LLŶR FLOATING OFFSHORE WIND PROJECT

Llŷr 1 Floating Offshore Wind Farm

Environmental Statement

Volume 6: Appendix 11D - Assessment of Effects and Significance

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Acronyms and abbreviations

Acronym or Abbreviation	Definition	Acronym or Abbreviation	Definition
CSM	Conceptual Site Model	SPA	Special Protection Area
SAC	Special Area of Conservation	SSSI	Site of Special Scientific Interest

Glossary of project terms

Term	Definition
The Applicant	The developer of the Project, Llŷr Floating Wind Limited
Array	All wind turbine generators, inter array cables, mooring lines, floating sub-structures and supporting subsea infrastructure within the Array Area, as defined, when considered collectively, excluding the offshore export cable(s).
Array Area	The area within which the wind turbine generators, inter array cables, mooring lines, floating sub-structures and supporting subsea infrastructure will be located
Floventis Energy	A joint venture company between Cierco Ltd and SBM Offshore Ltd of which Llŷr Floating Wind Limited is a wholly owned subsidiary.
Landfall	The location where the offshore export cable(s) from the Array Area, as defined, are brought onshore and connected to the onshore export cables (as defined) via the transition joint bays (TJB).
Llŷr 1	The proposed Project, for which the Applicant is applying for Section 36 and Marine Licence consents. Including all offshore and onshore infrastructure and activities, and all project phases.
Marine Licence	A licence required under the Marine and Coastal Access Act 2009 for marine works which is administered by Natural Resources Wales (NRW) Marine Licensing Team (MLT) on behalf of the Welsh Ministers.
Offshore Development Area	The footprint of the offshore infrastructure and associated temporary works, comprised of the Array Area and the Offshore Export Cable Corridor, as defined, that forms the offshore boundary for the S36 Consent and Marine Licence application
Offshore Export Cable	The cable(s) that transmit electricity produced by the WTGs to landfall.
Offshore Export Cable Corridor (OfECC)	The area within which the offshore export cable circuit(s) will be located, from the Array Area to the Landfall.
Onshore Development Area	The footprint of the onshore infrastructure and associated temporary works, comprised of the Onshore Export Cable Corridor and the Onshore Substation, as defined, and including new access routes and visibility splays, that forms the onshore boundary for the planning application.
Onshore Export Cable(s)	The cable(s) that transmit electricity from the landfall to the onshore substation
Onshore Export Cable Corridor (OnECC)	The area within which the onshore export cable circuit(s) will be located.
proposed Project	All aspects of the Llŷr 1 development (i.e. the onshore and offshore components).

Term	Definition
Onshore Substation	Located within the Onshore Development Area, converts high voltage generated electricity into low voltage electricity that can be used for the grid and domestic consumption.
Section 36 consent	Consent to construct and operate an offshore generating station, under Section 36 (S.36) of the Electricity Act 1989. This includes deemed planning permission for onshore works.

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11-D APPENDIX 11D: ASSESSMENT OF EFFECTS AND SIGNIFICANCE

1. This Technical Appendix supplements **Chapter 11: Geology and Hydrogeology** and lists the significance of the effects identified for each Conceptual Site Model (CSM).

Table 1D-1. Impact significance for the former gun emplacement

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
CSM group: Former gun emplacement						
Former gun emplacement	On-site users - Public open space users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Public open space users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Public open space users Inhalation of ground gases.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Inhalation of ground gases.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible	Minor (as on-site and off-site)	Negligible	Minor (as on-site and off-site)
	Groundwater abstractions - 500m and 750m northeast - "Broomhill (ii)" and "Broomhill (i)" (PWS03b and PWS03a) - assumed potable Leaching, vertical and lateral migration from contaminated soils and waters.	High	Negligible	Negligible (based on distance from site)	Negligible	Negligible (based on distance from site)
	Ecological receptors: SSSI: Broomhill Burrows (off-site) SAC: Limestone Coast of South West Wales / Arfordir Calchfaen De Orllewin Cymru (off-site) SPA: Castlemartin Coast (off-site)	Very high	Negligible	Minor (as on-site and off-site)	Negligible	Minor (as on-site and off-site)

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
	National Parks: Pembrokeshire Coast (on-site) Vertical and lateral migration, direct contact.					
	Property receptors – Commercial buildings and structures (on-site) Exposure to explosive gases.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Property receptors – Commercial buildings and structures (on-site) Aggressive ground conditions.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)

Table 1D-2. Impact significance for the farms

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
CSM group: Farms						
Farms	On-site users - Residential users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	Very high	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Residential users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Very high	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Residential users Inhalation of ground gases.	Very high	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Commercial users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Commercial users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Commercial users Inhalation of ground gases.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Inhalation of ground gases.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible	Minor (as on-site and off-site)	Negligible	Minor (as on-site and off-site)

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
	Groundwater abstractions (assumed potable) on-site "Broomhill (i)" (PWS03a) 300m south "Broomhill (ii)" (PWS03b) 750m south - "Morestone Cottage" and "Morestone Farm" (PWS08 and PWS07) Leaching, vertical and lateral migration from contaminated soils and waters.	High	Negligible	Negligible (based on distance from site)	Negligible	Negligible (based on distance from site)
	Surface water abstractions (agricultural) 150m east and 230m northeast Groundwater migration, direct run-off from site.	Medium	Negligible	Minor (based on distance from site)	Negligible	Minor (based on distance from site)
	Goldborough Pill and 60m south Groundwater migration, direct run-off from site	Medium	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Milford Haven 70m southeast Groundwater migration, direct run-off from site	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Ecological receptors: National Parks: Pembrokeshire Coast (on-site). Vertical and lateral migration, direct contact.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Property receptors – Residential buildings and structures (on-site). Exposure to explosive gases.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Property receptors – Residential buildings and structures (on-site). Aggressive ground conditions.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Property receptors – Commercial buildings and structures (off-site). Exposure to explosive gases.	Medium	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Property receptors – Commercial buildings and structures (off-site). Aggressive ground conditions.	Medium	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)

Table 1D-3. Impact significance for the potentially infilled land

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
CSM group: Potentially infilled land						
Potentially infilled land	On-site users - Public open space users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Public open space users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Public open space users Inhalation of ground gases.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Inhalation of ground gases.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Controlled waters – groundwater - Superficial Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible	Minor (as on-site and off-site)	Negligible	Minor (as on-site and off-site)
	Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible	Minor (as on-site and off-site)	Negligible	Minor (as on-site and off-site)
	Groundwater abstractions - 170m west and 440m south - "Broomhill (i)" and "Broomhill (ii)" (PWS03a and PWS03b) - assumed potable Leaching, vertical and lateral migration from contaminated soils and waters.	High	Negligible	Minor (based on distance from site)	Negligible	Minor (based on distance from site)

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
	Controlled waters – surface waters – Unnamed pond and drains (on-site and off-site) Groundwater migration, direct run-off from site.	Medium	Negligible	Minor (as on-site and off-site)	Negligible	Minor (as on-site and off-site)
	Surface water abstractions (3) - agricultural - on-site	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Ecological receptors: National Parks: Pembrokeshire Coast (on-site) Vertical and lateral migration, direct contact.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)

Table 1D-4. Impact significance for the former tank farm and current oil pipeline

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
CSM group: Former tank farm and current oil pipeline						
Former tank farm and current oil pipeline	On-site users - Public open space users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Public open space users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Public open space users Inhalation of ground gases.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Inhalation of ground gases.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Controlled waters – groundwater - Superficial Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible to small	Minor (limited works expected in proximity of the tank farm and limited extent of pipeline affected by works)	Negligible	Minor (as on-site)
	Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible to small	Minor (limited works expected in proximity of the tank farm and limited extent of pipeline affected by works)	Negligible	Minor (as on-site)

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
	Groundwater abstraction - assumed potable - closest located 50m	High	Negligible to small	Minor (abstractions at >150m from Onshore Development Area; unlikely to be significantly affected)	Negligible	Minor (based on distance from site)
	Controlled waters – surface waters – Reservoir (off-site) and unnamed drains and ponds (on-site and off-site) Groundwater migration, direct run-off from site.	Medium	Negligible	Minor (as on-site and off-site)	Negligible	Minor (as on-site and off-site)
	Controlled waters - surface waters Celtic Sea - Angle Bay/Milford Haven (off-site) Groundwater migration, direct run-off from site.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Surface water abstractions - agricultural - closest located 30m Groundwater migration, direct run-off from site.	Medium	Negligible	Minor (based on distance from site)	Negligible	Minor (based on distance from site)
	Ecological receptors: Ancient Woodland (on-site and off-site) National Parks: Pembrokeshire Coast (on-site) Vertical and lateral migration, direct contact.	High	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Property receptors – Residential and commercial buildings and structures (on-site) Exposure to explosive gases.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Property receptors – Residential and commercial buildings and structures (on-site). Aggressive ground conditions.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)

Table 1D-5. Impact significance for the former smithy

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
CSM group: Former smithy						
Smithy	On-site users - Residential users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	Very high	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Residential users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Very high	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Residential users Inhalation of ground gases.	Very high	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Off-site users - Residential users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	Very high	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Residential users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Very high	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Residential users Inhalation of ground gases.	Very high	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Inhalation of ground gases.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Controlled waters – groundwater - Superficial Secondary aquifer - Undifferentiated. Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible to small	Minor (as although on-site, limited excavation works occurring in vicinity of the smithy (cable only))	Negligible	Minor (as on-site)

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
	Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible to small	Minor (as although on-site, limited excavation works occurring in vicinity of the smithy (cable only))	Negligible	Minor (as on-site)
	Controlled waters – groundwater - Bedrock Secondary aquifer B. Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible to small	Minor (as although on-site, limited excavation works occurring in vicinity of the smithy (cable only))	Negligible	Minor (as on-site)
	Controlled waters – surface waters – unnamed pond (off-site). Groundwater migration, direct run-off from site.	Medium	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Property receptors – Residential and commercial buildings and structures (on-site and off-site) Exposure to explosive gases.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Property receptors – Residential and commercial buildings and structures (on-site and off-site). Aggressive ground conditions.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)

Table 1D-6. Impact significance for Pembroke Power Station

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
CSM group: Pembroke Power Station						
Pembroke Power Station	On-site users - Commercial users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Commercial users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	On-site users - Commercial users Inhalation of ground gases.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of dust/ vapour with/ from contaminated soils.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Off-site users - Public open space users Inhalation of ground gases.	High	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Controlled waters – groundwater - Superficial Secondary aquifer - A Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible to small	Minor (as although on-site, limited excavation works occurring in vicinity of the power station (cable only))	Negligible	Minor (as on-site)
	Controlled waters – groundwater - Bedrock Secondary aquifer - A Leaching, vertical and lateral migration from contaminated soils and waters.	Medium	Negligible to small	Minor (as although on-site, limited excavation works occurring in vicinity of the power station (cable only))	Negligible	Minor (as on-site)
	Controlled waters – groundwater - Bedrock Principal aquifer Leaching, vertical and lateral migration from contaminated soils and waters.	High	Negligible to small	Minor (as although on-site, limited excavation works occurring in vicinity of the power station (cable only))	Negligible	Minor (as on-site)

Site name and ID	Receptor	Sensitivity of receptor	Magnitude of impact (during construction/ decommissioning]	Significance of effect	Magnitude of impact (post-construction)/ operation	Significance of effect
	Controlled waters – surface waters - unnamed drains and ponds (on-site and off-site) Groundwater migration, direct run-off from site.	Medium	Negligible	Minor (as on-site and off-site)	Negligible	Minor (as on-site and off-site)
	Controlled waters – surface waters – Celtic Sea - Milford Haven/Pembroke River (adjacent) Groundwater migration, direct run-off from site.	High	Negligible	Minor (as adjacent)	Negligible	Negligible (as off-site)
	Surface water abstraction - industrial - (on-site) Groundwater migration, direct run-off from site.	Medium	Negligible	Minor (as on-site)	Negligible	Minor (as on-site)
	Ecological receptors: SSSI: Milford Haven Waterway (adjacent) SAC: Pembrokeshire Marine / Sir Benfro Forol (adjacent). Vertical and lateral migration, direct contact.	Very high	Negligible	Minor (as adjacent)	Negligible	Negligible (as off-site)
	Property receptors – Commercial buildings and structures (off-site) Exposure to explosive gases.	Medium	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)
	Property receptors – Commercial buildings and structures (off-site). Aggressive ground conditions.	Medium	Negligible	Negligible (as off-site)	Negligible	Negligible (as off-site)