferdam is relatively small (40 x 75 m) and located around MHWS, as such any changes in hydromorphology would be short term and of negligible magnitude.

Offshore waters (beyond 1 NM)

129. This impact has the potential to occur several times during the construction period (three years), with each period of elevated SSC and associated sediment deposition persisting for a maximum of 15 days before returning to background levels. Therefore, frequency of the impact is deemed to be low and duration of impact is considered negligible.

130. Anticipated SSC increases are transient in nature, short term and temporary, and, despite exceeding average concentrations for the locality, are consistent with levels observed during storm events. Given this, any levels of nutrients released from sediments into the water column will not exceed those that occur during storm events and are not anticipated to result in a decrease in dissolved oxygen in the water column.

131. No construction activities will input bacteria into the offshore waters, and the low levels of increases in SSC are unlikely to reduce light attenuation to a level where it would significantly decrease bacteria mortality rates.

132. Given the hydrodynamic regime in the area, the low levels of predicted increases in SSC (which will only persist for a very short time), and the large area occupied by offshore waters within the study area, no non-reversible changes to characteristics or descriptors relating to marine water quality are predicted, and the consequences of the impact is therefore considered to be negligible.

133. Based on the above consideration and the criteria set out in **Table 7-5** the magnitude of the impact is therefore negligible.

WFD waterbodies (<1 NM from coast)

134. The OECC overlaps the Dublin Bay and Irish Sea Dublin WFD coastal bodies.

135. Dublin Bay waterbody includes a number of designated and non-designated bathing waters, and a nutrient-sensitive area (see **Table 7-9**). Sandymount Strand designated bathing waters overlap the offshore development area, and the non-designated Shelley Banks is overlapped by the offshore development area at the point of landfall. The detail of the construction programme is currently unknown, and as such works may occur either in or out of the designated bathing water season (22 May to 15 September). No nutrient-sensitive areas directly overlap the offshore development area, although the Liffey Estuary nutrient-sensitive area lies c. 800 m north of the OECC at landfall.

136. Peak levels of SSC from the proposed activities will only persist for a very short period (hours) and will affect only a very small area around the location of the activity (< 1 km). Beyond this, a discrete plume of elevated SSC will be present for a number of days, though levels will quickly fall to those experienced by the majority of habitats during the normal course of the year, such as through storm events or periods of high wave or tidal action. It should be noted that any area of elevated SSC will not remain consistently elevated during the plume's existence; rather it will increase and decrease over the predicted duration through the effects of hydrodynamic forces, such as tidal movements. Therefore, duration of impact is considered to be negligible, extent is considered low and levels of nutrients released from sediments into the water column will not exceed those that occur during storm events, meaning that any resulting impact on dissolved oxygen levels will be negligible.

137. It is recognised that the elevated areas of SSC may contribute to minor changes in monitored parameters, such as through a reduction in bacterial mortality through reduced UV light transmission. However, considering the short duration and temporary nature of the effects, any such change is expected to be quickly reversed upon cessation of impacting activity and the return of SSC to background levels.

138. The very short duration and temporary nature of these elevated SSC events, even if they may occur repeatedly throughout construction, and may have the potential to impact a relatively large proportion of a given waterbody, means that any predicted effect is not expected to result in a deterioration of status, or prevent achievement of WFD target status. Therefore, the consequences are deemed to be low. As such, magnitude of impact on these waterbodies (Dublin Bay, Dublin, Irish Sea Dublin and Southwestern Irish Sea–Killiney Bay) and any associated protected areas (such as bathing waters and nutrient-sensitive areas) is considered to be low.

139. Works in the River Liffey overlap the Liffey Estuary Lower transitional waterbody. In this area, the construction of a coastal wall and revetment will take place in part in the marine environment. The resulting hydromorphological changes and SSC resulting from these works is predicted to be negligible, as the only construction activity will be installation of the combi-wall, which is not predicted to increase the SSC above already-experienced levels within the local area. This is within the Dublin Port limits and is regularly exposed to increases in SSC arising from maintenance works, as well as natural river and estuarine processes. Any effects are only predicted to affect a small area of the

waterbody, and although activities may result in repeated impacts, any impact is not predicted to lead to any change greater than a short-term and reversible change to characteristics or descriptors relating to marine water quality. This is not expected to result in a deterioration of status or prevent achievement of WFD target status or GES; therefore, the consequences are deemed to be negligible. As such, magnitude of impact on the Lower River Liffey waterbody is negligible.

140. The following transitional waterbodies are in proximity to, but have no overlap with, the offshore development area.

- Tolka Estuary;
- Liffey Estuary Upper;
- Liffey Estuary Lower; and
- North Bull Island.

141. The Tolka Estuary and North Bull Island waterbodies are located to the north and west of the offshore development area, and Liffey Estuary Upper is located a considerable distance upstream from the works in Pigeon Park. As such, there is no predicted interaction with any sediment that may arise from construction activities. However, considering a highly precautionary approach, should any levels of increased SSC reach these waterbodies, it is considered that levels would be so minimal that they would not be discernible from the natural background levels that exist in these areas of natural sediment accretion. A small amount of the works in Pigeon Park will occur in the Liffey Estuary Lower. The works at Pigeon Park are not considered to increase SSC above that experienced through natural variation, and so no discernible change in SSC levels above those experienced as part of natural variation is expected in the River Liffey Upper waterbody. Therefore, consequences are low. As such, magnitude of impact on these waterbodies (Tolka Estuary, North Bull Island, River Liffey Upper and River Liffey Lower) is considered to be negligible.

142. Based on the above consideration and the criteria set out in **Table 7-5**, the magnitude of impact is considered to be negligible to low.

Significance of effect

143. The sensitivity of offshore waters in the study area is considered to be low and the magnitude the of impact negligible. Therefore (as per the matrix in **Table 7-6**), an effect of not significant impact on offshore waters is assessed, which is **not significant**.

144. The sensitivity of WFD marine and transitional waters bodies in the study area is considered to be medium and the magnitude the of impact low to negligible. Therefore (as per the matrix in **Table 7-6**), a slight to slight / not significant adverse effect on WFD waterbodies is assessed, which is **not significant**.

145. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

146. Although the impact of direct temporary habitat disturbance resulting in temporary increases in SSC is not significant and in addition to the primary mitigation measures described in **Section 7.9**, additional mitigation measures will be in place which will further reduce the potential for impact and are described below.

Additional mitigation

147. Installation of the landfall cable ducts using open cut methods will require the excavation of a single swathe with three cable trenches between the TJBs and the intertidal area, within which cable ducts for each of the three cable circuits will be laid and buried. Prior to the commencement of open cut cable duct installation, a temporary cofferdam will be installed to act as a barrier to tidal inundation

whilst the existing stone covered foreshore is temporarily removed and the ducts installed. The type of cofferdam that is used will be determined post-consent once a cable installation contractor has been appointed. However, a water- or sand-filled cofferdam is likely to be a viable option, taking into account the low tidal pressures. Other options include a berm created using existing sediment or temporary sheet piling.

148. The cofferdam will be installed in such a way as to permit open cut trenching from the onshore area to the intertidal area, allowing a dry working area below the MHWM. As well as providing a temporary flood defence structure, the cofferdam will act as a barrier to prevent the transport of sediment and any associated contaminants from the onshore works area into the marine environment.

149. After installation of the temporary cofferdam, open cut trenching and cable duct installation will commence between the repositioned footpath and the intertidal area (within the cofferdam). A trench for each of the three circuits (up to 3 m in depth) will be excavated using a backhoe and / or 360° excavator, with access provided via the haul road.

150. Based on water level monitoring, groundwater levels are c. 3.5 to 4 m below ground level; therefore, limited groundwater is expected to be encountered during the excavation. However, any water encountered within the open trenching will be collected at sumps, treated on site and discharged to the existing sewerage network. There will be no discharge of surface water or groundwater to the intertidal area.

Residual effect

151. Following the additional mitigation measures, the residual effect will remain **not significant** on all marine water quality receptors.

Impact 2: Direct disturbance resulting in resuspension of contaminated sediments

152. The potential for resuspension of contaminants from sediments in the marine environment is associated with the resuspension of seabed sediments and can therefore also be characterised by sediment plume modelling presented in **Appendix 6.3 Modelling Report**.

153. Levels of contaminants above Irish lower action level (AL) and Cefas action level 1 (AL1) were detected at four stations during site-specific surveys (**Appendix 8.3 Benthic Baseline Report**), which may be disturbed during the works: stations 28, 30 and 77 (arsenic), and station 59 (cadmium, chromium and zinc). None exceeded Irish upper AL or Cefas AL2, and no other pollutants exceeded risk levels. In the Pigeon Park area of the River Liffey, contaminated sediment results showed that no contaminants were found at levels above those of Cefas AL1 or above Irish lower action levels.

154. Regarding potential onshore sources, no contamination above or near levels of concern for the environment or public health has been found during site-specific surveys. However, waste material is previously known to have been deposited at the landfall site (**Chapter 19 Soils and Geology**), therefore as a conservative approach it is assumed for the purpose of this assessment that there may be chemicals present that are on the EQSD list. Cable installation methodologies spanning the onshore to the offshore environment have the potential to provide a route to impact for the Dublin Bay waterbody. However, it is considered that primary mitigation in the form of controlling runoff and prevention of water exchange between on and offshore environments will ensure this is fully prevented (See **Table 7-14**).

Receptor sensitivity

Offshore waters (beyond 1 NM)

155. Water quality in the offshore waters (beyond 1NM) in the study area supports or contributes to the designation of international or national protected areas, notably a number of international designated sites. As such, the value of this receptor is deemed to be high.

156. The potential for sediments to accumulate chemical contamination is linked with sediment type. Finer particles (muds and silts, < 63 µm) have greater surface area-to-volume ratio and adsorptive capacity compared to coarser grains (sands and gravels) (Sheahan et al., 2001). As described in **Chapter 6 Marine Geology, Sediments and Coastal Processes** and site-specific PSA analysis, seabed across the offshore development area is predominantly sandy gravel (grain size > 2 mm), with a higher percentage of sand (0.063–2.0 mm) found closer to the coastline.

157. In general, seabed sediments are susceptible to resuspension by tidal currents and waves (see **Chapter 6 Marine Geology, Sediments and Coastal Processes: Section 6.6.5**), resulting in high dispersion and dilution of any low-level contaminants. In addition, seabed sediments in the offshore waters tend towards coarser grain sizes, which are less susceptible to the accumulation of contamination. This is reflected by the generally low levels of contaminants found in the Irish Sea (OSPAR, 2917; DHLGH, 2020), with the Irish Sea considered to have achieved GES for contaminants under MSFD. Therefore, tolerance and recoverability of the offshore water quality is considered to be high.

158. Considering the low background levels of contamination, predicted sediment mobility and the coarse nature of much of the sediments offshore, and the criteria set out in **Table 7-4,** the overall sensitivity is considered to be negligible.

WFD marine and transitional water bodies (<1 NM from coast)

159. Water quality in the WFD coastal and transitional waters (within 1NM) in the study area supports or contributes to the designation of international or national protected areas, including a number of international designated sites, including SACs and SPAs, bathing waters, shellfish waters and nutrient-sensitive areas. As such, the value of this receptor is deemed to be high.

160. WFD waterbodies are classified for chemical status based on the presence of priority substances and priority hazardous substances in line with the EQSD, as well as the EU-established watch list (EPA, 2021). WFD chemical status of the seven coastal and transitional waterbodies within the study area of the predicted sediment plume (**Appendix 6.3**) ranges between poor to good status, where classified (EPA, 2022a). Coastal waterbodies (such as Dublin Bay and Irish Sea Dublin) tend to have a good chemical status, which is likely to be due to the greater influence of currents and waves on sediment transport and mixing compared to transitional waters (Liffey Lower and Tolka Estuary), which are more heavily influenced by inputs from terrestrial sources and experience greater deposition volumes from their respective rivers. Only sediments within Dublin Bay, Liffey Lower, Irish Sea Dublin (south section) and Southwestern Irish Sea–Killiney (north corner of the waterbody) are within the offshore development area and would be subject to direct disturbance. Therefore, tolerance and recoverability of the water quality in these areas is considered to be high.

161. Site-specific chemical analysis was undertaken at eight stations within the offshore development area, with selected contaminants recorded at levels above Irish lower ALs detected at four stations (**Appendix 8.3 – Benthic Baseline Report**) which may be disturbed during the works: stations 28, 30 and 77 (arsenic), and station 59 (cadmium, chromium and zinc). Station 59 is located within the Dublin Bay coastal waterbody, and as a result there is potential for these sediments to be released into the Dublin Bay coastal waterbody. Based on sediment plume modelling (**Appendix 6.3**), sediments

disturbed at this location are not anticipated to travel into other WFD waterbodies. Stations 28, 30 and 77 are located outside of the WFD jurisdiction, but sediments disturbed from these stations may interact with the Irish Sea Dublin (HA 09) coastal waterbody and the Southwestern Irish Sea–Killiney (HA 10).

162. As described in **Chapter 6 Marine Geology, Sediments and Coastal Processes** and site-specific PSA analysis, a higher percentage of sand (0.063–2.0 mm) is found closer to the coastline and is therefore more likely to accumulate contamination. However, seabed sediments are still mobile and susceptible to regular resuspension by tidal currents and waves, resulting in high natural dispersion and dilution of any low-level contaminants. Any disturbance of sediments as a result of the works would likely dilute contaminants further and would not risk deterioration of the overall chemical status of waterbodies.

163. The sensitivity of the coastal and transitional waterbodies is considered to be low due to the presence of protected areas in the vicinity of the works, coupled with the high tolerance of the receiving environment to the predicted level of impact and associated good recoverability potential and the criteria set out in **Table 7-4**.

Magnitude of impact

Offshore waters (beyond 1 NM)

164. As per Impact 1, the area anticipated to be affected by increased SSC is a relatively small proportion of the Irish Sea, with the greatest increases in SSC and sediment deposition observed in the immediate vicinity of the disturbance site. As such, the extent is low, frequency of the impact is low and duration is negligible. In general, chemical contamination detected in site-specific samples and background sediment contamination in the Irish Sea is low, and would be further diluted by natural disturbance events. The impact is considered to be equivalent to background levels of disturbance and redistribution of sediments due to high natural sediment mobility in the Irish Sea (DHLGH and Marine Institute, 2013; DHLGH, 2020); therefore, the likelihood of any contamination being resuspended in sufficient quantities to affect GES is highly unlikely, making the consequences on marine water quality negligible.

165. Based on the above consideration and the criteria set out in **Table 7-5**, the magnitude of the impact is therefore negligible.

WFD waterbodies

166. The potential for waterbodies to be impacted by resuspended contaminants from disturbed sediments is considered to be analogous to the potential connectivity with increased SSC described under Impact 1.

167. Background contamination for waterbodies potentially affected is generally low, and site-specific sampling in the marine environment only detected contaminants above Irish lower AL/Cefas AL1 in discreet areas in the offshore environment, with no areas of elevated contaminants recorded in the vicinity of Pigeon Park in the Liffey.

168. In accordance with the sediment plume modelling (**Appendix 6.3**), sediments at these offshore locations are not anticipated to travel a considerable distance from the point of disturbance, and any contaminants that are present would be further diluted as a result of any such transport. Considering the relatively small scale of the distances transported, and the low levels of contaminants present, it is considered that there will be no change to contaminant levels in the wider receiving environment from the direct disturbance of sediments, with no risk of deterioration of the overall chemical status of

waterbodies, or hindrance to achievement of WFD target status or GES, making the consequences on marine water quality negligible.

169. Based on the above consideration and the criteria set out in **Table 7-5,** the magnitude of impact is therefore considered to be negligible.

Significance of the effect

170. The sensitivity of offshore waters in the study area is considered to be negligible and the magnitude of the impact is negligible. Therefore (as per the matrix in **Table 7-6**), an imperceptible effect, which is **not significant** in EIA terms, is predicted.

171. The sensitivity of WFD marine and transitional waters bodies in the study area is considered to be low and the magnitude the of impact negligible. Therefore (as per the matrix in **Table 7-6**), a not significant adverse effect on WFD waterbodies is assessed, which is **not significant** in EIA terms**.**

172. Where flexibility in the proposed design exists there is no other scenario which would lead to a more significant effect.

173. Based on the predicted level of effect, it is concluded that no additional mitigation is required beyond the primary mitigation described in **Section 7.9**.

Impact 3: Accidental pollution events

174. Accidental spills during construction have the potential to have a negative effect on marine water quality. Potential pollutants consist of grease, hydraulic oil, gear oil, nitrogen, transformer silicon / ester oil, diesel fuel, SF6, glycol / coolants, drill fluid, grouting materials and batteries.

Receptor sensitivity

Accidental spills affecting offshore waters (beyond 1 NM) and WFD waterbodies (<1 NM from coast)

175. The sensitivity of the marine environment to an accidental pollution event is dependent on the nature of the spill – its size, proximity to sensitive features (such as protected areas), the properties of the spilled material and the capacity of responders to contain any spill. As a result, it difficult to define (DHLGH and Marine Institute, 2013; DHLGH, 2020).

176. As a conservative approach, and using the criteria set out in **Table 7-4,** sensitivity is considered to be high due to the presence of sensitive protected areas which may be affected by large or small spills.

Magnitude of impact

Spills affecting offshore waters (beyond 1 NM) and WFD waterbodies (<1 NM from coast)

177. The potential magnitude of impact varies depending on the type of incident and magnitude is much greater for incidents which require a larger response, such as vessel grounding or collision, compared to small-scale spills, such as discharges of light hydrocarbons (e.g. hydraulic fluid or diesel) from equipment (OSPAR, 2012; Varela et al., 2006; Yin et al., 2015). However, incidents such as vessel grounding or collisions are much less likely to occur than small-scale spills with a much smaller magnitude of impact.

178. Primary project mitigation outlined in **Section 7.9**, includes a Construction Environmental Management Plan (CEMP) to provide a management framework, to ensure appropriate controls are in place to manage environmental risks associated with the construction of the CWP Project. It outlines environmental procedures that require consideration throughout the construction process, in accordance with legislative requirements and industry best practice. In summary, the CEMP includes details of measures proposed to ensure effective handling of chemicals, oils and fuels including compliance with the MARPOL convention, a Marine Pollution Prevention and Contingency Plan to address the procedures to be followed in the event of a marine pollution incident originating from the operations of the CWP Project, and offshore waste management and disposal arrangements.

179. The CEMP will be implemented by the Applicant and its appointed contractor(s) and will be secured through conditions of the development consent. It will be a live document which will be updated and submitted to the relevant authority prior to the start of construction. Through the application of primary mitigation measures, the risk of occurrence of significant accidental pollution events will be reduced to as low as is reasonably practical. As a result, marine water quality receptors are extremely unlikely to be adversely affected by any such incident.

180. Based on the above consideration and the criteria set out in **Table 7-5**, the magnitude of impact is therefore considered to be negligible for both offshore waters and WFD waterbodies, as mitigation will reduce to as low as reasonably practical on any route to impact.

Significance of effect

181. The sensitivity of offshore waters and WFD waterbodies in the study area is considered to be high and the magnitude the of impact negligible. Therefore (as per the matrix in **Table 7-6**), the effect is slight, which is **not significant** in EIA terms.

182. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

183. Based on the predicted level of effect it is concluded that no additional mitigation is required beyond the primary mitigation described in **Section 7.9**.

7.10.2 Operation and maintenance

Impact 1: Direct temporary disturbance resulting in temporary increases in SSC as a result of maintenance and repair.

184. Temporary increases in SSC during operation and maintenance of the CWP Project are anticipated to occur in the event one of the following is required:

- Cable reburial, following movement of seabed sediments resulting in the exposure of the buried cable;
- Cable repair, requiring exposure, recovery and reburial of cables; and
- Use of JUVs during WTG / OSS maintenance.

185. It is anticipated that the same or similar methodology will be required as described for the construction phase, except over a greatly reduced area and shorter duration.

Receptor sensitivity

Offshore waters (beyond 1 NM)

186. Water quality in the offshore waters (beyond 1 NM) in the study area supports or contributes to the designation of international or national protected areas, notably a number of international designated sites. As such the value of this receptor is deemed to be high.

187. Tolerance and recoverability of the receiving environment to increases in SSC are deemed high, as the vast extent and volume of water and hydrodynamic regime mean any increases in SSC would be quickly dispersed.

Based on the above consideration of value, tolerance and recoverability, receptor sensitivity is low in accordance with **Table 7-4**.

WFD coastal and transitional waterbodies (<1 NM from coast)

188. Water quality in the WFD coastal and transitional waters (within 1 NM) in the study area supports or contributes to the designation of international or national protected areas, including a number of international designated sites, including SACs and SPAs, bathing waters, shellfish waters and nutrient-sensitive areas. As such, the value of this receptor is deemed to be high.

189. Tolerance and recoverability of the receiving WFD waterbodies to increases in SSC are deemed high This is because, although the predicted levels of SSC would not be discernible above the wider natural variation that is likely to be experienced during storm events and the coastal waterbodies are at Good or High WFD status water quality, suggesting high tolerance and recoverability to the impact. Whilst the transitional waterbodies in the study area are at Moderate or Poor status, this is due to a combination of being highly modified waterbodies and of nutrient pressure from urban wastewater treatment works.

190. Designated bathing waters can be sensitive to increases in SSC. However, for light increases in SSC, tolerance and recoverability is deemed to be high as there will still be adequate transmission of the ultraviolet (UV) component of light to remove bacteria in the water column.

191. In accordance with **Table 7-4**, and based on the above consideration of value, tolerance and recoverability, receptor sensitivity is considered to be medium for WFD waterbodies considering the presence of designated bathing water areas.

Magnitude of impact

192. The scale of operational works will be significantly reduced compared to construction, consisting of routine WTG maintenance and cable inspections. Only operations requiring large component repair or replacement are anticipated to result in increases in SSC, which would be local to the repair site and short in duration, estimated at one day per replacement to complete. Cable repairs, reburial or maintenance is not anticipated to be required, but will also be subject to regular inspection to ensure the cable remains buried. Reburial methodology will be similar to the installation methodology, but only required in discrete sections. Any levels of nutrients released from sediments into the water column will not exceed those that occur during storm events and are not anticipated to result in a decrease in dissolved oxygen in the water column. Therefore, any increases in SSC will be less than those of construction activities for which the magnitude of impact was assessed as negligible to low.

193. Based on the above consideration and the criteria set out in **Table 7-5**, the magnitude is therefore negligible for both offshore waters and WFD waterbodies.

Significance of effect

194. The sensitivity of offshore waters in the study area is considered to be low and for WFD waters is medium. The magnitude the of impact for both is negligible. Therefore (as per the matrix in **Table 7-6**), a not significant to slight **/** not significant effect on offshore waters is assessed, which is **not significant** in EIA terms.

195. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

196. Based on the predicted level of effect, it is concluded that no additional mitigation is required beyond the primary mitigation described in **Section 7.9**.

Impact 2: Direct disturbance resulting in resuspension of contaminated sediments

197. Resuspension of contaminants sediments is associated with the disturbance of seabed sediments and increases in SSC. See Impact 1 above.

Receptor sensitivity

Offshore waters (beyond 1 NM)

198. As per construction Impact 2, considering the low background levels of contamination, predicted sediment mobility and coarse nature of much of the sediments offshore, the overall sensitivity is considered to be negligible in accordance with **Table 7-4**.

WFD coastal and transitional waterbodies (<1 NM from coast)

199. As per construction Impact 2, the sensitivity of the coastal and transitional waterbodies are considered to be low due to the presence of protected areas in the vicinity of the works, coupled with the high tolerance of the receiving environment to the predicted level of impact and associated good recoverability potential and in accordance with **Table 7-4**.

Magnitude of impact

200. Based upon the potential scale and extent of increases in SSC that may arise throughout the operation and maintenance phase (see Impact 1), and the general low levels of contamination present (see Impact 2), there is no predicted impact on WFD chemical status (or achievement of target status) from operation and maintenance works. Based on the above consideration and the criteria set out in **Table 7-5**, the magnitude is therefore negligible for both offshore waters and WFD waterbodies.

Significance of effect

201. The sensitivity of offshore waters in the study area is considered to be low and for WFD waterbodies is medium. The magnitude of the impact for both is negligible. Therefore (as per the matrix in **Table 7-6**), a not significant to slight / /not significant effect on offshore waters and WFD waterbodies is assessed, which is **not significant** in EIA terms.

202. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

203. Based on the predicted level of effect, it is concluded that no additional mitigation is required beyond the primary mitigation described in **Section 7.9**.

Impact 3: Accidental pollution events

204. As outlined for Impact 3, accidental spills have the potential to have a negative effect on marine water quality. Accidental spills are less likely, with fewer annual vessel movements and regular maintenance of infrastructure. However, any incident which may occur during the operational phase can be expected to be similar to those possible during construction.

Receptor sensitivity

205. As per the assessment of Impact 3, a conservative approach has been taken and sensitivity is considered to be high due to the presence of sensitive protected areas which may be affected by large or small spills and in accordance with **Table 7-4**.

Magnitude of impact

206. The potential magnitude of impact varies depending on the type of incident. Magnitude is much greater for incidents which require a larger response, such as vessel grounding or collision, compared to small-scale spills, such as discharges of light hydrocarbons (e.g. hydraulic fluid or diesel) from equipment (OSPAR, 2012; Varela et al., 2006; Yin et al., 2015). However, incidents such as vessel grounding or collision are much less likely to occur than small-scale spills, which have a much smaller magnitude of impact.

207. Primary project mitigation outlined in **Section 7.9** includes a CEMP to provide a management framework, to ensure appropriate controls are in place to manage environmental risks associated with the construction of the CWP Project. It outlines environmental procedures that require consideration throughout the construction process, in accordance with legislative requirements and industry best practice. In summary, the CEMP includes details of: measures proposed to ensure effective handling of chemicals, oils and fuels, including compliance with the MARPOL convention, a Marine Pollution Prevention and Contingency Plan to address the procedures to be followed in the event of a marine pollution incident originating from the operations of the CWP Project, and offshore waste management and disposal arrangements.

208. The CEMP will be implemented by the Applicant and its appointed contractor(s) and will be secured through conditions of the development consent. It will be a live document which will be updated and submitted to the relevant authority prior to the start of construction. Through the application of primary mitigation measures, the risk of occurrence of significant accidental pollution events will be reduced to as low as is reasonably practical. As a result, marine water quality receptors are extremely unlikely to be adversely affected by any such incident.

209. Based on the above consideration and the criteria set out in **Table 7-5**, the magnitude of impact is therefore considered to be negligible for both offshore waters and WFD waterbodies.

Significance of effect

210. The sensitivity of offshore waters and WFD waterbodies in the study area is considered to be high and the magnitude the of impact negligible. Therefore (as per the matrix in **Table 7-6**), the effect is slight, which is **not significant** in EIA terms.

211. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

212. Based on the predicted level of effect it is concluded that no additional mitigation is required beyond the primary mitigation described in **Section 7.9**.

7.10.3 Decommissioning phase

213. The potential environmental impacts arising from the decommissioning of the CWP Project are listed in **Table 7-10**.

214. It is recognised that legislation and industry best practice change over time. However, for the purposes of the EIA, at the end of the operational lifetime of the CWP Project all offshore infrastructure will be rehabilitated. Primary mitigation measures set out in **Section 7.9** include a Rehabilitation Schedule provided as part of the planning application. This has been prepared in accordance with the MAP Act (as amended by the Maritime and Valuation (Amendment) Act 2022) to provide preliminary information on the approaches to decommissioning the offshore and onshore components of the CWP Project.

215. A final Rehabilitation Schedule will require approval from the statutory consultees prior to the undertaking of decommissioning works. This will reflect discussions held with stakeholders and regulators to determine the exact methodology for decommissioning, taking into account available methods, best practice and likely environmental effects.

216. A description of the potential effect on marine water quality receptors caused by each identified impact is given below.

Impact 1: Direct temporary disturbance resulting in temporary increases in SSC

217. Activities associated with the removal of WTG and OSS superstructures, substructures, foundations are anticipated to require the use of a JUV, similar to construction. However, the monopole is expected to be cut at the seabed, and disturbance of suspended sediments is anticipated to be limited.

218. Any removal of cables is anticipated to be similar to installation methodology, i.e. use of a jetting tool to unbury the cables. Resulting increases in SSC are anticipated to be similar to those modelled in **Appendix 6.3** for trenching activities. It is not expected that dredging activities will be required.

219. It is likely that increases in SSC during decommissioning with be no greater than those associated with the dredge and disposal and trenching activities during construction. Given this, the potential effects of this impact on the marine water quality receptors will be less than, or equal to, those of temporary increase in SSC during construction which have been assessed as not significant.

220. Therefore, an effect of **not significant** adverse impact is predicted for offshore water and WFD waterbodies.

221. Based on the predicted level of effect, it is concluded that no additional mitigation is required beyond the primary mitigation described in **Section 7.9**.

Impact 2: Direct disturbance resulting in resuspension of contaminated sediments

222. Activities associated with removal of the CWP Project generating station and OfTI have the potential to remobilise sediments which may contain levels of chemical contaminants.

223. In the baseline site-specific survey, contaminated sediment results showed low levels of chemical contaminants at stations sampled within the offshore development area. The majority of contaminants

levels at sampled stations were below the Irish lower AL and Cefas AL1 (**Appendix 8.3 Benthic Baseline Report**). It is unknown what levels of contaminated sediments will exist in the areas of habitat disturbance at the time of decommissioning, but no sources of significant contamination are predicted to be present within the offshore development area during its lifetime, and as such it is expected that levels of contamination will not increase during this time.

224. As such, it is considered that the remobilisation of contaminated sediment during decommissioning will be no greater than that during construction.

225. Given this, the potential effects of this impact on the marine water quality with be less than, or equal to, those of remobilisation of contaminated sediments during construction, which have been assessed as not significant. Therefore, an effect of **not significant** adverse impact is predicted for offshore water and WFD waterbodies.

Impact 3: Accidental pollution events

226. Generally, decommissioning is anticipated to be a reverse of the construction and installation process for the CWP Project and the assumptions around the number of vessels on site, and vessel round trips is therefore the same as described for the construction phase of the offshore components.

227. Primary project mitigation outlined in **Section 7.9**, includes a CEMP to provide a management framework, to ensure appropriate controls are in place to manage environmental risks associated with the construction of the CWP Project. It outlines environmental procedures that require consideration throughout the construction process, in accordance with legislative requirements and industry best practice. In summary, the CEMP includes details of measures proposed to ensure effective handling of chemicals, oils and fuels including compliance with the MARPOL convention, a Marine Pollution Prevention and Contingency Plan to address the procedures to be followed in the event of a marine pollution incident originating from the operations of the CWP Project, and offshore waste management and disposal arrangements.

228. The CEMP will be implemented by the Applicant and its appointed contractor(s) and will be secured through conditions of the development consent. It will be a live document which will be updated and submitted to the relevant authority prior to the start of construction. Through the application of primary mitigation measures, the risk of occurrence of significant accidental pollution events will be reduced to as low as is reasonably practical. As a result, marine water quality receptors are extremely unlikely to be adversely affected by any such incident.

229. Given this and based on the criteria set out in **Table 7-5**, the magnitude of impact is considered to be negligible, as mitigation will minimise as far as possible any route to impact.

230. Therefore, an effect of **not significant** adverse impact is predicted for offshore water and WFD waterbodies.

231. Based on the predicted level of effect it is concluded that no additional mitigation is required beyond the primary mitigation described in **Section 7.9**.

7.11 Cumulative impacts

232. A fundamental component of the EIA is to consider and assess the potential for cumulative effects of the CWP Project with other projects, plans and activities (hereafter referred to as 'other development').

233. **Appendix 7.1** presents the findings of the CEA for marine water quality, which considers the residual effects presented in **Section 7.10** alongside the potential effects of other proposed and reasonably foreseeable other development.

234. As the magnitude of impacts of accidental pollution events are assessed as negligible from CWP Project activities alone, it is considered that there is no potential for cumulative impacts with the other projects identified in **Appendix 7.1**.

235. A summary of the CEA for marine water quality is presented below.

236. The potential impacts considered for cumulative assessment are in line with those conclusions described for assessment of the project alone and include the following:

For construction:

- Direct temporary disturbance resulting in temporary increases in SSC, **not significant.**
- Direct disturbance resulting in resuspension of contaminated sediments, **not significant.**

For O&M:

- Direct temporary disturbance resulting in temporary increases in SSC, **not significant.**
- Direct disturbance resulting in resuspension of contaminated sediments, **not significant.**

For decommissioning:

- Direct temporary disturbance resulting in temporary increases in SSC, **not significant.**
- Direct disturbance resulting in resuspension of contaminated sediments, **not significant.**

7.12 Transboundary impacts

237. There are no transboundary impacts with regard to marine water quality, as the anticipated impacts do not extend beyond 10 km from the offshore development area, and are not near any international boundaries. Transboundary impacts are therefore scoped out of this assessment and are not considered further.

7.13 Inter-relationships

238. The inter-related effects assessment considers the potential for all relevant effects across multiple topics to interact, spatially and temporally, to create inter-related effects on a receptor group. This includes incorporating the findings of the individual assessment chapters to describe potential additional effects that may be of greater significance when compared to individual effects acting on a receptor group.

239. The term 'receptor group' is used to highlight the fact that the proposed approach to the inter-relationships assessment has not assessed every individual receptor considered in this chapter, but instead focuses on groups of receptors that may be sensitive to inter-related effects.

240. **Chapter 5 EIA Methodology** provides a matrix to show at a broad level where, across the EIAR, interactions between effects on different receptor groups have been identified.

241. The potential inter-related effects that could arise in relation to marine water quality are presented in **Table 7-14**. If there are additional effects, these are considered additively and qualitatively using expert judgement.

Table 7-14 Inter-related effects (lifetime) assessment for Marine Water Quality

Impact / Receptor	Related chapter	Phase assessment
Direct temporary disturbance resulting in temporary increases in SSC	**Chapter 6 Marine Geology, Sediments and Coastal Processes.** **Chapter 8 Subtidal and Intertidal Ecology** **Chapter 9 Fish, Shellfish and Turtle Ecology** **Chapter 10 Ornithology**	There is limited potential for temporal and spatial interactions between direct impacts to water and sediment quality. The scope for inter-related effects is predicted to arise through the combined effects of deterioration in water quality as a result of the re-suspension of sediments, and the accidental release of contaminants, which could in theory lead to impacts of a greater significance than when the two impacts are considered in isolation. However, the implementation of a CEMP which will include a MPPCP, will ensure that, in the unlikely event of accidental release of pollutants, measures will be in place to ensure that it does not result in significant effects. Therefore, it is not considered that this inter-relationship will result in effects of greater significance than the two impacts considered in isolation. Inter-relationships between marine water and sediment quality and biological receptors are considered in the relevant chapters.
Direct disturbance resulting in resuspension of contaminated sediments	**Chapter 6 Marine Geology, Sediments and Coastal Processes.** **Chapter 8 Subtidal and Intertidal Ecology** **Chapter 9 Fish, Shellfish and Turtle Ecology** **Chapter 10 Ornithology**	

7.14 Potential monitoring requirements

242. Monitoring requirements for the CWP Project will be described in the In Principle Project Environmental Monitoring Plan (IPPEMP) submitted alongside the EIAR and further developed and agreed with stakeholders prior to construction.

243. The assessment of impacts on marine water quality as a result of the construction, operation and maintenance and decommissioning phases of the CWP Project are predicted to be not significant in EIA terms. Based on the predicted impacts, it is concluded that no specific monitoring is required.

7.15 Impact assessment summary

244. This chapter of the EIAR has assessed the potential environmental impacts on marine water quality from the construction, operation and maintenance and decommissioning phases of the CWP Project. Where significant impacts have been identified, additional mitigation has been considered and incorporated into the assessment.

245. This section, including **Table 7-15**, summarises the impact assessment undertaken and confirms the significance of any residual effects, following the application of additional mitigation.

246. In this chapter, marine water quality is assessed in line with the requirements of the WFD and MSFD, two key pieces of Irish and European-wide legislation aimed at characterising, maintaining and, where required improving the water environment.

247. Key consultees including the EPA and DHLGH were consulted in preparation of this chapter.

248. The marine environment can be divided into two main receptors:

- Offshore waters > 1 NM from the coast (under the MSFD); and
- WFD waterbodies <1 NM from the coast (under WFD).

249. These receptors are characterised in line with descriptors set out within the MSFD and WFD.

250. Impacts assessed included direct temporary disturbance resulting in temporary increases in SSC, direct disturbance resulting in resuspension of contaminated sediments, and accidental pollution events for construction, operation and maintenance and decommissioning phases of the project. The conclusion of the assessments is summarised in **Table 7-15**.

251. No additional mitigation beyond the primary mitigation measures included in **Section 7.9** is considered to be required. However, additional mitigation is proposed as best practice to safeguard sensitive features. No monitoring is required.

Table 7-15 Summary of potential impacts and residual effects

Potential impact	Receptor	Receptor sensitivity	Magnitude of impact	Significance of effect	Additional mitigation	Adverse residual effect
Construction						
Impact 1: Direct temporary disturbance resulting in temporary increases in SSC	Offshore waters (>1 NM)	Low	Negligible	**Not Significant**	None	**Not significant** (not significant)
	WFD waterbodies (<1 NM)	Medium	Low / Negligible	Slight to Slight / Not Significant (**not significant**)	Use of Cofferdam	**Slight to Slight / Not Significant** (not significant)
Impact 2: Direct disturbance resulting in resuspension of contaminated sediments	Offshore waters (>1 NM)	Negligible	Negligible	Imperceptible (**not significant**)	None	**Imperceptible** (not significant)
	WFD waterbodies (<1 NM)	Low	Negligible	**Not Significant**	None	**Not Significant** (not significant)
Impact 3: Accidental pollution events	Offshore waters (>1 NM)	High	Negligible	Slight (**not significant**)	None	**Slight** (not significant)
	WFD waterbodies (<1 NM)	High	Negligible	Slight (**not significant**)	None	**Slight** (not significant)
Operation and maintenance						
Impact 1: Direct temporary disturbance	Offshore waters (>1 NM)	Low	Negligible	**Not Significant**	None	**Not Significant** (not significant)

Potential impact	Receptor	Receptor sensitivity	Magnitude of impact	Significance of effect	Additional mitigation	Adverse residual effect
resulting in temporary increases in SSC	WFD waterbodies (< 1 NM)	Medium	Negligible	Slight / Not significant (**not significant**)		**Slight / not significant** (not significant)
Impact 2: Direct disturbance resulting in resuspension of contaminated sediments	Offshore waters (> 1 NM)	Low	Negligible	**Not Significant**	None	**Not Significant** (not significant)
	WFD waterbodies (< 1 NM)	Medium	Negligible	Slight / Not Significant (**not significant**)		**Slight / not significant** (not significant)
Impact 3: Accidental pollution events	Offshore waters (> 1 NM)	High	Negligible	Slight (**not significant**)	None	**Slight** (not significant)
	WFD waterbodies (< 1 NM)	High	Negligible	Slight (**not significant**)		**Slight** (not significant)
Decommissioning						
Impact 1: Direct temporary disturbance resulting in temporary increases in SSC	Offshore waters (> 1 NM)	Low	Negligible	**Not Significant**	None	**Not Significant** (not significant)
	WFD waterbodies (< 1 NM)	Medium	Negligible	Slight to Slight / Not Significant (**not significant**)	None	**Slight to Slight / Not Significant** (not significant)
Impact 2: Direct disturbance resulting in	Offshore waters (> 1 NM)	Negligible	Negligible	Imperceptible (**not significant**)	None	**Imperceptible** (not significant)

Potential impact	Receptor	Receptor sensitivity	Magnitude of impact	Significance of effect	Additional mitigation	Adverse residual effect
resuspension of contaminated sediments	WFD waterbodies (< 1 NM)	Low	Negligible	**Not Significant**		**Not Significant** (not significant)
Impact 3: Accidental pollution events	Offshore waters (> 1 NM)	High	Negligible	Slight (**not significant**)	None	**Slight** (not significant)
	WFD waterbodies (< 1 NM)	High	Negligible	Slight (**not significant**)		**Slight** (not significant)

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