

# LLYR FLOATING OFFSHORE WIND PROJECT

**Llŷr 1 Floating Offshore Wind Farm**

**Environmental Statement**

**Volume 6: Appendix 11-C – Potential Areas of Contamination:  
Site Rating and Further Risk and Impact Assessment**

**August 2024**



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## Acronyms and abbreviations

Acronym or Abbreviation	Definition	Acronym or Abbreviation	Definition
CEMP	Construction Environmental Management Plan	SPA	Special Protection Area
CSM	Conceptual Site Model	SSSI	Site of Special Scientific Interest
PAH	Polycyclic Aromatic Hydrocarbons	SVOC	Semi Volatile Organic Compounds
PCB	Polychlorinated Biphenyls	TPH	Total Petroleum Hydrocarbons
PPE	Personal Protective Equipment	VOC	Volatile Organic Compounds
SAC	Special Area of Conservation		

## Glossary of project terms

Term	Definition
The Applicant	The developer of the Project, Llŷr Floating Wind Ltd.
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 Onshore Development Area, 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.



Term	Definition
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.
Project	All aspects of the Llŷr development
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-C APPENDIX 11-C: POTENTIAL AREAS OF CONTAMINATION: SITE RATING AND FURTHER RISK AND IMPACT ASSESSMENT

1. This Technical Appendix supplements **Chapter 11: Geology and Hydrogeology** and describes the additional details for the approach to assessment for land contamination for the Onshore Development Area.
2. In accordance with the screening methodology presented in **Section 11.4.1 of Chapter 11**, a site rating has been assigned to each of the potential areas of contamination identified and this is presented in **Table 11C-1**. It is also visually represented on **Volume 5: Figure 11-4 (Chapter 11)**. It has been conservatively assumed at this stage, and for the purposes of the assessment, that excavation (cut) may occur anywhere within the Onshore Development Area boundary.

Table 11C-1. Site rating

Site ID <sup>5</sup>	Site name	Proximity zone <sup>1</sup>	Land use class <sup>2</sup>	Relationship to cut / fill / construction work	Site rating <sup>3</sup>
CL01	Potential farm	3	1	Cutting / at grade	1
CL02	Former gun emplacement	2	2	Cutting / at grade	3
CL03	Farm	1	1	Cutting / at grade	3
CL04	Old quarry	2	2	Cutting / at grade	3
CL05	Former tank farm with electrical substation, historical limekiln	1	3	Cutting / at grade	5
CL08	Historical tank	2	2	Cutting / at grade	3
CL11	Historical refuse heaps	3	2	Cutting / at grade	2
CL12	Neath Farm and old quarry	3	1	Cutting / at grade	1
CL14	Newton Farm campsite; former smithy	3	1	Cutting / at grade	1
CL20	Farm	3	1	Cutting / at grade	1
CL21	Wallaston Green Farm	3	1	Cutting / at grade	1
CL22	Valero high pressure oil pipeline <sup>4</sup>	1	3	Cutting / at grade	5
CL23	Former smithy	1	1	Cutting / at grade	3
CL24	Farm	3	1	Cutting / at grade	1
CL26	Lambeeth (or "The Stables") Farm with tanks / silos	1	1	Cutting / at grade	3
CL27	Pembroke Power Station	1	2	Cutting / at grade	4
CL28	Unspecified ground workings	3	2	Cutting / at grade	2

<sup>1</sup> Proximity zone definition is included within **Table 11B-1, Appendix 11-B**.

<sup>2</sup> Land use class types are defined within **Table 11B-2, Appendix 11-B**.

<sup>3</sup> Site rating method is defined within **Table 11B-3, Appendix 11-B**.

<sup>4</sup> Indicative route of the Valero high pressure pipeline inferred from the Project Erebus Environmental Statement [1].

<sup>5</sup> CL06, CL07, CL09, CL10, CL13, CL15, CL16, CL17 and CL18 are old quarries / pits / potentially infilled areas of land. However, as they are less than 0.5ha, they are not considered to present a significant risk from contamination and have therefore not been considered for further risk and impact assessment.

3. The sites from **Table 11C-1** with a site rating of three and above have been considered for further risk and impact assessment, and this is presented in the following tables. The sites from **Table 11C-1** with a site rating of two or below are not considered to pose an unacceptable risk within the context



of the Onshore Development Area construction, operation or decommissioning and have therefore been scoped out of any further assessment.

4. Sites considered for further risk and impact assessment have, where applicable, been grouped where they share similar risk profiles. The sites have been grouped as follows;
  - Former gun emplacement;
  - Farms;
  - Potentially infilled land;
  - Tank farm and oil pipeline;
  - Smithy; and
  - Pembroke Power Station.
5. The risk and impact assessments for each group / individual site (which are presented and defined in **Table 11C-2** below) are presented as a series of tables comprising: a baseline Conceptual Site Model (CSM), a construction phase CSM, a post-construction CSM and then a significance of effect assessment table.

*Table 11C-2. Potential areas of contamination with site ratings of 3 to 5*

Group name / individual site	Site Title (Site ID), land use class	Site rating
1. Former gun emplacement	Former gun emplacement (CL02), Class 2	3
2. Farms	Farm (CL03), Class 1	3
	Lambeeth (or "The Stables") Farm with tanks / silos (CL26), Class 1	3
3. Potentially infilled land	Old quarry (CL04), Class 2	3
4. Tank farm and oil pipeline	Former tank farm with electrical substation, historical limekiln (CL05), Class 3	5
	Historical tank (CL08), Class 2	3
	Valero high pressure oil pipeline (CL22), Class 3	5
5. Smithy	Former smithy (CL23), Class 1	3
6. Pembroke Power Station	Pembroke Power Station (CL27), Class 2	4



Table 11C-3. Risk and impact assessment for the former gun emplacement

Site ID (IDS)	CL02				
Site group	1. Former gun emplacement				
Site title (Site ID), land use class	Former gun emplacement (CL02) - Class 2				
Site title (Site ID)	Human receptor (on-site, adjacent and / or off-site (<50m))	Groundwater, including aquifer designation, and active groundwater abstractions (within 1km)	Surface water, including watercourses (on-site, adjacent and / or off-site (<50m)) and active surface water abstractions (within 250m)	Ecological designation (on-site, adjacent and / or off-site (<50m))	Property e.g. buildings and structures (on-site, adjacent and / or off-site (<50m))
CL02 Former gun emplacement	Public open space users (on-site and off-site)	Bedrock geology - Secondary aquifer - A Groundwater abstractions - 500m and 750m northeast - "Broomhill (ii)" and "Broomhill (i)" (PWS03b and PWS03a) - assumed potable	-	SSSI: Broomhill Burrows (off-site) SAC: Limestone Coast of South West Wales / Arfordir Calchfaen De Orllewin Cymru (off-site) SPA: Castlemartin Coast (off-site) National Parks: Pembrokeshire Coast (on-site)	Commercial buildings and structures (on-site)
<b>Notes / assumptions;</b>					
<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> CL02 is located outside of the Onshore Development Area but within the study area.					





Table 11C-4. Baseline CSM: former gun emplacement

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including Polycyclic Aromatic Hydrocarbons (PAH) and Total Petroleum Hydrocarbons (TPH). Low potential for ground gas. Potential for Unexploded Ordnance (UXO).	On-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with/ from contaminated soils.	Low likelihood	Mild	Low
		Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with/ from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Bedrock Secondary aquifer – A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	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.	Unlikely	Severe	Moderate / low
	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) National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely to low likelihood	Medium	Low to moderate / low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low
Notes / assumptions					
<sup>1</sup> Sites are assessed against baseline condition without construction of the proposed Site.					
<sup>2</sup> ‘On-site’ and ‘off-site’ are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					



Table 11C-5. During construction / decommissioning CSM: former gun emplacement

Source	Receptor	Pathway	Probability	Consequence	Risk during construction
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Low potential for ground gas. Potential for UXO.	On-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with/ from contaminated soils.	Low likelihood	Mild	Low
		Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with/ from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	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.	Unlikely	Severe	Moderate / low
	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) National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely to low likelihood	Medium	Low to moderate / low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low



Notes / assumptions;					
<sup>1</sup> Site investigation will be required prior to construction of the Onshore Development Area.					
<sup>2</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>3</sup> During construction, standard mitigation procedures are assumed to be implemented in accordance with a CEMP.					
<sup>4</sup> Construction workers have been excluded from the assessment due to the use of PPE / risk management protocols and in accordance with CIRIA C692, 2010.					
<sup>5</sup> It is assumed that earthworks may require cut operations anywhere within the Project site boundary. This might temporarily worsen groundwater quality, for example, as a result of dewatering activities, which may potentially draw contaminated groundwater away from the sources identified. This may result in a temporary worsening in groundwater quality compared to baseline. Due to the very low potential for contamination from CL02, it is unlikely that CL02 would have the potential to influence groundwater conditions on the Project site during construction.					
<sup>6</sup> The potential for ground gas from this site is not considered significant enough to result in an increased risk during construction.					



Table 11C-6. Post construction CSM: former gun emplacement

Source	Receptor	Pathway	Probability	Consequence	Risk post construction
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Low potential for ground gas. Potential for UXO.	On-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with/ from contaminated soils.	Low likelihood	Mild	Low
		Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with/ from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with/ from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	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.	Unlikely	Severe	Moderate / low
	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) National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely to low likelihood	Medium	Low to moderate / low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low
Notes / assumptions;					
<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> Assumes construction works are complete and remediation has been carried out where necessary on areas within the Onshore Development Area. However, CL02 is located out of the Proposed Development boundaries, therefore no remediation.					



Table 11C-7. Former gun emplacement– magnitude of impact

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
On-site users - Public open space users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low	Low	Low	Negligible	Negligible
On-site users - Public open space users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Very low	Very low	Very low	Negligible	Negligible
On-site users - Public open space users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Low	Low	Low	Negligible	Negligible
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.	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible
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) National Parks: Pembrokeshire Coast (on-site) Vertical and lateral migration, direct contact.	Low to moderate / low	Low to moderate / low	Low to moderate / low	Negligible	Negligible
Property receptors – Commercial buildings and structures (on-site) Exposure to explosive gases.	Low	Low	Low	Negligible	Negligible
Property receptors – Commercial buildings and structures (on-site) Aggressive ground conditions.	Very low	Very low	Very low	Negligible	Negligible



Overall magnitude of impact				Negligible	Negligible
Notes / assumptions:					
<sup>1</sup> The construction column assumes that a CEMP will be in place to mitigate impacts from construction.					



Table 11C-8. Risk and impact assessment for the farms

Site ID (IDS)	CL03, CL26				
Site group	2. Farms				
Site title (Site ID), land use class	Farm (CL03) - Class 1 Lambeeth (or "The Stables") Farm with tanks /silos (CL26) - Class 1				
Site title (Site ID)	Human receptor (on-site, adjacent and / or off-site (<50m))	Groundwater, including aquifer designation, and active groundwater abstractions (within 1km)	Surface water, including watercourses (on-site, adjacent and / or off-site (<50m)) and active surface water abstractions (within 250m)	Ecological designation (on-site, adjacent and / or off-site (<50m))	Property e.g. buildings and structures (on-site, adjacent and / or off-site (<50m))
CL03 Farm	Residential users (on-site) Commercial users (on-site) Public open space users (off-site)	Bedrock geology - Secondary aquifer - A Groundwater abstractions - on-site and 300m south - "Broomhill (i)" and "Broomhill (ii)" (PWS03a and PWS03b) - assumed potable	Surface water abstractions - 150m east and 230m northeast - agricultural	National Parks: Pembrokeshire Coast (on-site)	Residential buildings and structures (on-site) Commercial buildings and structures (on-site)
CL26 Lambeeth (or "The Stables") Farm with tanks /silos	Residential users (on-site) Commercial users (on-site) Public open space users (off-site)	Bedrock geology - Secondary aquifer - A Groundwater abstractions: 570m southwest - "Morestone Cottage" (PWS7); 670m south - "Goldborough" (PWS12); 780m and 810m southwest - "Moreston (i)" and "Moreston (ii)" - assumed potable	Goldborough Pill - 60m south Celtic Sea - Milford Haven - 70m southeast	-	Residential buildings and structures (on-site) Commercial buildings and structures (on-site)
Notes / assumptions;					
<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> CL26 overlaps the Onshore Development Area for a limited extent. CL03 is adjacent to the Onshore Development Area.					



Table 11C-9. Baseline CSM: farms

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Low potential for ground gas.	On-site users - Residential users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Medium	Low
	On-site users - Commercial users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	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.	Low likelihood	Severe	Moderate
	Surface water abstractions (agricultural) 150m east and 230m northeast	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Goldborough Pill - 60m south	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate/low
	Milford Haven - 70m southeast	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate/low





Source	Receptor	Pathway	Probability	Consequence	Risk at baseline
	Ecological receptors: National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely	Medium	Low
	Property receptors – Residential buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Low likelihood	Mild	Low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low
Notes / assumptions;					
<sup>1</sup> Sites are assessed against baseline condition without construction of the Onshore Development Area.					
<sup>2</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					



Table 11C-10. During construction / decommissioning CSM: farms

Source	Receptor	Pathway	Probability	Consequence	Risk during construction
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Low potential for ground gas.	On-site users - Residential users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Medium	Low
	On-site users - Commercial users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	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.	Low likelihood	Severe	Moderate
	Surface water abstractions (agricultural) 150m east and 230m northeast	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Goldborough Pill - 60m south	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate/low
	Milford Haven - 70m southeast	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate/low



Source	Receptor	Pathway	Probability	Consequence	Risk during construction
	Ecological receptors: National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely	Medium	Low
	Property receptors – Residential buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Low likelihood	Mild	Low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low
Notes / assumptions;					
<sup>1</sup> Site investigation will be required prior to construction of the Onshore Development Area.					
<sup>2</sup> ‘On-site’ and ‘off-site’ are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>3</sup> During construction, standard mitigation procedures are assumed to be implemented in accordance with a CEMP.					
<sup>4</sup> Construction workers have been excluded from the assessment due to the use of PPE / risk management protocols and in accordance with CIRIA C692, 2010.					
<sup>5</sup> It is assumed that earthworks may require cut operations anywhere within the Project site. This might temporarily worsen groundwater quality, for example, as a result of dewatering activities, which may potentially draw contaminated groundwater away from the sources identified. This may result in a temporary worsening in groundwater quality compared to baseline. Due to the low potential for contamination from the farms and only a very slight overlap of CL26 into the Project site boundary, it is unlikely that these farms would have the potential to influence groundwater conditions on the Project site during construction.					
<sup>6</sup> The potential for ground gas from these sites is not considered significant enough to result in an increased risk during construction.					



Table 11C-11. Post construction: farms

Source	Receptor	Pathway	Probability	Consequence	Risk post construction
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Low potential for ground gas.	On-site users - Residential users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Medium	Low
	On-site users - Commercial users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	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.	Low likelihood	Severe	Moderate
	Surface water abstractions (agricultural) 150m east and 230m northeast	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Goldborough Pill - 60m south	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate/low
	Milford Haven - 70m southeast	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate/low



Source	Receptor	Pathway	Probability	Consequence	Risk post construction
	Ecological receptors: National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely	Medium	Low
	Property receptors – Residential buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Low likelihood	Mild	Low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low
Notes / assumptions;					
<sup>1</sup> ‘On-site’ and ‘off-site’ are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> Assumes construction works are complete and remediation has been carried out where necessary on areas within the Onshore Development Area. However, sites are only adjacent to the Onshore Development Area or only overlap the boundary for a limited extent. Therefore, no remediation expected.					



Table 11C-12. Farms– magnitude of impact

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
On-site users - Residential users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible
On-site users - Residential users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Low	Low	Low	Negligible	Negligible
On-site users - Residential users Inhalation of ground gases.	Low	Low	Low	Negligible	Negligible
On-site users - Commercial users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible
On-site users - Commercial users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Low	Low	Low	Negligible	Negligible
On-site users - Commercial users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Low	Low	Low	Negligible	Negligible
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.	Moderate	Moderate	Moderate	Negligible	Negligible
Surface water abstractions (agricultural) 150m east and 230m northeast Groundwater migration, direct run-off from site.	Low	Low	Low	Negligible	Negligible



Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
Goldborough Pill and 60m south Groundwater migration, direct run-off from site	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Milford Haven 70m southeast Groundwater migration, direct run-off from site	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Ecological receptors: National Parks: Pembrokeshire Coast (on-site). Vertical and lateral migration, direct contact.	Low	Low	Low	Negligible	Negligible
Property receptors – Residential buildings and structures (on-site). Exposure to explosive gases.	Low	Low	Low	Negligible	Negligible
Property receptors – Residential buildings and structures (on-site). Aggressive ground conditions.	Low	Low	Low	Negligible	Negligible
Property receptors – Commercial buildings and structures (off-site). Exposure to explosive gases.	Low	Low	Low	Negligible	Negligible
Property receptors – Commercial buildings and structures (off-site). Aggressive ground conditions.	Very low	Very low	Very low	Negligible	Negligible
<b>Overall magnitude of impact</b>				<b>Negligible</b>	<b>Negligible</b>
<b>Notes / assumptions:</b>					
<sup>1</sup> The construction column assumes that a CEMP will be in place to mitigate impacts from construction.					



Table 11C-13. Risk and impact assessment for the potentially infilled land

Site ID (IDS)	CL04				
Site group	3. Potentially infilled land				
Site title (Site ID), land use class	Old quarry (CL04) - Class 2				
Site title (Site ID)	Human receptor (on-site, adjacent and / or off-site (<50m))	Groundwater, including aquifer designation, and active groundwater abstractions (within 1km)	Surface water, including watercourses (on-site, adjacent and / or off-site (<50m)) and active surface water abstractions (within 250m)	Ecological designation (on-site, adjacent and / or off-site (<50m))	Property e.g. buildings and structures (on-site, adjacent and / or off-site (<50m))
CL04 Old quarry	Public open space users (on-site and off-site)	Superficial geology - Secondary aquifer - A Bedrock geology - Secondary aquifer - A Groundwater abstractions - 170m west and 440m south - "Broomhill (i)" and "Broomhill (ii)" (PWS03a and PWS03b) - assumed potable	Unnamed ponds and drains (on-site and off-site) 'Surface water abstractions (3) - agricultural - on-site	National Parks: Pembrokeshire Coast (on-site)	-
Notes / assumptions;					
<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> CL04 is located outside of the Onshore Development Area					





Table 11C-14. Baseline CSM: potentially infilled land

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Potential for ground gas.	On-site users - Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Mild	Low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer – A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	Controlled waters – groundwater - Bedrock Secondary aquifer – A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	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.	Unlikely	Severe	Moderate / low
	Controlled waters – surface waters – unnamed pond and drains (on-site and off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
Notes / assumptions;	Surface water abstractions (3) - agricultural - on-site	Groundwater migration, direct run-off from site.	Likely	Mild	Moderate / low
	Ecological receptors: National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely to low likelihood	Mild	Very low to low
<sup>1</sup> Sites are assessed against baseline condition without construction of the Onshore Development Area.					
<sup>2</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					



Table 11C-15. During Construction / Decommissioning CSM: potentially infilled land

Source	Receptor	Pathway	Probability	Consequence	Risk during construction
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Potential for ground gas.	On-site users - Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Mild	Low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	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.	Unlikely	Severe	Moderate / low
	Controlled waters – surface waters – unnamed pond and drains (on-site and off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Surface water abstractions (3) - agricultural - on-site	Groundwater migration, direct run-off from site.	Likely	Mild	Moderate / low
	Ecological receptors: National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely to low likelihood	Mild	Very low to low



Notes / assumptions;					
	<sup>1</sup> Site investigation will be required prior to construction of the Onshore Development Area.				
	<sup>2</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.				
	<sup>3</sup> During construction, standard mitigation procedures are assumed to be implemented in accordance with a CEMP.				
	<sup>4</sup> Construction workers have been excluded from the assessment due to the use of PPE / risk management protocols and in accordance with CIRIA C692, 2010.				
	<sup>5</sup> It is assumed that earthworks may require cut operations anywhere within the Onshore Development Area. This might temporarily worsen groundwater quality, for example, as a result of dewatering activities, which may potentially draw contaminated groundwater away from the sources identified. This may result in a temporary worsening in groundwater quality compared to baseline. However, as this site is located outside of the Onshore Development Area, it is unlikely that CL04 would have the potential to influence groundwater conditions on the Project site during construction.				
	<sup>6</sup> The potential for ground gas from these sites is not considered significant enough to result in an increased risk during construction.				



Table 11C-16. Post construction CSM: potentially infilled land

Source	Receptor	Pathway	Probability	Consequence	Risk post construction
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Potential for ground gas.	On-site users - Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Mild	Low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - A	Leaching, vertical and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	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.	Unlikely	Severe	Moderate / low
	Controlled waters – surface waters – unnamed pond and drains (on-site and off-site)	Leaching, vertical and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	Surface water abstractions (3) - agricultural - on-site	Groundwater migration, direct run-off from site.	Likely	Mild	Moderate / low
	Ecological receptors: National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely to low likelihood	Mild	Very low to low



Notes / assumptions;					
<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> Assumes construction works are complete and remediation has been carried out where necessary on areas within the Onshore Development Area. However, both sites are located out of the Onshore Development Area boundaries, therefore no remediation.					



Table 11C-17. Potentially infilled land— magnitude of impact

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
On-site users - Public open space users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low	Low	Low	Negligible	Negligible
On-site users - Public open space users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Very low	Very low	Very low	Negligible	Negligible
On-site users - Public open space users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Controlled waters – groundwater - Superficial Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Low	Low	Low	Negligible	Negligible
Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Low	Low	Low	Negligible	Negligible
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.	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible
Controlled waters – surface waters – unnamed pond and drains (on-site and off-site) Groundwater migration, direct run-off from site.	Low	Low	Low	Negligible	Negligible



Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
Surface water abstractions (3) - agricultural - on-site	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible
Ecological receptors: National Parks: Pembrokeshire Coast (on-site) Vertical and lateral migration, direct contact.	Very low to low	Very low to low	Very low to low	Negligible	Negligible
<b>Overall magnitude of impact</b>				<b>Negligible</b>	<b>Negligible</b>
<b>Notes / assumptions:</b>					
<sup>1</sup> The construction column assumes that a CEMP will be in place to mitigate impacts from construction.					



Table 11C-18. Risk and impact assessment for the former tank farm and current oil pipeline

Site ID (IDS)	CL05, CL08, CL22				
Site group	4. Former tank farm and current oil pipeline				
Site title (Site ID), land use class	Former tank farm with electrical substation, historical limekiln (CL05) - Class 3 Historic tank (CL08) - Class 2 Valero high pressure oil pipeline (CL22) - Class 3				
Site title (Site ID)	Human receptor (on-site, adjacent and / or off- site (<50m))	Groundwater, including aquifer designation, and active groundwater abstractions (within 1km)	Surface water, including watercourses (on-site, adjacent and / or off-site (<50m)) and active surface water abstractions (within 250m)	Ecological designation (on-site, adjacent and / or off-site (<50m))	Property e.g. buildings and structures (on-site, adjacent and / or off-site (<50m))
CL05 Former tank Farm with electrical substation, historical limekiln	Public open space users (off-site)	Superficial geology - Secondary aquifer - A Bedrock geology - Secondary aquifer - A Groundwater abstractions - assumed potable 400m west and 600m southwest - "Broomhill (i)" and "Broomhill (ii)" (PWS03a and PWS03b)	Unnamed drains and ponds (on-site and off-site) Celtic Sea - Angle Bay/Milford Haven (off- site) 'Surface water abstractions (5) - agricultural - off-site (40m west, 70m south, 70m west, 170m southwest, 250m southeast)	Ancient Woodland (on-site) National Parks: Pembrokeshire Coast (on-site)	Commercial buildings and structures (on-site)
CL08 Historical tank	Public open space users (on-site and off-site)	Superficial geology - Secondary aquifer - A Bedrock geology - Secondary aquifer - A Groundwater abstractions - assumed potable 600m west and 780m southwest - "Broomhill (i)" and "Broomhill (ii)" (PWS03a and PWS03b)	Unnamed drains and ponds (on-site and off-site) Surface water abstraction - agricultural - (30m south)	National Parks: Pembrokeshire Coast (on-site)	Commercial buildings and structures (on-site)
CL22 Valero high pressure oil pipeline	Public open space users (on-site and off-site)	Superficial geology - Secondary aquifer - Undifferentiated Bedrock geology - Secondary aquifer - A Groundwater abstractions - closest located 50m northeast "Moreston Cottage" (PWS7)	Reservoir and unnamed ponds and drains (on-site and off-site)	Ancient Woodland (off-site)	Commercial buildings and structures (on-site and off-site)





Notes / assumptions;					
<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> CL05 is adjacent to the Onshore Development Area. CL08 is located outside of the Onshore Development Area. CL22 crosses the Onshore Development Area.					



Table 11C-19. Baseline CSM: former tank farm and current oil pipeline

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline
Soil, leachate and groundwater contamination. Potential for: metals and semi-metals; inorganics (sulphate, sulphide, asbestos, pH); organics (oil / fuel hydrocarbons, PAH, VOC and SVOC, PCB, non-chlorinated solvents, chlorinated solvents, fire retardants, cleaning agents, other process chemicals. Low potential for ground gas from Made Ground.	On-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Medium	Moderate / low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Medium	Moderate / low
	Groundwater abstraction - assumed potable - closest located 50m	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Severe	Moderate
	Controlled waters – surface waters – Unnamed drains and ponds (on-site and off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Controlled waters - surface waters Controlled waters - surface waters Celtic Sea - Angle Bay/Milford Haven (off-site) and reservoir (off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate / low
	Surface water abstractions - agricultural - closest located 30m	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Ecological receptors: Ancient Woodland (on-site and off-site) National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely to low likelihood	Medium	Low to moderate / low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low



Notes / assumptions;					
<sup>1</sup> Sites are assessed against baseline condition without construction of the Onshore Development Area.					
<sup>2</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					



Table 11C-20. During construction / decommissioning CSM: former tank farm and current oil pipeline

Source	Receptor	Pathway	Probability	Consequence	Risk during construction
Soil, leachate and groundwater contamination. Potential for: metals and semi-metals; inorganics (sulphate, sulphide, asbestos, pH); organics (oil / fuel hydrocarbons, PAH, VOC and SVOC, PCB, non-chlorinated solvents, chlorinated solvents, fire retardants, cleaning agents, other process chemicals. Low potential for ground gas from Made Ground.	On-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood to likely	Medium	Moderate / low to moderate
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood to likely	Medium	Moderate / low to moderate
	Groundwater abstraction - assumed potable - closest located 50m	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood to likely	Severe	Moderate to high
	Controlled waters – surface waters – Unnamed drains and ponds (on-site and off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Controlled waters - surface waters	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate / low



Source	Receptor	Pathway	Probability	Consequence	Risk during construction
	Celtic Sea - Angle Bay/Milford Haven (off-site) and reservoir (off-site)				
	Surface water abstractions - agricultural - closest located 30m	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Ecological receptors: Ancient Woodland (on-site and off-site) National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely to low likelihood	Medium	Low to moderate / low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low
	Notes / assumptions;				
<sup>1</sup> Site investigation will be required prior to construction of the Onshore Development Area.					
<sup>2</sup> ‘On-site’ and ‘off-site’ are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>3</sup> During construction, standard mitigation procedures are assumed to be implemented in accordance with a CEMP.					
<sup>4</sup> Construction workers have been excluded from the assessment due to the use of PPE / risk management protocols and in accordance with CIRIA C692, 2010.					
<sup>5</sup> While a CEMP will make it unlikely that there will be adverse consequences resulting from construction there may still be temporary minor adverse effects from ground disturbance in these areas. The adoption of a CEMP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline.					
<sup>6</sup> It is assumed that earthworks may require cut operations anywhere within the Onshore Development Area. This might temporarily worsen groundwater quality, for example, as a result of dewatering activities, which may potentially draw contaminated groundwater away from the sources identified. This may result in a temporary worsening in groundwater quality compared to baseline					
<sup>7</sup> The potential for ground gas from these sites is not considered significant enough to result in an increased risk during construction.					



Table 11C-21. Post Construction CSM: former tank farm and current oil pipeline

Source	Receptor	Pathway	Probability	Consequence	Risk post construction
Soil, leachate and groundwater contamination. Potential for: metals and semi-metals; inorganics (sulphate, sulphide, asbestos, pH); organics (oil / fuel hydrocarbons, PAH, VOC and SVOC, PCB, non-chlorinated solvents, chlorinated solvents, fire retardants, cleaning agents, other process chemicals. Low potential for ground gas from Made Ground.	On-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Medium	Moderate / low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Medium	Moderate / low
	Groundwater abstraction - assumed potable - closest located 50m	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Severe	Moderate
	Controlled waters – surface waters – Unnamed drains and ponds (on-site and off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Controlled waters - surface waters Celtic Sea - Angle Bay/Milford Haven (off-site) and reservoir (off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate / low
	Surface water abstractions - agricultural - closest located 30m	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Ecological receptors: Ancient Woodland (on-site and off-site) National Parks: Pembrokeshire Coast (on-site)	Vertical and lateral migration, direct contact.	Unlikely to low likelihood	Medium	Low to moderate / low



Source	Receptor	Pathway	Probability	Consequence	Risk post construction
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low
Notes / assumptions;					
<sup>1</sup> ‘On-site’ and ‘off-site’ are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> Assumes construction works are complete and remediation has been carried out where necessary on areas within the Onshore Development Area. It is considered possible that minor remediation works may be required in proximity of CL22 (where it crosses the Onshore Development Area); however the extent of the remediation works is unlikely to determine a measurable impact, therefore no post-construction impacts have been considered in this CSM.					



Table 11C-22. Former tank farm and current oil pipeline – magnitude of impact

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
On-site users - Public open space users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low	Low	Low	Negligible	Negligible
On-site users - Public open space users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Low	Low	Low	Negligible	Negligible
On-site users - Public open space users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Controlled waters – groundwater - Superficial Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Moderate / low	Moderate / low to moderate	Moderate / low	Negligible to small	Negligible
Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Moderate / low	Moderate / low to moderate	Moderate / low	Negligible to small	Negligible
Groundwater abstraction - assumed potable - closest located 50m	Moderate	Moderate to high	Moderate	Negligible to small	Negligible
Controlled waters – surface waters – Reservoir (off-site) and unnamed drains and ponds (on-site and off-site) Groundwater migration, direct run-off from site.	Low	Low	Low	Negligible	Negligible
Controlled waters - surface waters Celtic Sea - Angle Bay/Milford Haven (off-site) Groundwater migration, direct run-off from site.	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible





Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
Surface water abstractions - agricultural - closest located 30m Groundwater migration, direct run-off from site.	Low	Low	Low	Negligible	Negligible
Ecological receptors: Ancient Woodland (on-site and off-site) National Parks: Pembrokeshire Coast (on-site) Vertical and lateral migration, direct contact.	Low to moderate / low	Low to moderate / low	Low to moderate / low	Negligible	Negligible
Property receptors – Residential and commercial buildings and structures (on-site) Exposure to explosive gases.	Low	Low	Low	Negligible	Negligible
Property receptors – Residential and commercial buildings and structures (on-site). Aggressive ground conditions.	Very low	Very low	Very low	Negligible	Negligible
<b>Overall magnitude of impact</b>				<b>Negligible to small adverse</b>	<b>Negligible</b>
<b>Notes / assumptions:</b>					
<sup>1</sup> The construction column assumes that a CEMP will be in place to mitigate impacts from construction.					



Table 11C-23. Risk and impact assessment for the smithy

Site ID (IDS)	CL23				
Site group	5. Former smithy				
Site title (Site ID), land use class	Former smithy (CL23) - Class 1				
Site title (Site ID)	Human receptor (on-site, adjacent and / or off-site (<50m))	Groundwater, including aquifer designation, and active groundwater abstractions (within 1km)	Surface water, including watercourses (on-site, adjacent and / or off-site (<50m)) and active surface water abstractions (within 250m)	Ecological designation (on-site, adjacent and / or off-site (<50m))	Property e.g. buildings and structures (on-site, adjacent and / or off-site (<50m))
CL23 Former smithy	Residential users (on-site and off-site) Public open space users (off-site)	Bedrock geology - Secondary aquifer - A	Unnamed pond (off-site)	-	Residential buildings and structures (on-site)
Notes / assumptions;					
<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> CL23 is located within the Onshore Development Area.					



Table 11C-24. Baseline CSM: former smithy

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Low potential for ground gas.	On-site users - Residential users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Residential users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Mild	Low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - Undifferentiated	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Minor	Very low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	Controlled waters – groundwater - Bedrock Secondary aquifer - B	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Minor	Very low
<b>Notes / assumptions;</b>					
<sup>1</sup> Sites are assessed against baseline condition without construction of the Onshore Development Area.					
<sup>2</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					



Table 11C-25. During construction / decommissioning CSM: former smithy

Source	Receptor	Pathway	Probability	Consequence	Risk during construction
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Low potential for ground gas.	On-site users - Residential users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Residential users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Mild	Low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - Undifferentiated	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood to likely	Minor	Very low to low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood to likely	Mild	Low to moderate / low
	Controlled waters – groundwater - Bedrock Secondary aquifer - B	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood to likely	Minor	Very low to low
	Controlled waters – surface waters – unnamed pond (off-site)	Groundwater migration, direct run-off from site.	Unlikely	Mild	Very low
	Property receptors – Residential buildings and structures (on-site and off-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low



Notes / assumptions;					
	<sup>1</sup> Site investigation will be required prior to construction of the Onshore Development Area.				
	<sup>2</sup> CL22 is located within the Onshore Development Area.				
	<sup>3</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is at or adjacent (within 50m) of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.				
	<sup>4</sup> During construction, standard mitigation procedures are assumed to be implemented in accordance with a CEMP.				
	<sup>5</sup> Construction workers have been excluded from the assessment due to the use of PPE / risk management protocols and in accordance with CIRIA C692, 2010.				
	<sup>6</sup> While a CEMP will make it unlikely that there will be adverse consequences resulting from construction there may still be temporary minor adverse effects from ground disturbance in these areas. The adoption of a CEMP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline.				
	<sup>7</sup> It is assumed that earthworks may require cut operations anywhere within the Onshore Development Area. This might temporarily worsen groundwater quality, for example, as a result of dewatering activities, which may potentially draw contaminated groundwater away from the sources identified. This may result in a temporary worsening in groundwater quality compared to baseline. It has been assumed that earthworks will occur in areas adjacent to CL22. The risk during construction may need to be revisited when the cable route is defined. If the route avoids CL22, the risk is likely to be downgraded to Very low (Superficial Secondary aquifer – Undifferentiated and Bedrock Secondary aquifer - B) and Low (for the Bedrock Secondary aquifer – A).				
	<sup>8</sup> The potential for ground gas from this site is not considered significant enough to result in an increased risk during construction.				



Table 11C-26. Post construction CSM: former smithy

Source	Receptor	Pathway	Probability	Consequence	Risk post construction
Soil, leachate and groundwater contamination. Potential for metals; inorganics; organics including PAH and TPH. Low potential for ground gas.	On-site users - Residential users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Residential users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Mild	Low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - Undifferentiated	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Minor	Very low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Mild	Low
	Controlled waters – groundwater - Bedrock Secondary aquifer - B	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Minor	Very low
	Controlled waters – surface waters – unnamed pond (off-site)	Groundwater migration, direct run-off from site.	Unlikely	Mild	Very low
	Property receptors – Residential buildings and structures (on-site and off-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low

**Notes / assumptions;**

<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is at or adjacent (within 50m) of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.

<sup>2</sup> Assumes construction works are complete and remediation has been carried out where necessary on areas within the Onshore Development Area.

<sup>3</sup> A range may be given as remediation strategies will vary in design. Remediation strategies may involve source removal or pathway intervention as appropriate.

<sup>4</sup> CL23 is considered to have limited contamination potential considering that the smithy has not been mapped in historical maps since 1970 and is currently a residential area. In addition, it is considered unlikely that the Onshore Development Area will disturb the residential areas to a significant extent.



Table 11C-27. Smithy – magnitude of impact

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
On-site users - Residential users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible
On-site users - Residential users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Low	Low	Low	Negligible	Negligible
On-site users - Residential users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Residential users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low	Low	Low	Negligible	Negligible
Off-site users - Residential users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Residential users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Controlled waters – groundwater - Superficial Secondary aquifer - Undifferentiated. Leaching, vertical and lateral migration from contaminated soils and waters.	Very low	Very low to low	Very low	Negligible to small	Negligible
Controlled waters – groundwater - Bedrock Secondary aquifer - A. Leaching, vertical and lateral migration from contaminated soils and waters.	Low	Low to moderate / low	Low	Negligible to small	Negligible
Controlled waters – groundwater - Bedrock Secondary aquifer B. Leaching, vertical and lateral migration from contaminated soils and waters.	Very low	Very low to low	Very low	Negligible to small	Negligible
Controlled waters – surface waters – unnamed pond (off-site). Groundwater migration, direct run-off from site.	Very low	Very low	Very low	Negligible	Negligible
Property receptors – Residential and commercial buildings and structures (on-site and off-site) Exposure to explosive gases.	Low	Low	Low	Negligible	Negligible





Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
Property receptors – Residential and commercial buildings and structures (on-site and off-site). Aggressive ground conditions.	Very low	Very low	Very low	Negligible	Negligible
Overall magnitude of impact				Negligible to small adverse	Negligible to small beneficial
Notes / assumptions:					
<sup>1</sup> The construction column assumes that a CEMP will be in place to mitigate impacts from construction.					



Table 11C-28. Risk and impact assessment for Pembroke Power Station

Site ID (IDS)	CL27				
Site group	6. Pembroke Power Station				
Site title (Site ID), land use class	Pembroke Power Station (CL27) - Class 2				
Site title (Site ID)	Human receptor (on-site, adjacent and / or off-site (<50m))	Groundwater, including aquifer designation, and active groundwater abstractions (within 1km)	Surface water, including watercourses (on-site, adjacent and / or off-site (<50m)) and active surface water abstractions (within 250m)	Ecological designation (on-site, adjacent and / or off-site (<50m))	Property e.g. buildings and structures (on-site, adjacent and / or off-site (<50m))
CL27 Pembroke Power Station	Commercial users (on-site) Public open space users (off-site)	Superficial geology - Secondary aquifer - A Bedrock geology - Principal aquifer and Secondary aquifer - A	Unnamed drains and ponds (on-site and off-site) Celtic Sea - Milford Haven / Pembroke River (adjacent) Surface water abstraction - industrial - (on-site)	SSSI: Milford Haven Waterway (adjacent) SAC: Pembrokeshire Marine / Sir Benfro Forol (adjacent)	Commercial buildings and structures (on-site)
Notes / assumptions;					
<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> CL27 is adjacent to the Onshore Development Area.					



Table 11C-29. Baseline CSM: Pembroke Power Station

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline
Soil, leachate and groundwater contamination. Potential for: metals and semi-metals; inorganics (sulphate, sulphide, asbestos, pH); organics (oil / fuel hydrocarbons, PAH, Volatile and Semi-Volatile Organic Compounds (VOC and SVOC), polychlorinated biphenyls (PCB), non-chlorinated solvents, chlorinated solvents, fire retardants, cleaning agents, other process chemicals. Low potential for ground gas from Made Ground.	On-site users - Commercial users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Medium	Moderate / low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Medium	Moderate / low
	Controlled waters – groundwater - Bedrock Principal aquifer	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Severe	Moderate
	Controlled waters – surface waters – unnamed drains and ponds (on-site and off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Controlled waters – surface waters – Celtic Sea - Milford Haven / Pembroke River (adjacent)	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate / low
	Surface water abstraction - industrial - (on-site)	Groundwater migration, direct run-off from site.	Low likelihood	Minor	Very low
	Ecological receptors: SSSI: Milford Haven Waterway (adjacent) SAC: Pembrokeshire Marine / Sir Benfro Forol (adjacent)	Vertical and lateral migration, direct contact.	Low likelihood	Medium	Moderate / low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low



Notes / assumptions;					
<sup>1</sup> Sites are assessed against baseline condition without construction of the Onshore Development Area.					
<sup>2</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					



Table 11C-30. During construction / decommissioning CSM: Pembroke Power Station

Source	Receptor	Pathway	Probability	Consequence	Risk during construction
Soil, leachate and groundwater contamination.  Potential for: metals and semi-metals; inorganics (sulphate, sulphide, asbestos, pH); organics (oil / fuel hydrocarbons, PAH, VOC and SVOC, PCB, non-chlorinated solvents, chlorinated solvents, fire retardants, cleaning agents, other process chemicals. Low potential for ground gas from Made Ground.	On-site users - Commercial users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood to likely	Medium	Moderate / low to moderate
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood to likely	Medium	Moderate / low to moderate
	Controlled waters – groundwater - Bedrock Principal aquifer	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood to likely	Severe	Moderate to high
	Controlled waters – surface waters – unnamed drains and ponds (on-site and off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Controlled waters – surface waters – Celtic Sea - Milford Haven / Pembroke River (adjacent)	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate / low
	Surface water abstraction - industrial - (on-site)	Groundwater migration, direct run-off from site.	Low likelihood	Minor	Very low
	Ecological receptors: SSSI: Milford Haven Waterway (adjacent) SAC: Pembrokeshire Marine / Sir Benfro Forol (adjacent)	Vertical and lateral migration, direct contact.	Low likelihood	Medium	Moderate / low
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low



Notes / assumptions;					
	<sup>1</sup> Site investigation will be required prior to construction of the Proposed Development.				
	<sup>2</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.				
	<sup>3</sup> During construction, standard mitigation procedures are assumed to be implemented in accordance with a CEMP.				
	<sup>4</sup> Construction workers have been excluded from the assessment due to the use of PPE / risk management protocols and in accordance with CIRIA C692, 2010.				
	<sup>5</sup> While a CEMP will make it unlikely that there will be adverse consequences resulting from construction there may still be temporary minor adverse effects from ground disturbance in these areas. The adoption of a CEMP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline.				
	<sup>6</sup> It is assumed that earthworks may require cut operations anywhere within the Onshore Development Area. This might temporarily worsen groundwater quality, for example, as a result of dewatering activities, which may potentially draw contaminated groundwater away from the sources identified. This may result in a temporary worsening in groundwater quality compared to baseline.				
	<sup>7</sup> The potential for ground gas from these sites is not considered significant enough to result in an increased risk during construction.				



Table 11C-31. Post construction CSM: Pembroke Power Station

Source	Receptor	Pathway	Probability	Consequence	Risk post construction
Soil, leachate and groundwater contamination. Potential for: metals and semi-metals; inorganics (sulphate, sulphide, asbestos, pH); organics (oil / fuel hydrocarbons, PAH, VOC and SVOC, PCB, non-chlorinated solvents, chlorinated solvents, fire retardants, cleaning agents, other process chemicals. Low potential for ground gas from Made Ground.	On-site users - Commercial users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Low likelihood	Medium	Moderate / low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Medium	Low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Off-site users- Public open space users	Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Unlikely	Mild	Very low
		Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Unlikely	Mild	Very low
		Inhalation of ground gases.	Unlikely	Mild	Very low
	Controlled waters – groundwater - Superficial Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Medium	Moderate / low
	Controlled waters – groundwater - Superficial Secondary aquifer - undifferentiated	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Medium	Moderate / low
	Controlled waters – groundwater - Bedrock Secondary aquifer - A	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Medium	Moderate / low
	Controlled waters – groundwater - Bedrock Principal aquifer	Leaching, vertical, and lateral migration from contaminated soils and waters.	Low likelihood	Severe	Moderate
	Controlled waters – surface waters – unnamed drains and ponds (on-site and off-site)	Groundwater migration, direct run-off from site.	Low likelihood	Mild	Low
	Controlled waters – surface waters – Celtic Sea - Milford Haven / Pembroke River (adjacent)	Groundwater migration, direct run-off from site.	Low likelihood	Medium	Moderate / low
	Surface water abstraction - industrial - (on-site)	Groundwater migration, direct run-off from site.	Low likelihood	Minor	Very low
	Ecological receptors: SSSI: Milford Haven Waterway (adjacent)	Vertical and lateral migration, direct contact.	Low likelihood	Medium	Moderate / low



Source	Receptor	Pathway	Probability	Consequence	Risk post construction
	SAC: Pembrokeshire Marine / Sir Benfro Forol (adjacent)				
	Property receptors – Commercial buildings and structures (on-site)	Exposure to explosive gases.	Unlikely	Medium	Low
		Aggressive ground conditions.	Unlikely	Mild	Very low
Notes / assumptions;					
<sup>1</sup> 'On-site' and 'off-site' are terms used here to describe whether a receptor is on or within 50m of the potential areas of contamination being assessed. It does not refer to whether the receptor is within or outside of the Onshore Development Area.					
<sup>2</sup> Assumes construction works are complete and remediation has been carried out where necessary on areas within the Onshore Development Area. However, all sites are located out of the Proposed Development boundaries, therefore no remediation.					





Table 11C-32. Pembroke Power Station – magnitude of impact

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
On-site users - Commercial users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible
On-site users - Commercial users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Low	Low	Low	Negligible	Negligible
On-site users - Commercial users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of dust / vapour with / from contaminated soils.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Direct contact, ingestion, inhalation of vapour with / from contaminated waters.	Very low	Very low	Very low	Negligible	Negligible
Off-site users - Public open space users Inhalation of ground gases.	Very low	Very low	Very low	Negligible	Negligible
Controlled waters – groundwater - Superficial Secondary aquifer - A Leaching, vertical and lateral migration from contaminated soils and waters.	Moderate / low	Moderate / low to moderate	Moderate / low	Negligible to small	Negligible
Controlled waters – groundwater - Bedrock Secondary aquifer - A Leaching, vertical and lateral migration from contaminated soils and waters.	Moderate / low	Moderate / low to moderate	Moderate / low	Negligible to small	Negligible
Controlled waters – groundwater - Bedrock Principal aquifer Leaching, vertical and lateral migration from contaminated soils and waters.	Moderate	Moderate to high	Moderate	Negligible to small	Negligible
Controlled waters – surface waters - unnamed drains and ponds (on-site and off-site) Groundwater migration, direct run-off from site.	Low	Low	Low	Negligible	Negligible
Controlled waters – surface waters – Celtic Sea - Milford Haven / Pembroke River (adjacent) Groundwater migration, direct run-off from site.	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible



Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction magnitude of impact	Post-construction magnitude of impact
Surface water abstraction - industrial - (on-site) Groundwater migration, direct run-off from site.	Very low	Very low	Very low	Negligible	Negligible
Ecological receptors: SSSI: Milford Haven Waterway (adjacent) SAC: Pembrokeshire Marine / Sir Benfro Forol (adjacent). Vertical and lateral migration, direct contact.	Moderate / low	Moderate / low	Moderate / low	Negligible	Negligible
Property receptors – Commercial buildings and structures (off-site) Exposure to explosive gases.	Low	Low	Low	Negligible	Negligible
Property receptors – Commercial buildings and structures (off-site). Aggressive ground conditions.	Very low	Very low	Very low	Negligible	Negligible
<b>Overall magnitude of impact</b>				<b>Negligible to small</b>	<b>Negligible</b>
<b>Notes / assumptions:</b>					
<sup>1</sup> The construction column assumes that a CEMP will be in place to mitigate impacts from construction.					