Chapter 9

Water Quality and Resources

CONTENTS

TABLES

FIGURES

APPENDICES

Appendix 9.1: Flood Consequence Assessment
Appendix 9.2: Water Framework Directive Screening Assessment

9. Water Quality and Resources

9.1 Introduction

9.1.1 This chapter provides an assessment of the likely significant effects on water quality, water resources and flood risk arising from construction, operation and decommissioning of the Project.

9.1.2 A detailed description of the Project Site and the Project is provided in **Chapter 3: Project and Site Description**. A glossary of terms and list of abbreviations used in this chapter is provided at the start of this PEIR. This chapter is supported by the assessment demonstrated in Appendix 9.1: Flood Consequence Assessment (FCA), and a Water Framework Directive (WFD) Screening Assessment provided in Appendix 9.2. Both the FCA and WFD Screening Assessment should be read alongside this chapter. Assessments of likely significant effects on hydrogeology are presented in **Chapter 10: Geology, Ground Conditions and Hydrogeology**.

a) Objectives of the assessment

9.1.3 The objectives of the assessment were to:

- Assess the activities to be carried out and their associated potential impacts likely to arise throughout the different phases of the Project which pose a risk to all water environmental receptors within the Project Site and surroundings;
- To provide any additional mitigation as required to prevent, reduce and offset any significant adverse effects to water quality and resources likely to be affected by the Project;
- Detail the residual effects after implementation of the mitigation;
- Detail cumulative effects of the Project and nearby projects.
- To ensure the Project complies with all local, national and international regulatory and legislative requirements.
- To address the issues and concerns raised in the Scoping Opinion (Appendix 4.2) by the SoS in relation to Water Quality and Resources following an initial consultation in 2014.

9.2 Changes since the 2014 PEIR

9.2.1 There have been changes to the Project design as a result of design evolution and consultation as detailed in **Chapter 3: Project and Site Description**. To aid the reader, Table 9-1 below outlines the changes to this assessment compared with the 2014 PEIR.

Table 9-1: Summary of changes since the 2014 PEIR to the water quality and resources assessment

Section	Changes since the 2014 PEIR	Section Reference
Legislation and Policy	Regulation amendment - The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2016 which came into force from 3 March 2016.	Section 9.3.6
	Introduction of new regulation - The Water Pollution Prevention - Oil Storage Standards (Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016	Section 9.3.27
Baseline	Additional baseline data has become available since the 2014 PEIR was prepared.	Updated baseline data for 2014, 2015 and 2016 are presented in Section 9.5
	Updated baseline data for private groundwater supply boreholes	WFD Screening Assessment (Appendix 9.2)
Project Design	Water supply option to the Project has been revised. Water will be delivered via tanker.	**Chapter 3: Project Site and Description**
	Drainage strategy has been revised to suit the new design	**Chapter 3: Project Site and Description** & Appendix E in Appendix 9.1 - Outline Drainage Strategy
	Embedded designs to mitigate potential, water quality and flood risk impacts	**Chapter 3: Project and Site Description** & Appendix E in Appendix 9.1 - Outline Drainage Strategy
	Removal of all operational waste water from the Project Site	**Chapter 3: Project Site and Description** & Appendix E in Appendix 9.1 - Outline Drainage Strategy
	Following new Climate Change Allowances in 2016 - climate change allowances agreed to be 1% AEP + 20% for the attenuation volume calculations	Section 9.7
Significance of Effect	Update of new receptors, update to existing operational / planned / approved projects for the potential cumulative impact in Section 9.11	Summary of Receptors in Table 9-8 and Cumulative Effects are Section 9-11

9.3 Legislation, policy and guidance

9.3.1 This section identifies and describes legislation, policy and guidance of relevance to the assessment of the potential water quality, water resources and flood risk impacts associated with the Project.

9.3.2 Legislation and policy has been considered on an international, national, regional and local level. The following is considered to be relevant to the water quality, water resources and flood risk assessment as it has influenced the sensitivity of receptors and requirements for mitigation or the scope and/or methodology of the Environmental Impact Assessment (EIA).

a) International

i. Water Framework Directive (WFD) (2000/60/EC) (European Union, 2000)

9.3.3 The Water Framework Directive (WFD) (2000/60/EC) together with its two daughter directives, being the Groundwater Directive (GWD) (2006/118/EC) and the Priority Substances Directive (2008/105/EC), and the EC Floods Directive (2007/60/EC) set out by the European Union are key international legislations that affect the Project within the context of water quality and resources. These directives together provide consensus measures on which surface water and groundwater bodies are protected.

9.3.4 The WFD also establishes a legal framework to protect and restore clean water status (i.e. “good” in terms of ecological and chemical quality and water quantity, as appropriate) across Europe and to ensure its long-term, sustainable use. The WFD (Directive 2000/60/EC) is a significant piece of EU water legislation, with the overarching objective of enabling all water bodies in Europe to attain ‘Good’ or ‘High’ ecological status by 2015.

9.3.5 The WFD directive establishes an innovative approach for water management based on river basins, the natural geographical and hydrological units and sets specific deadlines for Member States to protect aquatic ecosystems. The Directive addresses inland surface waters, transitional waters, coastal waters and groundwater. It establishes several principles for water management, including public participation in planning and the integration of economic approaches, including the recovery of the cost of water services.

9.3.6 The WFD is implemented in England and Wales by “The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017”. The Natural Resources Wales (NRW) is the competent authority in Wales responsible for delivering the objectives of the WFD. River Basin Management Plans (RBMP) specifically set out measures to ensure that water bodies in Wales achieve ‘Good’ ecological status.

b) National

9.3.7 The national legislations relevant to the Project in terms of water quality and water resources are summarised below:

i. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

9.3.8 The Water Framework Directive requires that Member States continue to provide shellfish water protected areas with at least the same protection as under the

repealed Shellfish Waters Directive. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 were laid before the National Assembly for Wales on 16 March 2017. The regulations came into force from 10 April 2017.

9.3.9 The Regulations ensure that objectives are set for improving or protecting the water quality of shellfish waters and that these are monitored. Information about these areas must also be included in the river basin management plans.

9.3.10 The content of the list of shellfish water protected areas in Wales has not changed since 2013.

ii. Flood and Water Management Act 2010

9.3.11 The Act designates CCS as the Lead Local Flood Authority (LLFA), with the responsibility to lead and co-ordinate local flood risk management in the area. It also requires a Sustainable Urban Drainage System (SuDS) Approving Body (SAB) to be established within the LLFA. This responsibility to promote, approve and adopt sustainable drainage systems in new and re-developments can be delegated but the legal responsibility for drainage remains with CCS as the LLFA. SAB must approve drainage systems for the new and re-developed site in their area before construction can begin. The proposed drainage system must also meet National Standards for Sustainable Drainage (Ref. 9-7).

iii. Flood Risk Regulations 2009

9.3.12 The Flood Risk Regulations require NRW and LLFA to produce a Preliminary Flood Risk Assessment, Flood Hazard Maps, Flood Risk Maps and Flood Risk Management Plans for any areas at significant risk.

iv. Environmental Permitting (England and Wales) Regulations 2016

9.3.13 The Permitting regulations require operators to obtain permits for some facilities regarding water resources. The permits are granted by NRW, who control permitting water discharge and groundwater activities. The 2016 update requires permits to be obtained for flood risk activities, including work on or near a main river and in a flood plain.

v. Well-being of Future Generations (Wales) Act 2015)

9.3.14 The Act requires public bodies to undertake their duties and decision making in a sustainable way to help secure Wales' long term well-being, so that it benefits from a prosperous economy, a healthy and resilient environment and vibrant, cohesive communities. The Act includes the requirement for decision making to take account of long term implications, such as climate change.

vi. Environment (Wales) Act 2016

9.3.15 The Act aims to enable Wales' natural resources to be managed in a more proactive, sustainable and joined up way and to help tackle climate change.

c) National Policy

i. Overarching National Policy Statement for Energy (NPS EN – 1)

9.3.16 According to the policy, an assessment of the existing baseline conditions regarding water quality, water resources and physical characteristics of the water environment is required where a proposed project is likely to have effects on the water environment.

9.3.17 The NPS EN – 1 also sets the requirement for additional pollution control measures that must be considered for all activities that discharge to the water environment and recommends that the SoS gives increased weight in its decision making to impacts on the water environment that would have an adverse effect on the achievement of the objectives of the WFD.

ii. National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (NPS EN – 4)

9.3.18 The NPS EN-4 Part 2 Section 2.22.2 recognises that "constructing pipelines creates corridors of surface clearance and excavation that can potentially affect watercourses, aquifers, water abstraction and discharge points, areas prone to flooding and ecological receptors. Pipeline impacts could include inadequate or excessive drainage, interference with groundwater flow pathways, mobilisation of contaminants already in the ground, the introduction of new pollutants, flooding, disturbance to water ecology, pollution due to silt from construction / demolition and disturbance to species and their habitats".

9.3.19 The NPS EN-4 states that where the project is likely to have effects on water resources or water quality, an assessment of the impacts should be provided in line with Section 5.15 of EN-1. The SoS should be satisfied that the impacts on water quality and resources are acceptable in accordance with Section 5.15 of EN-1.

iii. National Policy Statement for Electricity Networks Infrastructure (NPS EN-5)

9.3.20 NPS EN-5 requires consideration of adaption to climate change particularly from the increased risk of flooding to the resilience of some of the sites infrastructure and should be covered in the FCA.

iv. Planning Policy Wales (Welsh Government, 2016)

9.3.21 This is supplemented by TAN15 and incorporates sustainable development into the planning system which can be adhered to. It requires every local planning authority to have produced a Local Development Plan (LDP) superseding the Unitary Development Plan (UDP).

v. TAN15: Development and Flood Risk (Welsh Government, 2004)

9.3.22 Technical Advice Note 15 (TAN15) provides the framework for guiding planning decisions to assess and manage flood risk impacts for new developments. The aim is to, for preference, direct new developments away from high risk of flooding

areas. If using a high risk area is unavoidable, the development must be justified on sustainability grounds and that the consequences of the flooding are acceptable.

9.3.23 The development advice maps (DAM) are the information considered most suitable to determine flood risk zones and when flood risk issues must be taken into consideration in planning future development in that area.

vi. Recommended non-statutory standards for sustainable drainage (SuDS) in Wales (Welsh Government, 2017)

9.3.24 This SuDS approach aims at reducing the volume of water contaminated by sewerage and needing to be pumped for treatment. This would allow new development to use the free capacity in the sewerage network to remove the need to install new infrastructure and reducing the risk of flooding.

vii. Water Strategy for Wales (Welsh Government, 2015)

9.3.25 The Water Strategy aims to improve natural resource management of water systems. It aims to improve the resilience of the whole water systems and therefore reduce costs to consumers and businesses, including water companies.

d) Regional

i. Western Wales River Basin Management Plan (RBMP) (NRW, 2015)

9.3.26 The purpose of RBMP is to protect and improve the water environment in the Western Wales River Basin District (RBD). The plan includes; classification of water bodies; summary of Programme of Measures to achieve statutory objectives and statutory objectives for water bodies.

e) Local

i. City and County of Swansea Council Local Development Plan (2017)

9.3.27 This adopts a sustainable approach to flood risk by avoiding vulnerable development occurring within flood hazard areas. Policy RP4 Avoidance of Flood Risk states that development will not be permitted if it causes an increase to flooding on or off site.

ii. City and County of Swansea Council Unitary Development Plan (2008)

9.3.28 Policy EV35: Surface water run-off, and Policy EV36: Development and Flood Risk, are the relevant policies in CCS Unitary Development Plan. Policy EV35 affects developments that will lead to additional surface water run-off or cause a reduction of the quality of surface water run-off, and encourages SuDS implementation wherever practical to counteract this. Policy EV36 only allows new development within flood risk areas if developers can justify the location by proving the flooding consequences associated with the development are acceptable.

iii. The City and County of Swansea Council Strategic Flood Consequence Assessment (SFCA) Stage 2 (2012)

9.3.29 Stage 1 SFCA is a desk based study of flood risk, and Stage 2 is a more detailed assessment of flood risks. This determined that the main flood risk to the area is from fluvial and tidal water sources, with surface water also occurring and groundwater risk considered minimal. A Stage 3 SFCA was not required as Stage 1 and 2 satisfied the requirements of TAN15 for the potential development.

iv. The City and County of Swansea Flood Risk Management Plan (FRMP) (2015)

9.3.30 The FRMP contains the overview of the flood risk within the CCS area and the objective to reduce flood risk in significant flood risk areas for six years to 2021. The plan covers flooding from surface water, groundwater and ordinary watercourse. NRW are responsible for flooding from main rivers and reservoirs.

v. The City and County of Swansea Site Waste Management Plan (SWMP) (2015)

9.3.31 The SWMP details how resources will be managed and how waste will be minimised and reduced, re-used and recycled wherever possible. This will include guidelines such as to keep waste segregated as it's generated to save time and money.

vi. The City and County of Swansea Local Flood Risk Management Strategy (LFRMS) (2013)

9.3.32 Under the LFRMS, flood risk from surface run-off, groundwater and ordinary watercourses have been considered. The LFRMS is the method through which the LLFA leads and co-ordinates flood risk management on a day to day basis. Local strategies must include objectives and methods for managing local flood risk, as well as timescales and cost of implementation.

9.4 Methodology

a) Scope of the assessment

9.4.1 The scope of this assessment has been determined through a formal EIA scoping process undertaken with the SoS and subsequent consultation with key consultees, including NRW and CCS. Comments raised on the EIA Scoping Report by NRW in their letter dated 14 November 2014 have been taken into account in the development of the assessment methodology and these are detailed where relevant in this chapter. Responses to the comments raised in the EIA Scoping Opinion, NRW and CCS can be found in Table 9-2.

i. Water Quality

9.4.2 The scope of the water quality assessment has been undertaken in accordance with the relevant applicable regulations as outlined in Section 9.3 above.

9.4.3 The assessment consisted of a desk-based study to establish the baseline conditions of the water environment within the Project Site and surroundings, informed by the literature and internet-based information sources and supplemented by responses received via direct consultation with relevant regulatory authorities and stakeholders.

9.4.4 The potential impacts on the water environment during the construction, operational and decommissioning phases of the Project have been identified and assessed, taking into account the embedded design mitigations as contained in **Chapter 3: Project and Site Description** and the comments raised in the Scoping Opinion Report by the SoS (Appendix 4.2).

ii. Flooding

9.4.5 Potential effects from the development have been assessed with reference to the Highway Agency's Design Manual for Roads and Bridges (DMRB, HD/45/09) in relation to the water environment. Although primarily developed for the assessment of water quality effects, the method can also be applied to drainage and flooding effects and provides a robust and accepted method for assessing the significance of effects

9.4.6 This chapter has also followed guidance set out in NPS EN-1 and TAN15: Development and Flood Risk. Consultation with NRW, and with the LLFA has also been undertaken for the preparation of the FCA, which has informed this assessment, as noted in Section 9.4b. The FCA (Appendix 9.1) supporting this PEIR, considers the impact of the Project on flooding and drainage.

9.4.7 Sustainable disposal of surface water through SuDS design has been proposed wherever possible.

9.4.8 Appropriate methods for the construction of the Gas Connection and Electrical Connection at water crossings to prevent adverse effects on drainage and flooding have been considered.

b) Consultation

9.4.9 The scope of the assessment has also been informed by ongoing consultation with statutory consultees throughout the design and assessment process, including past and recent email communications with the SoS, and a meeting with NRW and CCS. A summary of the comments raised and responses are detailed in Table 9-2.

Table 9-2: Summary of consultation responses that have informed the scope and methodology of the water quality and resources assessment

Consultee	Date	Comment	AECOM Response
Secretary of State (SoS) (Scoping Opinion, para 2.45)	August 2014	The Scoping Report did not detail whether any areas of the site are at risk from flooding. EA data indicates that an area to the south west of the application site is within EA Flood Zones 2/3. The SoS notes that the ES is to contain an FCA. This document should include a description of which areas of the site are at risk from flooding and the exact locations of all watercourses on site, including springs, streams and drainage ditches.	The sites at risk from flooding and the locations of watercourses on site are addressed in full within Section 6 and Appendix D of the FCA (Appendix 9.1)
SoS (Scoping Opinion, para 3.11)	August 2014	The SoS agrees to the proposal to scope out WFD Screening Assessment subject to the agreement of NRW	WFD Screening Assessment has been completed (Appendix 9.2)
SoS (Scoping Opinion, para 3.45)	August 2014	The SoS notes the comments of NRW that the assessment should include consideration of surface water drainage impacts and options for improving site surface water drainage to prevent localised flooding during extreme rainfall events.	The prevention of localised flooding during extreme rainfall events is addressed in full within the FCA (Appendix 9.1) which also considers the Outline Drainage strategy (Appendix E of FCA).
SoS (Scoping Opinion, para 3.46)	August 2014	The SoS recommends that the applicant considers temporary attenuation ponds to allow adequate settlement of site generated run-off during the construction and decommissioning phases of the development. The SoS draws the attention of the applicant to NRW's comments that silt fencing, scour protection and sediments alone have been proven ineffective in this catchment due to its flashy nature.	The settlement of site generated run-off is addressed in the Outline Drainage Strategy (Appendix E of FCA provided in Appendix 9.1) and within Sections 9.6 and 9.7 of this chapter and included in the construction environmental management plan (Outline CEMP) in Appendix 3.1.
SoS (Scoping	August 2014	The SoS recommends that the applicant ensures that it can be demonstrated that the surface water disposal scheme would cause no harm to local watercourses	Assessment in the FCA (Appendix 9.1) and Sections 9.6 and 9.7 of this report confirms there will be no temporary or permanent significant

Consultee	Date	Comment	AECOM Response
Opinion, para 3.47)		upon discharge.	effects on local watercourses. The attenuation ponds would allow for sampling to prove quality.
SoS (Scoping Opinion, para 3.49)	August 2014	The SoS notes the concerns of NRW regarding how sewage and waste waters would be managed at the site, the SoS recommends that details of proposed discharges are provided within the ES.	Included in Sections 9.7 and 9.8 of this chapter and the Outline Drainage Strategy (Appendix E of FCA provided in Appendix 9.1). The sewage and waste waters will be discharged on site to either a package sewage treatment plant or septic tank.
SoS (Scoping Opinion, para 3.53)	August 2014	The SoS notes that NRW would set limits on the quantity of water that is discharged from the Power Generation Plant under an Environmental Permit.	The limits on the quantity of water that is discharged is discussed in the FCA in Appendix 9.1 and Sections 9.6 and 9.7 of this chapter.
SoS (Scoping Opinion, para 3.54)	August 2014	The SoS notes the concerns of NRW regarding cooling water, it should be stated within the ES whether any cooling water would be required and if so where it would be derived from and discharged to.	Based on the Project's Design Concept (Ref. 9 – 22), water cooling is not required. Domestic and demineralised water will be delivered to site via tanker. No discharge of process water to nearby water receptors is envisaged as all process water will be taken off-site via tanker to appropriate wastewater treatment facility by specialist contractors.
SoS (Scoping Opinion, para 3.55)	August 2014	The SoS notes the concern of Dwr Cymru (Welsh Water) regarding the potential impact of the development on water quality within the Lower Lliw Reservoir. It is recommended that the applicant assesses potential impacts on the reservoir including potential impacts from deposition and affected rainfall.	The potential impacts on the reservoir has been assessed in Section 9.6 of this chapter.
SoS (Scoping Opinion,	August 2014	The SoS recommends that the applicant consults Dwr Cymru (Welsh Water) regarding the 48" strategic water main that crosses the application site.	The Water Main has been considered in the indicative site layout plans (Figure, C1, Appendix C of FCA provided in Appendix 9.1) and through ongoing consultation with Dwr Cymru (Welsh

Consultee	Date	Comment	AECOM Response
para 3.56)			Water).
SoS (Scoping Opinion, para 3.56)	August 2014	The SoS comments regarding a potential Landfill at the Project Site which may lead to re-mobilisation of contaminated material	Landfill leading to remobilisation of contaminated material has been considered in the embedded mitigation (Section 9.6) and will be considered further in the Outline CEMP (Appendix 3.1) for the Project.
SoS (Scoping Opinion, para 3.45)	August 2014	The SoS comments regarding localised flooding of the Project Site.	Localised flooding has been considered in the embedded mitigation (**Chapter 3: Project and Site Description**), the revised Outline Drainage Strategy and discussed in the FCA in Appendix 9.1
NRW (Annex 1 Para E1.7)	14 November 2014	NRW raised comments regarding any process wastewater composition (i.e. including the chemical composition and temperature) to be generated at the Project Site and the potential impacts on receiving water receptor(s)	Wastewater to be generated from the Project Site has been considered in the embedded mitigation (**Chapter 3: Project and Site Description**). No discharge of process water to nearby water receptors is planned as all process wastewater will be taken off-site via tanker to an appropriate wastewater treatment facility by specialist contractors.
NRW (para 6 page 6	14 November 2014	NRW requested that the exact location of ordinary water courses within the Project Site be identified and assessed for any potential impacts.	The location of ordinary water courses and any potential impacts has been considered in the in the embedded mitigation (**Chapter 3: Project and Site Description**) the revised Outline Drainage Strategy (Appendix E of FCA provided in Appendix 9.1) and discussed in the FCA in Appendix 9.1 and the WFD assessment
NRW	14 November 2014	NRW raised concerns regarding contaminated excavation material and hazardous wastes management	Contaminated material and hazardous wastes management has been considered in the embedded mitigation (**Chapter 3: Project and Site Description**) and will be considered further

Consultee	Date	Comment	AECOM Response
			in the Outline CEMP for the Project.
NRW	14 November 2014	NRW concerns regarding the Peat Management Plan	The Peat Management Plan has been proposed in the embedded mitigation (**Chapter 3: Project and Site Description**) and will be considered further in the Outline CEMP for the Project
NRW	14 November 2014	NRW concerns regarding flood risk, water quality and resources – potential impacts on ordinary water courses crossing the Project Site and running adjacent to the Main River Llan	The impact on ordinary water courses has been considered in the in the embedded mitigation (**Chapter 3: Project and Site Description**), the revised Outline Drainage Strategy (Appendix E of FCA provided in Appendix 9.1) and discussed in the FCA in Appendix 9.1 and the WFD Screening Assessment (Appendix 9.2) Prior consent will be sort from NRW for any works likely to affect the Main River (i.e. within 7 m from the Main River Llan)
NRW	14 November 2014	NRW concerns regarding water quality and sediment loading on the Llan and other watercourses in proximity with the Project site	Water quality and sediment loading has been considered in the embedded mitigation (**Chapter 3: Project and Site Description**).
NRW	14 November 2014	NRW concerns regarding temperature and chemical composition of cooling/process waters to be discharge to watercourses	Concerns regarding temperature has been considered in the embedded mitigation (**Chapter 3: Project and Site Description**).
NRW	14 November 2014	NRW request for a WFD Screening Assessment be undertaken	This has been addressed by the completion of a WFD Screening Assessment as provided in Appendix 9.2
NRW	14 November 2014	NRW concerns regarding potential impacts on groundwater from past mineworks/mine adit as a result of construction activities	The impacts on groundwater from past mineworks has been considered in the embedded mitigation (**Chapter 3: Project and Site Description**) and will be considered further in the Outline CEMP for the Project

Consultee	Date	Comment	AECOM Response
NRW	14 November 2014	NRW concerns regarding the sediment filled effluent water discharge to surface and groundwater	The concerns regarding sediment filled effluent water discharge has been considered in in the embedded mitigation (**Chapter 3: Project and Site Description**) and will be considered further in the Outline CEMP for the Project
NRW	14 November 2014	NRW concerns regarding potential Groundwater/Surface water abstraction – requirement for EPR Permit if water used for dust control is to be sourced from the Project Site	The potential Groundwater/Surface water abstraction has been considered in the in the embedded mitigation (**Chapter 3: Project and Site Description**) and will be considered further in the Outline CEMP for the Project
NRW	14 November 2014	NRW concerns regarding dewatering during construction and the associated potential impacts on the water environment – required for EPR permit	Dewatering has been considered in the in the embedded mitigation (**Chapter 3: Project and Site Description**) and will be considered further in the Outline CEMP for the Project
NRW	14 November 2014	NRW concerns regarding the potential landfill at the Project Site – requirement for the Scope of a Contaminated Land Risk Assessment be discussed with the Local Authority.	The potential landfill has been considered in the in the embedded mitigation (**Chapter 3: Project and Site Description**) and will be considered further in the Outline CEMP for the Project
NRW	14 November 2014	NRW concerns regarding the need for a cumulative assessment be done in relation to other planned and existing projects	The need for cumulative assessment has been considered in the in the embedded mitigation (**Chapter 3: Project and Site Description**) and will be considered further in the Outline CEMP for the Project
CCS	12 October 2017	Identified approach for analysing flood risk from ordinary watercourses on site based upon a desk based study rather than a modelling approach. Volumes and flows at key locations can be calculated based upon the latest hydrological methods. Climate Change Allowances were agreed to be 1% AEP +20% for the attenuation volume calculations on site. Short	This comment regarding analysing flood risk is addressed in full within the FCA (Appendix 9.1)

Consultee	Date	Comment	AECOM Response
		length culvert beneath the proposed road is acceptable. 7 m easement should be adhered to for ordinary watercourses.	
NRW	18 October 2017	Flood data provided	Information regarding flood data is used to complete the FCA (Appendix 9.1)
NRW	19 October 2017	Confirmation that NRW have a 1D HEC-RAS model for Afon Llan to the south of the Project Site.	NRW have advised that this model is not suitable for use within an FCA so has not been included
NRW	7 November 2017	NRW will only comment on development within Flood Zone C, and are happy with the assessment approach providing there is no land raising or development within the C2 Flood Outline.	NRW do not consider an FCA required for their remit as the development proposal does not fall within flood zones C1 and C2. Blockage scenarios will fall under the CCS remit.
NRW	7 November 2017	Response by NRW to proposed methodology/approach to be adopted for the WFD assessment. Provision of baseline data for WFD water bodies	In accordance with the methodology agreed with NRW, a preliminary WFD assessment has been prepared to assess compliance.
NRW	09 October 2017	Data provided by the NRW data distribution team	Data has been used to inform the WFD assessment
CCS	09 October 2017	Data provided by the CCS Environment team	Data has been used to inform the WFD assessment
CCS	13 November 2017	Provided and confirmed opinions on findings from site visit. Key points include given the size of the local watercourses and steep catchment, there is low risk of flooding from ordinary watercourses. Diversion of the ordinary watercourse through Generating Equipment Site is acceptable because the size of the water course is small. CCS agrees with views in principle.	Agreed points from site visit. Land Drainage Consent is required for any field drains diversion.
CCS	27 November 2017	Discussion and agreement of approach to assessing the flood risk from ordinary watercourse. CCS understands the limitations of the UFMfSW and accepts that the flood risk to the site is likely to be more	This comment is included for information within the FCA (Appendix 9.1)

Consultee	Date	Comment	AECOM Response
		from overland flow than fluvial sources. Therefore maintenance of flow routes is important to reduce this flood risk and any downstream impacts. The overland flow path on the eastern boundary of the Generating Equipment Site should be kept clear and formalised to encourage water to flow downslope, away from the development and nearby Solar Farm and towards the ecological mitigation area to the south. The 7 m easement could be relaxed provided some access is maintained. Overland flow routes should be formalised along the eastern edge of the site and kept clear. Easement of these routes is not necessary.	

c) Study area

9.4.10 The study area adopted with respect to the water quality and water resources extends beyond the Project Site boundary as provided in Figure 9.1. The study area therefore includes the area within the Project Site boundary and a potential zone of influence (ZoI) which is defined as a distance over which significant effects on important water receptors/features can reasonably have the potential to occur. In this case, from the perspective of water receptors/features, this is defined as a 1 km buffer zone of influence (ZoI) around the Project Site boundary (Figure 1.1 of Appendix 9.2).

9.4.11 The 1 km buffer ZoI has been determined considering a number of factors, including the number of water receptors likely to be affected by the Project, taking into account the nature of the Project, adopted assessment methodology as described in **Chapter 4: Approach to Environmental Impact Assessment,** the embedded design mitigation measures, the Outline CEMP, outline drainage strategy (Appendix E in Appendix 9.1) and the proximity of each identified receptor to the Project Site.

d) Sensitivity and value of resources

9.4.12 The sensitivity of each water feature/receptor identified with respect to the water quality and water resources within the study area has been determined by the importance of the affected features/receptors in the study area.

9.4.13 A list of the main water features/receptors identified and considered within the study area is given below. The list takes into account the site's characteristics, background project documents, relevant reference documents and professional judgement.

- WFD classified water bodies ('Main Rivers');
- Ordinary water bodies including springs, ponds, reservoirs, lakes and rivulets;
- Groundwater bodies and aquifer(s);
- Licensed groundwater and surface water abstractions;
- Flood risk zones; and
- Water dependent conservation areas and other key environmental receptors such as sites of importance for nature conservation (SINC), ancient Woodlands, SSSI (Figure 9.2).

9.4.14 The criteria used in assessing the value and sensitivity of key water features/receptors within the study area are set out in Table 9-3.

Table 9-3: Determining Water Receptor Sensitivity and Value

Value/ sensitivity	Guidelines	Relevant Examples Used to Assess Sensitivity
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance. Attribute has high quality and rarity on regional or national scale.	Water body of very good chemical or biological quality, i.e. Water Framework Directive (WFD) Class 'High'. Site protected/designed under EU or UK habitat legislation (Special Areas of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interests (SSSI), Water Protection Zone (WPZ), Ramsar site, species protected by EU legislation.). EC designated Salmonid fishery. Principal aquifer providing a regionally important groundwater resource or supporting a site protected under EC and UK habitat legislation. Source Protection Zone (SPZ) 1. A source used for public or local potable water supply. Water body of high amenity value, including areas of bathing and where water immersion sports are regularly practised. Floodplain or defence protecting >100 residential properties from flooding. Areas which include essential infrastructure or must be operational during a flood, including emergency services. Development Advice Map Zone C2 (Areas of the floodplain without significant flood defence infrastructure.)
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance. Attribute has a high quality and rarity on local scale.	Water body of good chemical and biological quality, i.e. WFD Class 'Good'. Species protected under UK legislation. EC designated Cyprinid fishery. Principal aquifer providing locally important resource or supporting river ecosystem. SPZ 2 or 3. A source used for non-potable water supply. Water body of a moderate amenity value including public parks, boating, non-contact water sports, popular footpaths adjacent to watercourses, or watercourses running through housing developments/town centres. Floodplain or defence protecting between 1 and 100 properties or industrial premises from flooding. Areas which are highly vulnerable to flooding, including power stations, residential units, educational facilities and waste management sites. Development Advice Map Zone C1 (Areas of the floodplain which are developed

Value/ sensitivity	Guidelines	Relevant Examples Used to Assess Sensitivity
		and served by significant infrastructure, including flood defences). High risk of surface water flooding (chance of flooding of greater than 1 in 30 (3.3% AEP)).
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance. Attribute has a medium quality and rarity on local scale.	Water body of fair chemical or biological quality, i.e. WFD Class 'Moderate'. Aquifer providing water for agricultural or industrial use with limited connection to surface water. Water body of particular local social/cultural/educational interest. Water body of low amenity value with only casual access, e.g. along a road or bridge in a rural area. Floodplain or defences protecting <10 industrial properties from flooding. Areas which are less vulnerable to flooding, including retail, commercial, general industry, transport and utilities infrastructure. Development Advice Map Zone C (Based on Environment Agency extreme flood outline, equal to or greater than 0.1% AEP (river, tidal or coastal). Medium risk of surface water flooding (chance of flooding between 1 in 100 (1% AEP) and 1 in 30 (3.3% AEP)).
Low	The receptor is tolerant of change without detriment to its character, is of low environmental value, or local importance. Attribute has a low quality and rarity on local scale.	Water of poor or bad chemical or biological quality, i.e. WFD Class 'Poor'. Low sensitivity aquatic ecosystem. Non-Aquifer. Water body of no amenity value, seldom used for amenity purposes, in a remote or inaccessible area. Floodplains with low probability of flooding residential and industrial properties Areas that are water tolerant, including flood control infrastructure, boatyards and marinas. Development Advice Map Zone B (Areas known to have been flooded in the past evidenced by sedimentary deposits). Low risk of surface water flooding (chance of flooding is between 1 in 1000 (0.1% AEP) and 1 in 100 (1% AEP)).
Negligible	The receptor is resistant to change and is of little	The receptor is resistant to change and is of little environmental value. Very low risk of surface water flooding (chance of flooding is less than 1 in 1000

Value/ sensitivity	Guidelines	Relevant Examples Used to Assess Sensitivity
	environmental value. Attribute is of negligible quality and rarity	(0.1% AEP). Outside Development Advice Map flood risk zones.

e) Magnitude of impact

9.4.15 The definitions of the magnitude of potential impact and examples are set out in Table 9-4, based on HD/45/09 Table A4.4 (DMRB) and professional judgement based on the vulnerability of the affected area.

Table 9-4: Determining the Magnitude of Impact on Water Receptors within the Study Area

Magnitude	Guidelines	Relevant Examples Used to Assess Magnitude
High	Total loss or major alteration to key elements/features of the baseline conditions such that post development of the character/composition of the baseline conditions will be fundamentally changed.	Results in loss of attribute and/or quality and integrity of the attribute Deterioration in element of WFD. Increase in peak flood level (1% AEP) >100 mm (Hydrological Assessment of Design Floods and Hydraulic Assessment, Methods E and F, Annex I) Increased flood risk to essential infrastructure, highly vulnerable developments
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development of the character/composition of the baseline conditions will be materially changed.	Results in effect on integrity of attribute, or loss of part of attribute Increase in peak flood level (1% AEP) >50 mm. Loss of flood storage and increased flood risk to less vulnerable developments
Low	Minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline conditions will be similar to the pre-development situation.	Results in some measurable change in attributes quality of vulnerability Loss of flood storage and increased flood risk to water tolerant development or impact which does not affect existing or any possible future developments
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity Negligible change in peak flood level (1% AEP) <10 mm Negligible change to flood risk / storage

f) Significance of effect and definitions

9.4.16 The significance of the potential effects of the Project on the water environment is defined by the sensitivity of and the magnitude of the impact on the receptors/features within the study area.

9.4.17 Based on the receptor sensitivity and the magnitude of impact on the water environment, the definition of the significance of effect on the water features receptors are set out in Table 9-5.

Table 9-5: Classification of Effects

Magnitude	Value and Sensitivity of Receptor				
	Very High	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

9.4.18 Following the classification of an effect as detailed in Table 9-5, a clear statement is made as to whether the effect is ‘significant’ or ‘not significant’.

9.4.19 Effects predicted to be **Minor** or **Negligible** are considered to be manageable and are therefore ‘Not Significant’ and effects assessed as **Moderate** or **Major** are considered to be 'Significant'.

9.5 Baseline Environment

9.5.1 This section describes the baseline environmental characteristics for the Project Site and surroundings with specific reference to the water quality and water resources within the study area.

9.5.2 In order to assess the potential impacts and effects of the Project, the baseline environmental conditions and relevant water features/receptors that currently exist in the study area have been determined from a number of sources including the following:

- Reports of the 2014 PEIR baseline study;
- British Geological Survey (BGS) 1:50,000 Series Geological Maps Sheet 247 Swansea (England and Wales);
- Information from Natural Resources Wales (NRW) website and consultation;
- Information from City Council of Swansea (CCS) website and consultation;
- Information from Ordnance Survey Map covering the study area;
- Report of the Western Wales River Basin Management Plan (RBMP)
- Relevant European Union (EU) legislation – Status report of WFD designated water bodies identified within the study area;
- Observations made during a site visit on 8 November 2017; and

- Envirocheck report, Landmark (2017) (Appendix 10.1).

9.5.3 Taking into account the defined study area as described in Section 9.4(c), the value and sensitivity of the main environmental receptors and resources identified within the study area is summarised in Table 9-11 (water quality) and Table 9-12 (flood risk and surface water drainage).

9.5.4 The criteria used in determining the sensitivity and value, significance of the magnitude and effects impact on the water environment baseline conditions are set out in Section 9.4 of this PEIR.

a) Topography and land use

9.5.5 The topography of the study area is reasonably elevated and steeply sloping. Ground levels across the Project Site vary from approximately 146 m AOD in the north with ground levels at the Generating Equipment Site reaching an elevation of about 90 m AOD before generally falling in a southerly and south easterly direction to an elevation of approximately 80 m AOD along the Afon Llan River and its tributaries. Felindre Gas Compressor Station located immediately to the north of the Access Road is constructed on raised ground at a level of approximately 87 m AOD. This is approximately 5-8 m above the flood plain of the field drainage and ordinary watercourse to the south of the Access Road, which drains to the Afon Llan.

9.5.6 The land within the Project Site is currently used for sheep and horse grazing with existing development consisting of farm buildings and access roads. The area surrounding the Project Site is, at present, predominantly rural, although there is a Felindre Park and Share to the south and a substantial amount of utility infrastructure in the area, some of which cross the Project Site. There are a number of solar farms in fields neighbouring the Site. Some springs and drainage channels/ditches within the Project Site drain the land and discharge into the Afon Llan River. The current land uses are considered “Less vulnerable” to flooding according to the TAN15 classifications.

b) Ground conditions and hydrogeology

9.5.7 A full description of ground conditions and hydrogeology of the Project Site is provided in **Chapter 10: Geology, Ground Conditions and Hydrogeology**. A summary is provided here to understand the possible linkages with surface water features and groundwater resources explicitly used for private groundwater supply within the study area.

9.5.8 The British Geological Survey (BGS), online mapping data, provides details of both the regional and local geology of the study area. The data indicates that the Project Site is underlain by bedrock of the Grovesend Formation, comprising mudstone, siltstone and sandstone (Figure 9.3). Superficial deposits across the Project Site are quite variable. However, they primarily comprise till and glaciofluvial deposits (sands and gravels) with a smaller area of peat, to the west of the north-western corner of the Project Site (Figure 9.4). The thickness of the superficial deposits

beneath the Project Site is currently unknown. Groundwater occurs in both the superficial and bedrock beneath the study area.

9.5.9 NRW has designated the bedrock geology beneath the Project Site and the study area as a Secondary A aquifer with the superficial deposits designated a mixture of Secondary A aquifer and unproductive strata. Secondary A aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale and, in some cases, can form a vital source of base flow to rivers. Unproductive strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. Soils in the study area are variable, designated to have high, intermediate and low leachate potential.

9.5.10 Groundwater movement within the underlying geology is likely to be limited considering the aquifer designations as discussed above. Although the Project Site is elevated, shallow or perched groundwater within the superficial deposits is expected to be reasonably close to the surface and in hydraulic connectivity with the surface watercourses present within the Project Site and immediate surroundings. From the site visit in November 2017, it was noted that infiltration is likely to be limited on the Generating Equipment Site where collections of surface water and saturated ground were observed throughout the locality. The timing of the visit did not follow a particularly wet period of weather.

9.5.11 The objectives of the WFD have been used to assess the groundwater quality in the study area. The Carmarthen Carboniferous Coal Measures (Waterbody ID GB41002G200600) and Swansea Carboniferous Coal Measures (Waterbody ID GB410002G201000) are two WFD groundwater bodies within the study area (Figure 9.5). Information on their status regarding water quality is available from NRW Rivers and Waterbodies website (accessed October 2017). According to NRW website, the current quantitative water quality for both the Carmarthen and Swansea water bodies is good and predicted to remain so beyond 2015, based on the most recent available data from 2015.

9.5.12 However, the overall 2015 Cycle 2 Status and current chemical quality for both Carmarthen Carboniferous Coal Measures and Swansea Carboniferous Coal Measures groundwater bodies are reported to be poor and are expected to remain so beyond 2015. There are no identified designated groundwater SPZs or drinking water Safeguard Zones with regards to agricultural activities within 1 km of the Project Site. Furthermore, information on the status of the Carmarthen and Swansea Carboniferous WFD groundwater bodies shows that they are not targeted for improvement within the Western Wales River Basin Management Plan (RBMP).

9.5.13 The Landmark Envirocheck report (Appendix 10.1) has identified no groundwater abstraction licences associated with the Project Site. The Landmark report identified only one licence located within 100 m of the Project Site, recorded 56 m to the north-east for a well at Abergelli Farm, licence number 22/59/4/0027 dated February 1993, for general farming and domestic use. Recent (received on 9 October 2017) data on private groundwater and abstraction licences received from

CCS and NRW respectively did not identify this licence or any other licences within the 4 km of the Project Site. .

c) Contaminated land

9.5.14 A detailed assessment of the potential for contaminated land is included in **Chapter 10: Geology, Ground Conditions and Hydrogeology**. A summary of the possible risks to surface water features and the groundwater bodies and aquifer is provided below.

9.5.15 No intrusive site investigation has been completed to inform this assessment. However, as the majority of the Project Site is undeveloped, it is unlikely to have experienced significant potentially contaminative activities. Figure 9.6 shows current or historical potential pollution point/aerial sources within 1 km of the Project Site. It also includes historic landfill and industrial land use activities that have a higher potential for ground contamination such as the disused (inert) landfill site located approximately 100 m west of the Gas Connection, a coal mine north of Abergelli Farm and the Substation towards the south west of the Project Site.

9.5.16 The Project Site is overlying mine workings. An assessment of the workings, adits and mine entries is discussed in **Chapter 10: Geology, Ground Conditions and Hydrogeology**. A comprehensive ground investigation will be undertaken as part of embedded mitigation, prior to construction, and will provide more detail of ground conditions.

9.5.17 A mine spoil dump covered approximately three-quarters of the landfill area from the former Abergelli Colliery (Figure 9.6). This mine waste largely was removed leaving a layer of well compacted mine waste over the majority of the landfill area. Part of the ground that was covered by mine spoil was formerly used for drying out of water treatment sludge (aluminium sulphate) though this ceased when the landfill became operational. No further information regarding potential impacts to the water environment from this operation is known.

d) Surface water and groundwater features

9.5.18 There are both designated "ordinary" and "main" surface water bodies within the study area (Figures B2 and B3, Appendix B of FCA provided in Appendix 9.1). Within the Project Site, there are springs and spring-drainage rivulets and drainage ditches that drain the Project Site into the Afon Llan River. The Afon Llan River and its tributaries are the closest surface water features in the vicinity of the Project Site considered in the assessment. The Afon Llan River catchment includes all of the Project Site. The Loughor Estuary, alongside other ecological statutory designated sites more distant from the Project Site downstream of the Project Site, are also discussed.

9.5.19 There are three WFD classified surface water bodies (Figure 9.1) within the study area: the Afon Llan (Water body ID GB110058032070 to the south of the Project Site), the Afon Lliw (Water body ID GB110059032100 to the north of the Project Site) and the Loughor Estuary (Burry Inlet Inner) (Water body ID GB531005913500

located approximately 7 km south of the Project Site) into which these water bodies discharges.

9.5.20 The Afon Llan River is the closest WFD designated surface watercourse that traverses the immediate vicinity of the Project Site. It flows in a south-westerly direction and is designated as a Main River by Natural Resources Wales (NRW). The Afon Llan borders the southern boundary of the Project Site. The Afon Llan links with the Afon Lliw and the River Loughor, which discharges into Carmarthen Bay. The Power Generation Plant is located approximately 400 m from the Afon Llan watercourse. The rivers will not be directly altered by the Project.

9.5.21 There is one WFD groundwater body (Table 9-10) (i.e. the Carmarthen Carboniferous Coal Measures Water body ID GB41002G200600) in the vicinity of the Project Site. This WFD water body is not targeted for improvements within the Western Wales RBMP.

9.5.22 Information about the current and predicted status of the Afon Llan River and the other designated WFD water bodies within the study area are available from NRW Cycle 2 River and Waterbodies websites[1] (accessed May 2017) and is summarised in Table 9-8. Details of groundwater bodies are provided in Table 9-10.

Table 9-6: Surface water bodies WFD Cycle 2 status WFD status of Afon Llan, Afon Lliw and Loughor Estuary

Status			
Water Body	**Afon Llan**	**Afon Lliw**	**Loughor Estuary (Burry Inlet Inner)**
Overall Status	Good	Moderate	Poor
Chemical Status	Good	Fail	Good
Ecological Status	Good	Good	Poor
Driving Ecological Quality Elements	Fish, Invertebrates, Macrophytes and Phytobenthos Combined	Fish, invertebrates	Phytoplankton blooms
Mitigation Measures by NRW	Not yet applied	Not yet applied	Not yet applied
Typology	Low, Small, Siliceous	Low, Small, Siliceous	Mixed, Macro, Extensive

[1] https://nrw.maps.arcgis.com/apps/wegappviewer/index.html?id=2176397a06d64731af8b21fd69a143f6

Table 9-7: Groundwater body WFD Cycle 2 status

Status	
Water Body	**Carmarthen Carboniferous Coal Measures**
Overall 2015 Cycle 2 Status	Poor
2015 Cycle 2 Quantitative Status	Good
2015 Cycle 2 Chemical Status	Poor

9.5.23 The Afon Lliw is located approximately 1.3 km north of the Project Site and has been assessed under the WFD as shown in Table 9-9.

9.5.24 There are other smaller watercourses in the vicinity of the Project Site that drain to the Afon Llan, along with some springs and small ponds. These have not been individually assessed previously under the WFD. The selection of waterbodies to be evaluated in 2015 was based on the judgment of NRW considering the catchment size, available data and overall significance. It is thought that these waterbodies were not previously assessed partly due to lack of data and because their small size means their overall importance to the river basin district is reduced.

9.5.25 The largest ordinary watercourse traversing the eastern perimeter of the Project Site has been observed to be 2.0-2.5 m wide at the bank and 1 m deep. Some ordinary watercourses will be directly altered by the Project (Figures 2.4-2.6, Appendix E (Outline Drainage Strategy) provided in FCA in Appendix 9.1)..

9.5.26 Both the Afon Llan and Afon Lliw discharge to the Loughor Estuary west of Swansea, approximately 7 km from the Project Site. The Project Site lies outside of the Afon Lliw topographic catchment and therefore it is expected that any direct hydraulic connectivity will be limited. The Afon Llan does, however, join with the Afon Lliw approximately 9 km downstream of the Project Site. There may also be some potential for the cross-transfer of shallow groundwater flows between the two catchments. The Loughor Estuary has been assessed under the WFD as shown in Table 9-9. NRW has identified that the Loughor Estuary contains designated Shellfisheries.

9.5.27 No surface water abstraction points have been identified within the Project Site. The closest surface water abstractions, assumed to be from a tributary of the Afon Llan, have been identified approximately 1.6 km northeast and upstream of the Project Site. Accordingly, no impact to this receptor is envisaged and it is not considered further in this assessment.

9.5.28 There are a number of small drainage ditches and land drains which cross the Project Site and output into the ordinary watercourses and then the Afon Llan. There are also springs with associated streams which discharge into the Afon Llan throughout the Project Site.

9.5.29 There are two heavily vegetated ponds located within the Generating Equipment Site. These are of unverified extent owing to vegetation cover but are thought to have a radius of approximately 5 m.

e) Flood risk

9.5.30 There are no flood defence structures in the study area.

9.5.31 The LIe Geo-Portal Development Advice Map (DAM) (Ref 9-25) determines that a relatively small area in the Project Site, south of the Generating Equipment lie within DAM Zone C2 (areas of the floodplain without significant defence infrastructure). Small areas along the eastern edge of the Project Site boundary, east and south of the Generating Equipment Site lie within DAM Zone B (areas known to have flooded in the past). The remainder of the Project Site is outside the DAM Zones and considered to be at very low risk of flooding i.e. DAM Zone A. Figure D1 in Appendix 9.1 displays the flood zones and Project Site boundary.

9.5.32 During the site visit, the area between the Felindre Gas Compressor Station and the Generating Equipment Site was notably saturated. It is assumed that this area and the lower lying area to the south may be susceptible to groundwater or surface water flooding. This is consistent with BGS groundwater flooding susceptibility mapping showing the south area of Project Site as potential groundwater flooding at surface, while the rest of the Project Site lies in limited potential or potential for flooding properties below ground level. **Chapter 10: Geology, Ground Conditions and Hydrogeology** describes additional information on the Landmark Envirocheck Report (2017).

9.5.33 The literature review has not identified any historic incidents of flooding affecting the Project Site from any source. The references considered are in the References section (Section 9.12).

9.5.34 The CCS PFRA (2011), Level 1 (2010) and Level 2 (2012) SFCA's do not report any recorded flood events from groundwater sources within the CCS region. The FRMP (2015) indicates that there is a low risk of groundwater flooding across the CCS region.

9.5.35 NRW online maps show that reservoir flooding is not predicted to affect the Project Site. This is relevant with respect to the upstream Lliw Reservoir.

9.5.36 The existing Water Main that crosses the Project Site in a northwest to southeast orientation could present a flood risk if inadvertently damaged or leaking. Previous consultation on the Project with Welsh Water ascertained that flow rates in the pipe are approximately 1.2.-1.7 m^3/s. The flood risk from this source if it were to leak is considered to be very low.

f) Artificial water features

9.5.37 Situated north of the Project Site is Felindre Water Treatment Works with a covered reservoir. There is a Water Main connected to Felindre water treatment works via a

1.68 m diameter pipe which follows a south-east to north-west direction across the Generating Equipment Site and along the line of an existing access track. The treated water is supplied to Swansea, Llanelli and Bridgend areas.

9.5.38 The Lower Lliw Reservoir is also situated north and upstream of the Site, approximately 1.1 km away. It is part of the water supply infrastructure in the adjacent Lliw catchment.

g) Ecological designations

9.5.39 A detailed description of ecological designations within the study area is provided in **Chapter 8: Ecology** and illustrated in Figures 8.1 and Figure 8.2. A summary of features relevant to the assessment of impacts on the water environment is provided below.

9.5.40 The Loughor Estuary is located approximately 7 km west of the Project Site and receives water from the Afon Llan and Afon Lliw. It is designated as an SSSI with the Burry Inlet further downstream also a designated Ramsar site. Both form part of the Carmarthen Bay SAC.

9.5.41 Two SSSI sites (Figure 9.2) located closer to and potentially in hydraulic connectivity with the Project Site are:

- Nant y Crimp SSSI, located approximately 2.2 km west which is designated for its wet pastures, grassland/woodland habitat and marsh fritillary butterfly. The Project Site is not located within the catchment of the Nant y Crimp and therefore any hydraulic connectivity with the Project Site would be limited to potential groundwater flows; and
- Penllergaer railway cutting SSSI, approximately 3 km to the south-west which is designated for geological interest. An unnamed tributary of the Afon Llan flows through the Penllergaer SSSI. Geological designations are not relevant to this assessment as there will not be any effects of the Project on the geological conditions from the perspective of water quality and resources.

9.5.42 Effects on the SSSIs are addressed in **Chapter 8: Ecology**.

9.5.43 There are SINCs situated within and surrounding the Project Site (Figure 9.2). Three are considered relevant to this assessment: the Lletty Morfil SINC, which is partly within the Project Site and is designated for purple moor grass and rush pasture and scrub habitats; and the Waun Garn Wen and Rhos Fawr SINCs adjacent to the Project Site, which are also designated for purple moor grass and rush pasture, wet woodland, scrub and watercourse habitats. The SINCs may, therefore, have some sensitivity to changes in water table and water quality. The area of peat adjacent to the north-west corner of the Project Site extends into the Waun Garn Wen SINC.

h) Drainage

9.5.44 Most of the Project Site is undeveloped and surface water run-off flows overland and through field drains discharging into the Afon Llan. These field drains and drainage ditches can be seen to cross the Project Site and flow to the ordinary

watercourses. The largest ordinary watercourse flows south along the east perimeter of the Project Site before discharging to the Afon Llan.

9.5.45 It has been identified that there are no foul sewers within the Project Site, and therefore assumed that the foul effluent from the nearby farm and residential properties discharge to cess pits and septic tanks.

i) Summary of Receptors

9.5.46 Based on the information reviewed for this PEIR, the water quality and resources and flood receptors/features with the potential to be affected by the Project have been identified.

9.5.47 Table 9-8 summarises the key receptors and classifies their importance. This has been undertaken using professional judgement and with reference to the baseline information and the policy guidance noted in Section 9.2. The identified receptors are assessed to have a hydrological or hydraulic connection to the Project Site. The Lower Lliw reservoir and Afon Lliw are upgradient and not in direct hydraulic continuity so are excluded from further assessment.

Table 9-8: Summary of Relevant Water Quality and Resources and Flood Receptors/Features

Receptor	Key Attributes Defining Importance	Sensitivity
Afon Llan	Water Quality and Resources - WFD Class Moderate. **Flood Risk** - DAM Zone C2. However, the floodplain protects between 1 and 100 properties from flooding, so sensitivity lowered from Very High.	Medium High
Overland flow routes	**Water Quality and Resources** – n/a **Flood Risk** - Proximity of Generating Equipment Site to flow route and high risk of surface water flooding (greater than 1 in 30 (3.3% AEP).	n/a High
Water Main	**Water Quality and Resources** – n/a **Flood Risk** - Supply of potable water from Lower Lliw Reservoir and passes through Project Site. Despite being at very low risk of fluvial and/or surface water flooding, asset importance is defined as floodplains with low probability of flooding residential and industrial properties.	n/a Low
Tributary of the Afon Llan crossing the Generating Equipment Site, (Ordinary Watercourses and Drainage Channels)	**Water Quality and Resources** Assessed to be of fair ecological quality. **Flood Risk** - DAM Zone B, despite some ordinary watercourses and drainage channels considered to be very low risk.	Medium Low
Tributary of the Afon Llan immediately east of Generating Equipment Site	**Water Quality and Resources** Assessed to be of fair ecological quality. **Flood Risk** - DAM Zone B, despite some ordinary watercourses and drainage channels considered to be very low risk.	Medium Low
Tributaries of the Afon Llan crossing/adjacent to the Access Road west of the Project Site	**Water Quality and Resources** Assessed to be of fair ecological quality. **Flood Risk** - DAM Zone B, despite some ordinary watercourses and drainage channels considered to be very low risk.	Medium Low
Ponds within the Generating Equipment Site	**Water Quality and Resources** Assessed to be of fair ecological quality.	Medium

Receptor	Key Attributes Defining Importance	Sensitivity
	Flood Risk - DAM Zone B, despite some ordinary watercourses and drainage channels considered to be very low risk.	Low
Groundwater bodies and aquifers	**Water Quality and Resources** - Secondary A aquifer providing water for agricultural and domestic use. Flood Risk – n/a	Medium n/a
Loughor Estuary/Burry Inlet	Water Quality and Resources - SAC, SSSI designations. **Flood Risk** – DAM Zone B, despite some ordinary watercourses and drainage channels considered to be very low risk	Medium Low
Nant y Crimp SSSI	**Water Quality and Resources** – SSSI designations. **Flood Risk** – DAM Zone B, despite some ordinary watercourses and drainage channels considered to be very low risk.	Medium Low
Lletty Morfil SINC	**Water Quality and Resources** – SINC designations. **Flood Risk** – DAM Zone B, despite some ordinary watercourses and drainage channels considered to be very low risk.	Medium Low
Waun Garn Wen SINC	**Water Quality and Resources** – SINC designations. **Flood Risk** – DAM Zone B, despite some ordinary watercourses and drainage channels considered to be very low risk.	Medium Low
Rhos Fawr SINC	**Water Quality and Resources** – SINC designations. **Flood Risk** – DAM Zone B, despite some ordinary watercourses and drainage channels considered to be very low risk.	Medium Low
Other non-specific locations within study area	Water Quality and Resources – no environmental designation. Flood Risk - Very low risk of surface water flooding (chance of flooding is less	Negligible

Receptor	Key Attributes Defining Importance	Sensitivity
	than 1 in 1000 (0.1% AEP). Outside Development Advice Map flood risk zones.	Negligible

9.6 Embedded Mitigation

9.6.1 As detailed in **Chapter 3: Project Site and Description**, a number of embedded mitigation measures have been identified through the iterative EIA process and have been incorporated into the design and construction planning of the Project.

9.6.2 As these mitigation measures have been embedded into the design, are legal requirements or are standard practices that will be implemented, the assessment of likely significant effects assumes that they are in place.

9.7 Assessment of Effects

9.7.1 This section presents the findings of the water quality and resources impact assessment and flood risk impact assessment during the construction, operation and decommissioning phases of the Project.

9.7.2 This section identifies any likely significant effects that are likely to occur and the additional mitigation and monitoring measures that are proposed to reduce or eliminate the identified significant effects.

j) Construction effects – Power Generation Plant

i. Water Quality and Resources

9.7.3 This section considers the potential impacts and effects that construction works for the Project pose to water quality and resources. A description of the anticipated scope of the construction works required is included in **Chapter 3: Project Site and Description**.

9.7.4 The principal risks of the construction works to water quality and resources therefore comprise:

- Pollution impacts on surface watercourses and groundwater associated with:
  - increased sediment loads in site runoff containing elevated suspended sediment levels disturbed during site clearance;
  - the release of hydrocarbons and oils due to a large number of vehicles accessing the site, leakages from temporary oil/fuel storage tanks and accidental spillages; and
  - accidental leaks of hazardous materials, such as concrete and cement products, which can be contained in uncontrolled wash-down water and surface water runoff;
  - dewatering of excavations and the discharge of potentially polluted/high sediment loading water to the water receptors;and
  - pollution from dust and debris.

9.7.5 Measures to address the above have been identified and, where appropriate, are included in the embedded mitigation given in **Chapter 3: Project and Site Description** and in the Outline CEMP (Appendix 3.1).

Increased pollution and sediment load

9.7.6 The magnitude of potential impacts to surface water receptors will be most significant when working in areas adjacent to a water body or drainage channel. If they occur, the impacts will be direct and temporary - water quality within the affected water body is expected to improve over time as sediments settle or are trapped by vegetation and pollutants such as hydrocarbons, oils and other hazardous products are dispersed, diluted and treated by natural processes.

9.7.7 Surface water runoff from the Project Site will be conveyed to the tributaries of the Afon Llan River, east of the Project Site. This tributary to the Afon Llan is a designated ordinary watercourse with a **Medium** sensitivity. Consequently, the magnitude of any potential impacts to this water receptor during the construction phase of the Project will be **Negligible**. Accordingly, the significance of effects is assessed to be **Negligible** and no additional mitigation is required.

9.7.8 There is potential for hydraulic connectivity (most likely through shallow groundwater) and therefore for runoff to migrate to the Lletty Morfil, Waun Garn Wen and Rhos Fawr SINCs located within the Project Site at approximately 200 m and 300 m from the Power Generation Plant (Figure 9.2). Given the approximate distances and locations of these features, their **Medium** sensitivity and the inferred groundwater flow direction (Figure 9.2), the magnitude of potential impacts on these receptors is assessed as **Negligible**. Hence the significance of any effects will be **Negligible** and no additional mitigation is required.

9.7.9 Surface water runoff from the Project Site may infiltrate and migrate further afield via groundwater. The primary groundwater flow direction is assessed to be towards the Afon Llan (Figure 9.3) but will be confirmed through future geotechnical/ground investigations at the Project Site post DCO Application. The groundwater aquifer beneath the Project Site is a WFD designated water body (i.e. Carmarthen Carboniferous Coal Measures groundwater body) (Figure 9.5) of medium sensititivity. Taking into account its current and forecasted WFD water quality status which is expected to remain poor, its dilution and dispersion potential, it is envisaged that infiltration of surface runoff will not significantly impact the flow or quality of groundwater. The receptor sensitivity is **Medium**, the magnitude of potential impact on groundwater arising from pollution by surface water runoff is considered to be **Negligible** so the significance of effects is assessed to be **Negligible** and no mitigation is required. Potential impacts to groundwater resources are discussed in **Chapter 10: Geology, Ground Conditions** and Hydrogeology.

9.7.10 Runoff from the Generating Equipment Site will contribute only a small proportion of flow in the Afon Llan. The Afon Llan is hydrologically connected with the Loughor Estuary which is also a WFD designated surface water body of **High** sensitivity located about 7 km south of the Project Site. In the event that surface water runoff is accidentally polluted, before it is discharged from the Project Site into the Afon Llan River, it will have to travel several kilometres before reaching the Loughor Estuary (SAC, SSSI). As such, any pollutants would have settled, dispersed, diluted

and be treated by natural processes thereby limiting any subsequent impact to the Loughor Estuary. The sensitivity of the Loughor Estuary is **High**, the magnitude of potential pollution impacts will be **Negligible,** hence the significance of effect has been assessed as **Minor** and no additional mitigation is required.

9.7.11 The two existing ponds within the Power Generation Plant area will be lost as a result of the Project. Based on this, from a water quality and resources perspective, the potential pollution and sediment loading impacts on these ponds is scoped out of the assessment.

9.7.12 Potential impacts and effects associated with ground instability and piling works are discussed in **Chapter 10: Geology, Ground Conditions and Hydrogeology**.

Dewatering discharges

9.7.13 Dewatering of site excavations may be required for piling or construction of foundations within the Generating Equipment Site. As described previously, given the current and historic land uses, ground contamination is unlikely to pose a significant groundwater quality risk as a result of mobilisation of existing contaminants. Therefore dewatering of excavations is unlikely to introduce polluted water to the water environment. Water removed during dewatering activities may contain elevated suspended solids and will be subject to appropriate mitigation (e.g. settlement ponds) before discharge to the water environment off-site.

9.7.14 As noted above, water from dewatering activities will be discharged a treatment process (e.g. settlement ponds/oil removal system) and this will likely be discharged directly into the tributary to the Afon Llan east of the Project Site. This tributary is not a WFD designated water body but an ordinary water body of **Medium** sensitivity. The magnitude of potential impacts from dewatering discharges on this tributary to the Afon Llan during construction is considered to be **Low**. Accordingly, the significance of potential effects is assessed as **Minor** and no additional mitigation is required.

Sediment filled and turbid surface water resulting from dust and debris

9.7.15 Construction activities have the potential to release debris and dust that may be blown into adjacent surface water features. Increased dust levels in surface water bodies may reduce the levels of light reaching aquatic plant and animal species and cover sensitive habitats on the floor of the streams and ponds. Debris blown into water bodies can decrease the aesthetic quality of the water body. Impacts will be direct and temporary.

9.7.16 The Project does not involve any demolition activities therefore high levels of dust and debris are unlikely particularly with the implementation of the dust control measures incorporated into the Outline CEMP (Appendix 3.1).

9.7.17 The ordinary surface water bodies (i.e the watercourses close to and within the Generating Equipment Site) including the tributary to the Afon Llan east of the the Project Site are potential surface water receptors that could be impacted by dust

and debris during construction. These will be directly affected by physical works however the embedded mitigation measures in the Outline CEMP will control potential pollution impacts. The sensitivity of the receptors is **Medium**, the magnitude of impacts associated with dust generation and debris has been assessed as **Negligible**. Accordingly, the significance of effects is assessed to be **Negligible** no additional mitigation is required.

9.7.18 It is envisaged that the embedded mitigation measures will help control dust and debris related impacts such that they do not affect waterbodies and SINCs at a distance from the Power Generation Plant. The sensitivity of the ordinary waterbodies and SINCs within the Project Site is **Medium**. In the event of any accidental escape of dust and debris into any of the ordinary surface water receptors (e.g. ponds, rivulets and ditches) within and nearby watercourses (e.g. the tributary to the Afon Llan) to the Project Site the magnitude of impact will be **Negligible**. Accordingly, the significance of effect at any of these ordinary water receptors (i.e. the tributary to the Afon Llan, ponds, rivulets and ditches) is assessed as **Negligible** and no additional mitigation is required.

9.7.19 The magnitude of the potential impacts likely to arise during the construction works on the identified water receptors at the Power Generation Plant are considered to be negligible. Accordingly the effect significance on the water receptors within the Project Site and study area is assessed as minor or negligible and **Not significant**.

ii. Flooding

9.7.20 This section considers the potential impacts and effect that construction works for the Power Generation Plant may have on flood risk and drainage. A description of the anticipated scope of construction works required is included in **Chapter 3: Project and Site Description.** The construction phase is expected to take approximately 22 months.

9.7.21 The potential flood risks include:

- Damage to Water main;
- Water Main Temporary Bridge; and
- Maintenance Compound and construction car parking within temporary Laydown Area.

<u>Damage to Water main</u>

9.7.22 A 1.68 m diameter Water Main, the Felindre-Margam trunk main, traverses the Generating Equipment Site, and is a key part of the main water supply infrastructure in the area. The exact location and depth of the Water Main will be determined during site investigations (currently scheduled to be completed in January 2018), liaison with Dwr Cymru Welsh Water and a precautionary safeguarded area of 30 m will be in place either side during construction to avoid the chance of striking the Water Main.

9.7.23 Within the Water Main easement area, the existing ground level has been retained. In the very unlikely event of an accidental rupture, any resultant outflow is likely to

pass through the Project Site but is unlikely to impact the elevated Generating Equipment Site. The predicted flow volumes and land levels are such that the adjacent ordinary watercourses, either side of the main, and the receiving Afon Llan should accommodate the temporary increase in overland flow until the fracture is repaired or flow is halted, avoiding an effect on third parties. Therefore, based on the sensitivity of the receptor being **Low**, and a **Low** magnitude impact as a result of embedded mitigation and accounting for the unlikely event of an accident, the significance of effect via safeguarding is predicted to be **Negligible**, and therefore not significant.

Water Main Temporary Bridge

9.7.24 The Water Main will be crossed by a temporary bridge designed for construction loads from the Access Road to Generating Equipment Site. Welsh Water will be consulted during detailed design to include the required protective measures to the crossing to preserve the Water Main's integrity. There will also be a specialist engineering consultant on site during the bridge's construction to ensure the safe crossing of heavy loads in the construction period, some in excess of 300 tons, over the Water Main. Historic Welsh Water consultation has preferred a Bailey bridge solution, previously used to cross the same Water Main, which will be discussed further. Any crossing solution will be subject to Welsh Water agreement. With a receptor sensitivity of **Low** and a predicted impact magnitude of **Negligible** owing to appropriate loading mitigation, the effect significance predicted to be **Negligible**, and therefore not significant.

Maintenance Compound and construction car parking within the temporary Laydown Area

9.7.25 The temporary Laydown Area will provide storage space for materials, plant and equipment. It will also comprise accommodation and welfare facilities for construction staff as well as parking. The location of the Laydown Area is currently greenfield. The construction of the Laydown Area will involve vegetation clearance and laying down of granular material which, subject to infiltration tests, should permit surface water to drain to ground at a rate close to the existing conditions. The granular area amounts to 2.8 ha. The footprints of the construction compound building facilities will result in some, temporary, loss of surface draining area; however, this amounts to a negligible portion of the Laydown Area.

9.7.26 The temporary, low permeability of the surface during construction from building facilities and changes in runoff have not been considered in calculations for permanent construction runoff. Therefore, this has not been allowed for in the compensatory attenuation pond, proposed for the south eastern corner of the Generating Equipment Site. However, there is provision for consideration of temporary runoff in the Outline CEMP. The temporary Laydown Area will be returned to its original pre-construction composition (grassland) following construction, Based on the sensitivity of the receptor (other non-specific locations within study area) being **Negligible** because of the very low flood risk, and the **Negligible** magnitude of the impact through embedded mitigation of predominantly

gravel surfacing. The significance of the temporary effect is considered to be **Negligible**.

9.7.27 The size of the temporary Laydown Area car park is 0.3 ha and is additional to the 2.8 ha referred to above for the remainder of the Laydown Area i.e. it is approximately 10% of the total Laydown Area. The surface of the car parking area is assumed to be constructed using a gravel / granular surface finish, under the 'General Site Area' runoff designation of the Outline Drainage Strategy (Appendix E of FCA provided in Appendix 9.1). This should, subject to infiltration tests, permit surface water to drain to ground at a rate close to existing conditions. Based on the sensitivity of the receptor (other non-specific locations within study area) being **Negligible** because of the very low flood risk, and the **Negligible** magnitude of the impact through embedded mitigation, the significance of the permanent effect is considered to be **Negligible**.

k) Construction effects - Gas Connection

i. Water Quality and Resources

9.7.28 The potential impacts associated with the activities and the water receptors likely to be impacted during the construction phase are the same as those identified for the Power Generation Plant. From water quality and resources perspective, it is envisaged that the Gas Pipeline will not give rise to an increase in impermeable area within the Project Site and impact upon the surface water run-off regime for the Gas Connection. Consequently, given the nature of the works and the size of the area required for the Gas Connection construction works, the overall effects of the potential impacts associated with the construction activities at the Gas Connection areas are considered to be similar or less than the impacts determined at the Power Generation Plant and as detailed above.

9.7.29 Accordingly, given that the water receptors and their sensitivities remains the same, the **Nagnitude** of the potential water quality impacts likely to arise during the construction works at the Gas Connection point is considered to be **Negligible** and the overall significance of effects on the range of sensitivity water receptors as a result of the construction activities is therefore considered to range from **minor to Negligible** and therefore **Not significant** with no further mitigation required.

ii. Flooding

9.7.30 No Gas Connection effects for flooding have been identified during the construction phase.

l) Construction effects – Electrical Connection

i. Water Quality and Resources

9.7.31 A detailed description of the construction activities for the Electrical Connection is provided in **Chapter 3: Project and Site Description**. In summary, the Electrical Connection will run along side the Access Road for the majority of the route.

9.7.32 The potential impacts associated with the activities and the water receptors likely to be impacted during this construction phase are likely to be similar to those identified for the Power Generation Plant. Consequently, given the nature of the works and the size of the area required for the Electrical Connection construction works, the overall effects of the potential impacts associated with the construction activities at the Electrical Connection are considered to be similar, but slightly less than the impacts determined at the Power Generation Plant as detailed above.

9.7.33 Taking into account the medium sensitivity of the groundwater body beneath the Project Site and the current and forecasted WFD status (i.e. poor water quality) for the groundwater body, the **Magnitude** of potential impacts likely to arise from the installation of the Electrical Connection is considered to be **Negligible**. Hence the significance of effect is assessed as **Negligible**.

9.7.34 Additionally, given that the water receptors and their sensitivities remains the same, the overall **Magnitude** of the potential water quality impacts likely to arise during the construction of the Electrical Connection is considered to be **Negligible** and the overall significance of effects on the range of sensitivity water receptors as a result of the construction activities is therefore considered to range from **Minor to Negligible** and therefore **Not significant** with no further mitigation required.

ii. Flooding

9.7.35 No Electrical Connection effects for flooding have been identified during the construction phase.

m) Operational Effects – Power Generation Plant

9.7.36 A full description of the operational phase of the Project is included in **Chapter 3: Project and Site Description.**

i. Water Quality and Resources

9.7.37 The main activities with the potential to affect the water environment have been identified as follows:

- Potable water use for staff welfare and discharge of grey water/sewage (i.e. treated foul wastewater discharges);
- Water for emergency use (e.g. fire control) (water discharges);
- Storage and use of fuels or other chemicals on-site; and
- Vehicle movement to and around the Project Site.

9.7.38 The key risks to the water environment during the operational phase include:

- Pollution from oil (lubrication etc.) and fuels leakage from storage facilities or resulting from accidental spillages during delivery which may be carried by surface water runoff discharging to the water environment through the proposed surface water drainage system; and
- Water quality impacts associated with treated wastewater discharges.

Pollution

9.7.39 Within the drainage strategy (Appendix E of Appendix 9.1) it is proposed that surface water runoff from the Power Generation Plant will be discharged either via infiltration (where ground conditions allow) or to the local watercourses on and around the Power Generation Plant which eventually drain to the Afon Llan. It is expected that the Power Generation Plant drainage will include a combination of piped and SuDS systems, including oil interceptors, trapped gullies/filter drains, attenuation ponds and swales providing appropriate water quality treatment stages in line with current guidance to reduce the risk of surface water and groundwater contamination.

9.7.40 The tributary to the Afon Llan east of the Project Site will be the receiving surface water body for discharges from the Project Site. The sensitivity of this water body is **Medium**. Taking into account the embedded mitigation measures, the **Magnitude** of potential impacts from pollution during the operational phase is considered to be **Negligible**. Accordingly, the significance of effects is therefore assessed to be **Negligible**.

9.7.41 The potential water quality related pollutants likely to arise from the Project Site during operation are expected to be hydrocarbon-related, mainly from fuel, oil and lubricant stored at the Project Site. Where pollution occurs due to a breach of the embedded mitigation measures, impacts arising from leachate from the attenuation pond or accidental hydrocarbon spillage, for example, there is the potential for infiltration to groundwater to occur. However, the impacts will likely be localised. The sensitivity of the groundwater beneath the Project Site is **Medium**. Taking into account natural attenuation, the quantity of hydrocarbon likely to be stored at the Project Site at a given time as well as the dilution potential of the groundwater, the magnitude of potential impacts arising from pollution is **Negligible**. Accordingly, the significance of effects is assessed to be **Negligible** and no additional mitigation is required.

Water quality impacts associated with treated wastewater discharges

9.7.42 The quantity of foul effluent generated on site is expected to be small due to the limited number of workers on site at any one time during regular operational hours. Connection to a public sewer is not deemed feasible. The drainage strategy has considered the use of either septic tanks within the site or a package sewage treatment plants for foul effluent. However, package treatment plants are the preferred option, subject to detailed design following completion of ground investigations. The choice of one or other of these disposal methods is not considered to have a material effect on the impact assessment. Due to the small quantity of foul water generated during operations, it is anticipated that treated water can be discharged via infiltration (soakaway) on site. The foul water drainage system will be positioned to minimise the risk of inundation by floodwaters. Where there is an inadequate unsaturated zone beneath the site, the option of discharging to local watercourses will be adopted. Any discharges will be subject to the

Environmental Permitting Regulations and will need to meet quality criteria set by NRW.

9.7.43 The sensitivity of the surface water and/or groundwater receptors (i.e. the tributary to the east of the Afon Llan and/or Carmarthen Carboniferous Coal Measures groundwater body beneath the Project Site) likely to receive foul effluent from the Project Site is **Medium.** Taking into account the quantity of treated foul waste/watstewater likely to be generated from the packaged sewage treatment plant and dilution properties of these receiving receptors, the magnitude of pollution impacts from discharges is considered to be **Negligible**. Hence, the significance of effect is considered to be **Negligible** and not significant.

9.7.44 It envisaged that temporary toilets with appropriate foul waste facility will be in place during maintenance operation and all foul waste generated during this period will be taken off-site for disposal at appropriate facilities by specialist contractors. Accordingly, no impact on water receptors is expected and no further mitigation is required.

ii. Flooding

9.7.45 Potential impacts and effects on flood risk and surface water drainage during operation are detailed in this section.

Surface water runoff from impermeable areas

9.7.46 There will be a change in the existing surface water drainage behaviour and storage capacity as a result of the development. This will result in a reduction in infiltration rates compared to existing conditions. To compensate for this impact, an attenuation pond is proposed for the south eastern corner of the Generating Equipment Site. The purpose of the attenuation pond is to attenuate surface water runoff in order to maintain the equivalent greenfield runoff. Additional information regarding the attenuation pond is in FCA Section 8.4. The discharge will enter the ordinary watercourse immediately to the east of the Generating Equipment Site via a drainage swale, subject to the agreement of CCS. An emergency overflow will be provided to the attenuation pond to prevent the site becoming inundated in the event of an extreme rainfall event.

9.7.47 The sensitivity of the receptor (Generating Equipment Site) is considered to be **High** as a result of the Generating Equipment Site coinciding with an area of high risk of surface water, and historic (Dam Zone B), flooding. The magnitude of the impact is considered to be **Negligible** through the embedded attenuation mitigation. The significance of the permanent effect is therefore considered to be **Minor** and **Not significant**.

9.7.48 For the Access Road, and internal roads, it is proposed that roadside swales or infiltration drains will be used to remove and convey surface water from the road surface. Alternatively, where there are space constraints, the new site roads will be kerbed and drain via road gullies with pollution control measures. It is proposed that roadside swales will discharge to the nearest local watercourse, attenuated the

existing greenfield runoff rate. The sensitivity of the Access Road as a flood risk receptor is considered to be **Negligible** since the Access Road is in a very low flood risk area. The magnitude of the impact is considered to be **Low** through embedded mitigation. The significance of the permanent effect is therefore considered to be **Negligible**, and **Not significant**.

Drainage System Modifications (diversions of ditches for cut offs including Gas Connection diversion, swales)

9.7.49 The existing site benefits from a combination of ordinary watercourses and drainage ditches that drain surface water towards the Afon Llan main river. The presence of the development may impede existing surface water flow paths. Cut off drainage ditches will be placed around the uphill site perimeter of the Generating Equipment Site. The new drainage ditches will be designed to divert existing surface water runoff around the Project Site and downstream to rejoin the existing drainage ditches and local watercourses. They will also be designed to avoid any loss of existing conveyance capacity. The sensitivity of the Generating Equipment Site as a flood risk receptor is considered to be **High** as a result of the Generating Equipment Site coinciding with an area of high risk of surface water and historic (Dam Zone B), flooding. The magnitude of the impact is considered to be **Negligible** through the embedded drainage diversion mitigation. The significance of the permanent effect is therefore considered to be **Minor** and **Not significant**.

9.7.50 The new Access Road may also impede existing surface water drainage channels and overland flow routes. Therefore, existing field drainage that coincides with the new Access Road will be culverted or bridged for a short length to allow flow up to the 1 in 100 year return period. This is required in the area to the south of the Felindre Gas Compressor Station, where the new Access Road extends from the existing access road, and swings east and northeast towards the Generating Equipment Site. The sensitivity of the Access Road as a flood risk receptor is considered to be **Negligible** since the Access Road is in a very low flood risk area. The magnitude of the impact is considered to be **Low**. The significance of the permanent effect is therefore considered to be **Negligible,** and **Not significant**.

Water Main Permanent Bridge

9.7.51 The Water Main will be crossed by a single, permanent access bridge replacing the temporary one for construction to allow access from the new Access Road and Laydown Area. This section of road will be built on an embankment above the easement or on a suspended bridge structure. The embankment would include open pipes to allow surface water run-off from the north to drain through and the suspended bridge option allows surface water to flow unhindered underneath without being impeded. It is considered that the sensitivity of the bridge to flood risk is **Low** because the crossing is in an area of low risk of surface water flooding. The predicted magnitude of the impact is **Negligible** through the implementation of embedded mitigation to avoid flow impedance. The significance of the permanent effect is therefore considered to be **Negligible** and **Not significant**.

Impedance and storage of overland flow route

9.7.52 There is an existing overland flow route that crosses the eastern boundary of the Generating Equipment Site, which also flanks an ordinary watercourse immediately east. This route, according to NRW surface water maps is considered to be 'medium to high' risk of surface water flooding. Part of this overland flow route could enter the Generating Equipment Site because of the raised topography of the land surrounding the northern tip of the Project Site. To mitigate this potential impact, localised land reprofiling and appropriate orientation of the uphill perimeter ditch is planned. In the event that some flow does enter the site, the onsite drainage and surface water attenuation storage in the south eastern corner has been designed to accommodate it.

9.7.53 There is land raising at the Generating Equipment Site, which could impede the existing overland flow route to be diverted along the eastern boundary of the Project Site. CCS have noted the need to retain access to this overland flow path along the eastern boundary of the Generating Equipment Site. This means it should be kept clear and formalised to encourage water downslope and away from the development towards the Ecological Mitigation Area to the south. By taking these steps, it would provide the access easement required by CCS for maintenance access to the watercourse. This would need to be subject to an agreement between APL and CCS, but legislation permits access by CCS for up to 7 m either side of the ordinary watercourse.

9.7.54 The sensitivity of the Generating Equipment Site receptor as a flood risk receptor is considered to be **High** as a result of the Project Site coinciding with an area of high risk of surface water, and historic (DAM Zone B) flooding. The magnitude of the impact is considered to be **Negligible** through the embedded mitigation to accommodate and retain the overland flow path. The significance of the permanent effect is therefore considered to be **Minor.**

n) Operational effects - Gas Connection

i. Water Quality and Resources

9.7.55 A detailed description of the activities at the Gas Connection point during this phase is provided in **Chapter 3: Project and Site Description**. From a water quality and resources point of view, no impact is expected to arise from the Gas Connection during the operational phase of the Project. The effects are not material during the operation of the Project and have been scoped out of the assessment. No mitigation is therefore required.

ii. Flooding

9.7.56 The only permanent structure constructed for the Gas Connection is the Above Ground Installation (AGI) at the connection to the National Gas Transmission System (Figure 3.4), which will change the infiltration capacity of the ground.

9.7.57 The installation will have exposed plant on reinforced foundations with gravel surfacing in between. The detailed layout will be determined in the next design

phase. It is anticipated that, like the main Generating Equipment Site, infrastructure will be identified to appropriately attenuate surface water runoff in order to maintain the equivalent greenfield runoff. The total size of the AGI, including access spur road is approximately 0.3 ha. The sensitivity of theAGI as a flood risk receptor receptor is considered to be **Low** as a result of the AGI being located in an area of very low surface water risk. The magnitude of the impact is considered to be **Negligible** through the embedded attenuation mitigation. The significance of the permanent effect is therefore considered to be **Negligible** and **Not significant**.

o) Operational effects – Electrical Connection

i. Water Quality and Resources

9.7.58 Detailed description of the activities at the Electrical Connection during the operational phase is provided in **Chapter 3: Project and Site Description**. For water quality and resources, no impact is expected to arise from the Electrical Connection location during the operational phase of the Project. The effects are not material during the operation of the Electrical Connection and have therefore been scoped out of the assessment. No mitigation is therefore required.

ii. Flooding

9.7.59 For flooding, no impact is expected to arise from the Electrical Connection during the operational phase of the Electrical Connection. The effects are not material during the operation of the Electrical Connection and have therefore been scoped out of the assessment. No mitigation is therefore required.

p) Decommissioning effects – Power Generation Plant

i. Water Quality and Resources

9.7.60 The assessment has considered the effects of decommissioning the Power Generation Plant after 25 years. At that time, the Generating Equipment would be removed and the Generating Equipment Site re-instated to a similar condition as before construction. The decommissioning phase would be likely to be of a similar duration to construction i.e. 22 months. Based on the principle of the construction effects being wholly reversed, the assessment considers that decommissioning will not result in any change to the effects identified for construction and operation. The significance of effects would be **Negligible** and no further mitigation is required.

ii. Flooding

9.7.61 Reinstatement of the Power Generation Plant to the existing characteristics would bring back the drainage benefits of the existing ‘greenfield’ characteristics. The significance of effects would be **Negligible** and no further mitigation is required.

q) Decommissioning effects – Gas Connection

9.7.62 The assessment has also considered the effects of decommissioning Gas Connection after 25 years. It is probable that the Gas Connection may be left in situ as this is likely to cause less environmental effects than removal.

9.7.63 Assuming the gas pipeline is left in situ, no impact from the Gas Connection on water quality and resources and flooding is expected during the decommissioning phase of the Project and no additional mitigation is required.

r) Decommissioning effects – Electrical Connection

9.7.64 As for the Gas Connection, no impact from the Electrical Connection on water quality and resources and flooding is expected during this phase of the Project. Accordingly no additional mitigation is required.

9.8 Water Framework Directive Assessment

9.8.1 This section provides a summary of the Water Framework Directive Assessment (WFD) of the WFD water bodies likely to be impacted by the Project. A separate assessment to the EIA required to satisfy the objectives of the WFD is provided in Appendix 9.2 and should be read along this section of the PEIR.

9.8.2 It is envisaged that the construction works will require diversion of existing ordinary watercourses (i.e. watercourses that are not WFD designated water bodies, but are tributaries to WFD designated water bodies) currently crossing the Generating Equipment Site to instead run around the perimeter of the Generating Equipment Site. This diversion is expected not to significantly affect the general drainage paths, flow regime or connectivity of watercourses in the area. It is also anticipated that bankside vegetation lost on the Generating Equipment Site will be returned along the route of the new watercourses. There may be some short-term loss of habitat while vegetation establishes, however, no reduction is expected in the longer term.

9.8.3 The Project will involve culverting of ordinary watercourses (i.e. watercourses that are not WFD designated water bodies) where these are crossed by the Access Road. In accordance with the embedded design mitigation the crossings will be designed so as not to restrict flood flows, to maintain a natural bed through the structure, and where necessary to include specific measures to maintain species connectivity through the structure such as otter ledges. There will be some permanent loss of bankside habitat at the culverts. However, this will be for short lengths only and is therefore not expected to affect the integrity of the aquatic ecosystems significantly.

9.8.4 There is an existing pond on the Power Generation Plant which supports aquatic ecology and ecological habitat. The embedded mitigation provides for a permanent attenuation pond for the Project, which will be sited close to this location, including suitable habitat insofar as this does not compromise the storage volume.. Consequently, no significant permanent loss of habitat is, therefore, envisaged with these mitigation measures implemented.

9.8.5 The Project will incorporate appropriate SuDS and proprietary products as part of both its embedded and additional mitigation to provide adequate water treatment before discharging from the Project Site to any nearby ordinary (i.e. tributaries to WFD designated) water bodies or main (WFD designated) water bodies in

accordance with current guidance. It is predicted that even with these mitigation measures in place, slight changes in the water quality of the receiving water bodies may occur. However, due to dispersion and dilution, changes that will cause a fall in one class of any relevant element of the WFD water quality elements is unlikely. Consequently, while the Project may create a slight change in the water quality of WFD surface and groundwater bodies nearby, this will not threaten the current status of the water bodies and therefore does not pose a risk to achieving the objectives of the WFD.

9.8.6 Risks during construction will be temporary and will not cause any long term effects beyond the construction phase. The construction works will therefore not pose a risk to achieving the objectives of the WFD.

9.9 Mitigation and Monitoring

9.9.1 As a general rule, additional mitigation measures are proposed where a significant effect is predicted to occur. Embedded mitigation measures, which have been incorporated within the design of the Project or are standard practice measures that have been committed to are summarised in the Outline CEMP in Appendix 3.1.

9.9.2 It is considered that no additional mitigation is required, to supplement the identified embedded mitigation effects. The implemented embedded mitigation should result in minor or less significant risks from the operation of the Project.

9.9.3 No monitoring is proposed to supplement and verify the embedded mitigation proposed, which will be delivered via the Outline CEMP.

9.10 Residual Effects

9.10.1 The following tables present a summary of the Water Quality and Resources and Flooding assessment. They identify the receptors likely to be impacted, the level of effect and, where the effect is deemed to be significant, the tables include the mitigation proposed and the resulting residual effect.

Table 9-9: Water Quality and Resources – Overall Summary of Water Quality Effects and Flooding Arising During Construction Phase

Receptor	Description of Effect	Classification of Effect	Additional Mitigation	Classification of Residual Effect	Significant / Not Significant
Power Generation Plant - Water Quality and Resources					
Tributaries of Afon Llan crossing the Power Generation Plant, immediately east of site and adjacent to the Access Road west of the Project Site	Increased pollutant and sediment loads	Negligible	Not required	Negligible	Not Significant
	Pollution from dust and debris	Negligible	Not required	Negligible	Not Significant
	Pollution from dewatering discharge	Minor	Not required	Minor	Not Significant
Lletty Morfil SINC, Waun Garn Wen SINC (including areas of peat) and Rhos Fawr SINC	Increased pollutant and sediment loads	Negligible	Not required	Negligible	Not Significant
	Pollution from dust and debris	Negligible	Not required	Negligible	Not Significant
Groundwater body and aquifers	Infiltration of pollutants	Negligible	Not required	Negligible	Not Significant
Loughor Estuary	Increased pollutant and sediment load	Minor	Not required	Minor	Not Significant
Nant y Crimp SSSI	Increased pollutants	Negligible	Not required	Negligible	Not Significant
Power Generation Plant - Flooding					
Water Main	Flood Risk (main fracture)	Negligible	Not required	Negligible	Not Significant
Water Main	Temporary Bridge (bridge failure)	Negligible	Not required	Negligible	Not Significant
Other non-specific locations within study area	Change in surface water runoff caused by	Negligible	Not required	Negligible	Not Significant

Receptor	Description of Effect	Classification of Effect	Additional Mitigation	Classification of Residual Effect	Significant / Not Significant
	maintenance compound				
Other non-specific locations within study area	Surface water runoff from impermeable areas (Temporary Laydown Area)	Negligible	Not required	Negligible	Not Significant
Gas Connection – Water Quality and Resources					
Tributaries of Afon Llan crossing the Project Site and likely to be traversed by the Gas Connection and gas pipeline	Increased pollutant and sediment loads	Negligible	Not required	Negligible	Not Significant
	Pollution from dust and debris	Negligible	Not required	Negligible	Not Significant
	Pollution from dewatering discharge	Negligible	Not required	Negligible	Not Significant
Lletty Morfil SINC, Waun Garn Wen SINC (including areas of peat) and Rhos Fawr SINC	Increased pollutant and sediment loads	Negligible	Not required	Negligible	Not Significant
	Pollution from dust and debris	Negligible	Not required	Negligible	Not Significant
Groundwater body and aquifers	Infiltration of pollutants	Negligible	Not required	Negligible	Not Significant
Loughor Estuary	Increased pollutant and sediment load	Minor	Not required	Minor	Not Significant
Nant y Crimp SSSI	Increased pollutants	Negligible	Not required	Negligible	Not Significant
Electrical Connection – Water Quality and Resources					
Tributaries of Afon Llan crossing the Project Site and likely to be traversed by the Electrical Connection and cable route	Increased pollutant and sediment loads	Negligible	Not required	Negligible	Not Significant
	Pollution from dust and	Negligible	Not required	Negligible	Not Significant

Receptor	Description of Effect	Classification of Effect	Additional Mitigation	Classification of Residual Effect	Significant / Not Significant
and adjacent to the Access Road west of the Project Site	debris				
	Pollution from dewatering discharge	Negligible	Not required	Negligible	Not Significant
Lletty Morfil SINC, Waun Garn Wen SINC (including areas of peat) and Rhos Fawr SINC	Increased pollutant and sediment loads	Negligible	Not required	Negligible	Not Significant
	Pollution from dust and debris	Negligible	Not required	Negligible	Not Significant
Groundwater body and aquifers	Infiltration of pollutants	Negligible	Not required	Negligible	Not Significant
	Contamination from drilling	Negligible	Not required	Negligible	Not Significant
Loughor Estuary	Increased pollutant and sediment load	Minor	Not required	Minor	Not Significant
Nant y Crimp SSSI	Increased pollutants	Negligible	Not required	Negligible	Not Significant

Table 9-10: Water Quality and Resources - Summary of Water Quality Effects and Flooding Arising During Operation Phase

Receptor	Description of Effect	Classification of Effect	Additional Mitigation	Classification of Residual Effect	Significant / Not Significant
Power Generation Plant – Water Quality and Resources					
Tributaries of Afon Llan crossing the site, immediately east of site and adjacent to the Access Road west of the site	Pollution	Negligible	Not required	Negligible	Not Significant
	Discharge of treated wastewater	Negligible	Not required	Negligible	Not Significant
Groundwater body and aquifers	Infiltration of pollutants	Negligible	Not required	Negligible	Not Significant
	Discharge of treated wastewater	Negligible	Not required	Negligible	Not Significant
Power Generation Plant - Flooding					
Afon Llan and overland flow routes	Surface water runoff from impermeable areas (Generating Equipment Site)	Minor	Not required	Minor	Not Significant
Overland flow routes	Drainage system modifications (Generating Equipment Site)	Minor	Not required	Negligible	Not Significant
Tributary of the Afon Llan crossing the Generating Equipment Site, (Ordinary Watercourses and Drainage Channels)	Impedance and storage of flow	Minor	Not required	Minor	Not Significant
Temporary Laydown	Surface water runoff from	Negligible	Not required	Negligible	Not Significant

Receptor	Description of Effect	Classification of Effect	Additional Mitigation	Classification of Residual Effect	Significant / Not Significant
Area	impermeable areas				
Other non-specific locations within study area	Surface water runoff from impermeable areas (Access Road)	Negligible	Not required	Negligible	Not Significant
Tributaries of the Afon Llan crossing/adjacent to the Access Road west of the Project Site	Drainage system modifications (Access Road)	Negligible	Not required	Negligible	Not Significant
Water Main	Permanent Bridge (flow conveyance)	Negligible	Not required	Negligible	Not Significant

a) Project "in combination" Effects

9.10.2 From the perspective of both water quality and flood risk, there are no significant effects likely to arise from any elements of the Project during the different phases of the Project Life. Therefore, overall, it has been considered that there is no significant effect predicted for the Project.

9.11 Cumulative Effects

a) Assessment of Potential Cumulative Effects – Construction and Demolition

9.11.1 There is no potential for cumulative impacts on Water Quality and Resources and Flooding as a result of construction of the whole Project through the three different project elements, and also in combination with other schemes. None of the impacts identified in the assessment for the Project are considered to be significant, no significant cumulative impacts are predicted and therefore no significant cumulative effects are predicted.

b) Assessment of Potential Cumulative Effects – Operation

9.11.2 There is no potential for cumulative impacts on Water Quality and Resources and Flooding as a result of operation of the Project in combination with the identified other schemes. None of the impacts identified in the assessment for the Project are considered to be significant, no significant cumulative impacts are predicted and therefore no significant cumulative effects are predicted.

9.12 References

Ref. 9-1 Department of Energy & Climate Change. Overarching National Policy Statements for Energy (EN-1) July 2011.

Ref. 9-2 Department of Energy and Climate Change. National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). July 2011.

Ref. 9-3 Department for Environment, Food & Rural Affairs. Flood and Water Management Act 2010.

Ref. 9-4 Department for Environment, Food & Rural Affairs. Flood Risk Regulations 2009.

Ref. 9-5 Department for Environment, Food & Rural Affairs. Core Guidance for the Environmental Permitting (England and Wales) Regulations 2010.

Ref. 9-6 Welsh Assembly Government. Technical Advice Note 15: Development and Flood Risk. Cardiff, 2004.

Ref. 9-7 Welsh Government. Recommended non-statutory standards for sustainable drainage (SuDS) in Wales – designing, constructing, operating and maintaining surface water drainage systems. Cardiff, 2017.

Ref. 9-8 Well-being of Future Generations Act 2016.

Ref. 9-9 Welsh Government. Planning Policy Wales. Cardiff, Edition 9, November 2016.

Ref. 9-10 Welsh Government. Water Strategy for Wales. Cardiff, 2015.

Ref. 9-11 Natural Resources Wales. Western Wales River Basin Management Plan 2015-2021 Summary. Cardiff, December 2015.

Ref. 9-12 City and County of Swansea. Local Development Plan (unadopted; submitted for examination July 2017). Swansea, 2017.

Ref. 9-13 Scott Wilson. City & County of Swansea Council – Stage 1 Strategic Flood Consequence Assessment. September 2010.

Ref. 9-14 URS. City and County of Swansea – Strategic Flood Consequence Assessment - stage 2. Plymouth, October 2012.

Ref. 9-15 City and County of Swansea. Flood Risk Management Plan 2015. Swansea, 2015.

Ref. 9-16 City and County of Swansea. Local Flood Risk Management Strategy. Swansea, 2013.

Ref. 9-17 City and County of Swansea. Preliminary Flood Risk Assessment. Swansea, 2011.

Ref. 9-18 Orbis Energy Limited. Abergelli Power Project, Environmental Impact Assessment Scoping Report. Suffolk, June 2014.

Ref. 9-19 Highway Agency. Design Manual for Roads and Bridges (DMRB, HD/45/09). Chapter 11, November 2009..

Ref. 9-20 The Planning Inspectorate. Scoping Opinion Proposed Abergelli Power Project, 2014.

Ref. 9-21 WSP. Abergelli Power Plant Design Concept Report. Godalming, 2017.

Ref. 9-22 WSP. Outline Drainage Strategy, Abergelli Power Ltd. Manchester, 2017. Included in Appendix 9.1.

Ref. 9-23 Welsh Government. Natural Resources Wales' Flood Risk Map Viewer. 2017. (Online) Available from:

https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer/Index.html?configBase=https://maps.cyfoethnaturiolcymru.gov.uk/Geocortex/Essentials/REST/sites/Flood_Risk/viewers/Flood_Risk/virtualdirectory/Resources/Config/Default (Accessed November 2017)

Ref. 9-24 Lle Geo-Portal. Development Advice Map. 2017. (Online) Available from: http://lle.gov.wales/map#m=-3.159,51.47832,8&b=europa&l=328h;329h;330; (Accessed November 2017)

Ref. 9-25 Natural Resources Wales. Natural Resources Wales. 2017. (Online) Available from https://naturalresources.wales/?lang=en (Accessed November 2017)

Ref. 9-26 City and County of Swansea. Swansea Council. 2017. (Online) Available from http://www.swansea.gov.uk/residents (Accessed November 2017)

Ref. 9-27 The Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016. Available at:

http://www.legislation.gov.uk/wsi/2016/359/pdfs/wsi_20160359_mi.pdf (Accessed November 2017)

Ref. 9-28 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available at:

Ref. 9-29 https://www.legislation.gov.uk/uksi/2017/407/contents/made

Ref. 9-30 The Environmental Permitting (England and Wales) Regulations 2016. Available at:

https://www.legislation.gov.uk/uksi/2016/1154/pdfs/uksi_20161154_en.pdf. (Accessed November 2017)