Department of Energy & Climate Change

RECORD OF THE HABITATS REGULATIONS ASSESSMENT UNDERTAKEN UNDER REGULATION 61 OF THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2010 (AS AMENDED) FOR AN APPLICATION UNDER THE PLANNING ACT 2008 (AS AMENDED)

***Project Title*: South Hook Combined Heat & Power Project**

***Date*: 20th October 2014**

CONTENTS

1 Introduction

Background

1.1 This is a record of the Habitats Regulation Assessment (HRA) that the Secretary of State (SoS) for Energy and Climate Change has undertaken under Regulation 61 of the Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations) in respect of the Development Consent Order (DCO) for the proposed South Hook Combined Heat & Power Project and its associated infrastructure (the Project). For the purposes of these Regulations; the SoS is the competent authority for the Project application that has been submitted under the Planning Act 2008 regime (as amended).

1.2 QPI Global Ventures Limited (hereafter the Applicant) has applied to the SoS for a Development Consent Order (DCO) under Section 37 of the Planning Act 2008 (as amended) for the proposed South Hook Combined Heat & Power Project. This includes the construction and operation of a 500 megawatt Combined Heat and Power plant burning natural gas. The Project application is described in more detail in Section 1.23.

1.3 In England and Wales, onshore energy generating stations greater than 50 MW constitute nationally significant infrastructure projects (NSIPs) and applications for development consent are subject to the requirements of the Planning Act 2008 (as amended).

1.4 The Project was accepted by the Planning Inspectorate (PINS) on 26th June 2013 and a Single Inspector (the Inspector) was appointed as the Examining Authority (ExA) for the application. The examination of the Project application began on 23rd October 2013 and was completed on 23rd April 2014. The Inspector submitted his report of the examination, including its recommendation (the Inspector's Report), to the SoS on 23rd July 2014.

1.5 The SoS conclusions on habitats and wild birds issues contained in this HRA report have been informed by the Inspector's Report, and further information and analysis, including a Report on the Implications for European Sites (RIES) and its written responses.

Habitats Regulation Assessment (HRA)

1.6 Council Directive 92/43/EC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and Council Directive 2009/147/EC on the conservation of wild birds (the Birds Directive) aim to ensure the long-term survival of certain species and habitats by protecting them from adverse effects of plans and projects.

1.7 The Habitats Directive provides for the designation of sites for the protection of habitats and species of European importance. These sites are called Special Areas of Conservation (SACs). The Birds Directive provides for the classification of sites for the protection of rare and vulnerable birds and for regularly occurring migratory species. These sites are called Special

Protection Areas (SPAs). SACs and SPAs are collectively termed European sites and form part of a network of protected sites across Europe. This network is called Natura 2000.

1.8 In the UK, the Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations) transpose the Habitats and Birds Directives into national law as far as the 12 nm limit of territorial waters. The Convention on Wetlands of International Importance 1972 (the Ramsar Convention) provides for the listing of wetlands of international importance. These sites are called Ramsar sites. UK Government policy is to afford Ramsar sites the same protection as European sites.

1.9 Regulation 61 of the Habitats Regulations provides that:

"…..*before deciding to give consent, permission or other authorisation for, a plan or project which is likely to have a significant effect on a European site (either alone or in combination) and which is not directly connected with or necessary to the management of the site, the competent authority must make an appropriate assessment of the implications for the site in view of the site's conservation objectives.*"

1.10 This project is not directly connected with, or necessary to, the management of a European site or a European marine site. However, it may affect European and Ramsar sites and so a Habitats Regulation Assessment (HRA) is required by Regulation 61.

1.11 The Habitats Regulations require that, where the project is likely to have a significant effect on any such site, an appropriate assessment (AA) is carried out to determine whether or not the project will adversely affect the integrity of the site in view of its Conservation Objectives. In this document, the assessments as to whether there are likely significant effects (LSEs), and, where required, the AAs, are collectively referred to as the HRA.

1.12 The HRA takes account of mitigation measures being secured, by requirements and conditions, within the Development Consent Order (DCO).

1.13 In considering the possible impacts of the Project and in reaching his conclusions, the SoS has also taken into account duties and obligations provided for under the Conservation of Habitats and Species (Amendment) Regulations 2012, SI 2012 No. 1927, which came into force on 16th August 2012 and amend the Habitats Regulations. In particular, regulations 9(1) and 9A(1), (3) and (8) of the 2010 Regulations as inserted by regulation 8 of the 2012 Regulations are engaged when the SoS exercises his functions in relation to granting consent for a new electricity generating station and applies regulation 61(1). The key considerations in this context are securing compliance with the Habitats and Birds Directives; preserving, maintaining and re-establishing a sufficient diversity and area of habitat for wild birds in the United Kingdom; and using all reasonable endeavours to avoid any pollution or deterioration of habitats of wild birds.

1.14 This report should be read in conjunction with the following documents that provide extensive background information:

- South Hook CHP Environmental Statement (the ES), May 2013.

- Applicant's Habitats Regulations Assessment – Assessment of Impacts on European Sites (AIES). May 2013.
- Applicant's Habitats Regulations Assessment – Extended Summary. November 2013.
- Development Consent Order as made by the SoS dated 23rd October 2014 (DCO).
- Written Representations by Natural Resources Wales, 20th November 2013.
- Applicant's submission of: Comments on Relevant Representations, Responses to ExA's First Questions, and Draft Statements of Common Ground. Including the Extended Summary of Habitats Regulations Assessment) 21st November 2013.
- Summary of Natural Resources Wales oral representation relating to the Issue Specific Hearing held on 15 January 2014.
- Natural Resources Wales written summary of the oral case at the issue specific hearing relating to the draft DCO and any related local impact report matters and changes to the original application. 12th March 2014.
- Report on the Implications for European Sites proposed South Hook Combined Heat & Power Project. An examining authority report prepared with the support of the environmental services team, 17th March 2014. – termed "the RIES".
- Natural Resources Wales comments on the Report on the Implications for European Sites 7th April 2014.
- Applicant's Statement of Common Ground with Natural Resources Wales 11th April 2014.
- Natural Resource's Wales Appendix 11, Habitats Regulations Assessment for consultation on the Environment Permit application decision for South Hook. Signed 1st July 2014.
- The Planning Act 2008 (as amended) South Hook Combined Heat & Power Project Examining Authority's Report of Findings and Conclusions and Recommendations to the SoS for Energy and Climate Change. 23rd July 2014 – termed "the Inspector's Report".

1.15 So far as is possible, the key information in these documents and written representations is summarised and referenced in this report.

The RIES and Statutory Consultation

1.16 Under Regulation 61(3) of the Habitats Regulations, the competent authority must, for the purposes of an AA, consult the appropriate nature conservation body and have regard to any representation made by that body within such reasonable time as the authority may specify.

1.17 The Inspector, with support from the environmental services team of PINS, prepared a document entitled "Report on the implications for European Sites" (RIES). The RIES was published on PINS planning portal website on 17th March 2014 for a period of 21 days for the purpose of regulation 61(3) consultation. Written responses were received from Natural

Resources Wales[1] (NRW) and an individual. NRW confirmed that the Project will not adversely affect the integrity of the Pembrokeshire Marine Special Area of Conservation, provided that the conditions of Requirement 8 Schedule 2 of the DCO are implemented. They also confirm that they agree with the conclusions within the RIES for the other SACs and SPAs, namely: Pembrokeshire Bat sites and Bosherston Lakes SAC, Skokholm and Skomer SPA, Castlemartin Coast SPA and for the Limestone Coast of South and West Wales SAC.

1.18 This HRA has used the matrices within the RIES. The RIES documented the information, up until the 17th March 2014, submitted and considered during the examination and presents the inspector's understanding of the main facts regarding the HRA to be carried out by the SoS. This information, its matrices and subsequent written responses have been used to inform this HRA.

Relationship to other consents and licences / interdependencies

1.19 The Project will require an Environmental Permit for which NRW is the competent authority. This permit is necessary to control emissions such as those to air, water, noise and waste that might arise from the Project during its operation. An application for this permit was submitted by the Applicant on 22 October 2013 and was deemed by NRW to be 'duly made' on 12 November 2013. NRW in their oral representation from the 15th January 2014 state that this permit would contain conditions based on Best Available Techniques aimed at achieving a 'high level of protection of the environment taken as a whole by, in particular, preventing or, where that is not practicable, reducing emissions into the air water and land.' As part of the Environmental Permitting Regime NRW will also require the continuous monitoring of emissions from the Project.

1.20 There is an existing environmental permit governing the operation of the LNG Terminal (Permit Number XP3538LD - Variation Number XP3535ME). The Applicant proposes to use the LNG Terminal outfalls for its waste water and surface water discharges. In order for the Project to use this existing permit it will need to be amended to include the CHP Plant. An application to amend this permit was submitted in March 2014 but has not as yet been determined.

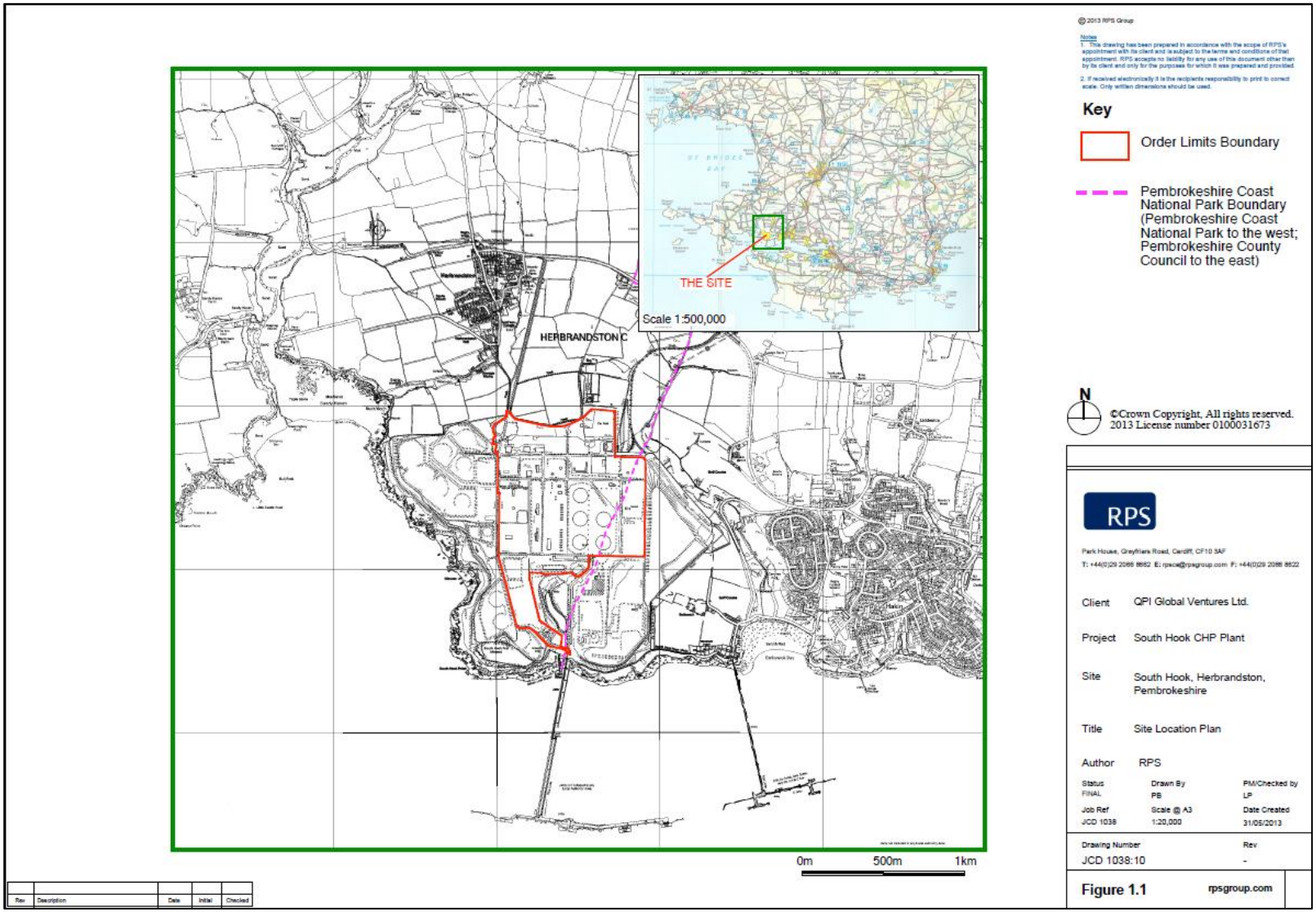
1.21 The Applicant submitted to NRW its shadow HRA assessment (as used in the examination), an assessment of the Ecology Air Quality Impact Assessment (as used in the examination) and an assessment on the Nitrate Discharges to Milford Haven. This last report is a mass balance approach to assessing the nitrate discharge concentrations and daily discharge from the Project alone and integrated with the LNG Terminal. The Applicant's HRA concludes that there are no adverse effects on the integrity of any European sites from South Hook CHP plant.

1.22 As part of its permitting regime, NRW has also undertaken an HRA to assess the implications of the operation of the Project for habitats and species of European importance. This found no

[1] Countryside Council for Wales, Environment Agency Wales and the Forestry Commission in Wales merged on the 1st April 2013 to form Natural Resources Wales.

likely significant effects on features in the Castlemartin Coast SPA, the Pembrokeshire Marine SAC or the Limestone Coast of South West Wales SAC from the Project.

Figure 1 Project site location plan for the Applicant's ES



Project description

1.23 The DCO for the South Hook Combined Heat & Power Project (Project) will authorise the Applicant to construct and operate a new combined heat and power plant (CHP Plant). The Project will be located to the west of the existing South Hook Liquefied Natural Gas Terminal (the LNG Terminal) near the village of Herbrandston and outside the town of Milford Haven, Pembrokeshire, Wales (see Figure 1).

1.24 The proposed development will have a capacity of up to 500 MW burning natural gas. Heat generated in the CHP plant steam turbine condenser system will be utilised in the neighbouring Liquid Natural Gas (LNG) Terminal to vaporise LNG, turning it back into natural gas.

1.25 Currently vaporisation in the LNG terminal is carried out in submerged combustion vaporisers (SCV) fired with natural gas. Some or all (depending on the demand for gas) of this gas firing could be replaced by heat from the CHP plant.

1.26 The Project will provide heat to the LNG Terminal during normal operation, but both facilities will also be designed to enable independent operation, as set out below - if one of the facilities is unavailable for any reason. The four main modes of operation are explained in the Environment Statement (ES) as the following:

- **Scenario 1: Integrated mode** (normal operating condition) – the CHP Plant operating as designed with heat being provided to the LNG Terminal for LNG vaporisation;
- **Scenario 2: Independent mode** (a) – the LNG Terminal operating as it currently does, without a heat supply from the CHP Plant (e.g. due to CHP Plant maintenance);
- **Scenario 3: Independent mode** (b) – the CHP Plant operating but not providing all of its heat to the LNG Terminal due to lack of heat demand (e.g. due to the LNG Terminal having a low gas send-out demand and hence a low heat demand);
- **Scenario 4: Independent mode** (c) – both the CHP Plant and the LNG Terminal operating with the requisite supply and demand of heat available, but without heat being provided to the LNG Terminal (e.g. due to the hot and return water lines between the CHP Plant and the LNG Terminal being unavailable as a result of maintenance during a period of high demand for gas and electricity).

1.27 When gas demand is lower and demand for heat from the LNG terminal is less than the waste heat from the CHP plant, cooling will be provided by air-cooled fin-fan coolers. This allows the Project to operate at full capacity independently of the LNG terminal. This cooling system does not require abstraction or discharge into the Milford Haven Waterway. There will be wastewater from operations within the plant that are discharged into the Waterway. This operation will also need an environmental permit from NRW.

1.28 The DCO application seeks consent for the Project which comprises the main generating CHP Plant and other integral infrastructure within the application site. The CHP Plant is described in

detail in Schedule 1 of the DCO and includes an electricity generating station with a nominal gross electrical output capacity of up to 500MW including:

- Gas/steam turbine generator building containing gas turbine generator set and steam turbine generator set;
- Administration office and control room;
- Workshop and maintenance/warehouse building;
- Electrical sub-station (HV switchgear indoor gas insulated building and
- compound) and electricity transformer;
- Heat recovery steam generator building containing heat recovery steam
- generator set;
- Standby direct air-cooled fin-fan coolers;
- Raw/fire water storage tank, pump house, pipework and hydrants;
- Demineralised water storage tank, demineralised water treatment plant, and
- pipework;
- Stack for discharge of flue gas;
- Fuel gas lines (1) from existing connection to the Gas NTS and (2) from the
- LNG Terminal, and gas receiving station;
- Electrical supply power lines;
- Water treatment equipment;
- Electrical export line to electrical sub-station;
- Pumps;
- Hot and return water lines, and support structure (where lines not buried);

1.29 The application site includes an area of just under 4ha adjacent to the Main CHP Plant Site that has been reserved for possible future installation of carbon capture technology if it is required.

1.30 Currently, a viable transport and storage system is not available. It is anticipated that, in due course, CO_2 transport infrastructure will become available through which captured CO_2 could be transported for storage in empty gas / oil fields or deep saline formations under the seabed. A small proportion of the captured CO_2 could possibly be supplied to industry or other users, but the majority of the captured CO_2 will require transport and storage.

1.31 Additional information is provided by the Applicant in the Carbon Capture Ready Feasibility Study and Carbon Capture and Storage Design Concept Report. The Overarching National Policy Statement for Energy EN-1[2] states that all applications for commercial scale fossil-fuelled generating stations have to be carbon capture ready.

1.32 A connection to the national electricity grid will be necessary to export the electricity generated. This will be the subject of a separate consent application(s) and the permissions needed depend on the exact proposals. The connection had not been finalised by the Applicant at the

[2] *https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/37046/1938-overarching-nps-for-energy-en1.pdf*

time of examination. The Inspector's report identified the two options on the basis of the Applicant's proposals. These comprise either trenching or carrying the cables within a tunnel under the Milford Haven Waterway. The Secretary of State has no reason to believe that these options will not be feasible and he relies on the appropriate regulating body or bodies to comply with their duties under Article 6 of the Habitats Directive in considering such applications and requesting any new environmental information, as necessary to inform their decision.

Project stages

Construction

1.33 The Applicant`s ES sets out their plans for construction works to take approximately 26-30 months. This is planned in the following phased timeframe (subject to permissions):

- construction commencing mid to late 2014;
- commissioning commencing mid to late 2016;
- commercial operation commencing 2017; and
- Decommissioning: not before 2037.

1.34 There are three main construction works activities planned. These will have interactions and overlaps, some parts of which will be undertaken in parallel. They include civil and structural engineering works, mechanical and electrical works and LNG Terminal modifications and tie-ins. In addition to the main civil and structural engineering works the installation of mechanical, electrical and control equipment will be required as well as modifications to the submerged combustion vaporisers (SCVs) and construction of the necessary pipework between the CHP Plant and the LNG Terminal.

1.35 The ES describes the civil and structural engineering works noting some of them can be undertaken under permitted development rights in advance of the DCO, the activities include the following:

- establishment of security fencing, internal site access control and signage;
- establishment of construction site car parking;
- establishment of construction site temporary offices;
- modification and establishment of site drainage system, including settlement/attenuation ponds, oil interceptors and wheel washes;
- site clearance, preparation, grading and levelling;
- establishment of construction material lay down areas and areas for the temporary storage of spoil;
- relocation/demolition/removal of existing structures;
- roads, fencing and other civil works, storm water systems, landscaping and utilities; and
- construction of all permanent buildings and structures.

1.36 During the construction phase, various construction plans (e.g. dust management plan) will be used, under an overarching Code of Construction Practice (CCP). This will be developed and put in place in consultation with the relevant local planning authorities in accordance with Requirement 12. The CCP will provide the framework for managing environmental impacts during the construction phase, including preventing or minimising nuisance to the public and other stakeholders, including staff working at the LNG Terminal, as well as addressing other key management concerns such as health and safety.

Operation and Maintenance

1.37 The ES sets out that the operational lifetime of the project will be at least 20 years. The CHP Plant will burn natural gas supplied from the LNG Terminal (with a back-up supply provided from the National Grid Gas PLC's Gas National Transmission System), to generate electricity and heat. Heat generated by the CHP Plant steam turbine condenser system will be utilised within the LNG Terminal to vaporise LNG, turning it back into natural gas, making this the largest operational high efficiency CHP Plant in the UK.

1.38 The CHP Plant will provide heat to the LNG Terminal during normal operation, but both facilities will be designed to enable independent operation - if one of the facilities is unavailable for any reason. The CHP Plant is designed for an output of up to 500 MWe (megawatts electrical), using a small portion of electricity generated on site for the requirements of the LNG Terminal and CHP Plant, but with the majority of electricity being exported to off-site consumers via the Grid or through direct electrical supply connections.

1.39 In normal operation, the CHP Plant is designed to meet the LNG Terminal's demand for heat when the LNG Terminal is operating at 70% of its maximum gas send-out capacity. In this mode of operation there will be a reduction of approximately two thirds of the consented discharges (under the LNG Terminal Environmental Permit) to atmosphere from the LNG Terminal's SCVs. As well as being able to operate in integrated mode at varying levels of output, there are three further modes of operation in which each facility is capable of operating independently. The four modes are set out above in section 1.26.

1.40 Planned maintenance will typically require one to two weeks per year for the CHP Plant (with a planned outage of 4-5 weeks approximately once every 4-5 years), whereas the design of the LNG Terminal obviates the need for routine shutdowns. It is extremely unlikely that a period of high demand for both gas and electricity will coincide with unavailability of the hot and return water lines between the CHP Plant and the LNG Terminal (independent mode scenario 4), which leads to the following expected frequencies of operation in each mode.

1.41 **All of the modes of operation result in a reduction in emissions from the LNG Terminal, with the exception of independent mode (scenario 4), which is an operationally inefficient mode of operation.**

1.42 In each of the modes of operation there are a large number of combinations of the LNG Terminal operating below full capacity and the CHP Plant operating below full capacity. In

practice the CHP Plant will be operated in each mode to provide heat to the LNG Terminal for optimum efficiency and the CHP Plant will be able to provide all of the LNG Terminal's heat demand at gas send out rates below 70% of full LNG Terminal capacity.

Decommissioning

1.43 The anticipated operational lifetime of the project is 20 years. A decision will be made at this point if it is appropriate to extend the life of the project. At the end of its lifetime, decommissioning must take place and at that point a separate authorisation will be needed. This will require new environmental assessment including the preparation of an EIA and HRA (including appropriate consultation with the relevant statutory nature conservation bodies). A full environmental departure audit will be carried out to examine and recommend remedial actions for all potential environmental risks (ES, 4.12 - 4.25).

1.44 Decommissioning will involve the demolition and removal of buildings. All underground structures will either be left buried *in situ* or made safe. Project materials will be recycled as far as is practicable. The majority of the buildings will be constructed in steel, comprising steel columns, beams and trusses, which facilitates both construction and dismantling. It also provides flexibility in design, and if statutory requirements necessitate future alterations to the Project then these can be made more easily with a steel construction than where concrete is used. At decommissioning, steel is easily dismantled for re-use or recycling, and has a scrap value that is likely to be maintained or increased over the long term.

1.45 At this point a scheme for the demolition and removal of the authorised development from site is needed as part of Requirement 24 of the DCO. This scheme will form part of the information needed for the site's Environmental Permit authorised by NRW. Decommissioning will be undertaken in accordance with the Environmental Permit for the Project under the Environmental Permitting Regulations 2010.

1.46 It is not possible at this stage to predict with any certainty what the European site context of the Project will be in the future: sites may increase or decrease in importance over that time. However, if the environmental baseline were to be similar to the current situation, then the impacts of decommissioning of the project could be expected to be similar to the anticipated impacts of construction.

1.47 There is no reason to suppose that the impacts of decommissioning will cause an adverse effect on the site integrity of any of the European sites scoped into this report and on this basis, the **SoS considers that it is reasonable not to include a detailed discussion on decommissioning impacts in this report. He is satisfied that decommissioning effects will be addressed fully by the relevant authorities, prior to decommissioning and in light of more detailed information on decommissioning processes and environmental conditions at that time.**

2 Project location

Location

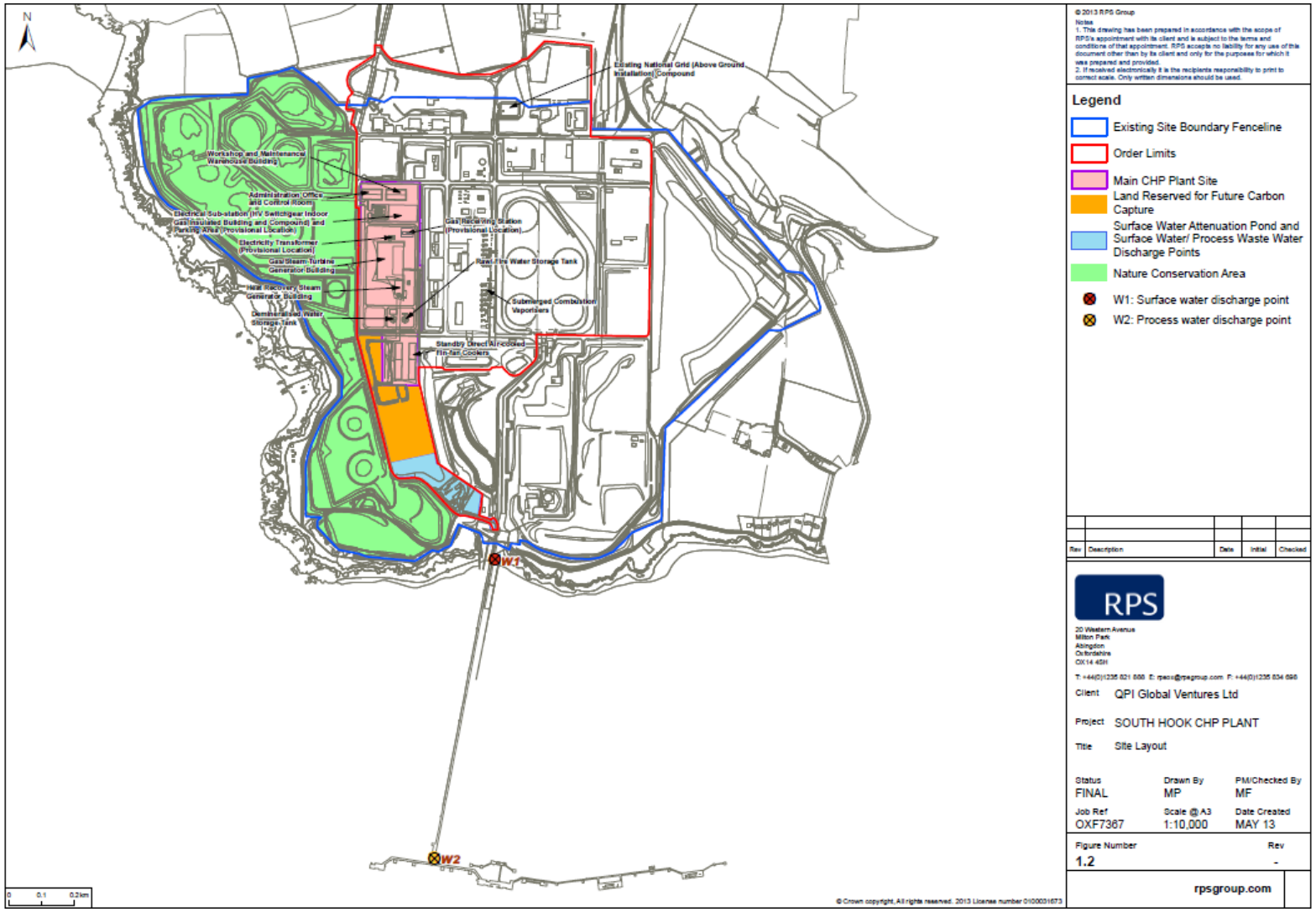
2.1 The Project will be located within the Pembrokeshire Coast National Park next to Milford Haven Waterway designated as Pembrokeshire Marine Special Area of Conservation (SAC). Milford Haven Waterway is the largest estuary in Wales and one of the deepest natural harbours in the world. Its sheltered, tidal waters are surrounded by a diverse 200 mile coastline providing habitats for an abundance of wildlife. The Milford Haven Waterway is a ria, or drowned valley flooded at the end of the last Ice Age formed by the Pembroke River and the Daugleddau estuary, and winds west to the sea[3]. The Milford Haven Waterway was designated as a European site as this wetland is home to one of the most diverse estuarine communities in the UK. In spring and summer, the embayments and rivers provide breeding habitats and sites for a multitude of breeding birds. Wildfowl and wader have observed in internationally significant numbers of shelduck, teal, widgeon, curlew and redshank, with numbers reaching over 25,000 in winter.

2.2 The buildings and structures forming part of the CHP Plant will occupy an area of some 10ha. The CCR area consists of just under 4ha of land.

2.3 The Main CHP Plant Site lies within the boundary of the LNG Terminal immediately to the west of the SCVs between the LNG storage tanks and the nature conservation area (NCA). These are shown on Figure 2. There are no non-statutory conservation sites within 2 km of the Project. The NCA managed as part of the Pembrokeshire Coast National Park was allocated and now protected through the LNG Terminal development it does not however have any statutory designations and its ecological value is considered as part of the Environmental Impact Assessment (EIA) within the ES for the Project.

[3] *SAC Website description http://www.pembrokeshiremarinesac.org.uk/english/where/where_c.htm (18th September 2014).*

Figure 2 Map of the Project site layout from the Applicant's Habitats Regulations Assessment



3 Likely significant effects (LSE) test

3.1 An Appropriate Assessment (AA) is required if a plan or project is likely to have a significant effect on a European site, either alone or in combination with other plans or projects. A likely significant effect (LSE) is, in this context, any effect that may be reasonably predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the site was designated, but excluding trivial or inconsequential effects.

3.2 The purpose of this test is to identify LSEs on European sites that may result from the Project. It is also to record the SoS conclusions on the need for an AA and his reasons for screening activities, sites or in-combination plans and projects, for further consideration in the AA. For those features where an LSE is identified, these must be subject to an AA. This review of potential implications can be described as a 'two-tier process' with the LSE test as the first tier and the review of effects on integrity (AA) as the second tier.

3.3 This section addresses this first tier of the HRA, for which the SoS has considered the potential impacts of the Project both alone and in-combination with other plans and projects on each of the interest features of the European sites identified in the RIES (see Annex A) to determine whether or not there will be an LSE. Where there are predicted LSEs, these are described briefly in Table 1. Further detail is set out in the RIES Matrices.

Sites screened in/out

3.4 The following sites were included in the RIES LSE screening matrices and the Applicant's shadow HRA report. These are all the European sites within 15km of the Project. Three sites were screened in as they are within 10km of the Project: Limestone Cliffs of South West Wales SAC; Pembrokeshire Marine SAC, and the Castlemartin Coast SPA. This limit considers the furthest reaching point of potential impact resulting from the Project, for example EA guidance[4] states that no likely significant air quality deposition effects are anticipated beyond a 10 km radius from such an installation. To capture any potential impacts on other international designations outside this radius the Cleddau Rivers SAC (e.g. migrating features), the Pembrokeshire Bat sites and Bosherston Lakes SAC (e.g. greater horse shoe bats), and Skokholm and Skomer SPA (e.g. chough birds) were also considered by the Applicant within their shadow HRA. This list of sites and appropriateness of 15 km radius was agreed with the Countryside Council for Wales (CCW) and the Environment Agency Wales (EAW)[5]. They comprise:

- Pembrokeshire Marine Special Area of Conservation
- Cleddau Rivers Special Area of Conservation

[4] *Environment Agency (2011) Environmental risk assessment for permits: overview. Annex F Air Emissions.*

[5] *CCW, EAW and the Forestry Commission in Wales merged on the 1st April 2013 to form Natural Resources Wales.*

- Pembrokeshire Bat Sites and Bosherston Lakes Special Area of Conservation
- Limestone Coast of South and West Wales Special Area of Conservation
- Castlemartin Coast Special Protection Area
- Skokholm and Skomer Special Protection Area

European Sites

3.5 **Pembrokeshire Marine Special Area of Conservation** is the third largest marine SAC in the UK, covering an area of 138,069 ha[6] and with the second highest number of features (eight habitats and seven protected species). It straddles the seas adjacent to the middle section of the Pembrokeshire Coast National Park, stretching roughly from near Abereiddy in North Pembrokeshire to Manorbier in South Pembrokeshire. It includes the islands of Ramsey, Skomer, Grassholm, Skokholm, the Bishops and Clerks, and The Smalls (21 miles offshore), together with St Brides Bay, Milford Haven Waterway, its Port, and the Daugleddau Estuary. The landward boundary of the SAC mostly follows the extreme high water mark.

3.6 The Daugleddau estuary[7] supports a wide range of habitats, including y seabed substrates, tidal streams and salinity gradients, supporting a wide diversity of communities and species. The species richness of sediment animal communities throughout Milford Haven Waterway and the Daugleddau is high. Intertidal mudflats draining into the main Waterway support rich and productive shellfish and worm communities. Muds typically support a greater biomass than other intertidal sediments. The abundant intertidal sediment infauna is an important food source that supports large numbers of overwintering waders and wildfowl. The site also includes smaller estuaries entering the Daugleddau and Milford Haven, and wide intertidal mudflats with rich and productive invertebrate annelid and mollusc communities, occurring in the creeks.

3.7 **Afonydd Cleddau/ Cleddau Rivers Special Area of Conservation**[8], the Cleddau rivers are a predominantly lowland catchment in the Pembrokeshire peninsula. The river covers an area of 750.7 ha, flowing through predominantly agricultural land with significant areas of permanent pasture, broadleaved woodland and other semi-natural vegetation. This site is of European importance because of its population of fish species, including migratory species such as sea lamprey (*Romyzon marinus)* and river lamprey *(Lampetra fluviatilis)*, and resident species such as brook lamprey (*Lampetra planeri*) and bullhead (*Cottus gobio*). The abundance of fish and widespread availability of undisturbed resting and breeding sites allows a population of otter to thrive. There is a range of river habitats including floodplain woodland, and beds of submerged aquatic plants often dominated by water-crowfoot. The substrates within the riverbed consist mainly of sand, gravel and well-aerated silt, providing an excellent mosaic of lamprey spawning and nursery habitat. This is reflected in electrofishing surveys carried out by the Environment

[6] *SAC website description http://www.pembrokeshiremarinesac.org.uk/english/where/where_c.htm (18/9/2014).*

[7] *JNCC site description, http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0013116 (18/9/2014).*

[8] *JNCC site description, http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUcode=UK0030074 (18/9/2014).*

Agency Wales (now NRW), which indicate the presence of ammocoetes (lamprey larvae) throughout the catchment.

3.8 **Pembrokeshire Bat Sites and Bosherston Lakes Special Area of Conservation,** supports lakes which are an outstanding shallow marl lake system created at intervals in the late 18th and mid-19th centuries by damming a limestone river valley[9]. They are fed in part by a series of calcium-rich springs and are isolated from the sea by a small sand dune ridge. This site supports approximately 9.5% of the UK greater horseshoe bat *Rhinolophus ferrumequinum* population. It represents the species at the north-western extremity of its range. The site contains a mixture of maternity, transitory and hibernation sites and so demonstrates good conservation of features required for survival.

3.9 **Limestone Coast of South and West Wales Special Area of Conservation,** The extensive cliffs of south-west Wales represent hard calcareous cliffs in the south-west of the UK[10]. The nature of the rock and the warm south-facing slopes have resulted in the occurrence of a sequence of important species-rich plant communities. At the base of the cliff, on rock platforms, characteristic maritime communities with thrift *Armeria maritima*, rock samphire *Crithmum maritimum* and buck's-horn plantain *Plantago coronopus* occur. These grade into calcareous grasslands and heathlands, which support a rich assortment of rare species. These include the yellow whitlowgrass *Draba aizoides*, a Mediterranean species restricted in the UK to South Wales, where it grows with more characteristic coastal species such as spring squill *Scilla verna*.

3.10 The sand dunes within this site are confined to the Castlemartin Peninsula in Pembrokeshire and include Broomhill, Brownslade, Kilpaison, Linney and Stackpole Burrows. The area includes extensive stands of short, species-rich, fixed dune grassland, which is being maintained by populations of rabbits, aided by sheep and cattle. Deposited on limestone, these dunes are extremely base-rich, and the fixed dune grasslands have much in common with calcicolous grasslands. They therefore support a number of 'lime-loving' species including the rare lichen *Fulgensia fulgens*.

3.11 **Castlemartin Coast Special Protection Area** is located on the south-west peninsular of Wales about 10 km south of Pembroke. According to JNCC[11] during the breeding season there are 12 pairs of chough *Pyrrhocorax pyrrhocorax* this represents at least 3.5% of the breeding population in Great Britain (Count as at 1998). Over winter 24 pairs were recorded representing again at least 3.5% of the wintering population in Great Britain (Count as at 1998). The site is 20 km of rocky coast with sea cliffs of Carboniferous Limestone which is of national geological and biological interest. The exposed sea cliffs support characteristic plants such as thrift *Armeria maritima*, golden-samphire *Inula crithmoides*, rock sea-lavender *Limonium binervosum* and sea Aster *Aster tripolium*, as well as rarities such as goldilocks Aster *Aster linosyris* and small

[9] *JNCC site description, http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0014793 (18/9/2014).*

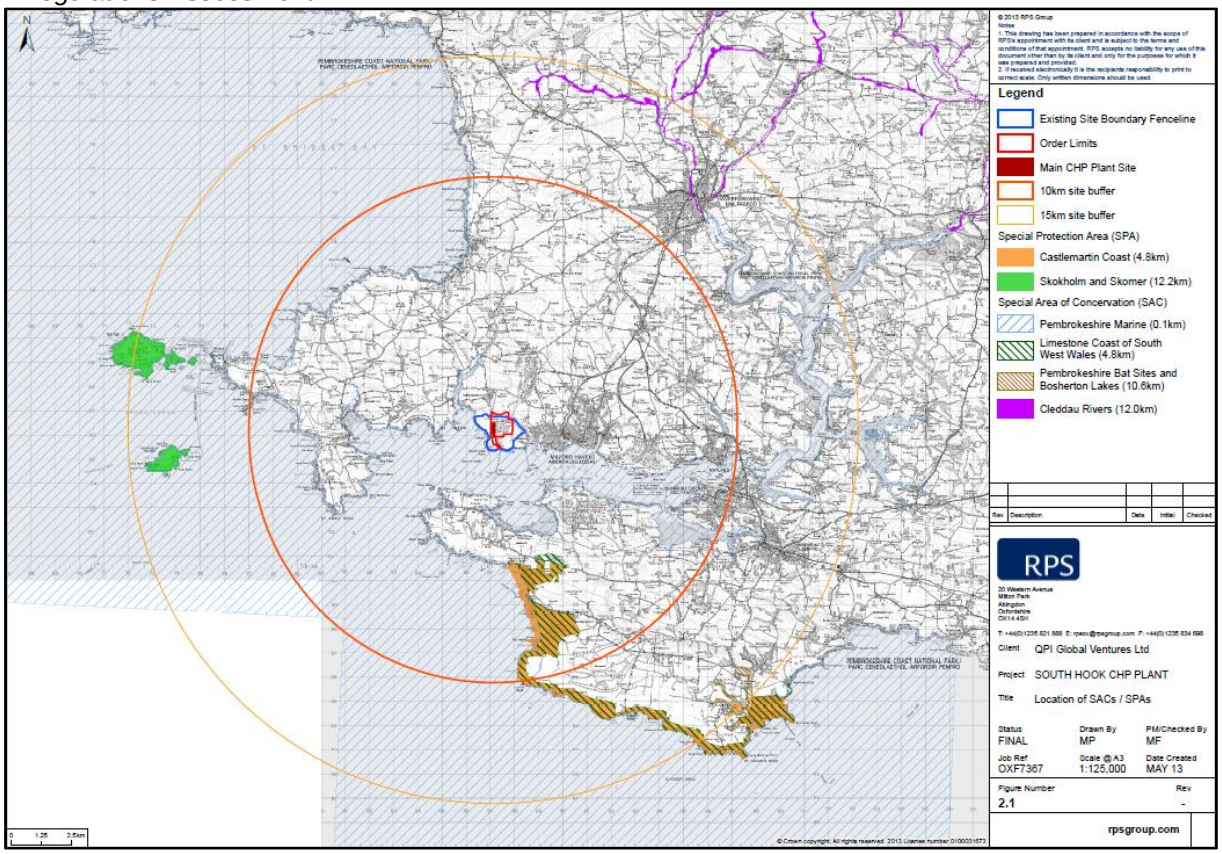
[10] *JNCC site description, http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUcode=UK0014787 (18/9/2014).*

[11] *JNCC site description, http://jncc.defra.gov.uk/page-2062-theme=default, (*18/9/2014*).*

Restharrow *Ononis reclinata*. Behind the cliff edges, species-rich maritime grasslands occur in front of maritime heath that in turn grades into gorse *Ulex europaeus* scrub in more sheltered situations. Rough winter grazing by sheep and cattle maintains the character of the maritime grasslands, and is essential for chough *Pyrrhocorax pyrrhocorax*. At the western end, a large calcareous dune system has an extensive natural transition to wet communities in dune slacks. The cliffs, dunes and wetland habitats along this section of coast support a rich invertebrate fauna. The cliffs are of importance for breeding chough, which exploit their immediate hinterland. They depend on the diverse mix of habitats present within the site and their continued low-intensity agricultural management.

3.12 **Skokholm and Skomer Special Protection Area** these are islands located off the extreme south-west tip of Pembrokeshire in south-west Wales. These islands support internationally important numbers of breeding seabirds, especially petrels, gulls and auks. Especially notable is the high proportion of the world population of manx shearwater that breed here. The coastal habitats of the SPA also support important resident populations of chough and short eared owl[12].

Figure 3 Map of Statutory European Sites and Project area from the Applicant's shadow Habitats Regulations Assessment.



[12] *CCW site description* http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape/special-sites-project/skokholm-and-skomer-spa.aspx*,(18/9/2014).*

Likely significant effects (LSE)

3.13 The Secretary of State (SoS) has considered the potential construction, operational and decommissioning impacts of the Project on all relevant interest features to determine whether there will be LSE in the context of the Habitats Regulations. LSEs as a result of the project are summarised in Table 1 below, followed by a site by site description. A list of all of the sites and features considered is provided in Annex A.

3.14 The potential impacts used within the likely significant effects test were considered within the Applicant's shadow HRA report and summarised in the RIES. These include habitat loss; habitat fragmentation (e.g. a restriction of movement through or across the Estuary); air quality change (e.g. increased concentrations of atmospheric pollutants and/ or increased nutrient enrichment/ acid deposition); aquatic impacts (e.g. discharge of pollutants and/or thermal plume and/or changes to hydromorphology); disturbance (e.g. noise, vibrations or light); and in-combination effects

3.15 The main LSEs discussed within the examination and assessed within this report are:

- surface and process waste water impacting on features within the Pembrokeshire Marine SAC;
- aerial emissions from the Project impacting on sensitive SAC and SPA features in the vicinity of the Project;
- impacts on greater horseshoe bats foraging, commuting and roosting from disturbance by the Project.

Table 1 SAC and SPA features where LSE could not be excluded in the RIES

Designated Site	Feature where LSE could not be excluded
Pembrokeshire Marine SAC (0.1km from the project)	• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sand flats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Submerged or partially submerged sea caves • *Halichoerus grypus* grey seal • *Rumex rupestris* shore dock • *Lampetra fluviatilis*; river lamprey • *Romyzon marinus;* sea Lamprey • *Alosa alosa;* allis shad • *Alosa fallax;* twaite shad

Designated Site	Feature where LSE could not be excluded
	• *Lutra lutra;* otter
Cleddau Rivers SAC (12km from the Project)	• Water courses of plain to montane level (with the *Ranunculion fluitantis* and *Callitricho-Batrachion)* • Active raised bog • *Lampetra planeri;* brook lamprey • *Lampetra fluviatilis*; river lamprey • *Romyzon marinus;* sea Lamprey • *Cottus gobio*; bullhead • *Lutra lutra;* otter
Limestone Coast of South and West Wales SAC (4.8km from the project)	• Vegetated sea cliffs of the Atlantic and Baltic coasts • Fixed dunes with herbaceous vegetation ("grey dunes") • European dry heaths • Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia)* • *Rhinolophus ferrumequinum;* greater horseshoe bat • *Gentianella anglica*; early gentian • *Petalophyllum ralfsii*; petalwort
Pembrokeshire Bat Sites and Bosherston Lakes SAC (10.6km from the project)	• Hard oligo-mesitrophic waters with benthic vegetation of *Chara* spp. • *Rhinolophus ferrumequinum;* greater horseshoe bat • *Rhinolophus hipposideros;* lesser horseshoe bat • *Lutra lutra;* otter
Castlemartin Coast SPA (12.2km from the project)	• *Pyrrhocorax pyrrhocorax; r*ed billed chough

Pembrokeshire Marine SAC (see RIES matrix D)

3.16 The RIES identifies LSE on habitats and species listed in Table 1. This SAC is located just 100m away from the Project site. The Applicant is proposing to discharge aqueous emissions into this European site.

3.17 There are 15 features to consider within this site. The RIES has found a LSE on each of the features and considers that they should be further assessed. However there is no construction inside the SAC so there is no potential for direct land/ habitat removal by the Project. Disturbance from noise, vibration or lighting have been screened out by the RIES. This is because the Project will not change the current levels of lighting to the marine environment at this location. NRW in their HRA for the Environmental Permit consider that the Applicant has undertaken a noise assessment to demonstrate that noise associated from the site will be below

marginal significance. NRW consider that based on the findings from the noise assessment the impact from noise is not likely to impact upon the grey seal. There are also no anticipated noise or vibration impacts on the marine environment.

3.18 The Project will discharge process waste water using the existing LNG Terminal infrastructure. This means there will be no additional construction needed. This outfall for the surface water drainage for the Project is located within the SAC. Surface drainage water will be discharged to the Milford Haven Waterway at point W1 in Figure 2. This means the RIES has recognised that there is a potential for the habitat quality within the SAC to be affected if significant amounts of contaminants are released into the Milford Haven Waterway within the run-off during construction, operation and decommissioning of the Project. Process waste water will also use existing LNG Terminal infrastructure and be released into the Milford Haven Waterway at point W2 Figure 2. Again the RIES identifies that contaminants within this discharge could impact on habitats within the SAC.

3.19 Aquatic discharges coming from the Project could also result in habitat fragmentation or cause barrier affects to species within the Milford Haven Waterway, according to the RIES. Depending on the volume of water at the outflow this has the potential to scour the bed of the Waterway. This could also cause changes to local hydrology, water and sediment quality.

3.20 The RIES highlights that aerial emissions during operation of the Project could impact on the habitat features of the site. These features are defined as sensitive by the Air Pollution Information System (APIS[13]). APIS provides a comprehensive source of information on air pollution and the effects on habitats and species. APIS is a support tool for staff in the UK conservation and regulatory agencies, industry and local authorities for assessing the potential effects of air pollutants on habitats and species. During operations of the Project there is potential for aerial emissions to result in changes to habitats through nitrogen enrichment or acidification within the SAC.

3.21 Low levels of dust from construction could extend 350m from the site (ES), however this will be managed through a dust management plan within the Code of Construction Practice Requirement 12 Schedule 2 and as part of the Construction Environmental Management Plan (CEMP) for the Project construction phase Requirement 13 Schedule 2. The Applicant and Inspector therefore do not consider that this could impact on the SAC.

Cleddau Rivers SAC (see RIES matrix A)

3.22 The RIES identifies LSE on habitats and species listed in Table 1. This SAC is located 12km away from the site. The RIES states that there is 27km of river between the Project and the Cleddau rivers SAC. The Cleddau Rivers SAC covers 751 ha.

[13] *http://www.apis.ac.uk/*

3.23 The location of the SAC means the RIES identifies that there are not LSE from direct land take and habitat loss. The distance between the Project and the site also means the Applicant does not consider there will be any impacts from lighting, noise and vibration from the Project.

3.24 There are aerial emissions from the Project. This site support features which are sensitive to nitrogen and acid deposition. The Applicant's HRA report finds that 'water courses of plain to montane level; active raised bog; Brook lamprey; River lamprey; Sea Lamprey; Bullhead; Otter'. The Applicant's ES concludes the Project when operating under scenario 1 (see section 1.26) in conjunction with the LNG terminal will result in a decrease in Nitrogen and acid deposition.

3.25 In the main the RIES does not find any LSE from aqueous emissions. This is due to the distance of the site from the Project and mitigation measures set out within the CEMP (Requirement 13 of Schedule 2) and surface water drainage strategy. The modelling within the Applicant's ES chapter 10 shows that thermal plume from the waste water will only have a localised impact. The Applicant also found that the emission in the waste water will not impact on the water quality in the water at the SAC. As the emissions from the Project will not affect water quality within the SAC and water quality will have reached all the Environment Quality Standards (EQS) under the Water Framework Directive a short distance from the outfalls.

3.26 The RIES did identify a LSE from habitat fragmentation and barrier effects from the aqueous discharge from the Project. The Applicant's shadow HRA finds a LSE for migrating river and sea lamprey from the SAC swimming past the discharge mixing zone from the Project. There is also a possibility that otters could roam through this area. The Applicant cites potential impacts such as bioaccumulation of toxins, and behavioural changes for the SAC features and their prey species.

3.27 The Applicant and RIES do not find any LSE on the alluvial forests with *Alnus glutinoa* and *Fraxinus excelsior* feature. The conservation objectives for this feature could not be affected by the Project and this is therefore not considered further within this report.

Pembrokeshire Bat Sites and Bosherston Lakes SAC (see RIES matrix C)

3.28 The RIES identifies LSE on habitats and species listed in Table 1. This SAC is located 10.6km away from the Project. This distance means that there is no direct land/ habitat removal by the Project.

3.29 As with the Cleddau Rivers SAC the distance of the site from the Project, mitigation measures set out within the CEMP (Requirement 13 Schedule 2) and surface water drainage strategy means the RIES does not find a LSE from aqueous emissions on the benthic vegetation features of this SAC. In a similar approach to the Cleddau Rivers SAC assessment there is also a possibility that wide ranging otters could roam through the discharge mixing zone from the Project. This could also mean a LSE on otters from habitat fragmentation and barrier effects from the aqueous discharge from the Project.

3.30 The RIES considers disturbance from noise, vibration and lighting and habitat fragmentation impacts on greater and lesser horseshoe bats. The UK has a population of >6,600 greater horseshoe bats (Battersby *et al,* 2005)[14]. The Pembrokeshire Bat Sites and Bosherston Lakes SAC greater horseshoe population is 627 bats. There are also populations of greater horseshoe at Limestone Coast of South and West Wales SAC and South Hook Fort. South Hook Fort is located close to the Project site. NRW consider the greater horseshoe bat populations at these three sites to be closely interacting with one another.

3.31 The Applicant's ES found that greater horseshoe bats roost in the South Hook Fortifications and associated gun emplacements throughout the year. The use of the fort is greatest during the hibernation period when the site supports up to 20% of the county's(and up to 2% of the UK's), greater horseshoe bat population. The main fort is not safe to access and the number of bats present is likely to be higher than the counts. The site is considered to be of national importance for the greater horseshoe bats in winter and of regional importance in summer. The ES uses bat foraging activity surveys that were undertaken in 2002 and 2003 to support the LNG terminal planning application.

3.32 The use of the South Hook Fort by greater horseshoe bats has been found to be at its greatest during the hibernation period, with 127 hibernating greater horseshoe bats recorded in 2012 (ES chapter 9). Activity surveys showed the species commuting from roost sites in the fort to foraging areas over cliff top grassland and scrub, moving northwards beyond the western boundary of the Nature Conservation Area. No activity was associated with the CHP Plant area and was considered by the ES to have has low suitability as foraging habitat for bats. The RIES considers that there is a LSE for greater horseshoe bats feature of the SAC to be impacted by noise, vibration and lighting disturbance from the Project which could also lead to habitat fragmentation. The Applicant's shadow HRA concluded that this assessment was equally applicable to lesser horseshoe bats.

Limestone Coast of South and West Wales SAC (see RIES matrix B)

3.33 The RIES identifies LSE on habitats and species listed in Table 1. This SAC is located closer at just 4.8km away from the Project. This distance does means that there is no direct land/ habitat removal by the Project. This distance will also mean that there are no direct impact on the site from noise, vibration or lighting.

3.34 The features of this site are not sensitive to aqueous discharges and the RIES also notes that the features are at such as distance that any water quality changes or thermal changes could not impact on the SAC.

3.35 The RIES highlights that aerial emissions during operation of the Project could impact on the vegetation features of the site. These features are defined as sensitive by the Air Pollution

[14] *Battersby. J. (Ed) & Tracking Mammals Partnership. (2005) UK Mammals Species Status and Population Trends. First Report by the Tracking Mammals Partnership. JNCC/Tracking Mammals Partnership, Peterborough*.

Information System (APIS[15]). APIS provides a comprehensive source of information on air pollution and the effects on habitats and species.

3.36 The RIES considers disturbance from noise, vibration and lighting and habitat fragmentation impacts on greater horseshoe bats. The Applicant within their shadow HRA assessment discussed evidence that the population of 297 greater horseshoe bats at the Limestone Coast of South and West Wales SAC are likely to interact with the population at South Hook Fort. This is to the West of the Project's CHP Plant operations site. The Applicant's shadow HRA activity surveys demonstrated that greater horseshoe bat activity commute from the roost sites in the fort to foraging areas in the wider landscape. No greater horseshoe bat activity was associated with the Project site which was found to have a low suitability as foraging habitat and was considered by the Applicant to be of negligible value. Due to the South Hook Fort population of bats as with Pembrokeshire Bat Sites and Bosherston Lakes SAC the RIES finds a LSE for the potential for greater horseshoe bats from the SAC to be impacted by noise, vibration and lighting disturbance which could also lead to habitat fragmentation. As this is the same population of bats, the impact on the two SACs will be considered together within the AA.

Castlemartin Coast SPA (see RIES matrix E)

3.37 The RIES identifies LSE on habitats and species listed in Table 1. This SPA is located 3.5km away from the Project. This SPA supports breeding and over-wintering choughs. These birds nest on cliffs and feed on grassland habitat around their nests. APIS show this is a species sensitive to nitrogen and acid deposition. This is due to a reduction in habitat quality where these birds feed and live.

3.38 The SoS agrees with the RIES that there are no other LSEs on these birds. The distance of the site from the Project means that there is no direct land/ habitat removal by the Project. It also means that there are no disturbance impacts or dust impacts on the site. Any aqueous emissions will not affect these cliff dwelling birds.

Skokholm and Skomer SPA (see RIES matrix F)

3.39 This SPA is located 12.2 km from the Project. The site is formed of two islands which are designated for a number of breeding seabird colonies, in particular manx shearwater, puffin, storm petrel and lesser black-backed gull, as well as for breeding chough and short-eared owl. Only choughs are defined by Air Pollution Information System (APIS) as being sensitive to air quality, however this site is over 10km from the Project and upwind therefore there is no potential impact to chough from the Project's aerial emissions.

3.40 The Applicant and ExA conclude that the Project will not have any LSE on this SPA. The SoS agrees with this conclusion as there is no pathway between the Project and the site for

[15] *http://www.apis.ac.uk/*

emissions to affect the features of this site. The 12.2 km distance means there are no potential impacts from aqueous emissions, air quality, habitat loss, habitat fragmentation, noise, vibration, dust or lighting caused through the Project.

3.41 **The SoS will not consider this site further within this HRA.**

Likely Significant Effects: In Combination

3.42 Under the Habitats Regulations, the SoS is obliged to consider whether other plans or projects might affect some of the same European sites as the Project. The Applicant has addressed potential in-combination impacts within their shadow HRA Report.

3.43 The SoS has assessed the underground grid connection within this report, but there may be other forms of grid connection that are feasible. As these have not been proposed by the Applicant they have not been assessed within this report. There are no formal plans or application for the grid connection at the moment and any connection will be subject to consent and HRA from the consenting body.

3.44 During the construction and at least 20 year (estimate) operational life time of the Project, there is a potential for a number of impacts generated from other plans or projects that could result in in-combination effects on the marine environment and marine ecology. In this case the RIES considered the following projects and plans for the in-combination assessment:

Current dredging projects

- Area A: Mill Bay – West Channel
- Area B: Thorn Island – South Channel
- Area C: Valero Berths and Approaches
- Area D: Milford Shelf and Dock Approach
- Area E: Sems logistics and Dragon LNG
- Area F: Pembroke Power Station Inlet and RoRo Approach
- Area G: Pembroke and RoRo facility
- Area H: Murco
- Neyland Yacht Milford Haven – Marina and Channel

Possible future dredging areas

- Blackbridge Development
- Martello Quays Development
- Angle Shelf Mussel Farm

Aqueous discharges

- South Hook LNG
- Pembroke Power Station
- Murco
- Valero

- Dragon LNG
- First Milk Discharge

Aerial emissions

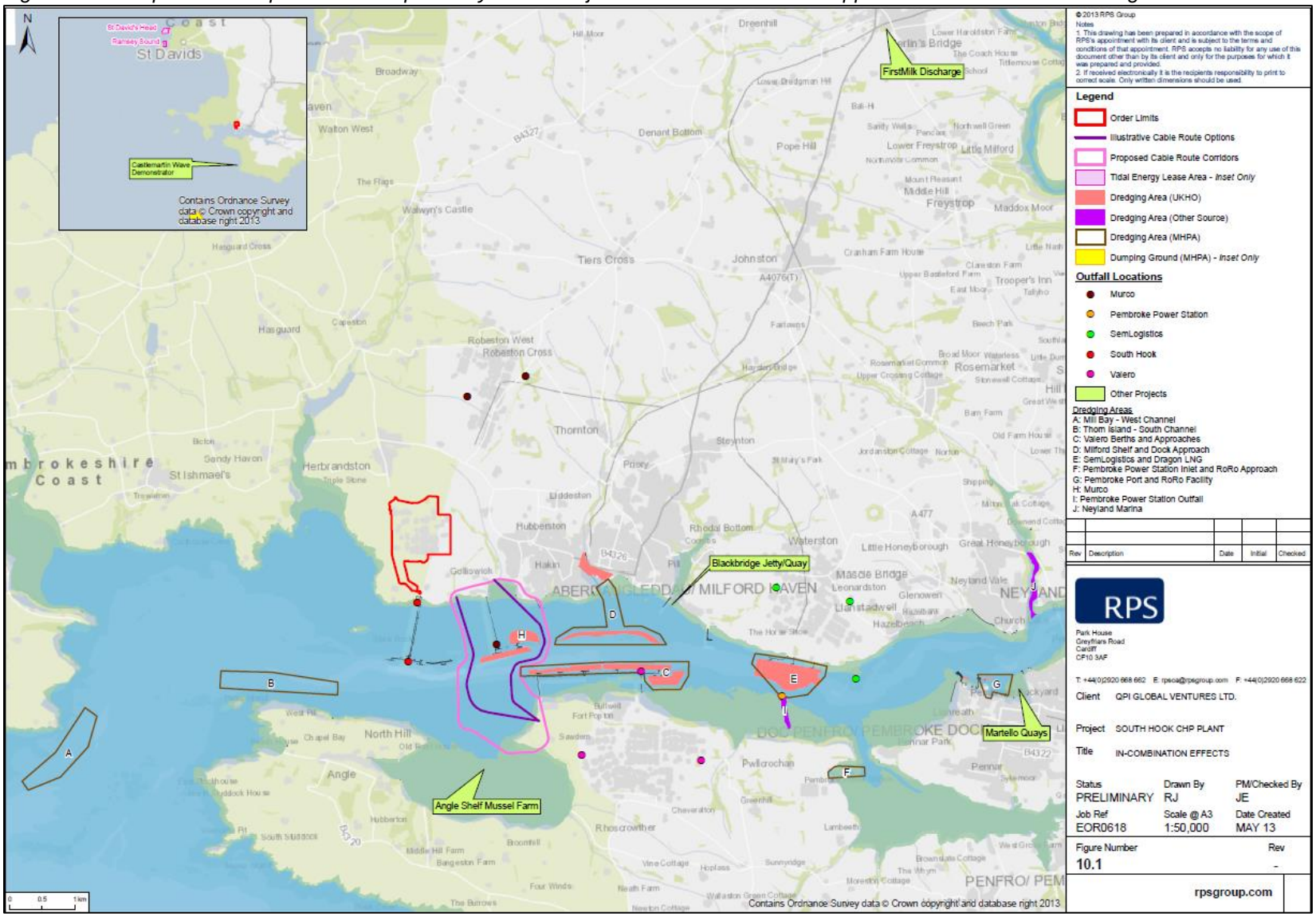
- South Hook LNG
- Pembroke Power Station

Renewable projects

- Ramsey Sound Demonstrator Project – Tidal Energy Ltd
- St Davids Array – Tidal Energy Ltd
- Castlemartin Demonstrator – Marine Energy Ltd

This report limits the scope of the Secretary of State's in combination assessment solely to these projects. The Inspectors report states that there was no disagreement over the scope of developments included.

Figure 4 Developments and plans in close proximity to the Project. Information from the Applicant's shadow Habitats Regulations Assessment



3.45 Many of the plans or projects listed above involve dredging. There is potential for an additive effect from dredging projects on the marine environment and marine ecology. However, as dredging or other marine construction/sediment distribution activities will not be undertaken as part of the Project itself, the Applicant considers that there will be no additive adverse effect as a result of habitat loss, increase in suspended solids or deposition.

3.46 Air emissions will need assessment in-combination with similar discharges from other developments. This in-combination assessment will need to be done for the Cleddau Rivers SAC, the Limestone Coast of South and West Wales SAC, the Pembrokeshire Bat Sites and Bosherston Lakes SAC, the Pembrokeshire Marine SAC and the Castlemartin Coast SPA. All these sites are located at a distance where potential in-combination impacts during operation of the Project could impact on sensitive features of these sites. The features include a number of different habitats and species such as bats and choughs.

3.47 The Applicant's shadow HRA assessment of aerial emissions showed that the operation of the Project with the LNG Terminal will result in a decrease in N and acid deposition on all of the sites considered compared to the existing situation. Therefore the Applicant considers that there are no potential for in-combination effects from aerial emissions on any SAC/SPAs.

3.48 The RIES also concluded that there is the potential for aqueous emissions to impact on otters and other features of the Pembrokeshire SAC in-combination with dredging activities from other developments.

3.49 NRW required the Applicant to assess the impact of a trenched grid connection in combination with the Project. The RIES describes that this grid connection will be complete prior to the Project becoming operational. This means that the discharge from the Project will not overlap with the area where trenching will be undertaken. NRW has confirmed in their written response to the second questions that if requirement 8 is in place there will be no adverse effect on this marine site resulting from nutrient discharge and contaminants from process water. As such they do not consider it necessary to assess the project together with the grid connection.

Conclusions on Likely Significant Effects

3.50 The SoS agrees with the ExA that an AA is required and the RIES sets out that this should concentrate on the following in considering the impact of the project alone on the integrity of Cleddau Rivers SAC, Limestone Coast of South and West Wales SAC, Pembrokeshire Bat Sites and Bosherston Lakes SAC, Pembrokeshire Marine SAC, Castlemartin Coast SPA:

- Aqueous emissions
- Air quality
- Habitat fragmentation
- Noise, vibration and lighting disturbance

The following will be considered in-combination with other plans and projects:

- Aqueous emissions
- Air quality

3.51 The SoS considers that sufficient information has been provided in particular by the Applicant and NRW to inform a robust assessment in line with his duties under the Habitats Regulations.

4 Appropriate Assessment (AA)

Test for Adverse Effect on Site Integrity

4.1 The requirement to undertake an AA is triggered when a competent authority, in this case the SoS, determines that a plan or project is likely to have a significant effect on a European site either alone or in combination with other plans or projects. Guidance issued by the European Commission states that the purpose of an AA is to determine whether adverse effects on the integrity of the site can be ruled out as a result of the plan or project, either alone or in combination with other plans and projects, in view of the site's conservation objectives (European Commission, 2001[16]).

4.2 The purpose of this AA is to determine whether or not adverse effects on the integrity of those sites and features during the LSE test can be ruled out as a result of the Project alone or in combination with other plans and projects in view of the site's conservation objectives and using the best scientific evidence available.

4.3 If the competent authority cannot ascertain the absence of an adverse effect on site integrity within reasonable scientific doubt, then under the Habitats Regulations, alternative solutions should be sought. In the absence of an acceptable alternative, the project can proceed only if there are imperative reasons of overriding public interest (IROPI) and suitable compensation measures identified. Considerations of IROPI and compensation are beyond the scope of this AA.

Conservation Objectives

4.4 European Commission guidance indicates that disturbance to a species or deterioration of a European site must be considered in relation to the integrity of that site and its conservation objectives (European Commission, 2000). Section 4.6.3 defines site integrity as:

"…the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified."

4.5 Conservation objectives outline the desired state for a European site, in terms of the interest features for which it has been designated. If these interest features are being managed in a way which maintains their nature conservation value, they are assessed as being in a 'favourable condition'. An adverse effect on integrity is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of its designation (English Nature, 1997[17]; Tyldesley, 2011[18]).

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[16] *European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites.*

[17] *English Nature (1997). Habitats Regulations Guidance Note, HRGN 1.*

[18] *Tyldesley, (2011) Assessing projects under the Habitats Directive: guidance for competent authorities. Report to CCW, Bangor.*

4.6 There are no set thresholds at which impacts on site integrity are considered to be adverse. This is a matter for interpretation on a site-by-site basis, depending on the designated feature and nature, scale and significance of the impact. The conservation objectives for the interest features for which LSE were identified are listed in the RIES. These have been used by the SoS to consider the potential for adverse impacts on integrity of the SACs and SPAs, as a result of the project in-combination with other plans or projects.

Avoidance and mitigation measures adopted as part of the Project

4.7 The Project has a number of requirements adopted within the design and these measures are secured through requirements within the DCO. The ES and Applicant's shadow HRA describe the mitigation measures. The development has adopted a dry (fin fan) cooling system to avoid abstracting water from the Milford Haven Waterway and causing an impact on the Pembrokeshire Marine SAC.

4.8 The CEMP must reflect the proposal set out by the Applicant in their draft CEMP within the ES. Construction of the Project could contaminate habitats adjacent to the site. Works must be undertaken in accordance with the CEMP, this will include specific pollution prevention measure to manage surface water and groundwater at or adjacent to the site. The CEMP will also require management plans for construction transport, waste management and an Environmental Action Plan to manage the risk from fuel or chemical spills.

4.9 The CEMP includes consideration of:

- traffic and access;
- air quality and dust;
- ecology and nature conservation;
- water protection and management;
- noise management;
- waste and materials management; and
- a complaints procedure.

4.10 Noise will be abated through screening, enclosures and cladding. This will be monitored and there is a requirement for a noise management scheme within the CEMP to ensure noise levels are minimised during construction. The Environmental Permit for the CHP Plant will further regulate the noise emissions during operation of the Project.

4.11 Dust suppression will also be managed through the CPP requirement and CEMP requirement within the DCO. The dust management plan will require measures such as wheel washers and regular cleaning of dirt from the roads. This will need to follow current best practice.

4.12 Requirement 16 ensures that the external lighting from the Project minimises impacts on wildlife and local residents. A key principle of the lighting scheme will be to avoid light spillage around bat roost and flight corridors. The requirement is worded to ensure light from the authorised development does not spill onto the access and egress points of the South Hook Fort bat roosting

areas and is in accordance with the Bat Conservation Trust Guidelines in respect of light spillage on the foraging and commuting areas within the NCA. They will use directional lighting and limit light intensity where necessary. The lighting plan will follow the principles set out in the guidance and current best practice[19].

4.13 The Project has used existing infrastructure from the LNG Terminal where possible. The use of the existing outfall for surface water and process water means that there is no construction necessary within the Pembrokeshire Marine SAC. The operation of the Project's CHP Plant integrated with the LNG Terminal will reduce emissions to air and water. Requirement 8 has been applied to this DCO to ensure NRW is consulted on details for the surface and waste water for the Project. It also restricts nitrate loads from aerial and waste water emissions to ensure overall levels do not increase from those already permitted for the LNG Terminal as part of its existing Environmental Permit.

[19] *See Institution of Lighting Professionals (2011) Guidance Notes for Reduction of Intrusive Light GN01:2011, and BCT (Version 3 2009), Bats and Lighting in the UK: Bats and the Built Environment Series.*

5 Pembrokeshire Marine SAC Conservation Objectives

5.1 Estuaries are coastal inlets where there is generally a substantial freshwater influence. Estuaries are complex and highly productive ecosystems, supporting a wide range of habitats and species, which are closely associated with surrounding terrestrial habitats. The Pembrokeshire Marine SAC includes the Daugleddau estuary and also smaller estuaries entering the Daugleddau and Milford Haven Waterway such as the Pembroke River, Cosheston Pill, Carew and Cresswell Rivers, Garron Pill, Sprinkle Pill, and Millin Pill to name the most prominent[20].

5.2 Estuaries form the interface between freshwater and marine environments and extend from the upper limit of tidal influence to the open sea. Where freshwater and seawater meet, and where current flows are reduced in the shelter of estuaries, fine sediments are deposited, often forming extensive intertidal mudflats and sandflats. This wide range of environmental conditions, particularly seabed substrata, tidal streams and salinity gradients, support a wide diversity of both communities and numbers of species. In particular these areas are typically inhabited by a variety of invertebrates, many of which provide important sources of food for fish, waterbirds and seabirds. At higher elevations within the tidal range, the mudflats and sandflats are exposed for sufficient periods to become vegetated with salt-tolerant plants forming saltmarshes, which play an important role in the nutrient and sediment cycling processes within the estuarine ecosystem. Saltmarshes also provide essential feeding and roosting areas for waterbirds. The intertidal and subtidal sediments of estuaries support biological communities that vary depending on their geographic location, sediment type, salinity gradients and the tidal currents within the Estuary.

5.3 The species richness of sediment animal communities throughout Milford Haven Waterway and the Daugleddau is high. Intertidal mudflats draining into the main Waterway support rich and productive shellfish and worm communities. Muds typically support a greater biomass than other intertidal sediments. The abundant intertidal sediment infauna is an important food source that supports large numbers of overwintering waders and wildfowl. Shell/cobble substrates and bedrock in the upper reaches of the Daugleddau are particularly spectacular with huge colourful anemones, sprawling current-swept sponges and carpets of sea squirts[20].

5.4 Primarily the conservation objective for Pembrokeshire Marine SAC states:

In the Milford Haven Waterways complex inputs of nutrients and contaminants to the water column and sediments derived from human activity must remain at or below levels at the time the site became a candidate SAC.

5.5 There are conservation objective for each habitat feature of the SAC which are in general to maintain them at 'favourable conservation status' including their natural range and the structures and functions necessary for their long-term maintenance, and the conservation status of its typical species supported on a long-term basis. For a number of habitats this 'favourable conservation status' will be levels at the point the site was designated or have contaminates at legal levels set in

[20] http://www.pembrokeshiremarinesac.org.uk/english/special/estu_c.htm *28th September 2014*

regulation. The conservation objective for each species feature, is to maintain at favourable conservation status its long-term population viability, natural range and the structure and function of its habitat within the site.

Assessment of effects on the Pembrokeshire Marine SAC from the project alone

Surface Water Emissions

5.6 Surface water run-off will use the LNG's terminal's existing drainage system and emission limits will remain within the existing Environmental Permit. The Applicant's extended HRA summary found that the operational design of the combined flows at the location of W1 will result in no additional freshwater impacts or physical seabed effects.

5.7 During construction and operation of the Project the surface water run off could impact on habitat quality. The Applicant is proposing a 3 hectare increase in areas of hardstanding, roofs and other impermeable surfaces associated with the Project. If this was not attenuated there will be a subsequent increase in the peak surface water run-off rate. During construction the features of the SAC could be impacted by construction materials and excavated materials causing contamination to surface waters, ground water or directly into the Milford Haven Waterway. In order to ensure these risks are fully mitigated the Applicant, as set out in their shadow HRA, has agreed to have a Code of Construction Practice with various other plans for the construction phase siting under this overarching plan. One of these plans is the CEMP for the site. This management is put in place by Schedule 2 Requirement 13 of the DCO.

5.8 The Applicant's ES has assessed the surface water drainage strategy which it predicts will ensure no net increase in peak flow to the Milford Haven Waterway compared to existing surface water. Schedule 2 Requirements 8 & 13 of the DCO will ensure these flows must be approved by the relevant planning authorities and must not increase overall Nitrate loads or create any adverse effect on the integrity of the site. The Project's surface water discharge point will use the existing LNG Terminal infrastructure to discharge into Milford Haven Waterway outfall labelled as W1 in Figure 2

5.9 There are a number of flow control measures proposed by the Applicant within chapter 4 of their ES. These measures are designed to attenuate storm water, fire water and oil spillages. They have proposed two attenuation basins. The primary basin is 5,500m^3 and can store a 1 in 30 year (+20% for climate change) flood flows over 24 hours. It will also be able to store 2,000m^3 of water used as part of controlling a fire on site. This basin could also store discharges from an accidental fuel or chemical spill. The outfall will also be fitted with a hydrobrake to prevent it discharging in to Milford Haven Waterway. Once this basin is full it can be isolated and further discharges will be captured by a secondary storage basin. This will have a maximum volume of 400 m^3 and can discharge at velocities up to 3000 l/s. There will also be bypass separators installed around the Project site to capture oil from any small spillages.

5.10 The surface water drainage design has been agreed with NRW to ensure that the water quality does not decline from the existing situation at the application site. Surface water run-off from the Project was assessed by the Applicant and they found that there will be no change in pollutants entering the Waterway during construction or operation of the Project. The Applicant and NRW have agreed that the details of the drainage system including pollution control will be approved by the relevant planning authority in consultation with NRW and Dwr Cymru. **This obligation is contained within Schedule 2 Requirement 8. The SoS is therefore confident that there will be no adverse effect from the surface water discharge on the integrity of the SAC.**

Operation Waste Water

5.11 The process water discharge has the potential to result in effects on the SAC habitat features. The Applicant's shadow HRA and HRA extended summary provides assessment of how the Project will discharge process waste water to the Milford Haven Waterway using the existing LNG Terminal infrastructure. The Applicant's ES describes how the waste waters from operations will be combined within the process waste water treatment plant for the Project. After treatment these will discharge into the existing LNG Terminal process waste water effluent pipeline, with the combined discharges from the Project and the LNG Terminal ultimately discharging from the existing LNG Terminal discharge point into the Milford Haven Waterway at W2 within Figure 2.

5.12 The Applicant undertook detailed dispersion modelling of this process waste water which was agreed with CCW and EAW. This assessment examined the potential effects of **temperature**, **metals** (lead, copper, zinc and nickel), **nitrate**, **chlorine** and **ammonia** on the receiving water column. The Applicant modelled all the four scenarios listed in section 1.26 of this report (see Figure 5). They also considered scour and sediment quality.

5.13 The Project will discharge **heated water** into the Milford Haven Waterway. Changes in physico-chemical parameters (such as water temperature) adversely affect water quality and the ability of the SAC to support the interest features for which it is designated. The otters and grey seal living in the Milford Haven Waterway will also move around the waters and the Waterway also acts as an important migration route for river lamprey and sea lamprey between coastal waters and their spawning areas. These species can be sensitive to changes in temperature and, in extreme circumstances, large differences in temperature could act as a barrier and influence sea lamprey and river lamprey migratory behaviour. In turn, this could impact upon spawning and recruitment of these species.

5.14 The Applicant within their ES has assessed the magnitude of impact from the thermal plume for all scenarios. Table 2 shows the differing discharge temperatures within the different scenarios. The ES states that the natural ambient seawater temperature in the Milford Haven Waterway ranges from 6.7°C to 16.7°C. The heated freshwater discharge is buoyant due to both the elevated temperature and reduced salt content when compared to the ambient water in Milford Haven. The Applicant predicts that the plume will rise from the caisson which is located 3.24 m off the seabed. The maximum discharge temperature at source ranges from 25°C to 29.6°C for all new scenarios. For scenario 1 which will be the majority situation for the Project, the maximum temperature of the

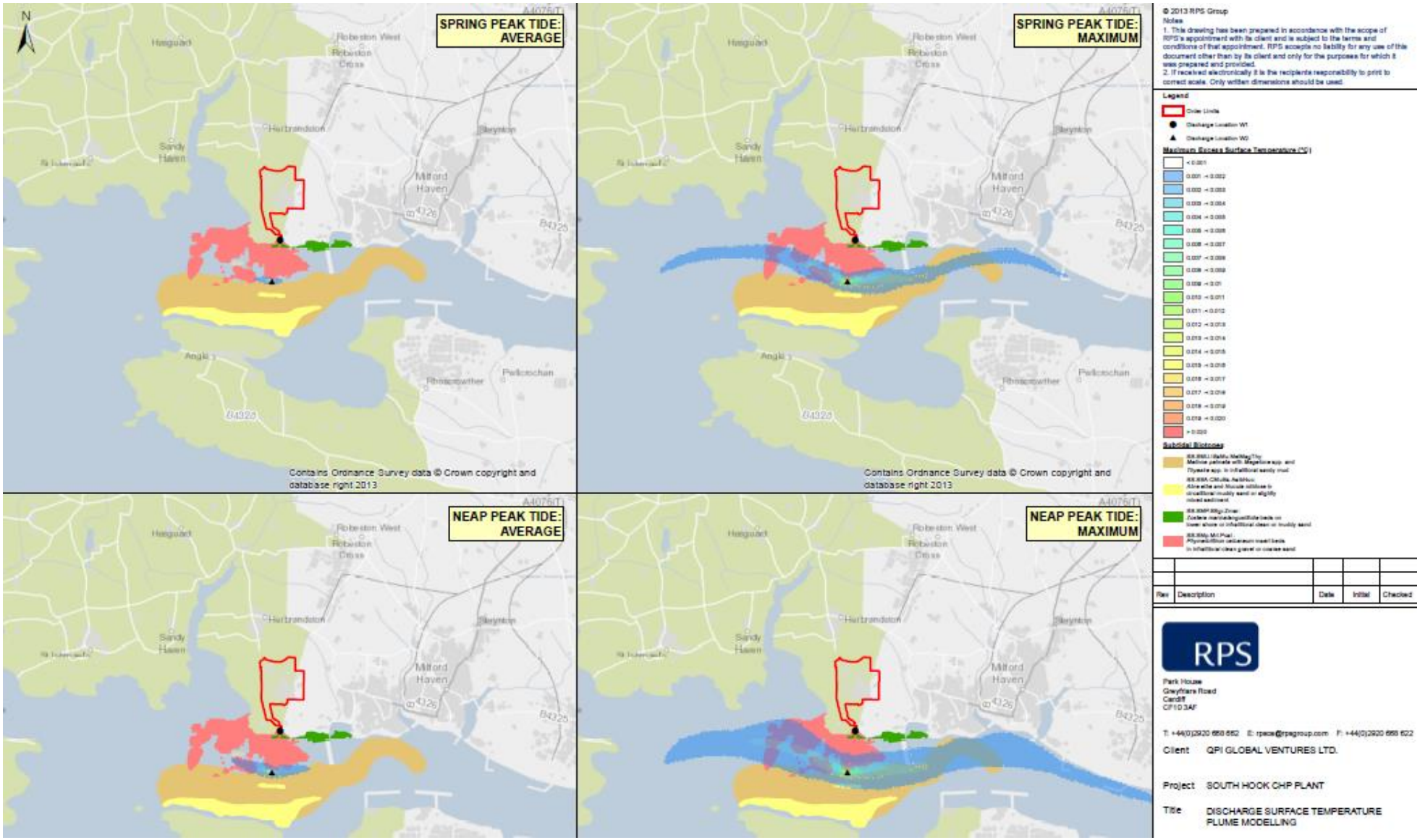
discharge is predicted by the Applicant to be 29.22°C, which will be 19.22°C above a winter ambient seawater temperature of 10°C. The current consented discharge for the LNG terminal alone is 30°C so the ES considers that there will be no observable change from the current consented operating conditions. The ES also emphasises the large amount of dilution within the Milford Haven Waterway which will mean that these temperatures rapidly reduce. *Figure 5* which is referenced from the Applicant's ES shows the plume modelling within the Milford Haven Waterway.

Table 2 Summary of Discharge Characteristics from the Applicant's ES

Case		Discharge m3/s	Discharge Temperature ºC	Excess Temperature ºC (above ambient)	Density
Scenario 1 –normal operations	*LNG & Project integrated*	0.0252	29.22	19.22	997
Scenario 2 – maximum 2 weeks	*LNG Independent at permit*	0.0456	30	20	996.5
Scenario 3 – maximum 2 weeks	*Project independent at permit*	0.00394	25	15	998
Scenario 4 – extremely rare	*LNG & Project Independent at permit*	0.0495	29.6	19.6	996.7

5.15 In terms of the extent of the plumes and associated surface temperature, *Figure 5* shows that the temperature of the discharge falls rapidly with dilution, the only exception being during low water on a spring tide. For all four scenarios, the associated low temperatures range from 0.010°C to 0.15°C. For Scenario 1 an excess surface seawater temperature of 0.08°C above ambient seawater temperature is achieved when the plume reaches the surface at a distance of 31 m downstream, on a spring mid-tide during a flooding tide. This means that when the Project is operation alongside the LNG Terminal, there will be a slight reduction in the temperature of the discharge; however this change may not be detectable. For scenario 4 where the Project and LNG Terminal operate independently, coming from the outfall, there will be maximum surface plume temperature of 2.07°C above ambient seawater temperature over the 12 tidal states modelled. This scenario is only being proposed to occur extremely rarely (see ES table 4.1) for a maximum of 2 days a year and is only 0.06°C above scenario 2 which is the LNG Terminal working alone under the current consented discharge.

Figure 5 plume modelling under different tidal states from the outfall at W2 (extracted from the Applicant's ES)



5.16 To conclude the Applicant's extended HRA summary demonstrates the thermal effluent will be discharged under normal circumstances at 0.78°C a slightly lower temperature than the currently consented discharge for the LNG Terminal alone. This lower temperature will not have an observable change from the currently consented operating conditions. The modelling has shown that the temperature rapidly reduces, due to the dilution available within the Milford Haven Waterway. Thus, the temperature of the thermal plume will be fully reduced to negligible levels before coming into proximity of sensitive features (*Figure 5*). Based on the rapid reduction in temperature due to the mixing and dilution available within a short distance of the location of the W2 discharge, and the overall reduction in flow as a result of the Project, they find no adverse effect on integrity of the site. The RIES also notes regarding species impacts that as the sea surface temperatures will be lower than the present situation; the species (and their prey species) are mobile they are capable of avoiding the discharge; and as there will be no observable change from the currently consented operating conditions. There is the potential for otter and grey seal to move into the zone of influence of the thermal plume, but this zone is very small. The area in the vicinity of the location at W2 has not been identified as a hotspot for these mammal species and they have a large geographical range, therefore the Applicant concludes these species will not deviate from their current behaviour. This emission level will be ensured through Schedule 2 Requirement 8 of the DCO. NRW in their statement of common ground with the Applicant agrees that waste water would not impact on integrity of any European site. **The SoS is therefore satisfied that there will be no adverse effect from higher temperatures within the waste water emissions on Pembrokeshire Marine SAC.**

5.17 The Applicant's ES assessed **nitrogen discharges** in the waste water from the Project. They found that when the Project is operating together with the LNG Terminal it will give rise to an overall decrease in Nitrogen deposition. From the RIES the combined discharge will reduce from an average daily mass of 40.9 kg N/day to 20.8 kg N/day. This is due to the lower nitrate concentration in the Project's discharge (reducing the combined concentration), and the avoided discharge from LNG Terminal SCVs that heating from the Project's CHP Plant enables.

5.18 The waste water discharge will be controlled under the existing LNG Terminal permit which will ensure that no increase in discharge of **nitrates** to the Milford Haven Waterway. Eutrophication is considered by NRW to be causing damage to habitats within the Waterway. Under scenario 1 the Applicant has shown that there will be a decrease in nitrogen input into the Waterway. Therefore the Applicant considered that there will be no adverse effect on integrity from process waste water discharge. This level will be ensured through Schedule 2 Requirement 8 of the DCO.

Table 3 Existing consented and proposed joint discharge consents from the Applicant's ES.

Substance	**EQS**[21]	**Existing Consented discharge limit (load)**	**Anticipated joint consented Discharges (load)**
Nitrates mg/l (as NO3)	N/A	200 mg/l (as NO3)	200 mg/l (as NO3
Nitrates kg/day (as N)	N/A	100 kg / day	100 kg / day
Nitrates kg/day (as N) (annual Mean)	N/A	50 kg / day	50 kg / day
Oil and grease mg/l	N/A	10 mg/l	10 mg/l
Total residual oxidant (as total residual Chlorine) mg/l	10 µg/l	0.1 mg/l	0.1 mg/l
pH	N/A	6-9	6-9
Temperature (°C)	N/A	30°C	30°C

5.19 The Applicant's ES found that the discharge of **ammoniacal nitrogen** (is a measure for the amount of **ammonia** in the waste water and used to calculate the amount of total N discharged) will be highly localised within the Milford Haven Waterway. The RIES sets out the distance it takes from the outfall at W2 to reach the relevant Environmental Quality Standard (EQS) value.(HRA 8.1.51):

- Scenario 1 (Project and LNG Terminal integrated) – 1m
- Scenario 2 (LNG Terminal operating alone) there will be no input of total ammonia.
- Scenario 3 (Project working alone) – 5m
- Scenario 4 (LNG Terminal and Project working independently) – 1m

5.20 The Applicant considers that the release of total ammonia is not anticipated to result in adverse effects on the natural range of the habitat features, or the specific structure and functions which are necessary for the long-term maintenance of the Milford Haven Waterway. Given the small affected area and the transitory nature of species features, the release of total ammonia in the discharge is not expected to form a barrier to migration. Any effects on prey species will also be localised, with food resources available elsewhere. The Applicant considers the discharge will not prevent the conservation objectives being met. These require that nutrients and contaminants should remain at or below levels at the time of the sites becoming a candidate SAC see Table 4. The relevant EQS is met in a very short distance from the discharge point. Therefore the Applicant assesses a negligible impact. However Schedule 2 Requirement 8 will secure existing permitted discharge levels.

5.21 Table 44 from chapter 7 of the Applicant's Environmental Statement defines the concentrations of **contaminates** within the waste water during operations of the Project. NRW has agreed that these are conservative upper limits for the discharge and that the Applicant's ES properly considers the

[21] *Environment Agency (2011) Environmental risk assessment for permits: overview. Annex D Basic Surface water discharges.*

impact from this discharge. Table 4 which comes from the Applicant's ES contains the EQS values[22] which are used by this report.

Table 4 Contaminant concentrations in process waste water

Contaminant	**Maximum Concentration (ug/l)**	**EQS (ug/l)**[21]	**Concentration Measurement Criteria**
Total Ammonia	776	21	Annual Average
Copper	80	5	Annual Average
Zinc	1000	40	Annual Average
Nickel	200	20	Annual Average
Lead	80	7.2	Annual Average
Free Chlorine	10	10	95th percentile

5.22 There will be small quantities of metal contaminants (lead, copper, zinc and nickel) discharged at W2 (ES chapter 10). In the plume these contaminants will be buoyant for the majority of tidal states and primarily extend to the east and west of the discharge point see Figure 5. The Applicant found that Scenario 1 (the Project's CHP Plant and LNG Terminal integrated) and Scenario 3 (the Project operating alone for 2 weeks per year) have been considered as the worst case scenarios. Taking into account the maximum background concentrations, the relevant EQS values will be achieved at the following distances from outfall W2:

- zinc: 5m (Scenario 1) and 13m (Scenario 3)
- lead: 1m (Scenario 1) and 3m (Scenario 3)
- copper: 1m (Scenario 1) and 5m (Scenario 3)
- nickel: 1m (Scenario 1) and 2m (Scenario 3)

5.23 The Applicant concludes that levels of metal contaminants in the water column will be diluted to the relevant EQS levels within a short distance from the discharge point (maximum distance of 13m), and only a small area will be affected, therefore the impact will be *de minimis*. Concentrations will quickly fall to within the natural background concentrations within the Milford Haven Waterway. Due to the mobile nature of fish species (i.e. river lamprey, sea lamprey, allis shad and twaite shad) and the small size of the mixing zone where levels are above EQS, direct toxic effects and the bioaccumulation of metals up through the food chain are considered by the Applicant to be limited. As most of the Waterway will be unaffected by the discharge, it is considered unlikely that the discharge will create a barrier to the migration of fish. For grey seal and otter, South Hook Jetty is not considered to be a key area for either species and they are capable of foraging over large areas for a variety of food items. NRW has agreed that these are conservative upper limits for the contaminants within the waste water and advises that that the Applicant's ES properly considers the impact from this discharge.

5.24 There are currently no permitted levels for these substances for the LNG Terminal. However NRW in their written representation agree that the Applicant has demonstrated that these will be at such levels within the discharge they believe that will not adversely affect the integrity of the site (with integrated operation in scenario 1 leading to overall improved water quality). They suggest that the

[22] *https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298245/geho0810bsxl-e-e.pdf*

mitigation provided through Schedule 2 Requirement 8 and the Environmental Permit will ensure that levels remain at or below the assessed levels there needs to be a guarantee that the quoted levels will not be exceeded.

5.25 **Chlorine's** EQS value is 10 ug/l and it is a Water Framework Directive specific pollutant. Chlorine gas when it is dissolved in water reacts quickly with other substances in water or dissipates as a gas. Taking into account the maximum background concentrations, EQS levels in the water will be achieved at the following distances from the outfall at W2 (from the Applicant's HRA): -

- Scenario 1 (CHP Plant and LNG Terminal integrated) - 2m
- Scenario 2 (LNG Terminal operating alone) – 3m
- Scenario 3 (the Project working alone) - at source
- Scenario 4 - not stated in the HRA Report

This means that there is a very slight reduction in distance under the normal operation of the Project. This is not expected to have an effect on the integrity of the feature of the SAC, however to ensure that the features are fully protected Schedule 2 Requirement 8 requires that waste water from the operations of the Project will the existing discharge levels for those substances specified in the LNG Terminal's Environmental Permit.

5.26 **Scour and sediment quality** will not impact on the sea bed and features of the SAC. The RIES states that the combined discharge flow from W2 will be 25.19 l/s (90.68 m^3/hr). The Applicant's ES indicates that the existing consented discharge from the LNG terminal is 45.6 l/s (164.16 m^3/hr). The existing consented discharge of freshwater for the LNG Terminal alone is 346m3/hour which will be reduced to 164 m^3/hr following integration of the CHP Plant. The discharge plume from W2 will be buoyant, and no seabed scouring is expected as it is located 3.24m above the seabed. As the discharge is buoyant the Applicant does not consider that the discharge will come in contact with the sea bed so will not disperse sediments from the bed of the Waterway.

5.27 The Applicant and NRW have agreed that the details of the drainage system will be approved by the relevant planning authority in agreement with NRW. This will ensure that safeguards within the drainage system to allow the SoS to conclude that there is no reason that the environmental permit cannot ensure discharge limits for the outfall. The statement of common ground between the Applicant and NRW agrees that mitigation within Schedule 2 **Requirement 8** will ensure there is no deterioration in water quality from discharges into the Milford Haven Waterway during operation of the Project. Schedule 2 Requirement 8 requires that waste water from the operations of the Project will use the existing infrastructure for the LNG terminal and that there is no increase in the existing discharge levels for chlorine and nitrogen from the LNG terminal's Environmental Permit. Surface water run-off from the Project was assessed by the Applicant and they predict no change in pollutants entering the Waterway during construction of the Project

5.28 The statement of common ground between the Applicant and NRW states that if mitigation is put in place in accordance with Schedule 2 **Requirement 8** of the DCO there will be no adverse effect on the integrity of the Pembrokeshire Marine SAC.

5.29 **The SoS therefore concludes that the predicted impacts from the Project's outfall and surface water drainage are not considered to have an adverse impact on the integrity of the Pembrokeshire Marine SAC.**

Aerial emissions

5.30 The RIES identifies the features within the Pembrokeshire marine SAC sensitive to air quality (defined by APIS[23]) are estuaries, mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, shore dock, sea lamprey, river lamprey, allis shad, twaite shad and otter. NRW confirmed verbally at the issue specific hearing during examination that they do not consider there will be an adverse impact on otters. This report therefore does not further consider this feature.

5.31 Aerial emissions from Project during operations include NOx concentrations, N (Nitrogen) deposition, acid deposition and inputs into the catchment. The ES found that the Project in operation with the LNG Terminal will result in a decrease in Nitrogen and acid deposition on all SACs/ SPAs within 15km of the scheme. This is in comparison to the existing maximum consented emissions from the LNG Terminal operating alone (scenario 2).

5.32 Nitrogen is a major growth nutrient; all plants need Nitrogen in order to grow[24]. Vascular plants normally take up most of their Nitrogen through their roots. Non vascular plants can absorb it through their entire surface (e.g. lichens and bryophytes). Most plants use reactive N, but some can use organic N, e.g. amino acids. If carbon assimilation is restricted, e.g. by insufficient phosphorous, light or water, then N can potentially accumulate to excess and become toxic making N a pollutant. Too much N is accepted as one of the main drivers of biodiversity change across the globe (Sala et al 2000[25]). Communities most at risk from N eutrophication are those rich in bryophytes and where species richness is comprised of slow growing species. Many semi-natural plants do not have the capacity to assimilate nitrogen in the presence of increased N availability (e.g. from N deposition emitted by a power station) and can be outcompeted by plants that can, e.g. many grass species. This species loss is caused by shading by other plants or an inability to compete for other limiting resources. Low growing species such as forbs and non-vascular plants are especially at risk of being outcompeted. Such species replacements can lead to a loss of specialised communities and ecosystems, e.g. heathland transformed into grassland (Bobbink and Heil, 1993[26]). N deposition can also cause acidification of soils and increase the risk of damage from other environmental stress factors, e.g. drought and frost. APIS highlights that once N deposition

[23] *www.apis.ac.uk*

[24] *http://www.apis.ac.uk/overview/pollutants/overview_N_deposition.htm.*

[25] *Sala, O.E.* et al *(2000) Global Biodiversity Scenarios for the Year 2100.* Science ***287****, 1770 (2000).*

[26] *Bobbink, R. and Heil, G.W. (1993) Atmospheric deposition of sulphur and nitrogen in heathland ecosystems.* Heathland: Patterns and Processes in a changing environment *(eds. R. Aerts & G.W. Heil), pp.25-50. Geobotany 20. Kluwer, Dordrecht.*

exceeds the demands of sensitive plants, semi-natural ecosystems are at risk of species loss and changes in structure and function.

5.33 There are some species and habitat features listed within APIS as being sensitive to Nitrogen enrichment but no minimum critical load is listed. The Applicant has considered these as part of a catchment-wide assessment of N inputs from the Project. Within the Marine SAC some features are not considered by the Applicant, because there is no direct input of N into the water (from aerial emissions), so there is no pathway of N to cause an impact on these features.

5.34 The Applicant did not find a LSE for N deposition within their shadow HRA however the RIES did identify a LSE. The nutrient nitrogen deposition within scenario 1 is predicted by the Applicant to be less than the existing maximum emissions from scenario 2. So the Project will results in a decrease in nitrogen deposition at all sites.

5.35 The Applicant did not assess scenarios 3 or 4. Scenario 3 is where the Project's CHP plant operates on its own, therefore the emissions will be far below scenario 1 where the Project is operating alongside the LNG Terminal. Scenario 4 is where the CHP plant and LNG terminal will operate independently at capacity. The Applicant's shadow HRA states that this will only occur in exceptional circumstances as there will need to be an equipment failure that still allows both plants to operate independently at capacity. However scenario 1 has been assessed as the CHP plant operating at capacity and the LNG Terminal operating in excess of its capacity at the expected consented limits, using the worst case meteorological data from five years' worth of data. The Applicant therefore considers that this scenario take a worst case long-term approach to the emissions from the differing scenarios. NRW in their statement of common ground agrees with the Applicant's methodology within the assessment for the shadow HRA and ES chapters 10 and 11. NRW agreed that the assessment undertaken covers all operating scenarios. NRW considers that the DCO (including Requirement 8) for the Project will ensure the integration of operation of the Project's CHP Plant with the LNG Terminal.

5.36 Features within the site are considered sensitive to acid deposition by APSI however there is only a critical load for active raised bogs. However both scenarios 1 and the existing scenario 2 are predicted to be less than 1% of the minimum critical load. So the RIES does not consider that this will impact on the integrity of the site.

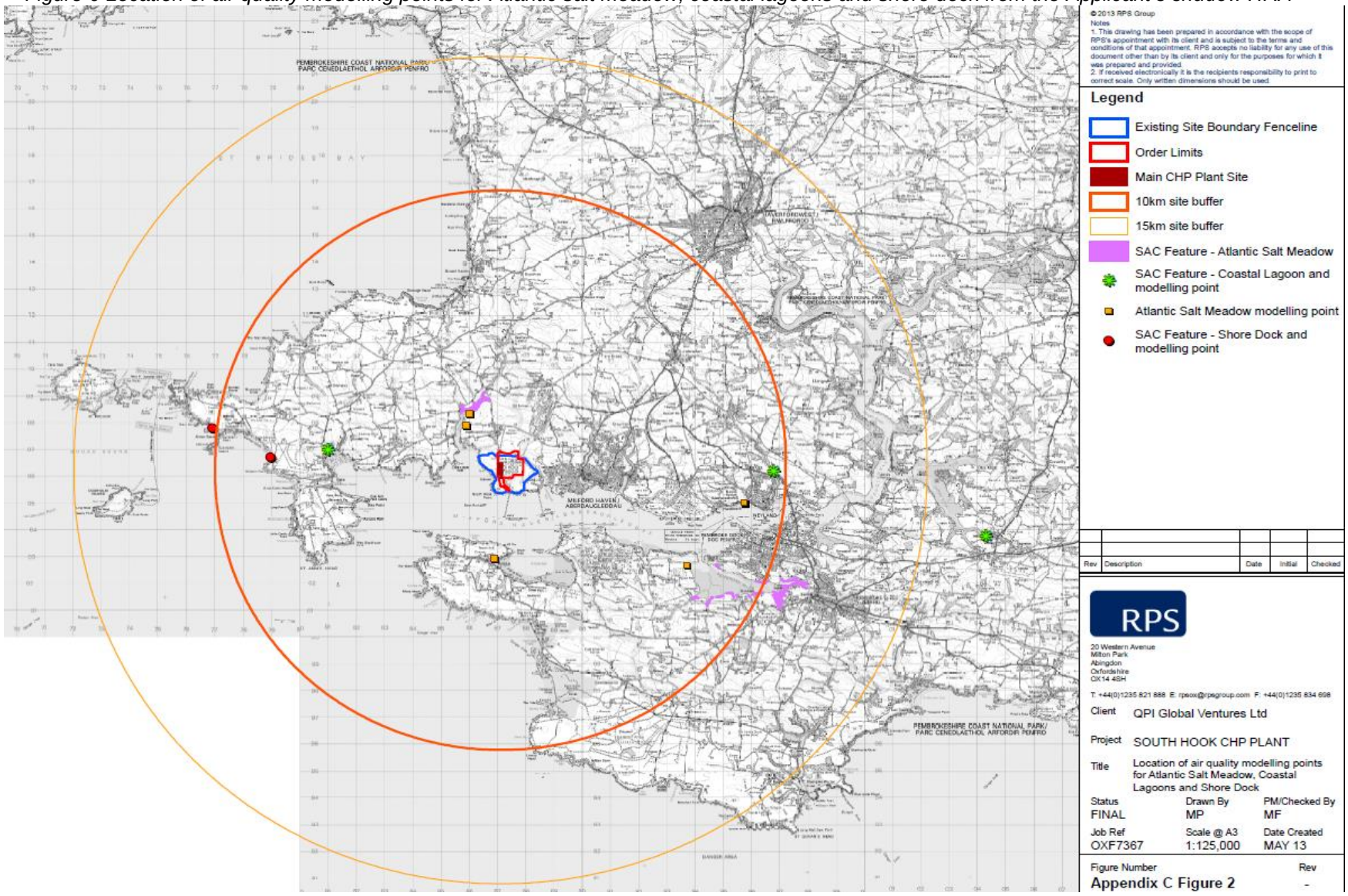
Table 5 additional Nutrient N deposition modelling for Coastal Lagoons, Atlantic salt meadows & shore dock from the Applicant's shadow HRA.

Site name	Habitat/ interest feature	Sensitive to N deposition?	Min. CL	Existing deposition (kg/ha/yr)	Scenario 1			Scenario 2		
					PC	PC % min CL	LSE	PC	PC % min CL	LSE
Pembrokeshire Marine SAC	coastal lagoons	Yes	20	7.28	0.0282	0.1%	No	0.0434	0.2%	No
	Atlantic salt meadows	Yes	20	8.54	0.628	0.3%	No	0.1128	0.6%	No
	shore dock	Yes	10	8.54	0.0196	0.2%	no	0.0319	0.3%	No

5.37 For both scenarios, the predicted N process contribution for assessment points immediately adjacent to Scheme boundary with the Pembrokeshire Marine SAC is greater than 1% of the critical loads for the following features: estuaries, coastal lagoons, Atlantic salt meadows and shore dock. This meant the Applicant undertook further analysis. For Atlantic salt meadows, coastal lagoons and shore dock the process contribution from the Scheme at the locations where these features are known to occur was modelled (Figure 6). When this additional modelling was carried out, it was found that predicted process contribution at these all points was <1% of the minimum critical loads.

5.38 For the estuaries feature of the SAC the Applicant considered it more appropriate to assess the effect on this habitat via catchment N modelling, given that the Estuary habitat is regularly flushed by tidal inundation. This also applies to mudflats and sandflats not covered by seawater at low tide habitats and to brook lamprey, river lamprey, sea lamprey and bullhead, which all do not have a critical load defined in APIS.

Figure 6 Location of air quality modelling points for Atlantic salt meadow, coastal lagoons and shore dock from the Applicant's shadow HRA



5.39 The catchment modelling of N inputs showed that the operation of the Project will result in a decrease in N inputs to the catchment compared to the current maximum consented N input from the LNG. The RIES identifies that the Applicant's catchment modelling shows the percentage of total nitrogen inputs for Scenarios 1 and 2 are both <1% of the total catchment nitrogen input estimates. Scenario 1 will result in a lower annual nitrogen input to the catchment than currently consented maximum of the LNG Terminal alone (Scenario 2), and as such the CHP Plant will not therefore contribute to further eutrophication.

Total Nitrogen

5.40 In order to demonstrate there is no increase in emissions to the SAC the Applicant also assesses total N emissions from water to air. The Applicant provides information on the discharges to water within the different scenarios in table 3.8 of chapter 10 appendices in the ES. The highest emissions are under scenario 3 and these are 0.776 mg/l with a flow rate of 0.00394 m^3/s for ammonia. For scenario 1 the amount of N discharged from aerial emissions is 1499 kg/yr. The Applicant did not assess the aerial impacts from the Project alone as they are not envisaging operating in that manner. NRW accept this and within their HRA assessment for the environmental permit they provide further calculations to justify their decision. The LNG Terminal emissions to air will remain unchanged however their daily discharge rate is predicted to be lowered from 3500 to 3100 m^3/ day. This lowers the annual emissions of nitrates by the LNG Terminal. NRW have assessed changes in total Nitrogen by offsetting the improved amount of nitrates released by the LNG Terminal within their discharges with the additional total N released through the Project's CHP Plant. They found that this still had a reduction of 5705kg/ year of Nitrogen. When the CHP plant and LNG Terminal are operating in an integrated mode there will be further reductions, in emissions to air (and less nitrates in the waste water) from the LNG Terminal as the emissions from the LNG Terminal SCVs will be avoided through the heating that the CHP Plant enables.

5.41 Requirement 8 of the DCO provides that aerial emissions must not increase overall nitrate loads beyond that consented by the existing environmental permit, and must ensure no adverse effect on the integrity of the SAC. This means that the Applicant will only be able to operate the CHP plant to the extent that the current consented emissions are not exceeded. This will ensure that the Project can only use the CHP plant and LNG Terminal working in independent mode (scenario 4) to the extent that it does not increase emissions above current consented levels or create an adverse effect on the integrity of the SAC.

5.42 NRW's statement of common ground with the Applicant agrees that this study shows nitrate inputs from the Project's CHP Plant and LNG Terminal represent less than 1% of the nitrate inputs to Milford Haven Waterway. The Applicant's ES considers that this level of emission will not represent a priority for control, the major inputs being from agriculture and waste water treatment works. NRW agrees with the conclusion that operation of the Project, operating as designed in CHP mode as its principal mode of operation, will result in a decrease in NOx concentrations and N deposition at all SAC/SPAs compared with that resulting from the existing maximum consented limit. They further confirm they agree with the assessment's conclusion that the operation of the CHP Plant,

operating as designed in CHP mode, as its principal mode of operation, will also result in a decrease in total N input to the Pembrokeshire Marine SAC, compared with that resulting from the existing maximum consented limit. As operations of the Project are further regulated through the Environmental Permitting regime if necessary further mitigation could also be required under the Environmental Permit. However there is already mitigation to ensure existing levels contained within the DCO.

5.43 The ES assessment has demonstrated that there will be no increase in pollutants associated with acidification and/or nutrient enrichment and with the Project and LNG Terminal operating in an integrated mode there will be a reduction in emissions. **The SoS agrees that the LSEs identified will be mitigated through the Requirement 8 & 13 in schedule 2 of the DCO. The SoS is therefore satisfied that there will be no adverse effect on the Pembrokeshire Marine SAC from air quality impacts, hydrological changes or fragmentation from the aqueous discharge into the Milford Haven Waterway from construction or operation of the Project.**

6 The Cleddau Rivers SAC Conservation Objectives

6.1 The Cleddau Rivers SAC have been designed on the basis of the important features listed in Annex A. The Cleddau Rivers is one of the western most rivers in Britain. The ecological structure and function of the site are dependent on hydrological and geomorphological processes, the quality of riparian habitats and connectivity of habitats. Animals such as otters and fish move around and sometimes leave the site. This means that these features may also be affected by factors outside the SAC. All of the qualifying features which could be affected by the project are considered in this section:

- Water courses of plain to montane level (with the *Ranunculion fluitantis* and *Callitricho-Batrachion)*
- Active raised bog
- *Cottus gobio*; Bullhead
- *Lampetra planeri;* Brook lamprey
- *Lutra lutra;* Otter
- *Petromyzon marinus*; Sea lamprey and;
- *Lampetra fluviatilis*; River lamprey.

Assessment of effects on the Cleddau Rivers SAC from the project alone

Aqueous emissions

6.2 The Project will discharge process waste water to the Milford Haven Waterway using the existing LNG Terminal infrastructure. This discharge has been assessed for the Pembrokeshire Marine SAC and this assessment should be read in conjunction with the findings above. The Applicant within their shadow HRA looked at how the contaminants within these emissions may cause barrier effects on river and sea lamprey that migrate from the Cleddau Rivers SAC.

6.3 The Applicant undertook detailed dispersion modelling of this process waste water, examining the potential effects of: temperature, metals, chlorine and ammonia on the receiving water column. An assessment of the Nitrogen mass balance for the Scheme demonstrated that the Scheme operating together with the LNG Terminal will give rise to an overall decrease in Nitrogen deposition into the Milford Haven Waterway catchment compared to the maximum consented emissions from the LNG Terminal. The discharge of aqueous emissions will be controlled under the existing LNG Terminal permit ensuring that no increase in discharge of nitrates to the Waterway. The RIES concludes that the Applicant found no adverse effect on the Pembrokeshire Marine SAC features so the lamprey which might migrate from the Cleddau River through the Marine SAC will not be detrimentally affected from process waste water discharge. Requirement 8 and 13 within schedule 2 of the DCO will provide mitigation through a CEMP and surface water drainage strategy.

Aerial emissions

6.4 This report has reported on the Applicant's assessment of aerial emissions within the Pembrokeshire Marine SAC section 5 and this should be read in conjunction with the following assessment. The Applicant concluded that the Project in operation with the LNG Terminal will result in a decrease in Nitrogen and acid deposition on all SACs /SPAs within 15km of the Scheme, compared to the existing maximum consented emissions from the LNG Terminal operating alone.

6.5 The Applicant's HRA reports that the predicted process contribution for NOx is less than 1% of the Annual Average Air Quality Objective of 30µg/m3 for Cleddau Rivers SAC. The RIES notes that the predicted process contribution for NOx is >1% of the Daily Average Air Quality Objective of 75µg/m3, however the predicted environmental concentration is <70% of the Daily Average Air Quality Objective for all the sites.

6.6 The RIES does not find that acid deposition will affect site integrity, although the features within the SAC are considered sensitive to acid deposition by APIS. The Critical Load Function is only available on APIS for active raised bogs. For both scenarios 1 and 2, the process contribution is predicted to be less than 1% of the minimum Critical Load Function.

6.7 The Applicant's HRA considers the habitats themselves are not sensitive to direct nitrogen atmospheric deposition; it is the cumulative input of nitrogen within the catchment via leaching to watercourses that contributes to eutrophication of these habitats. The catchment modelling of nitrogen inputs showed that the operation of the Scheme will result in a decrease in nitrogen inputs to the catchment compared to the current maximum consented nitrogen input from the LNG. The Project's CHP Plant will not therefore contribute to further eutrophication.

6.8 For both scenarios 1 and 2, the predicted process contribution for nutrient nitrogen deposition is <1% of the minimum critical load for active raised bogs. This means that there is no impact on integrity of this feature of the SAC.

6.9 **The SoS agrees that the LSEs identified for this site will be mitigated through Requirements 8 & 13 in schedule 2 of the DCO and further mitigation could be required under the Environmental Permit. The SoS is therefore satisfied that there will be no adverse effect on the Cleddau Rivers SAC from air quality impacts, hydrological changes or fragmentation from the aqueous discharge into the Milford Haven Waterway.**

7 Pembrokeshire Bat Sites and Bosherston Lakes SAC Conservation Objectives

7.1 Bosherston Lakes in south-west Wales were created by damming a limestone river valley[27]. The lakes are fed in part by a series of calcium-rich springs and are isolated from the sea by a small sand dune ridge. The lakes are important for their vegetation, including bristly, delicate, common and fragile stoneworts. The site is especially important for its population of greater horseshoe bat. Greater and lesser horseshoe bats are among at least ten species of bat utilising the surrounding woodland and swampy lakeside margins as feeding flyways. The lakes are notable for their population of otters. The SAC comprises important breeding sites and transitory roosts for these two rare bat species. The South Hook Fort bat roost is outside the SAC boundary but is to the West and at the nearest point 500m from the Project's CHP Plant. This bat population is considered by NRW to be the same population using this SAC and the Limestone Coast of South and West Wales SAC. As part of assessing this Project the performance indicator from the site's core management plan for suitable roost (including roosts outside the SAC) is important. It states that these roosts should be maintained and there should be no physical deterioration in or disturbance of these sites. Of relevance to this report there is also a requirement to ensure there is no loss of roosting opportunities within 1-16 km radius of the key breeding roosts within the SAC[28].

7.2 The vision for the site was set out by CCW and is now taken forward by NRW[29].

Assessment of effects on the Pembrokeshire Bat Sites and Bosherston Lakes SAC from the project alone

Aqueous and aerial emissions

7.3 **Aqueous emissions** could impact on otters migrating through the Milford Haven Waterway, for the same reasons set out for Pembrokeshire Marine SAC and the Cleddau Rivers SAC otters. The SoS is satisfied that there will not be an effect on the integrity of this feature from the Project.

7.4 **Aerial emissions -** as with the other European sites within 15km of the CHP Plant the Applicant concluded that the Project in operation with the LNG Terminal will result in a decrease in Nitrogen and acid deposition, compared to the existing maximum consented emissions from the LNG Terminal operating alone.

7.5 The Applicant's HRA reports that the predicted process contribution for NOx is less than 1% of the Annual Average Air Quality Objective for this SAC. The predicted process contribution for NOx is

[27] http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape/special-sites-project/north-to-rhos-sac-list/pembs-bat-sites-and-bosherston.aspx 29/9/2014

[28] CCW (2008) core management plan including conservation objectives for Pembrokeshire bat sites & Bosherston lakes SAC.

[29] http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape/special-sites-project/north-to-rhos-sac-list/idoc.ashx?docid=37c4bc9e-1149-4cd7-9afa-313671c7fa0c&version=-1. 29/9/2014

>1% of the Daily Average Air Quality Objective, however the predicted environmental concentration is <70% of the Daily Average Air Quality Objective for all the sites.

7.6 The RIES does not find that acid deposition will affect site integrity, although the features within the SAC are considered sensitive to acid deposition by APIS. For both scenarios 1 and 2, the process contribution is predicted to be less than 1% of the minimum Critical Load Function.

7.7 In terms of the species features of this site both scenarios 1 and 2, the predicted PC is <1% of the minimum critical load for greater and lesser horseshoe bats. No critical load is available for "Hard oligomesotrophic waters with benthic vegetation of *Chara* species" and otter but these are aquatic features not considered by APIS to be sensitive to direct nitrogen deposition, as is otter.

7.8 The Applicant's catchment modelling of total nitrogen inputs within the shadow HRA showed that the operation of the Project will result in a decrease in nitrogen inputs to the catchment compared to the current maximum consented nitrogen input from the LNG Terminal. The catchment modelling also shows the percentage of total nitrogen inputs for Scenarios 1 and 2 are both <1% of the total catchment nitrogen input estimates. For these reasons the RIES writes that the Project's CHP Plant will not contribute to further eutrophication.

7.9 Any further mitigation necessary for operation of the site can also be required by NRW under the Environmental Permit. **The SoS therefore concludes in line with previous assessments and the RIES that there will not be any effects on the integrity of the SAC habitat features and the greater horseshoe bat from aerial emissions.**

Noise / vibration - Construction

7.10 An assessment of noise by the Applicant showed that there is noise committing from the Project during construction that could impact on bat features of this site. The noise includes construction of the CHP Plant and delivery HGVs. The exact construction scenarios are not known yet. However, the Applicant's shadow HRA identifies that construction operations have the potential to reduce the number of bats using the roost if noise and vibration levels are such that bats are:

- adversely affected by noise levels within the South Hook roost;
- deterred from using flight lines to and from the South Hook Fort roost;
- deterred from using foraging habitat by excessive noise levels; or
- affected by vibration levels of significant magnitude to damage the structural integrity of the roost.

7.11 In order to assess these potential effects, the Applicant as part of the ES undertook the following studies

- counts of bats within the roost;
- bat activity surveys to assess patterns of bat use in and adjacent to the Project site;
- an assessment of construction noise and vibration levels.

7.12 These studies found that the bats use South Hook Fort mostly during the hibernation period, with 127 hibernating greater horseshoe bats recorded in 2012. Activity surveys demonstrated that

greater horseshoe bats commute from the roost sites in the fort to foraging areas in the wider landscape. No greater horseshoe bats activity was associated with the Project site which the Applicant considered to have a low suitability as foraging habitat and is considered to be of negligible value.

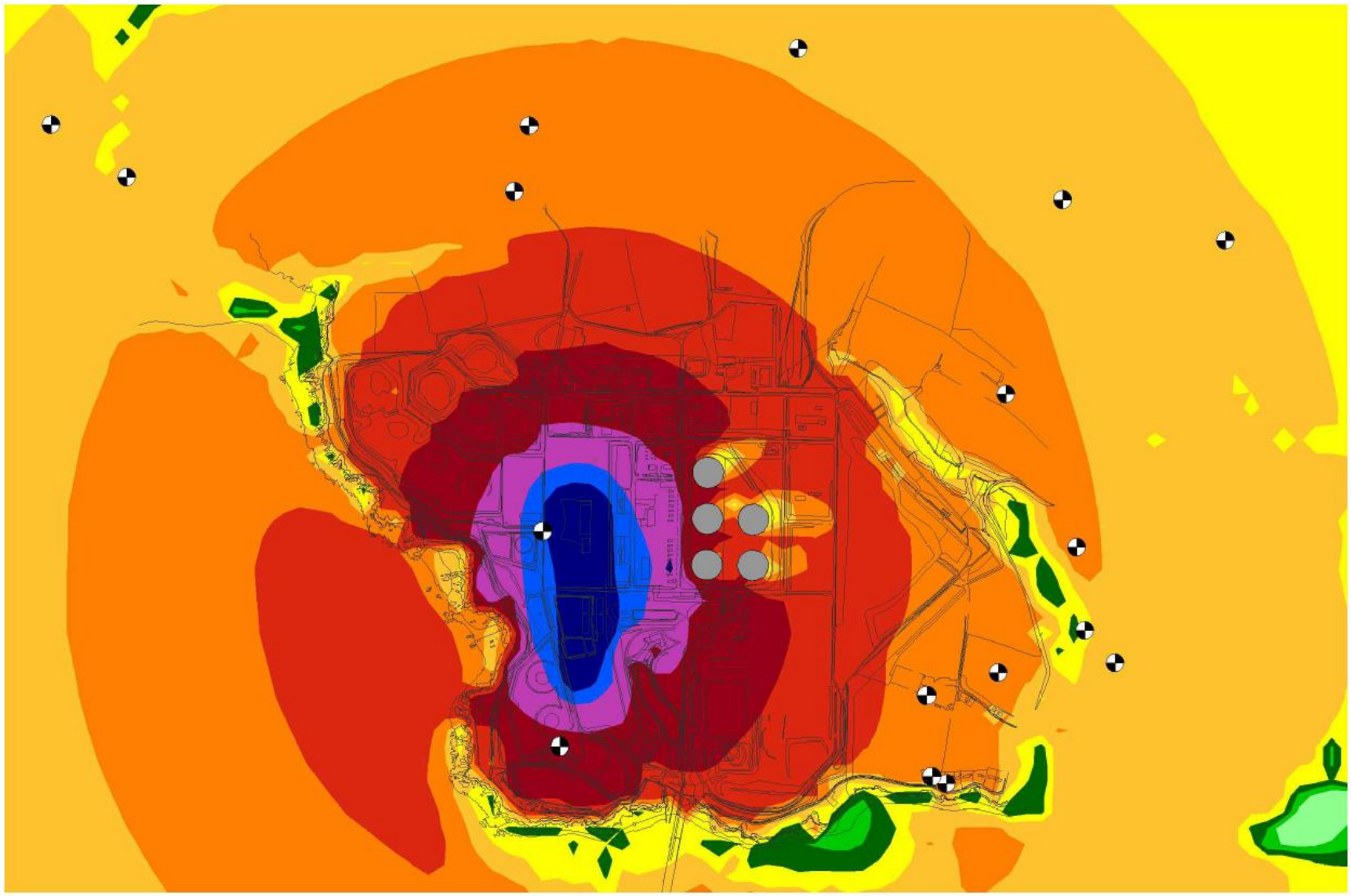
7.13 The Applicant's shadow HRA found that the 100m distance from the South Hook Fort to the site boundary is sufficient separation that **vibration** levels will not have a detrimental effect on the structure of the fort, or cause disturbance of the roost during construction.

7.14 The Applicant's shadow HRA finds that the maximum **construction noise** levels at ground level in South Hook Fort are predicted to be between 65-70 dBA LAeqT. The RIES notes that, noise will not impact below ground gun emplacements where the main winter hibernation roost is typically located and construction noise levels are not anticipated to disturb roosting or hibernating greater horseshoe bats. Key flight lines along the coastal cliffs lie outside the Project and LNG Terminal site and will remain unaffected (HRA Report chapter 7). During activity surveys bats were not found to be foraging or using the Project site including NCA as a dispersal corridor.

7.15 Construction noise will be controlled via a Noise Management Plan which forms part of the CEMP and secured by DCO Schedule 2 Requirement 13. Normal construction hours will be from 07:00 until 19:00 hours, except in exceptional circumstances as agreed with the local authority. Consequently there will be minimal overlap between the active construction operations and times when greater horseshoe bats will be active at night during the main activity season (April – October). The RIES recognises that this will eliminate the potential for significant impacts on greater horseshoe bat foraging and commuting behaviour during the majority of the construction period.

7.16 NRW in their statement of common ground has advised that this mitigation can reduce and avoid the impacts and that on the basis that agreed mitigation is put in place in accordance with the DCO requirements and their Environmental Permit, there will be no adverse effect to the integrity of Pembrokeshire Bat Sites and Bosherston Lakes SAC.

Figure 7 predicted construction noise during the day from the Applicant's shadow HRA.



Noise / vibration - Operational impacts

7.17 Predicted **operational noise** levels at the South Hook Fort are 32 dB LAeq during scenario 1 (integrated operation) and 39 dB LAeq where the Project and the LNG Terminal are operating separately. The highest levels expected on the nearest site boundary to the fort (along the NCA) are 54 dB LAeq during integrated operation and 57 dB LAeq during separate operations. These noise levels are not considered likely to affect the bats, as surveys have confirmed there is not a high degree of foraging or commuting activity in the Project site and NCA.

7.18 The Applicant considers it unlikely that during operation there will be any ultrasound noise levels beyond 40m from any significant items of proposed plant. Vibration from the operational plant will typically be below baseline levels beyond the site boundary and, therefore, will not be significant at receptors outside of the site.

7.19 Greater horseshoe bats are not tolerant of elevated **light levels**. Lighting can affect roosting, foraging or commuting behaviour (Applicant's extended HRA summary, ES). Bats are reluctant to fly across lit areas. The CHP Plant will be lit for safety and operational reasons; however a lighting scheme for construction and operation will be prepared and approved by the relevant local authority in consultation with NRW prior to development commencing. The Applicant's shadow HRA confirms that lighting will be designed in accordance with relevant guidance to minimise disturbance on ecological receptors and avoid light spillage around bat roosts, along bat flight corridors and in high quality wildlife habitats. It is also anticipated that there will no working during the night from April to October. The area that might have night work during this time period is the CHP Plant itself which is 500m from the fort at its nearest point. Key flight lines along the coastal cliffs outside of the Nature Conservation Area will be unaffected and the Applicant also confirms there will be no change to the eastern boundary of the Nature Conservation Area. NRW within the written representation advise using their suggested wording within Schedule 2 Requirement 16 to ensure that safeguards are in place to mitigate any light pollution impacts and ensure no adverse effect on the integrity of the SAC. This will be secured through the DCO for this Project.

7.20 In its statement of common ground with the Applicant, NRW states that it will regulate (and monitor) **noise** during commissioning, operation and decommissioning using the Environmental Permitting regime. Construction noise is also mitigated through Requirement 13 and the use of a Construction Environmental Management Plan.

7.21 Other mitigation is secured through **Requirement 20 Schedule 2** requiring a specific scheme for protection and mitigation of bats; Requirement 11 for an ecological management plan; Requirement 16 for external lighting details mitigating the effects on bats. All the requirements within the DCO need to be produced and implemented after consultation with NRW.

7.22 The statement of common ground between the Applicant and NRW states that potential for effects on the greater and lesser horseshoe bat population utilising the Pembrokeshire Bat Sites and Bosherston Lakes SAC has been addressed in the Applicant's shadow HRA. If protection and mitigation of bats is put in place in accordance with **Requirement 11, 13, 16, 20 Schedule 2** of the

DCO there will be no effect on the integrity of the SAC. **The SoS is therefore also satisfied that there will be no adverse effect on the Pembrokeshire Bat Sites and Bosherston Lakes SAC.**

8 Limestone Coast of South and West Wales SAC Conservation Objectives

8.1 The SAC comprises important breeding sites and transitory roosts for greater horseshoe bats. The South Hook Fort bat roost near the Project is outside the SAC boundary but this bat population is considered by NRW to be the same population using this SAC and the Pembrokeshire Bat Sites and Bosherston Lakes SAC.

Assessment of effects on the Limestone Coast of South and West Wales SAC from the project alone

8.2 Aerial emissions have been assessed for each of the previous protected sites. The ES assessment demonstrates that there will be no increase in pollutants associated with acidification and/or nutrient enrichment and with the Project and LNG Terminal operating in an integrated mode there will be a reduction in emissions. These assessments are not repeated for this site. No critical load is available for 'Vegetated sea cliffs of the Atlantic and Baltic coasts' feature. However as for both scenarios 1 and 2, the predicted Process Contribution is <1% of the minimum critical load for all features considered sensitive to nitrogen deposition that have critical loads defined by APIS. The predicted Process Contribution is lower for Scenario 1 than Scenario 2; therefore the proposed integrated operational mode of the Project with the LNG Terminal will result in a decrease in nitrogen deposition at all sites when compared with the existing maximum emissions from the LNG Terminal alone.

8.3 The RIES states that the 'Vegetated sea cliffs of the Atlantic and Baltic coasts' and petalwort features are not sensitive to acid deposition according to APIS.

8.4 Noise, vibrations and lighting impacts on greater horseshoe bats have been assessed in section 7 for Pembrokeshire Bat sites and Bosherston lakes SAC. As these are all considered the same population the SoS will not repeat the assessment on greater horseshoe bats using the South Hook Fort bat roost above.

8.5 **The SoS is therefore also satisfied that there will be no adverse effect on the Limestone Coast of South and West Wales SAC.**

9 Castlemartin Coast SPA Conservation Objectives

9.1 This site is 20 km of rocky coast with sea cliffs of Carboniferous Limestone which hosts an internationally important population of chough[30] birds. It is 1122.32 hectares and overlaps with the Limestone Coast of South and West Wales SAC. Behind the sea cliff edges, species-rich maritime grasslands occur in front of maritime heath that in turn grades into Gorse scrub in more sheltered situations. Rough winter grazing by sheep and cattle maintains the character of the maritime grasslands, which provide feeding areas for chough.

9.2 The conservation objectives for this site include maintaining the 12 breeding pairs of chough, and they will continue to feed roost and breed successfully. The site is 3.5km from the Project site and aerial emissions were identified as having a LSE on the site.

Assessment of effects on the Castlemartin Coast SPA from the project alone.

9.3 As previously described the Applicant concluded that the Project in operation with the LNG Terminal will result in a decrease in Nitrogen and acid deposition on all SACs /SPAs within 15km of the Scheme, compared to the existing maximum consented emissions from the LNG Terminal operating alone. As previously described the Applicant's catchment modelling study has also shown there will be a reduction in annual input of N into the catchment for scenarion1.

9.4 The Applicant's HRA reports that the predicted process contribution for NOx is greater than 1% of the Annual Average Air Quality Objective for Castlemartin Coast SPA / Limestone Coast of South West Wales SAC. However, the predicted environmental concentration is less than 70% of the AQO for both sites. The RIES notes that the predicted process contribution for NOx is >1% of the Daily Average Air Quality Objective, however the predicted environmental concentration is <70% of the Daily Average Air Quality Objective for all the sites. Thus it can be concluded that there will be no significant effects on the habitats that support the chough.

9.5 NRW have not identified or commented on the impact of the Project on this SPA. NRW also scope out any impact on this SAC within their HRA assessment as part of their decision on a Environmental Permit for the operation of the Project. The Applicant also does not find any impact on the integrity of red-billed clough feature of this site. **The SoS is therefore also satisfied that there will be no adverse effect on the Castlemartin Coast SPA from the Project**.

[30] *http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape/special-sites-project/castlemartin-coast-spa.aspx*

10 Assessment of effects of the Project in combination with other plans and projects

10.1 During the construction and at least 20 year operational life time of the Project, there is a potential for a number of impacts generated from existing and future developments that could result in cumulative effects on the SACs and SPAs located near the site. The RIES found two potential impacts on SAC and SPA features are from aqueous and aerial emissions.

10.2 There is a list of 23 projects within paragraph 3.44 above that were considered by the Applicant for their in-combination assessment. These are summarised within the Applicant's ES:

- Current dredge areas (with the nearest dredged area occurring at a distance of 1.1 km from the South Hook jetty and extending out to a distance of 9.55 km);
- Possible future dredge/development areas (with the nearest located at a distance of 1.5 km from the discharge point);
- Aqueous discharges (the nearest of these is Murco, which is located at a distance of 1.4 km);
- Aerial emissions (the nearest stack being located at a distance of 1 km); and
- Renewable projects (the nearest being located at a distance of 7.3 km).

10.3 The Applicant considered the in-combination effects of the grid connection options, although these are not yet a formal plan or project at this stage.

Aqueous emissions

10.4 Dredging or other marine construction/sediment distribution activities will not be undertaken as part of the Project itself, therefore the Applicant's HRA states there will be no additive adverse effect as a result of habitat loss, increase in suspended solids or deposition. There will be no construction in the Waterway for the CHP Plant. The only potential for additive effects from the Project is as a result of an increase in contaminants in the water column from dredging activities in-combination with the discharge from W2.

10.5 Dredging within the Milford haven Waterway takes place over relatively small discrete areas (see Figure 4) which are spatially separated from each other and only for a short duration resulting in temporary increases in contaminants in the water column. There are also a number of discharges into the Milford Haven Waterway. A number of these projects are already built and operational and therefore any potential effect will already be included in the baseline information gathered as part of the Applicant's assessment. The ES also found no spatial overlap between the dredging projects with the modelled plume for the Project's discharge and therefore concludes there can be no synergistic effects.

10.6 The RIES identifies that by considering the maximum distances at which EQS's are achieved (for zinc it is 14m) and as there will be no change in the temperature of the thermal plume, the Applicant's updated matrices consider the likelihood of any in-combination effects on migratory

species from the SAC is remote. The volume of discharge from W2 when the project is operating under scenario 1 is designed to reduce reducing barrier effects compared to the existing consented situation.

10.7 **The SoS therefore concludes that the predicted impacts from the Project's aqueous emissions and other projects are not considered to have an adverse impact on the integrity of Cleddau Rivers Special Area of Conservation; Pembrokeshire Bat Sites and Bosherston Lakes Special Area of Conservation and Pembrokeshire Marine Special Area of Conservation.**

Air Quality

10.8 The Applicant considered the LNG Terminal however as this is a component part of the Project it has also been considered within the impact from the four different operating scenarios. The ES found that the operation of the Project's CHP Plant with the LNG Terminal will result in a decrease in N and acidity deposition on all of the SAC's and SPA's features considered compared to the existing situation. Meaning the in-combination affect will be to reduce aerial emissions.

10.9 The only other project identified in HRA Report for aerial emissions is Pembroke Power Station which is built and operational and therefore included in the baseline. Pembroke Power Station is located approximately 6.5km to the south east of the application site. The Applicant's shadow HRA concludes that there is no potential for in-combination effects from aerial emissions on any SAC/SPAs.

10.10 NRW agree that the extended summary of the shadow HRA and shadow HRA is an accurate summary of the effects of the project on the interest features of the European sites.

10.11 **The SoS therefore concludes that there will not be any adverse effects from airborne emissions on the integrity of SAC or SPAs within 15km of the Project. There is further protection afforded through the Environmental Permitting regime ensuring the details of the operations of the Project do not have any adverse effects on the integrity of the sites**.

11 Conclusions

11.1 This Appropriate Assessment has been undertaken by DECC as the Competent Authority for the DCO in respect of the South Hook Combined Heat & Power Project as required by Regulation 61 of the Conservation of Habitats and Species Regulations 2010.

11.2 The SoS is satisfied that the Applicant has provided sufficient information to enable a robust judgement to be made on the LSE stemming from the construction and operation of the proposed CHP Plant, both alone and in-combination with other plans and projects.

11.3 The assessment has considered the potential for significant effects on, six SPA/ SACs, from the project alone and, where appropriate, in-combination with other projects, in both construction and operation. The assessment has assessed effects from the Project, taking account of the conservation objectives for the site, with the aim of determining whether it can be shown that the Project, as proposed and with the conditions and requirements described, will not have an adverse effect on the integrity of each of the SAC/SPA sites.

11.4 The assessment has identified that significant effects (before mitigation) are likely, or cannot be discounted, from the project alone and/ or in-combination with other projects in relation to the following impacts:

- Fragmentation
- Air quality
- Aqueous emissions
- Disturbance

11.5 The SoS concludes that as the Project's CHP Plant operating together with the LNG Terminal will mean an overall decrease in Nitrogen deposition into the Pembrokeshire Marine SAC catchment compared to the maximum consented emissions from the LNG Terminal. The LNG Terminal and CHP Plant integrated will be the operating scenario for the majority of the time. The discharge of aqueous emissions will also still be controlled under the existing LNG Terminal permit which will ensure that no increase in discharge of nitrates and chlorine to the Milford Haven Waterway. The ES also found that aerial emissions from the CHP Plant operating integrated with the LNG Terminal will result in a decrease in Nitrogen and acid deposition on all SACs/SPAs within 15km of the Scheme, compared to the existing maximum consented emissions from the LNG Terminal.

11.6 The SoS also found no adverse effects on the integrity of Greater Horseshoe Bats. The bats are using South Hook Fort as a bat roost. Construction noise and lighting will be minimised and managed to ensure no adverse effect on integrity. This mitigation is required through the DCO.

11.7 NRW's response to the RIES confirmed that if Requirement 8 was implemented then the Project will not adversely affect the integrity of Pembrokeshire Marine Special Area of Conservation. They were satisfied with the wording of relevant mitigation measures detailed in the draft DCO Requirements. They do not raise any further concerns with the findings of the RIES and confirm that the DCO will ensure no adverse effect on the integrity of the SAC/SPAs from the Project.

NRW have since undertaken a HRA assessment of the Environmental Permit application by the Applicant for the Project. They found no LSEs from the operation of the Project.

11.8 Mitigation for the Project will be secured and delivered through the following DCO requirements within Schedule 2:

- Requirement 6 – Provision, implementation and maintenance of landscaping;
- Requirement 8 – Drainage and aerial emissions;
- Requirement 9 – Contaminated land and groundwater;
- Requirement 11 – Ecological management plan;
- Requirement 12 – Code of construction practice;
- Requirement 13 – Construction Environmental Management Plan;
- Requirement 16 – External lighting;
- Requirement 17 – Construction hours;
- Requirement 20 – European protected species;
- Requirement 24 – Decommissioning.

11.9 The SoS is confident that there are no adverse effects on the integrity of the Cleddau Rivers Special Area of Conservation; Limestone Coast of South and West Wales Special Area of Conservation; Pembrokeshire Bat Sites and Bosherston Lakes Special Area of Conservation; Pembrokeshire Marine Special Area of Conservation; Castlemartin Coast Special Protection Area through airborne emissions or aqueous discharges in view of this mitigation and the protection secured by the Environmental Permitting regime. NRW anticipated that the Project will ensure a reduction in pollution as the LNG terminal and Project will operate together for the majority of time.

11.10 **The Secretary of State concludes that the construction and operation of the 500 megawatt Combined Heat and Power plant burning natural gas, referred to as the 'South Hook Combined Heat & Power Project', as proposed, with all of the proposed avoidance and mitigation actions being implemented in full, will not adversely affect the integrity of any of the SAC or SPA sites assessed within this report either alone or in-combination with other plans or projects.**

11.11 This Appropriate Assessment is positive; there is therefore no necessity for discussion of alternatives or Imperative Reasons of Overriding Public Interest under Article 6(4).

Author: **Toni Scarr, Environmental Manager**

National Infrastructure Consents Team, Department of Energy and Climate Change

Date: **20th October 2014**

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Annex A

Table 6 European and International Sites features

European Designated Sites	Site Features
Cleddau Rivers SAC	• Water courses of plain to montane level (with the *Ranunculion fluitantis* and *Callitricho-Batrachion);* • Active raised bog; • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*); • *Lampetra planeri;* Brook lamprey; • *Lampetra fluviatilis*; River lamprey; • *Romyzon marinus;* Sea Lamprey; • *Cottus gobio*; Bullhead; • *Lutra lutra;* Otter.
Limestone Coast of South and West Wales SAC	• Vegetated sea cliffs of the Atlantic and Baltic coasts; • Fixed dunes with herbaceous vegetation (“grey dunes”); • European dry heaths; • Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia);* • Caves not open to the public; • Submerged or partially submerged sea caves; • *Rhinolophus ferrumequinum;* Greater horseshoe bat; • *Gentianella anglica*; Early gentian; • *Petalophyllum ralfsii*; Petalwort.
Pembrokeshire Bat Sites and Bosherston Lakes SAC	• Hard oligo-mesitrophic waters with benthic vegetation of *Chara* spp.; • *Rhinolophus ferrumequinum;* Greater horseshoe bat; • *Rhinolophus hipposideros* Lesser horseshoe bat; • *Lutra lutra;* Otter.
Pembrokeshire Marine SAC	• Estuaries; • Large shallow inlets and bays; • Reefs; • Sandbanks which are slightly covered by sea water all the time; • Mudflats and sand flats not covered by seawater at low tide; • Coastal lagoons; • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*); • Submerged or partially submerged sea caves; • *Halichoerus grypus* Grey seal; • *Rumex rupestris* Shore dock;

European Designated Sites	Site Features
	• *Lampetra fluviatilis*; River lamprey; • *Romyzon marinus;* Sea Lamprey; • *Alosa alosa;* Allis shad; • *Alosa fallax;* Twaite shad; • *Lutra lutra;* Otter.
Castlemartin Coast SPA	• *Pyrrhocorax pyrrhocorax* Red billed Chough
Skokholm and Skomer SPA	• *Fratercula arctica* Puffin; • *Hydrobates pelagicus* Storm petrel; • *Puffinus puffinus* Manx shearwater; • *Alca torda* Razorbill; • *Asio flammeus* Short-eared owl; • *Larus fuscus* Lesser black-backed gull; • Seabird assemblage of international importance.