

Sizewell C Project

Construction Permitting Habitats Regulations Assessment (HRA) Report Permit CWDA/18: Early Site Discharge

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Construction Permitting Habitats Regulations Assessment (HRA)
Report

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1 PROJECT BACKGROUND

1.1 Introduction

- 1.1.1.1 The Sizewell C Project ('SZC Project') is a consented nuclear power station¹, comprising two UK European Pressurised Reactors™ located north of the existing Sizewell B power station in Suffolk. The Secretary of State's (SoS) Habitats Regulations Assessment (HRA)² (hereafter referred to as the 'SoS HRA') records his decision on the potential for adverse effects on the integrity of European and Ramsar sites as a result of the SZC Project. The SoS HRA was informed by the evidence submitted by Sizewell C Ltd in its Shadow HRA. The SoS HRA therefore records the position with regard to effects on European and Ramsar sites as a consequence of the construction and operation of the Sizewell C Project, and all construction permit applications will be considered and assessed in light of the conclusions of the SoS HRA.
- 1.1.1.2 Permits are required to complete specific works or construction activities (including, for example, water discharges, realignment of channels and other construction activities). A HRA is required to support the permit applications where these are identified as having a risk of an effect on European or Ramsar sites. In relation to Permit CWDA/18, the Competent Authority (Environment Agency, hereafter the 'EA') has determined through its Screening Tool that there is a risk to European and/or Ramsar sites up to 5km downstream of the location of the permit activities and, therefore, a HRA is required to support this application.
- 1.1.1.3 This HRA report therefore provides information to inform the EA's own HRA for the permit application, having regard to the outcome of the SoS HRA, as explained above. Potential effects associated with the proposed activities relevant to construction permits were taken into account within the SoS HRA. Consequently, and as explained above, the assessment for this permit (and all construction permits) is undertaken with cognisance of the outcome of the SoS HRA, but reflecting the (inevitable) greater degree of resolution on the activities relevant to each permit that is now available. Therefore, this assessment is based on an up to date baseline of the existing water environment and modelling which has been undertaken specifically for this permit application and the proposed works associated with it.

¹ The Sizewell C (Nuclear Generating Station) Order 2022. Available online at: <https://www.legislation.gov.uk/uksi/2022/853/contents/made>. [Accessed 25/05/2023]

² Secretary of State (Department for Business, Energy and Industrial Strategy) (2022). Habitats Regulations Assessment for an Application Under the Planning Act 2008: Sizewell C New Nuclear Power Station. Available online at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-011167-SZC-HRA.pdf>.

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2 PERMIT DETAILS

2.1 Introduction

- 2.1.1.1 This supporting document covers early construction discharging activities of surface and groundwater into inland watercourses and to ground, these discharges are associated with the wider development and require consent from the EA. These activities comprise the proposed discharge of either surface water run-off (rainfall-dependent) or groundwater, or both. The receiving receptors for the discharge of treated surface water run-off and / or potential groundwater include the Sizewell Foreshore, the Leiston Drain, Sizewell Belts (tributary of Sizewell Drain), upstream Leiston Drain and an unnamed Internal Drainage Board (IDB) adopted ditch to the north of the Sizewell C Project. The proposed works currently do not include the construction and installation of the outfalls due to insufficient information regarding their design, therefore, those works will form part of a separate permit application and a separate HRA of which this consent will be considered in-combination.
- 2.1.1.2 This permit is required in accordance with the Environmental Permitting Regulations, as it is classed as a Water Discharging Activity, the discharges are proposed to ensure that the hydro and hydrogeological environment remains similar to the existing baseline, via the implementation of sustainable urban drainage principles. Furthermore, the permit is required for the discharge of abstracted groundwater from excavations which are required for the construction of the Proposed Development.
- 2.1.1.3 As standard good site practice and management, the Code of Construction Practice (CoCP) requires a biosecurity risk assessment to be undertaken and a management plan to be implemented to avoid potentially facilitating the spread of invasive non-native species (INNS). The CoCP is secured through Requirement 2 of Schedule 2 of the DCO. No measures are required over and above these standard measures in connection with the proposed works.

2.2 Description of Proposal

- 2.2.1.1 **Table 2.1** provides a summary of the individual discharge streams that are subject to this permit application and HRA, including their locations and further information of the rates and type of discharge. Further information for each outlet location is provided below.

Table 2.1 Proposed Discharging Activities

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Discharge Stream	Outlet Reference and NGR	Receptor	Time scale	Maximum Discharge Rates & Volume	Summary
A	EO1 TM 47654 64054	Sizewell Foreshore (to ground) Greater Sizewell Bay / North Sea (potentially under surge conditions)	36 months (Groundwater discharge maximum of 9 months, however, expected to be a single discharge)	200 l/s 17,280 m ³ /day	Discharge of rainfall-dependent surface water run-off from the Main Construction Area (MCA) and dewatered groundwater and surface water collected in excavations from installation of the desalination plant shaft (intake tunnel). To be discharged via the Temporary Marine Outfall (TMO) to the Sizewell Foreshore.
B	DWO1 TM 47361 64528	Leiston Drain	12 Months (Groundwater discharge up to 6 months)	100 l/s 521 m ³ /day	Discharge of groundwater anticipated to be encountered during installation of the pile caps associated with the SSSI crossing located to the north of the MCA. Groundwater to be dewatered to the Leiston Drain watercourse following treatment.
C	O5 TM 46463 65940	Unnamed ditch running north into Internal Drainage Board (IDB) drain no. 7 (DRN163 G0101)	10-12 years	35.2 l/s 3,042 m ³ /day	Discharge of rainfall-dependent surface water run-off from Water Management Zone (WMZ) 5 within the TCA. Outlet O5 is essentially an overflow outlet for when infiltration is not possible.

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D	O6a TM 45443 63501	Leiston Drain	15 months (Groundwater dewatering for up to 10 weeks) 12 years for discharge from WMZ 6	5 l/s increase to 209.7 l/s 972 m ³ /day Increase to 4,352 m ³ /day (based on 1 in 5-year storm event) 9,319 m ³ /day (based on 1 in 100-year storm event)	<p>Rainfall dependent surface water run-off from part of the AD6 scheme and groundwater anticipated to be encountered from installation of an overbridge over the Leiston Drain. Discharge to be made to the Leiston Drain. The discharge may contain small quantities of groundwater from shallow excavations.</p> <p>The discharge rate and volumes are anticipated to increase at Outlet O6a once the WMZ 6 basin has been constructed and connected to the outlet (which is part of the MDS construction works, separate to AD6) and once the outlet receives highway drainage.</p>
E	O6b TM 45442 63495	Leiston Drain	15 months (Groundwater discharge for up to 10 weeks)	5 l/s Increasing to 191 l/s 972 m ³ /day Maximum discharge volumes (including highway drainage): 11.3 m ³ /day (based on 1 in 5- year storm event) 570 m ³ /day (based on 1 in 100-year storm event)	<p>Rainfall dependent surface water run-off from part of the AD6 scheme (Valley Road and Associated BR19 works) and groundwater anticipated to be encountered from installation of an overbridge over the Leiston Drain. Discharge to be made to the Leiston Drain. The discharge may contain small quantities of groundwater from shallow excavations.</p>
F	O6c TM 45474 63488	Leiston Drain	15 months	5 l/s increase to 64 l/s. 432m ³ /day (excluding highway drainage) 37m ³ /day (with highway drainage) and 133m ³ /day (1 in 100 storm)	<p>Rainfall-dependent surface water run-off from part of the AD6 scheme (Lovers Lane Junction Improvements) and potential small quantities of groundwater (if encountered) from shallow excavations.</p>

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G	O7 TM 46528 63491	Sizewell Belts (tributary of Sizewell Drain)	10-12 years	62 l/s 5357 m ³ /day	Discharge of rainfall-dependent surface water run-off captured from the ACA and discharged via WMZ 7 to the Sizewell Belts.
H	O8a NGR: TM 44625 64013	Upstream Leiston Drain (ordinary watercourse section)	15 months	5 l/s increases to 8.1 l/s with connection to highway drainage. 432m ³ /day without highway drainage. Increase to 451m ³ /day with highway drainage (1 in 5 year) and 476m ³ /day (1 in 100 year)	Rainfall dependent surface water run-off from AD6 scheme (MDS Roundabout) being discharged to an Upstream Section of Leiston Drain. May potentially contain small quantities of groundwater (if encountered) from shallow excavations. As per Outlets O6a, O6b and O6c above, once the highway and BR19 are completed and connected to the outlet, the discharge rate and volume will increase.
I	O8 TM 44466 63737	Leiston Drain	10-12 years	10.6 l/s 916m ³ /day	Rainfall dependent surface water run-off from WMZ 8 which forms part of the Green Rail Route.

2.2.1.2 Further information on each discharge stream is provided in the CWDA/18 Permit Application supporting document³.

³ SZC (2024). CWDA-18 Permit Application Supporting Document (101228245).

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3 SUPPORTING INFORMATION

3.1.1.1 This section provides the best available information at the time of writing, providing contextual data for the assessment, identifying baseline conditions and modelling of potential effects. Any mitigatory measures set out within this section are not being utilised for the Stage 1 Likely Significant Effects assessment, unless specifically referenced within **Table 4.2**. This section is not intended to replace the assessment of Likely Significant Effects or Adverse Effects on Site Integrity, which are provided in **Sections 4 and 5** below. This provides supporting information and details to support the wider assessment of the permit application.

3.2 Sizewell C Drainage Strategy

- 3.2.1.1 Where infiltration is not viable on site, there will be a need to discharge to surface watercourse / to ground (in the case of Discharge Stream A at Outlet EO1). Prior to the construction of the overall surface water network described in the Sizewell Drainage Strategy, provision of early surface water management will be required to limit flow and ensure that surface water reaching the watercourses is of on appropriate quality.
- 3.2.1.2 Where surface water is proposed to be infiltrated to ground, suitable infiltration rates have been confirmed through on-site testing. Where surface water cannot be discharged via infiltration, it will be treated and discharged to existing watercourses or to the Sizewell Foreshore. Maximum discharge rates have been defined by the greenfield run-off rates, defined by catchment areas (as agreed at the DCO submission stage).
- 3.2.1.3 For proposed surface water run-off and groundwater activities, Sustainable Drainage Systems (SuDS) techniques have been prioritised to aid pollution control. The primary pollutant of concern from construction sites is silt / sediment, or suspended solids. The drainage design has therefore been developed such that SuDS are proposed for treatment, maintenance and sustainability benefits, in so far as can be practicable. The methods proposed will provide flood reduction, pollution control and aim to mimic the existing drainage characteristics to prevent impact on designated habitats and species.
- 3.2.1.4 Where reliance on SuDS alone is not considered to be effective, for example due to the presence of other parameters in addition to suspended solids, or due to specific on-site characteristics (such as geological or hydrogeological conditions), additional treatment methods will be incorporated, and discharges will need to be made to receiving watercourses or to ground.
- 3.2.1.5 Proposals for attenuation structures have been designed to cater for the 100-year critical event, with an additional climate change allowance. The rate of discharge to any watercourse will be limited to the equivalent greenfield run-off rate for the site, as appropriate to the existing undeveloped conditions, via the provision of storage and / or flow restrictors (e.g., hydro-brakes or similar). This was agreed at DCO stage (Section 2.2.16 of Drainage Strategy⁴). Flow control systems will constrain the rate of discharge, and

⁴ [EN010012-010766-SZC - Appendix 3 - Part 1.pdf \(planninginspectorate.gov.uk\)](#)

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attenuation storage will be employed when the rate of inflow from the storm run-off is greater than the subgrade infiltration rate or greenfield run-off rate.

3.3 Surface Water Baseline

- 3.3.1.1 A surface water baselining assessment has been undertaken to identify water baseline conditions and to develop proposed limiting values for the discharge of surface water run-off from development areas to watercourses within the Sizewell Belts and Leiston Drain⁵.
- 3.3.1.2 Surface water quality monitoring has occurred at seven locations since 2014, with flow monitoring data being collected at five of the seven locations between 2013 and 2021.
- 3.3.1.3 On completion of the surface water screening exercise a number of sampling locations exhibited inorganic and metal determinant concentrations that exceeded the freshwater Environment Quality Standards (EQS) or Water Framework Directive (WFD) derived criteria. A total of 13 of 69no. samples exceeded the WFD derived criteria for total ammonia. Nitrite concentrations exceeded EQS in 56 of 61no. samples. G5 (which recorded the highest average concentrations of nitrite) is noted to be the location situated in closest proximity to the sewage treatment works.
- 3.3.1.4 A number of samples presented metal concentrations that exceeded the adopted EQS (or M-BAT PNEC) criteria, the majority of these exceedances related to cadmium and manganese which presented 7 of 69no. and 15 of 41no. exceedances respectively, other metal exceedances such as copper, nickel, zinc and iron were limited to less than 3no. samples.
- 3.3.1.5 Limiting values have been proposed for pH, suspended solids and Visible Oil and Grease in line with the early works drainage strategy. These parameters for limiting values broadly align with CIRIA guidance. Limiting Values include:
- pH – all but one of the measurements are within the range for EQS, which is between 6 and 9 pH. Therefore, limiting values of between 6 and 9 pH to align with the EQS will be implemented.
 - Suspended Solids - the data indicates the vast majority of the data points are less than 60 mg/l with less frequent higher values, the limiting value of 60 mg/l has therefore been set.
 - Visible Oil and Grease - Given the results of the baseline monitoring where the vast majority of organic tests recorded concentrations below laboratory LODs, it is proposed to retain the provisional limiting value presented in the Early Works Drainage Strategy where “no visible oil/grease” defines the discharge criteria.

3.4 SSSI Crossing (DWO1)

- 3.4.1.1 An inflow and discharge Surface Water Pollution Risk Assessment⁶ has been undertaken to determine the extent of discharge required for the SSSI Crossing foundations (Discharge Outfall DWO1) and whether the discharge could cause negative impacts to the receiving watercourse.
- 3.4.1.2 The Atkins 2022 monitoring report⁷ found that there were elevated contaminants including inorganics, metals/ metalloids, TPH and PAHs recorded in the groundwater samples tested underlying the MCA and parts of the TCA of Sizewell C. Locally, quality results have been obtained for five boreholes (C3S, C3D, C4S,

⁵ Atkins (2023). Surface Water Quality Flow and Baseline

⁶ Atkins (2023). Inflow and Discharge H1 Assessments – SSSI Crossing Dewatering

⁷ Atkins (2022). Groundwater Monitoring Report (2020-2022) - Main Development Site and Associated Developments.

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C4D and P10) which are in the vicinity of the SSSI Crossing. The screening results show elevated concentrations when compared to freshwater EQSs.

- 3.4.1.3 While exceedances of EQS were identified, all determinands were within one order of magnitude of the screening criteria, except for manganese and nitrite. Based on the above results, the risk to sensitive receptors is considered to be low from the discharge, however, it is recommended to undertake quality analysis for the water dewatered to validate the risk level prior to discharge.
- 3.4.1.4 A hydrogeological conceptual site model (CSM) has been developed for the site of the excavation required for installation of the SSSI Crossing to provide maximum dewatering volumes.
- 3.4.1.5 Assuming both abutments are progressed simultaneously, the worst credible total volume of discharge per day = $237 \text{ m}^3/\text{day} \times 2$ No abutments = $473 \text{ m}^3/\text{day}$. The proposal is that a daily volume of 521 m^3 (approximately $473 \text{ m}^3 \times 1.1$ multiplier) is a conservative value. The mean flow rate is $521 \text{ m}^3/\text{day} / 86400 \text{ s/day} = 0.00603 \text{ m}^3/\text{s}$. Therefore, the maximum flow rate would be 100 Litres per second ($0.1 \text{ m}^3/\text{s}$), which would allow for clearance pumping to be carried out intermittently.
- 3.4.1.6 Three of these – ammoniacal nitrogen, nitrite and phosphorus – fail on test four only, due to upstream water quality being above the EQS. It is noted that the concentration of these substances in the discharge concentration is lower than the BC (upstream background quality), showing that the discharge is not expected to impact surface water quality for those substances.
- 3.4.1.7 Concentrations of cadmium, nickel, chloride, manganese and trivalent chromium in the discharge are considered to be liable to cause pollution. Exact EQS values for each identified substance are set out within the H1 report⁶.
- 3.4.1.8 Part B of the phase 1 screening for freshwaters comprises the significant load test, which applies to any Priority Hazardous Substances in the discharge. Substances in groundwater to which a significant load limit applies comprise cadmium, anthracene, hexachlorobenzene, hexachlorobutadiene, mercury, benzo[a]pyrene and the sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3cd)pyrene. None of the substances included in the screening were recorded as significant on the basis of the part B significant load test.
- 3.4.1.9 The concentration of chloride, cadmium, manganese and nickel in the discharge is considered to be liable to cause pollution in the Leiston Drain. All four substances are expected to occur naturally in groundwater, therefore from a technical outlook
- chloride is considered to be elevated in groundwater due to the effects of saline intrusion, and is already elevated in surface waters further downstream of the discharge (Atkins, 2023);
 - measured cadmium, manganese and nickel and trivalent chromium concentrations in groundwater are considered the same as the natural background levels in the Crag aquifer, based on published values (Ander, Shand, & Wood, 2006).

3.5 Temporary Marine Outfall (EO1)

- 3.5.1.1 A groundwater risk assessment of surface water run-off and dewatered groundwater has been undertaken for discharges associated with the TMO (EO1)⁸. The discharge will occur onto the foreshore above the mean high water springs level (MHWS).
- 3.5.1.2 The pumping to the TMO outfall is proposed to have a maximum flow rate of 200 litres per second (l/s), which would equate to a maximum discharge rate of $17,280 \text{ m}^3/\text{day}$.
- 3.5.1.3 The TMO will also discharge relatively small volumes of groundwater from dewatering during the construction of the Desal shafts. Based on a conservative estimate the maximum volume of water

⁸ Atkins (2023). TMO Ground Water Discharge Risk Assessment.

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anticipated during the dewatering, which will be a mixture of groundwater and added water added by the contractors, is approximately 500m³ for each shaft, as a one-off discharge⁹.

- 3.5.1.4 Temporary ditches/bunds and sediment ponds will be created around the site as necessary to capture surface water runoff and allow for settlement of sediments. Silt fences will also be installed at intervals upgradient of the ponds. Water will be pumped from the top of the ponds to Package Settlement Units (treatment systems), prior to discharge to the foreshore via the TMO.
- 3.5.1.5 Expected groundwater quality for the dewatering from the Desal intake shaft was derived from groundwater monitoring data in the vicinity of the shafts over a period from 2020 to 2023⁹. Groundwater quality results have been compared to EQS for an estuarine / coastal environment.
- 3.5.1.6 Compared to Coastal and Estuarine EQS the data indicate only infrequent exceedances for the metals iron, copper, zinc, hexavalent chromium, fluoranthene and anthracene. Based on the groundwater quality data, five groundwater hazardous substances were detected above LOD, arsenic, hexavalent chromium, anthracene and fluoranthene. This data shows the presence at low concentration of three hazardous substances, as well as exceedances of EQS and DWS for a handful of non-hazardous pollutants, the discharge of dewatered groundwater represents a source of contaminants to controlled waters receptors. The magnitude of this source term hazard is considered low, given the small volume of groundwater to be discharged and the concentration and nature of the exceedances.
- 3.5.1.7 A coastal surface water H1 assessment was undertaken to understand the risk to surface water in the North Sea offshore of the TMO outfall. The substances anthracene, fluoranthene, hexavalent chromium and iron fail the initial screening test.
- 3.5.1.8 In the event of periods of high flow and high suspended solids on the inlet to the Package Settlement Units, the contractor has indicated that chemical dosing with coagulant (Ferric Chloride) and flocculant may be required, in order to ensure suspended solids are reduced to the required limit prior to outfall. Additionally high or low pH in the runoff may be treated by dosing with carbon dioxide gas (to treat high pH waters), or sodium hydroxide (to treat low pH waters). All chemical would be dosed on a flow proportional basis via a calibrated mag-flow meter to ensure an accurate dose rate at all flow rates.
- 3.5.1.9 Contaminants discharged in water at the TMO outfall could reach the aquifer by infiltration, contaminants migrating in the aquifer may discharge into the sea via seepages and springs below high water mean level. Probability of direct flow to Sea has been assessed, utilising tide data water levels were only high enough 0.53% of the time to inundate the TMO apron, therefore, the likelihood of discharge to sea is very unlikely.
- 3.5.1.10 The identified potential contaminant linkages have been assessed as having low risk when considering the following:
- Confirmatory sampling and testing of groundwater will be carried out prior to pumping to the TMO discharge to determine the presence of hexavalent chromium and PAHs;
 - Groundwater will not be pumped to the TMO if hexavalent chromium or PAHs are found to be present. The water would be treated to remove the substances prior to discharge at the TMO, or

⁹ Atkins (2023). SZC-EW0400-ATK-XX-000-XXXXXX-NOT-CIV-000011: Technical note: Desalination Intake Shaft Dewatering.

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would be disposed of from the site (for example via tankering to a permitted waste water treatment facility);

- Iron will be present in the groundwater at concentrations that exceed H1 screening test 1. No other substances fail the screening tests (once PAH and hexavalent chromium are confirmed not to be present); and
- Direct discharge of the groundwater to the sea is considered unlikely to occur. By monitoring outfall conditions prior to pumping out groundwater, direct discharge can be prevented, to prevent any impact with regards to iron in the sea.

3.6 AD6 Leiston Drain Overbridge Crossing (O6a and O6b)

- 3.6.1.1 A Surface Water Pollution Risk Assessment¹⁰ has been undertaken for the anticipated dewatering required for the construction of the proposed Leiston Drain Overbridge, during the advancement of the CFA piles. It is proposed that the groundwater that accumulates is proposed to be discharged into the Leiston Drain (via outfalls O6a and O6b). A phase 1 screening surface water pollution risk assessment has been undertaken.
- 3.6.1.2 Groundwater quality data has been recovered at a number of locations in the vicinity of Leiston Drain Overbridge, these include AD6-312 and AF6 screening the Crag Group and Piez 1A, 1B, 2A, 2B, 3A and 3B screening the peat. Out of the 215 analysed substances, 183 were either not present in the discharge (with a LOD below the relevant EQS value) or do not have an EQS value. Of the remaining 32 substances, 18 were screened out at Test 1 or Test 2, leaving 14 substances which were taken forward for Tests 3 and 4. Of those 14 substances taken forward, three substances – hexachlorobutadiene, cadmium and nickel - passed both Tests 3 and 4. A further nine substances failed one of Test 3 or 4, but have not been detected above LOD in any of the groundwater samples.
- 3.6.1.3 Three substances (Phosphorus, Nitrite and Trivalent Chromium) were determined as liable to cause pollution in the receiving surface water body. This was a result of being measured in the discharge and upstream water quality being recorded above the EQS leading to a failure in Test 4. For all four of these the average release concentration (RC) is lower than the BC showing that the discharge is not expected to impact surface water quality for these substances.
- 3.6.1.4 Part B of the phase 1 screening for freshwaters comprises the significant load test, which applies to any Priority Hazardous Substances in the discharge. Substances in groundwater to which a significant load limit applies comprise cadmium, anthracene, hexachlorobenzene, hexachlorobutadiene, mercury, benzo[a]pyrene and the sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3cd)pyrene. None of the substances included in the screening were recorded as significant on the basis of the part B significant load test.

¹⁰ Atkins (2023). Dewatering Discharge Risk Assessment AD6 Leiston Drain Crossing.

4 SCREENING FOR LIKELY SIGNIFICANT EFFECTS (LSE)

4.1 Introduction

4.1.1.1 The purpose of screening for LSE is to determine whether the permit under consideration will result in LSE (or whether LSE cannot be excluded) on any European or Ramsar site as a result of its implementation. The LSE test is taken as a ‘trigger’¹¹ and identifies whether the greater scrutiny of an ‘appropriate assessment’ is necessary. Case law informs how likely significant effects should be interpreted, as follows:

- Where such a plan or project is likely to undermine the conservation objectives of the site concerned, it must necessarily be considered likely to have a significant effect on the site¹²;
- Notwithstanding the word “likely” in Article 6(3) [Habitats Directive] the precondition, before there can be a requirement to carry out an appropriate assessment, is not that significant effects are probable, a risk is sufficient¹³;
- A “risk” of significant effects on the site concerned exists if it cannot be excluded on the basis of objective information that the plan or project will have significant effects on the site concerned and in case of doubt as to the absence of significant effects such an assessment must be carried out¹⁴; and
- There must be credible evidence that there was a real, rather than a hypothetical, risk¹³.

4.1.1.2 There are four steps of screening for LSE, as set out within European Commission guidance¹⁵ and as described below.

4.2 Step 1 Determining whether the project or plan is directly connected with or necessary for the management of the site

4.2.1.1 Permit CWDA/ 18 (comprising a ‘plan’ or ‘project’; for the purposes of HRA considerations) is not directly connected with, or necessary for, the management of any European Site and as such, it is necessary to undertake HRA.

4.3 Step 2 Describing the project (or plan)

4.3.1.1 A description of the permit, and associated activities, is presented within **Section 2** of this report.

¹¹ Scottish Courts and Tribunals (2012). *Bagmoore Wind Limited v The Scottish Ministers*. (CSIH 93). Available at: <https://www.scotcourts.gov.uk/search-judgments/judgment?id=f18a86a6-8980-69d2-b500-ff0000d74aa7>.

Lande

¹² Waddenvereniging and Vogelbeschermingsvereniging (2004). *Landelijke Vereniging tot Behoud van de Waddenzee, Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij*, C-127/02.

¹³ R. Boggis v Natural England (2009). *EWCA Civ 1061*. Sullivan LJ, paragraph 37. *Moore-Bick LJ* at paragraph 17 of R (Bateman) v South Cambridgeshire DC (2011) *EWCA Civ 157* commented obiter.

¹⁴ Waddenvereniging and Vogelbeschermingsvereniging (2004). *Landelijke Vereniging tot Behoud van de Waddenzee, Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij*, C-127/02. Paragraph 45.

¹⁵ European Commission (2001). *Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*. Available at: https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf

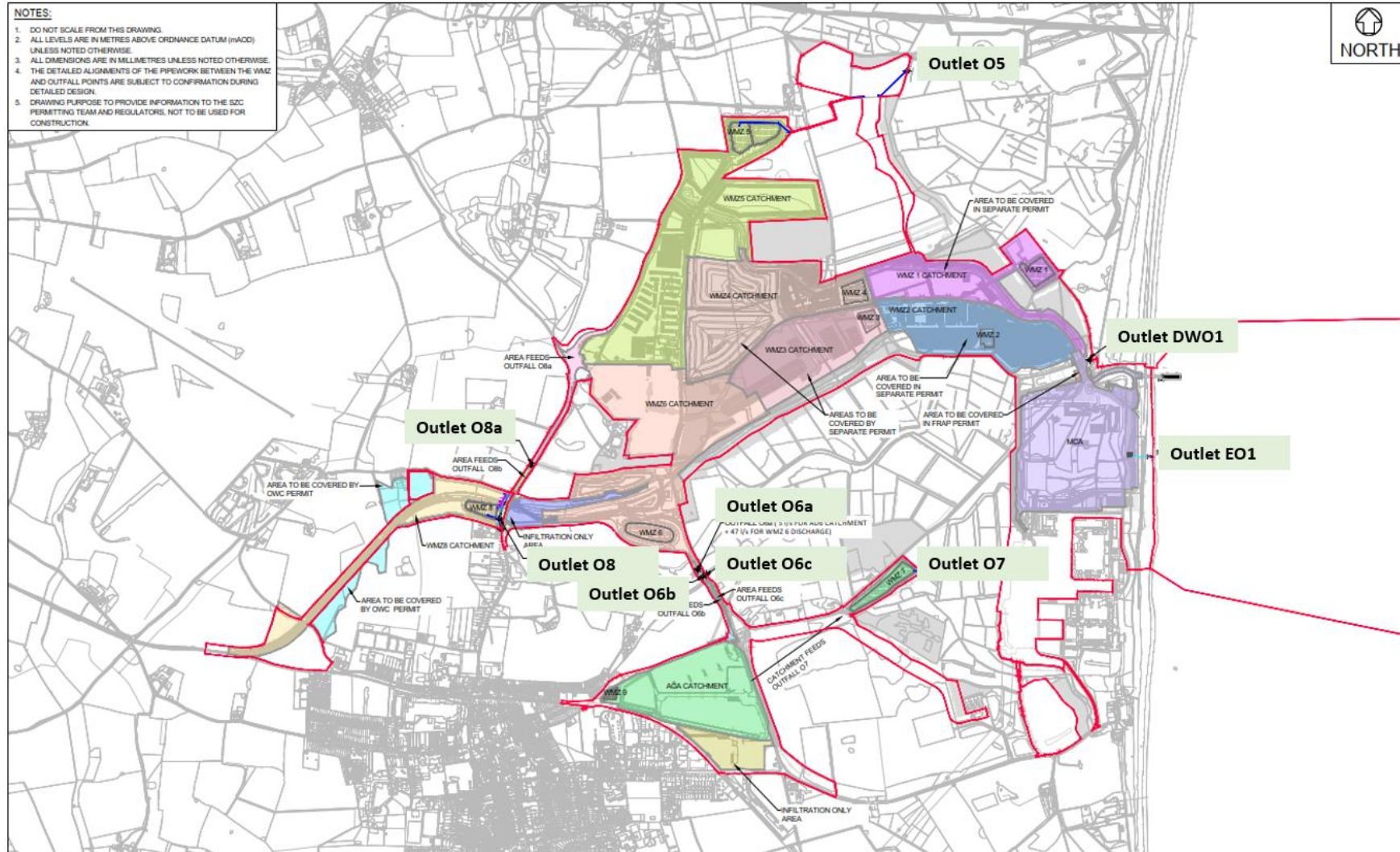
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4.4 Step 3 Identifying the potential effects on European (or Ramsar) Sites

- 4.4.1.1 The Zone of Influence (Zoi) is defined by the potential effects arising from the Works and the available pathways for those effects to reach and influence the interest features of European and Ramsar sites.
- 4.4.1.2 In order to identify all sites where potential direct, indirect and in-combination effects to European and Ramsar sites could reasonably be considered possible, an initial Zoi of 250m was used around each discharge point and a 5km downstream search was considered a suitable area for the initial screening of effects. This search area was identified as suitable through the use of the EA's Screening Tool.
- 4.4.1.3 In respect to Permit CWDA/18 the relevant European sites identified include:
- Minsmere to Walberswick Heaths and Marshes SAC (0.1km to Outfall DWO1 and downstream of outfalls O5, O6a, O6b, O6c, O7, O8a and O8);
 - Minsmere-Walberswick SPA (0.1km to Outfall DWO1 and downstream of outfalls O5, O6a, O6b, O6c, O7, O8a and O8);
 - Minsmere-Walberswick Ramsar site (0.1km to Outfall DWO1 and downstream of outfalls O5, O6a, O6b, O6c, O7, O8a and O8);
 - Southern North Sea SAC (5km downstream from Outfall DWO1 and adjacent to Outfall EO1); and
 - Outer Thames Estuary SPA (5km downstream from Outfall DWO1 and adjacent to Outfall EO1);
- 4.4.1.4 The locations of the European and Ramsar sites included in the assessment are shown on **Figure 1** and details of each site are provided in **Table 4.1** below.

Figure 1. Locations of proposed discharge locations

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4.5 Step 4 Assessing the presence of Likely Significant Effects on European Sites

- 4.5.1.1 Following a review of the activities to be undertaken under the permit (as described within **Section 2**), and with regard to potential risks identified in the Environment Agency Screening Tool, an initial high-level assessment of the effect pathways considered relevant to the discharges to establish relevant and non-relevant features for further assessment is given in **Table 4.2**, which also sets out the potential for LSE to arise, alone or in-combination with other plans and projects.
- 4.5.1.2 The EA have requested that the sHRA focusses on the permissible activity and the potential effects that could result from the permit / licence. Based on this, it has been agreed that the relevant EA risks for water discharge permits include:
- Turbidity.
 - Toxic contamination.
 - Siltation.
 - Physical damage.
 - PH.
 - Nutrient enrichment.
 - Changes in thermal regime.
 - Changes in salinity regime.

4.6 Introduction and Conservation Objectives

- 4.6.1.1 **Table 4.1** presents the European Sites screened in by the EA. Distance from the permit works area is given from closest NGR to furthest and associated qualifying features and conservation objectives are provided.

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Table 4.1 European Designated Sites, Qualifying Features, Baseline, Conservation Objectives and Threats

Designated Site	Distance / Direction	Qualifying Features	Baseline Description ¹⁶	Conservation Objectives	Threats and vulnerabilities
Minsmere to Walberswick Heaths and Marshes SAC (UK0012809)	0.1km to Outfall DWO1 and downstream of outfalls O5, O6a, O6b, O06c, O7, O8a and O8	<ul style="list-style-type: none"> • Annual vegetation of drift lines; • European dry heaths; and • Perennial vegetation of stony banks. 	<p><u>Annual vegetation of drift lines</u></p> <p>This site is one of two representatives of annual vegetation of drift lines on the east coast of England, occurring on a well-developed beach strandline of mixed sand and shingle and contains shingle species such as sea sandwort <i>Honckenia peploides</i> and sea beet <i>Beta vulgaris ssp. maritima</i>.</p> <p>Supra-tidal vegetated shingle recorded on the Minsmere to Walberswick Heaths and Marshes SAC frontage was recorded as destroyed (based on Natural England condition surveys) in Unit 113 between 2010 and 2011 due to natural coastal erosion. However, the surveys noted that the drift line vegetation may have rolled back into the landward Unit 112. Subsequent RSPB surveys in 2015 and 2021 show that drift line vegetation is indeed present in the landward Unit 112.</p> <p><u>European dry heaths</u></p> <p>The heathland is predominantly NVC type H8 <i>Calluna vulgaris</i> – <i>Ulex gallii</i> heath, dominated</p>	<p>To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:</p> <ul style="list-style-type: none"> - The extent and distribution of qualifying natural habitats; - The structure and function (including typical species) of 	<p>Coastal squeeze; public access/disturbance; changes in species distributions; invasive species; inappropriate pest control; air pollution (nitrogen deposition); water pollution; Deer; commercial fisheries¹⁸.</p>

¹⁶ As understood March 2024

¹⁸ Natural England (2019). European Site Conservation Objectives: Supplementary advice on conserving and restoring site features. Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC). 8th February 2019.

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Designated Site	Distance / Direction	Qualifying Features	Baseline Description ¹⁶	Conservation Objectives	Threats and vulnerabilities
			<p>by heather <i>C. vulgaris</i>, western gorse <i>U. gallii</i>, and bell heather <i>Erica cinerea</i>. Lowland heath occupies a large continuous tract of about 400 ha at Minsmere, Dunwich and Westleton Heath with smaller areas at Walberswick¹⁷, which is located >2km north of Sizewell C.</p> <p><u>Perennial vegetation of stony banks</u></p> <p>Perennial vegetation of stony banks is a qualifying feature of the site. Located landward of the bare shingle at the high tide mark, the vegetated areas are dominated by sand dune lying on top of the underlying shingle. The dune supports elements of dry heath vegetation, with both heather and bell heather being present. Therefore, the heath vegetation present to the north and seaward of the proposed Sizewell C power station is considered to form part of the “perennial vegetation of stony banks” SAC interest features.</p>	<p>qualifying habitats; and</p> <p>- The supporting processes on which qualifying natural habitats rely.</p>	
Minsmere-Walberswick SPA (UK9009101)	0.1km to Outfall DWO1 and downstream of outfalls	Qualifies under Article 4.1, by supporting, in summer, nationally important	The information presented on the baseline conditions for the Minsmere to Walberswick SPA comprises an overview of population status within the SPA, the data presented below is	Ensure that the integrity of the site is maintained or restored as appropriate,	Aggregate extraction, aquaculture, beach management, cables, coastal development and flood and erosion risk management

¹⁷ European Site Conservation Objectives: Supplementary advice on conserving and restoring site features, accessed online at: [UK0012809_Minsmere_SAC_Formal_Published_8_Feb_19_\(1\).pdf](#)

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Designated Site	Distance / Direction	Qualifying Features	Baseline Description ¹⁶	Conservation Objectives	Threats and vulnerabilities
	O5, O6a, O6b, O06c, O7, O8a and O8	<p>breeding populations of the following Annex 1 species:</p> <ul style="list-style-type: none"> • Bittern <i>Botaurus stellaris</i> (breeding); • Marsh Harrier <i>Circus aeruginosus</i> (breeding); • Avocet <i>Recurvirostra avosetta</i> (breeding); • Little tern <i>Sternula albifrons</i> (breeding); and • Nightjar <i>Caprimulgus europaeus</i> (breeding). <p>Qualifies under Article 4.1 by</p>	<p>formed from the citation¹⁹ and more recently completed surveys including the BTO Webs²⁰ count and Natural England's Designated Sites View²¹.</p> <p>Refer to Table 3-3 for an overview of population status for the qualifying species of the Minsmere-Walberswick SPA.</p>	<p>ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:</p> <ul style="list-style-type: none"> - The extent and distribution of the habitats of the qualifying features; - The structure and function of the habitats of the qualifying features; - The supporting processes on which the habitats of the qualifying features rely; 	<p>(Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC)), Coastal infrastructure, commercial shipping (operational), electricity from renewable energy sources, fishing, oil, gas and carbon capture storage, ports and harbours (construction, maintenance and operation) and recreation²¹.</p>

¹⁹ Natural England (1991) Minsmere to Walberswick (Suffolk) SPA Citation [Online] Accessed: September 2023.
²⁰ BTO (2023) Waterbirds in the UK 2021/22: The wetland bird survey and goose & swan monitoring programme.
²¹ Natural England (2023) Designated Sites View: Minsmere to Walberswick SPA [Online].

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Designated Site	Distance / Direction	Qualifying Features	Baseline Description ¹⁶	Conservation Objectives	Threats and vulnerabilities
		<p>regularly supporting, in winter, a nationally important wintering population of:</p> <ul style="list-style-type: none"> • Hen harrier <i>Circus cyaneus</i> (non-breeding). <p>Qualifies under Article 4.2 by supporting, in summer, in recent years, nationally important breeding populations of three regularly occurring migratory species:</p> <ul style="list-style-type: none"> • Eurasian teal <i>Anas crecca</i> (breeding); • Gadwall <i>Anas strepera</i> (breeding); 		<ul style="list-style-type: none"> - The population of each of the qualifying features; and - The distribution of the qualifying features within the site. 	

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Designated Site	Distance / Direction	Qualifying Features	Baseline Description ¹⁶	Conservation Objectives	Threats and vulnerabilities
		<ul style="list-style-type: none"> • Shoveler <i>Anas clypeata</i> (breeding); and • Bearded tit <i>Panurus biarmicus</i> <p>Qualifies under Article 4.2 by supporting nationally important wintering populations of three migratory waterfowl:</p> <ul style="list-style-type: none"> • Greater white-fronted goose <i>Anser albifrons</i> (non-breeding); • Gadwall (non-breeding); and • Shoveler (non-breeding). 			

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Designated Site	Distance / Direction	Qualifying Features	Baseline Description ¹⁶	Conservation Objectives	Threats and vulnerabilities
Minsmere-Walberswick Ramsar (UK11044)	0.1km to Outfall DWO1 and downstream of outfalls O5, O6a, O6b, O06c, O7, O8a and O8	<p><u>Criterion 1</u></p> <p>The site contains a mosaic of marine, freshwater, marshland and associated habitats, complete with transition areas in between. Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water.</p> <p><u>Criterion 2</u></p> <p>This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the</p>	<p><u>Ramsar criterion 1</u></p> <p>This composite Suffolk coastal site contains a complex mosaic of habitats notably, areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle, woodland and areas of lowland heath. The site supports the largest continuous stand of reed <i>Phragmites australis</i> in England and Wales and nationally rare transition in grazing marsh ditch plants from brackish to fresh water. The combination of habitats creates an exceptional area of scientific interest supporting nationally scarce plants, Red Data Book invertebrates and nationally important numbers of breeding and wintering birds.</p> <p>This is one of few sites nationally for red-tipped cudweed <i>Filago lutescens</i> which occurs on light, sandy soils. The site supports a range of nationally scarce plant species characteristic of heathland, wetland and coastal habitats, whilst also supporting a number of nationally important invertebrate species occurring on the site.</p> <p><u>Ramsar criterion 2</u></p> <p>This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British</p>	<p>There are currently no conservation objectives. The SAC/SPA conservation objectives (as outlined within this table) will be used when the qualifying features are the same, i.e., assemblages of wetland birds.</p>	

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Designated Site	Distance / Direction	Qualifying Features	Baseline Description ¹⁶	Conservation Objectives	Threats and vulnerabilities
		<p>mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls.</p> <p>An important assemblage of rare breeding birds associated with marshland and reedbeds including: <i>Botaurus stellaris</i>, <i>Anas strepera</i>, <i>Anas crecca</i>, <i>Anas clypeata</i>, <i>Circus aeruginosus</i>, <i>Recurvirostra avosetta</i> and <i>Panurus biarmicus</i>.</p>	<p>Red Data Book Endangered), recently discovered on the Blyth estuary river walls.</p> <p>An important assemblage of rare breeding birds associated with marshland and reedbeds including: <i>Botaurus stellaris</i>, <i>Anas strepera</i>, <i>Anas crecca</i>, <i>Anas clypeata</i>, <i>Circus aeruginosus</i>, <i>Recurvirostra avosetta</i> and <i>Panurus biarmicus</i>.</p>		
Southern North Sea	5km downstream from Outfall	<ul style="list-style-type: none"> Harbour Porpoise 	This site is an area of importance for harbour porpoise, supporting an estimated 17.5% of the UK North Sea Management Unit (MU)	To maintain site integrity by ensuring:	Threats and vulnerabilities for the SAC include:

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Designated Site	Distance / Direction	Qualifying Features	Baseline Description ¹⁶	Conservation Objectives	Threats and vulnerabilities
SAC (UK0030395)	DWO1 and adjacent to Outfall E01		population. Approximately two-thirds of the site, the northern part, is recognised as important for porpoises during the summer season, whilst the southern part supports persistently higher densities during the winter. The majority of this site lies offshore but does extend from the coastal areas of Norfolk and Suffolk out to the 12 nautical mile limit. Habitats present within this SAC include coarse sediment, sand and gravel beds.	<ul style="list-style-type: none"> • Harbour porpoise are a viable component of the site; and • There is no significant disturbance of the species. <p>The condition of supporting habitats and processes, and the availability of prey is maintained.</p>	<ul style="list-style-type: none"> • Exploration and extraction of oil and gas • Ecosystem Modification • Military use and civil unrest • Fishing and harvesting aquatic resources • Marine Water Pollution • Renewable abiotic energy use • Shipping lanes, ports and marine construction.
Outer Thames Estuary SPA (UK9020309)	5km downstream from Outfall DWO1 and adjacent to Outfall E01	<ul style="list-style-type: none"> • Common tern <i>Sterna hirundo</i> (breeding); • Little tern (breeding); and • Red-throated diver <i>Gavia stellata</i> (non-breeding). 	<p>This site extends between Norfolk and Kent and extends into the North Sea. The site comprises areas of shallow and deeper water, high tidal current streams and a range of mobile mud, sand, silt and gravely sediments extending into the marine environment, incorporating areas of sand banks often exposed at low tide. Refer to Table 3-3 for an overview of the population status of qualifying bird species.</p>	<p>See above, conservation objectives for Outer Thames Estuary SPA are the same as given for Minsmere-Walberswick SPA.</p>	<p>Threats and vulnerabilities for the SPA include:</p> <ul style="list-style-type: none"> • Aggregate extraction • Construction of renewable energy developments • Shipping lanes • Marine Pollution • Fishing Activities

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- 4.6.1.2 This section summarises the Stage 1 HRA screening exercise, considering the information previously presented within the sHRA, other DCO documentation, the SoS HRA and further modelling / assessment work where applicable and available (for example the risk assessments described above to undertake the permit application), to establish whether a potential pathway of effect exists between the permit activities and the identified designated sites. As described above, where this information has been superseded by new assessment, or to consider changes in design, this is presented and referenced accordingly.

Table 4.2 - Likely Significant Effects Screening

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Potential Impact / Risk ²²	MWHM SAC	MW SPA	MW Ramsar	OTE SPA	SNS SAC	Consideration of Potential for LSE	LSE Conclusion alone or in-combination
<p>Direct habitat loss and direct / indirect habitat fragmentation</p> <p>Relevant EA Risks:</p> <ul style="list-style-type: none"> Physical Damage 	N	N	N	N	N	<p><u>Minsmere SAC</u> <u>Annual Vegetation of Drift Lines and Perennial Vegetation of Stony Banks.</u> The proposed Works are not located within the European Site and therefore, no direct habitat loss or physical damage will occur as a result of the proposed works. The closest discharge to the interest features of the site is E01: discharge onto the foreshore, located 500m south of the location of the SAC interest features. The discharge to the foreshore is to ground, with intermittent discharge to the North Sea during times of high tide (as set out in Section 3). Therefore, as the SAC interest features are not groundwater dependent, there is no credible pathway to effect. Furthermore, the SAC boundary defines the extent of the interest features. However as set out in the Supplementary Advice²³, potential effects may occur through changes to coastal processes outside the boundary of the SAC. Given the discharge to ground and intermittently to sea would not alter coastal processes that are needed to maintain or restore the function of the site, the proposed works will not result in LSE that may otherwise frustrate the ability of the site to achieve any of its conservation objectives.</p> <p><u>European Dry Heath</u> Given the location of the interest feature ‘European Dry Heaths’ located north of the Minsmere Sluice, there is no pathway of</p>	<p>LSE can be ruled out alone for Minsmere SAC, Minsmere SPA, Ramsar, Outer Thames Estuary SPA and Southern North Sea SAC. There are no insignificant effects that could act in-combination and no requirement for further assessment.</p>

²³ Natural England (2019). European Site Conservation Objectives: Supplementary advice on conserving and restoring site feature. Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC) Site code: UK0012809

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effect to the interest feature from the discharge of groundwater and surface water run-off into inland watercourses or via discharge to the foreshore. As set out above, the proposed works will not prohibit the site in achieving its conservation objectives.

Minsmere SPA and Minsmere Ramsar

The works will not directly impact habitats within any European or Ramsar site. Functionally Linked Land is located within the vicinity of the discharge locations, namely Sizewell Marshes Site of Special Scientific Interest (SSSI); however no direct impacts will occur within these locations. Indirect impacts causing physical damage to habitats supporting the interest features (both habitats within designated sites and Functionally Linked Land) may occur as a result of changes to water quality. However, this is assessed below under the pathway of “Water quality”.

**Water quality
 (effects on
 freshwater or
 marine
 environment)**

N P P P P

Minsmere SAC

Given the location of the SAC interest feature ‘European Dry Heaths’ located north of the Minsmere Sluice, there is no pathway to effect from the discharge of groundwater or surface water run-off into inland watercourses or via discharge to the foreshore. The SAC interest features Perennial Vegetation of Stony Banks and Annual Vegetation of Drift Lines are not groundwater dependent. As discharges are spatially separated from the location of the SAC interest features (Unit 112), the only impact pathway is through groundwater effects, due to surface and groundwater continuity. Therefore, as the features are not groundwater dependent there is no pathway to effect, hence the discharges will not affect the site from achieving its conservation objectives.

LSE can be ruled out alone for Minsmere SAC. There are no insignificant effects that could act in-combination and no requirement for further assessment.

LSE alone cannot be excluded for the Minsmere SPA, Minsmere Ramsar (breeding and wintering) Outer Thames Estuary SPA and Southern North Sea SAC due to the discharge of potential pollutants. Further

Relevant EA Risks:

- Toxic Contamination
- Siltation
- pH
- Nutrient Enrichment

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Minsmere SPA and Minsmere Ramsar

The assessment of water quality⁵ indicates there is scope for the water quality of receiving environments to be negatively affected as a result of the proposed discharges. As such due to hydrological connectivity there is a potential pathway to effect from water quality impacts to MW SPA and MW Ramsar. In addition, there is suitable habitat²⁴ within the immediate areas surrounding the discharge locations to support interest features of the MW SPA and Ramsar. Therefore, there is a pathway to effect on the interest features of these sites (both breeding and wintering) through EA defined risks Toxic Contamination, Siltation, pH and Nutrient Enrichment risks which have the potential to affect supporting habitat of the interest features. The potential impacts could affect the sites ability to achieve its conservation objectives, including maintaining or restoring the extent and distribution of the habitats of qualifying features, as well as the structure and function of these habitats. Outfall EO1 has been screened out of this assessment, as the habitat within its area of influence, namely the foreshore, does not support interest features, namely little tern, as set out in paragraph 8.8.275 of the DCO sHRA.²⁵

assessment is required regarding the potential for adverse effects on integrity alone or in-combination.

Outer Thames Estuary SPA and Southern North Sea SAC

The discharge of surface water run-off and groundwater onto the foreshore and with the possibility of flow into the marine environment, indicates a potential pathway to effect on marine water quality and subsequently the interest features of these

²⁴ Habitats within the discharge locations have the potential to support interest features, including Marsh Harrier within Reedbeds and teal and shoveler within the floodplain.

²⁵ SZC (2020). Shadow Habitats Regulations Assessment Volume 1: Screening and Appropriate Assessment

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sites. The EA risks set out in the above paragraph are relevant for these European Sites. The discharge associated with this permit has the potential to impact the sites ability to achieve its conservation objectives relating to maintaining the extent, distribution and structure and function of habitats of qualifying features.

<p>Alteration of hydrological / hydro geological regime</p> <p>Relevant EA Risks:</p> <ul style="list-style-type: none"> • Turbidity • Changes in Salinity Regime • Changes in Thermal Regime 	N	N	N	N	N	<p>Discharge rates are in accordance with the greenfield run-off rates approved within the DCO application (2 l/s/ha), the rates provided within Table 2.1 are the discharge rates from each outlet (which have been calculated based on meeting the required greenfield run-off rates from the proposed development). All run-off and discharge will be restricted to greenfield rates, including through the implementation of hydrobrakes (or other necessary embedded control measures) where necessary, which will slow discharge rates. The implementation of these measures to slow discharge rates are required through the DCO Drainage strategy and are standard operating procedure to minimise flood risk. Therefore, as discharge rates will continue at the baseline levels (greenfield rates), with infiltration being promoted, and given the continuity between surface and ground water, there will be no changes to the groundwater or surface water levels or regime as a result of the proposed discharge activities. As the proposed discharges will remain at baseline rates and groundwater already present in the continuous system will be discharged there are no risks to the thermal regime as the temperature of discharge water would be within natural parameters. Additionally, there will be no change in the turbidity or salinity regime of the existing surface water or groundwater environment, as water which would be entering the surface water and groundwater environment will continue to do so at natural levels. Therefore, the proposed discharges will not</p>	<p>LSE can be ruled out alone for all sites. There are no insignificant effects that could act in-combination and no requirement for further assessment.</p>
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result in any LSE that could impact the sites ability to achieve its
conservation objectives.

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5 INFORMATION TO INFORM APPROPRIATE ASSESSMENT

5.1.1.1 It has not been possible to rule out LSE as a result of Permit CWDA/18 and as such it is necessary to undertake further assessment to determine whether adverse effects on the integrity of European and Ramsar sites can be ruled out alone and in-combination, considering mitigation measures.

5.1.1.2 The relevant sites, qualifying features and effects pathways are:

- Water Quality Changes
 - Habitats supporting the interest features (wintering and breeding assemblages) of Minsmere-Walberswick SPA and Ramsar site (mosaic of marine, freshwater, marshland and associated habitats, and reedbeds) and qualifying habitats of Minsmere to Walberswick Ramsar.
 - Interest features (wintering and breeding assemblages) of Outer Thames Estuary SPA and Southern North Sea SAC

5.1.1.3 Where LSE have been ruled out in **Table 4.2**, it is considered that there would be no residual effects which could act in combination with other plans and projects. The information for appropriate assessment is provided in **Table 5.1**.

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Table 5.1 Information for Appropriate Assessment

Qualifying Features screened in	LSE	Adverse Effect on the Integrity of the Site and Mitigation	Residual Effects and In-Combination Assessment
Minsmere -Walberswick SPA			
<ul style="list-style-type: none"> • Breeding and Wintering QFs 	<p>Changes to Water Quality Relevant EA Risks:</p> <ul style="list-style-type: none"> • Toxic Contamination • Siltation • pH • Nutrient Enrichment 	<p><i>Toxic Contamination</i> As detailed in the conservation objectives²⁶, threats to MW SPA include pollution to groundwater. As groundwater monitoring has identified potential contaminants present within the baseline, discharge of groundwater from outlets DWO1, O6a, O6b, O6c and O8a could result in adverse effects to the supporting habitats of interest features, both from surface water and groundwater effects and within potential functionally linked land (in the location of the outfalls themselves) and within the SPA, which is hydrologically connected. The assessments undertaken for the proposed discharges at DWO1⁶ and O6¹⁰ outlets identified substances in the groundwater which were liable to cause pollution to the receiving water body; however, a number of these were as a result of upstream water quality failing EQS. Phase 1 Screening identified the presence of substances in groundwater to which a significant load limit applies comprise cadmium, anthracene, hexachlorobenzene, hexachlorobutadiene, mercury, benzo[a]pyrene and the sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3cd)pyrene. None of the</p>	<p>It is anticipated that with the baseline risk of contaminants within the existing groundwater background and via the implementation of propriety treatment measures and sampling and monitoring, which are tried and tested measures, the risk of alterations to water quality via toxic contamination, siltation, pH, and nutrient enrichment would be negligible. In accordance with this assessment, it is concluded that there will not be any non-significant effects on Minsmere-Walberswick SPA that could act in combination with other plans or projects.</p> <p>Adverse effects on site integrity alone or in-combination can be excluded, beyond reasonable scientific doubt.</p>

²⁶ Natural England (2019). Minsmere-Walberswick SPA Conservation Objectives.

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Qualifying Features screened in	LSE	Adverse Effect on the Integrity of the Site and Mitigation	Residual Effects and In-Combination Assessment
		<p>substances included in the screening were recorded as significant on the basis for the Part B significant load test Whilst the other identified potential contaminants cadmium, nickel, chloride, manganese and trivalent chromium are present within the baseline natural background levels, and therefore, due to continuity of surface and groundwater within the hydrological environment the risk of adversely affecting the habitats supporting the interest features is minimal and would not comprise an adverse effect on the integrity of the site in consideration of the site’s conservation objectives.</p> <p><i>Siltation</i> Discharges (including location O5) could also adversely affect water quality via an increase in sediment concentrations within the watercourse / receiving environment as a result of sediment laden surface and groundwater discharges, resulting in siltation effects downstream. Each individual discharge location has an associated treatment train which is set out in the Technical Supporting Document³, Each treatment train has been developed in accordance with the CIRIA SuDs methodology. As set out in Section 3 a surface water baselining assessment⁵ has been undertaken to identify the limiting values for the proposed discharges for suspended solids (60 mg/l) and visible oil and grease (no significant trace). Given the sensitivity of the downstream environment and the locations of the outfalls EO1, DWO1 and O5, spot sampling once per week (this will occur at all discharge locations) would be implemented alongside the treatment</p>	

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Qualifying Features screened in	LSE	Adverse Effect on the Integrity of the Site and Mitigation	Residual Effects and In-Combination Assessment
		<p>trains to ensure compliance with the limiting values, these locations are proposed to be at the final discharge location, prior to the discharge entering the receiving watercourse.</p> <p>Where samples are not meeting the identified limiting values further treatment systems will be implemented including suspended solids settlement (flocculation and coagulation). Following the implementation of mitigatory measures to meet the limiting values, there would be no potential to negatively affect the water quality and subsequently the supporting habitat of the interest features of the SPA. In the unlikely event that sampling identified changes post-mitigation, and that the discharge was exceeding the limiting values, all discharge would cease immediately until the cause of the issue was identified and resolved. It is therefore not considered as a result of the Works (at locations O6 and O8 which comprise potential functionally linked habitat or within O5, the MHCA) that there would be any effect on the achievement of the conservation objectives to maintain or restore the structure and function / distribution of the habitats supporting the interest features of the SPA as a result of changes to water quality.</p> <p><i>pH</i></p> <p>There is potential that surface water discharges at all discharge locations could alter the pH of the receiving watercourses, and subsequently alter the botanical makeup of designated sites and or functionally linked land. Surface water travelling over concrete has the potential to alter the</p>	

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Qualifying Features screened in	LSE	Adverse Effect on the Integrity of the Site and Mitigation	Residual Effects and In-Combination Assessment
		<p>pH of the discharged water. Where samples are not meeting the identified limiting values, further treatment systems will be implemented. The limiting value for pH based on the surface water baselining assessment⁵ is between a pH of 6 and 9. Therefore, where exceedances are occurring, pH correction will be implemented, including the use of carbon dioxide or Sodium Hydroxide, to bring the discharges to within the limiting values. Following the implementation of mitigatory measures to meet the limiting values, there would be no potential to negatively affect the water quality and subsequently the supporting habitat of the interest features of the SPA. As set out above for the assessment of the siltation risk, that the changes to pH following the implementation of mitigatory and monitoring measures could not affect the achievement of the conservations objectives of the Site.</p> <p><i>Nutrient Enrichment</i></p> <p>Surface water monitoring data for Leiston Drain and Sizewell Marshes shows elevated levels of nitrates and phosphates. These are understood to be a result of the Leiston Wastewater treatment works further upstream, as well as wider agricultural run-off.</p> <p>There is potential that groundwater discharge from DWO1 at the SSSI Crossing could result in Nutrient Enrichment of the receiving watercourse, resulting in the alteration of the botanical community of the designated sites and functionally linked land, negatively affecting relevant interest features. The H1 assessment⁶ undertaken for DWO1 identified four</p>	

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Qualifying Features screened in	LSE	Adverse Effect on the Integrity of the Site and Mitigation	Residual Effects and In-Combination Assessment
		<p>substances that could result in nutrient enrichment, including, nitrogen, nitrite, phosphorus and ammonium. However, these substances failed the screening test due to the high mean concentration identified in upstream water samples, with the background concentration exceeding the EQS. Therefore, as the release concentration is lower than the background concentration, it is not expected that the discharges would result in enhanced nutrient enrichment of the receiving environment. The H1 assessment¹⁰ for groundwater discharge associated with Outlets O6a and O6b identified substances liable to cause nutrient enrichment, substances include phosphorus and nitrate which failed screening tests 3 and 4. However, the failing of these tests were a result of the high mean concentration identified in the upstream water samples.</p> <p>Therefore, as the anticipated discharges into Leiston drain, at both DWO1 and O6a and b (which have been identified as likely causes of nutrient enrichment due to groundwater discharge) are not anticipated to cause nutrient enrichment due to low levels of release concentration, it can be concluded that the discharge would not affect the achievement of the sites conservation objectives.</p>	
Minsmere to Walberswick Ramsar			
<p>Ramsar criterion 1:</p> <ul style="list-style-type: none"> • Mosaic of marine, freshwater, 	<ul style="list-style-type: none"> • Water Quality Effects 	<p>The assessment as described above for the Minsmere to Walberswick SPA is also relevant to this site. Adverse effects on site integrity alone or in-combination can be ruled out</p>	

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Qualifying Features screened in	LSE	Adverse Effect on the Integrity of the Site and Mitigation	Residual Effects and In-Combination Assessment
<p>marshland and associated habitats. Extensive reedbed habitat and transition in grazing marsh ditch plants from brackish to fresh water.</p>		<p>Relevant EA Risks:</p> <ul style="list-style-type: none"> • Toxic Contamination • Siltation • pH • Nutrient Enrichment 	
<p>Ramsar criterion 2:</p> <ul style="list-style-type: none"> • Supports nine nationally scarce plants; • Supports at least 26 red data book invertebrates; and • Important assemblage of rare breeding birds associated with marshland and reedbeds. 			

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Qualifying Features screened in	LSE	Adverse Effect on the Integrity of the Site and Mitigation	Residual Effects and In-Combination Assessment
Outer Thames Estuary SPA			
<ul style="list-style-type: none"> • Red-throated diver • Little tern • Common tern 	<ul style="list-style-type: none"> • Water Quality Effects <p>Relevant EA Risks:</p> <ul style="list-style-type: none"> • Toxic Contamination • Siltation • pH • Nutrient Enrichment 	<p>As set out above in the assessment of Minsmere to Walberswick SPA the proposed treatment trains and mitigatory treatment systems will minimise the risk and potential effects of discharges into the inland watercourses which are hydrologically connected to this Site.</p> <p><i>Toxic Contamination</i></p> <p>Discharge via EO1 (TMO) is required for the dewatering of the desalination shaft and is required for up to 500m³ of groundwater over a period of up to 9 months, although it is expected that this will constitute a single discharge, the wider discharge requirements are for 200 l/s of surface water run off over a period of up to 36 months. The risk of degradation of marine water quality from the discharge could result in impacts on prey species of the interest features within the wider marine environment, as intermittent discharge to the marine environment is predicted. Background water quality monitoring has indicated the presence of Fluoranthene, arsenic, hexavalent chromium and anthracene within the baseline groundwater conditions within the Main Construction Area (MCA)7. To ensure that the potential effect is appropriately assessed, groundwater from the desalination shaft would be tested for the presence of hexavalent chromium and PAHs prior to any dewatering activity taking place. If testing indicates the presence of these substances the groundwater discharge would be treated to remove the substances prior to discharge or would be disposed of from</p>	<p>Following the implementation of mitigation, there are no insignificant effects that could act in-combination. Adverse effects on site integrity alone and in-combination can be excluded, beyond reasonable scientific doubt.</p>

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Qualifying Features screened in	LSE	Adverse Effect on the Integrity of the Site and Mitigation	Residual Effects and In-Combination Assessment
		<p>the site. Sampling would be undertaken immediately downstream of the treatment to ensure the hazardous substances has been appropriately removed. Due to the small nature of the groundwater discharges, which includes 500m³, occurring over a limited period, which is unlikely to discharge to sea (see Section 3), alongside the proposed treatment the potential effect on prey species and subsequently the interest features is deemed to be de minimis with regard to effects on the conservation objectives including maintaining the structure and function / distribution of habitats supporting the interest features.</p>	
		<p><i>Siltation</i></p> <p>Surface water run-off discharge will be managed through a series of SuDS treatments including attenuation basins, to reduce the concentration of suspended solids. Subsequently the water will be pumped through a flow meter, to treatment plant, which are expected to include settlement tanks and potentially coagulation and flocculation as describe above, whilst pH correction will be utilised where required. The total suspended solids content of water discharged will be no greater than 250 mg/l in accordance with the baseline assessment undertaken. Error! Bookmark not defined. The values within the North Sea have been identified as between 266 and 609 mg/l. These baseline values are in excess of the maximum suspended solids expected in the discharge after treatment (250 mg/l), and accordingly the discharge is not expected to have a measurable impact in baseline suspended solids in the sea near the outfall. Such a direct discharge is</p>	

Construction Permitting Habitats Regulations Assessment (HRA)
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Qualifying Features screened in	LSE	Adverse Effect on the Integrity of the Site and Mitigation	Residual Effects and In-Combination Assessment
		<p>considered to be intermittent based on the limited circumstances in which it might occur.</p> <p><i>pH</i></p> <p>The assessment as described above the Minsmere to Walberswick SPA is also relevant to this site in relation to pH, as the limiting values have been predicted to be the same for pH (between 6 and 9), therefore, monitoring and where necessary treatment will be implemented to ensure that surface water discharge remains within the limiting values. Alongside the proposed treatment the potential effect on prey species and subsequently the interest features is deemed to be de minimis with regard to effects on the conservation objectives including maintaining the structure and function / distribution of habitats supporting the interest features.</p>	
Southern North Sea SAC			
<ul style="list-style-type: none"> • Harbour Porpoise 	<ul style="list-style-type: none"> • Water Quality Effects <p>Relevant EA Risks:</p> <ul style="list-style-type: none"> • Toxic Contamination • Siltation • pH • Nutrient Enrichment 	<p>The assessment as described above for the Outer Thames Estuary SPA is also relevant to this site.</p>	

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6 INTEGRITY TEST AND CONCLUSION

- 6.1.1.1 Following the implementation of the mitigation measures described in Table 5.1, no adverse effects on site integrity have been identified alone or in-combination as a result of water quality changes.
- 6.1.1.2 The Permit has been subjected to an appropriate assessment for the purposes of Regulation 63 of the Habitats Regulations 2017 as amended. It is considered that the competent authority is able to ascertain that an adverse effect on the integrity of the relevant European and Ramsar sites assessed can be ruled out alone or in-combination.
- 6.1.1.3 Consultation forms an essential part of HRA. To date, there has been consultation with the Environment Agency regarding the assessment methodologies, assumptions, and conclusions.
- 6.1.1.4 Natural England will be formally consulted on the findings of this report and due regard will be given to any representations within an agreed timeframe.

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7 REFERENCES

Reference Number	Full Reference
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19	Natural England (1991) Minsmere to Walberswick (Suffolk) SPA Citation [Online]
20	BTO (2023) Waterbirds in the UK 2021/22: The wetland bird survey and goose & swan monitoring programme.
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25	SZC (2020). Shadow Habitats Regulations Assessment Volume 1: Screening and Appropriate Assessment
26	Natural England (2019). Minsmere-Walberswick SPA Conservation Objectives.

Sizewell C Project

Appendix A - Construction Permitting Countryside Rights of Way (CRoW) Act Review Permit: MCA/CWDA/18: Early Site Discharge

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DOCUMENT CONTROL

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COUNTRYSIDE RIGHTS OF WAY (CROW) ACT REVIEW
PERMIT: GROUND INVESTIGATION CONSENT

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1 PROJECT BACKGROUND

1.1 Introduction

- 1.1.1.1 The Sizewell C Project ('SZC Project') is a consented nuclear power station, comprising two UK European Pressurised Reactors™ (EPR) located north of the existing Sizewell B power station in Suffolk. The Development Consent Order (DCO) for the SZC Project was granted in 2022¹. The DCO was granted based on a substantial amount of assessment work (underpinned by extensive baseline surveys and studies) and submitted to the Secretary of State (for Business, Energy and Industrial Strategy [BEIS]).
- 1.1.1.2 The SZC Project is currently undertaking the preparation of construction permit applications. Construction permits are required for a number of project-related activities (including, for example, water discharges and realignment of channels), several of which have Countryside Rights of Way (CRoW) 2000 Act considerations due to the proximity of the SZC Project to one or more Sites of Special Scientific Interest (SSSI).
- 1.1.1.3 This CRoW Assessment considers potential impacts on SSSIs as a result of Permit MDS/CWDA/18, having regard to the outcome of the DCO. Potential effects associated with the proposed activities relevant to construction permits were taken into account within the DCO. Consequently, and as explained above, the assessment for this permit (and all construction permits) is undertaken with cognisance of the outcome of the DCO, but reflecting the (inevitable) greater degree of resolution on the activities relevant to each permit that is now available.
- 1.1.1.4 This CRoW Assessment sits as a standalone document to assess the potential impacts on SSSIs in accordance with the CRoW Act 2000. It is noted that where a Habitats Regulations Assessment (HRA) is required, this assessment shall be appended to the relevant HRA for the permits being considered.

¹ The Sizewell C (Nuclear Generating Station) Order 2022. Made 20th July 2022, Coming into force 11th August 2022. Available at: <https://infrastructure.planninginspectorate.gov.uk/projects/eastern/the-sizewell-c-project/>. [Accessed 24th April 2023]

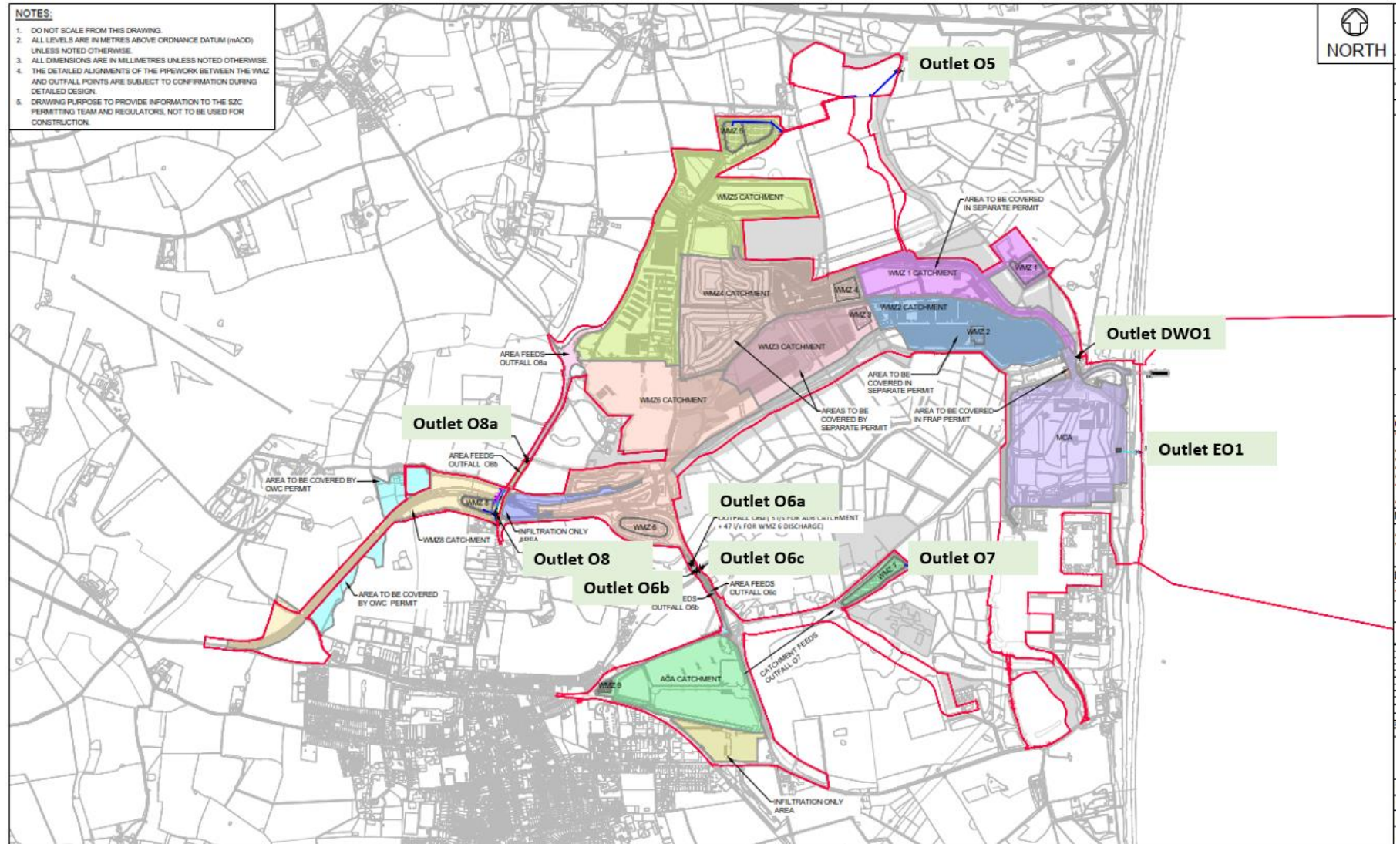
2 PERMIT DETAILS AND DESCRIPTION OF PROPOSAL

2.1 Permit Details

- 2.1.1.1 This CRoW Assessment is concerned with multiple discharges associated with the works which require consent from the EA (reference CWDA-18) for treated surface water and/or groundwater.
- 2.1.1.2 The applications comprise the proposed discharge of either treated surface water run-off (rainfall dependent) or groundwater, or both. The receiving receptors for the discharge of treated surface water run-off and / or potential groundwater include the Sizewell Foreshore, Leiston Drain, Sizewell Belts (tributary of Sizewell Drain), upstream Leiston Drain and an unnamed Internal Drainage Board (IDB) adopted ditch to the north of the SZC Project.
- 2.1.1.3 This permit is required to ensure that the SZC Project's drainage strategy including surface water run-off and the hydrological environment remains similar to the existing baseline, via the implementation of sustainable urban drainage principles. Furthermore, the permit is required for the discharge of abstracted groundwater from excavations which are required for the construction of the SZC Project.
- 2.1.1.4 As standard good site practice and management, the Code of Construction Practice (CoCP) requires a biosecurity risk assessment to be undertaken and a management plan to be implemented to avoid potentially facilitating the spread of invasive non-native species (INNS). The CoCP is secured through Requirement 2 of Schedule 2 of the DCO. No measures are required over and above these standard measures in connection with these proposed Works.
- 2.1.1.5 The locations of the discharge points are shown on Figure 1. This area is hereafter referred to as 'the Site'.

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Figure 1: Proposed Discharge Locations



2.2 Description of Proposal

2.2.1.1 **Table 2.1** provides a summary on the individual discharge streams that are subject to this permit application and CROW Act Assessment, including their locations and further information of the rates and type of discharge.

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Table 2.1 Proposed Discharging Activities

Discharge Stream	Outlet Reference and NGR	Receptor	Time scale	Maximum Discharge Rates & Volume	Summary
A	EO1 TM 47654 64054	Sizewell Foreshore (to groundwater) Greater Sizewell Bay / North Sea (potentially under surge conditions)	36 months (Groundwater discharge maximum of 9 months, however, expected to be a single discharge)	200 l/s 17,280 m ³ /day	Discharge of rainfall-dependent surface water run-off from the Main Construction Area (MCA) and dewatered groundwater and surface water collected in excavations from installation of the desalination plant shaft (intake tunnel). To be discharged via the TMO to the Sizewell Foreshore.
B	DWO1 TM 47349 64530	Leiston Drain	12 Months (Groundwater discharge up to 6 months)	100 l/s 521 m ³ /day	Discharge of groundwater anticipated to be encountered during installation of the pile caps associated with the SSSI crossing located to the north of the MCA. Groundwater to be dewatered to the Leiston Drain watercourse following treatment.
C	O5 TM 46463 65940	Unnamed Ditch running north into Internal Drainage Board (IDB) drain no. 7 (DRN163G0101)	10-12 years	32.5 l/s 3,042 m ³ /day	Discharge of rainfall dependent surface water run-off from Water Management Zone (WMZ) 5 within the TCA. Outlet O5 is essentially an overflow outlet for when infiltration is not possible.
D	O6a TM 45443 63501	Leiston Drain	15 months (Groundwater dewatering for up to 10 weeks) 12 years for discharge from WMZ 6	5 l/s increase to 209.7 l/s 972 m ³ /day Increase to 4,352 m ³ /day (based on 1 in 5-year storm event) 9,319 m ³ /day (based on 1 in 100-year storm event)	Rainfall dependent surface water run-off from part of the AD6 scheme and groundwater anticipated to be encountered from installation of an overbridge over the Leiston Drain. Discharge to be made to the Leiston Drain. The discharge may contain small quantities of groundwater from shallow excavations. The discharge rate and volumes are anticipated to increase at Outlet O6a once the WMZ 6 basin has been constructed and connected to the outlet (which is part of the MDS construction works, separate to AD6) and once the outlet receives highway drainage.
E	O6b TM 45442 63495	Leiston Drain	15 months (Groundwater discharge for up to 10 weeks)	5 l/s Increasing to 191 l/s 972 m ³ /day	Rainfall dependent surface water run-off from part of the AD6 scheme (Valley Road and Associated BR19 works) and groundwater anticipated to be encountered from installation of an overbridge over the Leiston Drain.

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				Maximum discharge volumes (including highway drainage): 11.3 m ³ /day (based on 1 in 5-year storm event) 570 m ³ /day (based on 1 in 100-year storm event)	Discharge to be made to the Leiston Drain. The discharge may contain small quantities of groundwater from shallow excavations.
F	O6c TM 45474 63488	Leiston Drain	15 months	5 l/s increase to 64 l/s. 432m ³ /day (excluding highway drainage) 37m ³ /day (with highway drainage) and 133m ³ /day (1 in 100 storm)	Rainfall-dependent surface water run-off from part of the AD6 scheme (Lovers Lane Junction Improvements) and potential small quantities of groundwater (if encountered) from shallow excavations.
G	O7 TM 46528 63491	Sizewell Belts (tributary of Sizewell Drain)	10-12 years	62 l/s 5357 m ³ /day	Discharge of rainfall dependent surface water run-off captured from the ACA and discharged via WMZ 7 to the Sizewell Belts.
H	O8a TM 44614 64000	Upstream Leiston Drain (ordinary watercourse section)	15 months	5 l/s increases to 8.1 l/s with connection to highway drainage. 432m ³ /day without highway drainage. Increase to	Rainfall dependent surface water run-off from AD6 scheme (MDS Roundabout) being discharged to an Upstream Section of Leiston Drain. May potentially contain small quantities of groundwater (if encountered) from shallow excavations. As per Outlets O6a, O6b and O6c above, above, once the highway and BR19 are completed and connected to the outlet, the discharge rate and volume will increase.

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				451m ³ /day with highway drainage (1 in 5 year) and 476m ³ /day (1 in 100 year)	
I	O8 TM 44466 63737	Leiston Drain	10-12 years	31.25 l/s 916m ³ /day	Rainfall dependent surface water run-off from WMZ 8 which forms part of the Green Rail Route.

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Discharge Stream A – Outlet EO1

- 2.2.1.2 The effluent proposed to be discharged at Outlet EO1 will comprise rainfall-dependent surface water run-off from the Main Construction Area (MCA) and groundwater expected to be derived during the installation of the desalination plant shaft. This effluent stream is being proposed to discharge via a temporary marine outfall (TMO) pipe to ground (the Sizewell foreshore).
- 2.2.1.3 The maximum flow rate will be restricted to 200 l/s.. Groundwater discharges for the installation of the desalination shaft will be short term and only when required, the total volume of water from dewatering is estimated to be up to 500m³.
- 2.2.1.4 The TMO outlet will discharge to the Sizewell Foreshore via a gravity pipe toward the shoreline above the mean high water spring tide mark (MHWS), and above highest astronomical tide level. The outlet will discharge to the Sizewell Foreshore via a gravity pipe toward the shoreline above the mean high water spring tide mark (MHWS), and above highest astronomical tide level.

Discharge Stream B – Outlet DWO1

- 2.2.1.5 The effluent from the SSSI crossing foundations will comprise groundwater which will be discharged from excavations required for the installation of the pile caps associated with the crossing and from the base / sides of a sheet piled cofferdam that is being proposed as part of the crossing foundations design. The maximum discharge flow rate from Outlet DWO1 will be restricted to 100 l/s.
- 2.2.1.6 The groundwater is proposed to be discharged, following treatment, at Outlet DWO1 to the Leiston Drain watercourse (north of the MCA).

Discharge Stream C – Outlet O5

- 2.2.1.7 Surface water run-off captured within the northern section of the Temporary Construction Area (TCA) will be conveyed, via a series of Sustainable Drainage Systems (SuDS) including Water Management Zone (WMZ) basin 5, to the Marsh Harrier Habitat. An overflow outlet will be provided, Outlet O5, to be used in the event that volumes of run-off are too high to infiltrate through the Marsh Harrier Habitat. The maximum discharge flow rate from Outlet O5 will be restricted to 35.2 l/s. The discharge will be made, when required, to a ditch which runs to an IDB adopted drain. This then converges with the Leiston Drain.

Discharge Stream D – O6a

- 2.2.1.8 Discharge Stream D will comprise treated surface water run-off and groundwater associated with AD6 construction works: Lovers Lane Realignment and Leiston Drain Overbridge. The discharge stream will connect to the permanent highway drainage system that is to be constructed which will discharge to the Leiston Drain. Connection of a WMZ basin (WMZ 6) will also feed into Outlet O6a (via an overflow) at a later date during the construction sequence.
- 2.2.1.9
- 2.2.1.10 The initial construction discharge rate for Outlet O6a will be limited to 5 l/s with a maximum discharge in a 24 hour period of 872 m³. This will increase to account for highway run-off and connection to WMZ 6 to 123 l/s.
- 2.2.1.11

Discharge Stream E – Outlet O6b

- 2.2.1.12 Discharge Stream E will be comprised of treated surface water run-off and groundwater associated with the AD6 construction works: Leiston Drain Overbridge and Valley Road and Associated BR19 works . As with

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Outlet O6a above, once the above construction activities have been completed, Outlet O6b will be retained as part of the permanent highway drainage design.

2.2.1.13 The maximum flow rate for discharging construction surface water run-off and dewatering from Outlet O6b will be restricted to 5 l/s. This will be controlled by a set pump capacity. The maximum flow rate, accounting for both construction discharging and highway run-off from the scheme itself, is anticipated to be 191 l/s .

2.2.1.14 Discharge from Outlet O6b will be made to the Leiston Drain watercourse via the permanent highway drainage system. The discharge will be directed to the drainage system via a series of SuDS such as filter drains and swales.

Discharge Stream F – Outlet O6c

2.2.1.15 Discharge Stream F will be comprised of treated surface water run-off and potentially small quantities of groundwater (if encountered in shallow excavations). The maximum proposed discharge flow rate from Outlet O6c for the construction related discharge is anticipated to be restricted to 5 l/s increasing to 64 l/s (weather dependent). This will be controlled by a set pump capacity.

2.2.1.16 Discharge from Outlet O6c will flow, via a ditch, into the Leiston Drain watercourse (following re-alignment works)Outlet O6c will also form part of the final permanent drainage design for BR19 once AD6 works are complete.

Discharge Stream G – Outlet O7

2.2.1.17 Discharge Stream G will comprise treated surface water run-off from the ACA. As described in Section 3 above, the ACA has an area of approximately 30 ha and will encompass caravan pitches, HGV parking, topsoil compound, sand and aggregate stockpile, material transfer laydown, park and ride and logistics compounds. Surface water run-off from the ACA will be captured in two WMZ basins; WMZ 7 and WMZ 9. WMZ 7 will be located to the east of the ACA while WMZ 9 will be located to the west. Run-off from the area of land forming the ACA will be captured in swales and diverted to the WMZ basins. WMZ 9 will then be pumped to WMZ 7, which will discharge from the eastern part of the ACA into a tributary within Sizewell Marshes via a headwall at Outlet O7.

2.2.1.18 Flows from the WMZ 7 basin at Outlet O7 will be restricted to 62 l/s.

Discharge Stream H – Outlet O8a

2.2.1.19 Discharge Stream H will be made up of treated surface water run-off and groundwater from part of the construction works associated with the AD6 scheme (as per Outlets O6a, O6b and O6c). The discharges include surface water run-off from the Main Development Site (MDS) Roundabout and Abbey Road BR19 (taking place in the northern part of the AD6 scheme of works). The discharges will be made to an existing watercourse at the southern end of Abbey Road, referred to as the Upstream Leiston Drain.

2.2.1.20 Discharge Stream H may comprise some quantities of groundwater from excavations (up to 4 m deep) which are required for the installation of pipework and chambers for the permanent highway drainage system. Where infiltration of the groundwater within the works boundary is not possible, it is proposed that the

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groundwater is discharged into the installed permanent drainage scheme which ultimately discharges into the Upstream Leiston Drain.

2.2.1.21 Flow rates for the construction related discharge are expected to be limited to 5 l/s, via a throttle structure.

Discharge Stream I – Outlet O8

2.2.1.22 The source of surface water run-off proposed to be discharged at Outlet O8 will be treated rainfall-dependent run-off from the construction area of the GRR. During the construction of the railway track bed and embankments / landscaping bunds, there is the potential for mobilisation of suspended solids and potential hydrocarbons from the earthworks activities, e.g., due to the use of plant, vehicles and machinery. It is proposed that SuDS techniques will be constructed within the area to collect and direct the construction related run-off from this part of the site and drain it to an attenuation basin (WMZ 8), which will then discharge to the realigned section of the Leiston Drain. Additional treatment measures such as settlement systems will be used where required too. The attenuation basin will remain a permanent feature of the GRR once operational.

2.2.1.23 The discharge rate from Outlet O8 will be restricted to 10.6 l/s. This is proposed to be controlled by vortex control (e.g., a hydrobrake) from an overflow structure (which also applies to the other basins described within this permit application). The maximum volume of effluent that could be discharged in a 24-hour period is 916 m³.

2.2.1.24 The proposals described above are hereafter referred to as 'the Works' throughout this CROW Assessment.

3 SCREENING PROCESS

3.1 Introduction

3.1.1.1 The purpose of screening is to determine whether the permit under consideration will have any potentially significant effects on designated SSSIs as a result of its implementation. It acts as a high-level 'filter' for identifying positive and negative effects which may occur, primarily based on established buffer zones / search areas. These search areas are defined based on the type of permit being applied for, and the activities which form part of the planned works. This initial search allows the assessment stage to then focus on the relevant SSSIs only, their associated qualifying features and potential impacts on them. Where no clear pathway of effect between the permitted works and SSSIs is identified (i.e., there is no overlap between the search area and the designated site), those SSSI are screened out of the process. In addition, not all qualifying features of a designated site may have the potential to be affected, despite geographical proximity, due to the nature of the works. This is also considered as appropriate within the screening process.

3.1.1.2 The key steps of the screening process are:

1. Identification of relevant designated sites and their qualifying features (**Section 3 and 4**);
2. Review of the type and timing of the permit being applied for (**Section 2**);
3. Review of the activities proposed under the permit, and potential effects which may arise as a result (**Section 5 and 6**); and
4. Review of existing baseline and assessment information to ascertain whether there is the potential for significant effects to arise on the SSSI as a result of the permit activities (**Sections 5 and 6**).

3.1.1.3 The screening used a 2km radius to identify the SSSI sites. The findings of the screening were as follows:

1. Sizewell Marshes SSSI (adjacent to the permit location, refer to **Figure 1**); and
2. Minsmere to Walberswick Heaths and Marshes SSSI (adjacent to the permit location, refer to **Figure 1**).
3. Leiston-Aldeburgh SSSI (approximately 1.1km to the South of the permit with no hydrological connection, refer to **Figure 1**).

3.1.1.4 Due to the absence of hydrological connection, and distance between the proposed discharging activities and Leiston-Aldeburgh SSSI, this site has been scoped out of further assessment.

3.1.1.5 A review of the potential impacts of the proposed permit works on Sizewell Marshes SSSI and Minsmere to Walberswick SSSI in relation to the qualifying features of the site is presented in Sections 5 and 6.

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4 BASELINE

4.1 Sizewell Marshes SSSI

- 4.1.1.1 During the initial investigative stages of the impact of the SZC Project on Sizewell Marshes SSSI, numerous surveys and assessments were conducted to characterize Sizewell Marshes SSSI and the likely impacts of works on the designation.
- 4.1.1.2 Baseline surveys and assessments of Sizewell Marshes were undertaken as part of the DCO Environmental Impact Assessment (EIA), firstly to assess the potential impact of the development on the SSSI and secondly to provide compensatory habitats in line with the loss of habitats within the SSSI². The habitats within the SSSI are noted as being of National Importance, including the wetland habitats, which includes wet woodland, reedbed and fen meadow².
- 4.1.1.3 The construction works to create the main platform, which will hold the power station and the SSSI crossing would result in the loss of reedbed, wet woodland and ditch habitat as defined in Table 1.1 below, the proposed permit are advanced works being undertaken as part of the wider DCO.

Table 1.1 Land take from Sizewell Marshes SSSI

Development Item	Habitat Feature	Extent of temporary land take (ha)	Extent of permanent land take (ha)
Land take will accommodate: - The main platform and SSSI crossing - Realignment of Sizewell drain - Restraining of pylons	Fen Meadow	0.90	0.70
	Wet Woodland	1.13	2.63
	Dry reedbed	0.00	3.55
	Wet reedbed	0.67	0.00
	Tall Ruderal	0.00	0.08
	Ditches	0.20	0.07
Habitat loss Totals		2.9ha	7.03ha

- 4.1.1.4 Detailed survey work and an ecohydrological assessment of the SSSI were undertaken; this included grading of the fen meadow habitat, this was completed to inform the mitigation and compensatory measures to be implemented³. The grading identified that the area of clearance associated with the permit is mainly Grade 3 which is defined as “Fair quality fen meadow, support some Principal Rich-Fen Indicator Species and other mire species, with few ‘low fertility’ indicators” and Grade 4 “Drier fen meadow grading to rush pasture and dry grassland, supporting few Principal Rich-Fen Indicator Species and other mire species, with very few ‘low fertility’ indicators.”³
- 4.1.1.5 Based on National Vegetation Classification (NVC) survey data, the fen meadow habitat can be placed within the M22 *Juncus subnodulosus* – *Cirsium palustre* fen meadow category. The defining characteristic, in what can be a habitat of relatively low floral diversity, is the presence of *Juncus subnodulosus* (blunt-flowered rush). The other identified habitat features include M23 – *Juncus effuse* / *acutiflorus* – *Gallium palustre*, rush pasture and S26 – *Phragmites australis* – *Utrica dioica* tall-herb fen.
- 4.1.1.6 The Phase 1 habitat mapping^{Error! Bookmark not defined.} undertaken as part of the DCO presents the underlying habitat types which cross both Units 1 and 2. The habitat types moving from east to west include Bracken –

² SZC Co (2020) – Volume 2, Chapter 14 Terrestrial Ecology and Ornithology.

³ SZC Co (2020) – Volume 2, Chapter 14, Appendix 14B1 Plant and Habitat Synthesis

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Continuous with scattered scrub, Broadleaved Woodland, Marsh/Marshy Grassland, with Running Water (Leiston Drain) and ditches which run in a southerly direction off Leiston Drain. The National Vegetation Classification (NVC) of these habitat types includes from east to west, W5 *Alnus Glutinosa – Carpa Panculata*, S26 – *Phragmites australis – Utrica diocia* tall-herb fen and M22 *Juncus subnodulosus – Cirsium palustre* fen meadow category.

- 4.1.1.7 Wet Woodland is noted within the citation of the SSSI, though it is not a qualifying feature. However, it partly supports the invertebrate assemblage designated feature and therefore is included as part of the assessment.
- 4.1.1.8 Valued wetland invertebrate assemblages, especially those associated with “permanent wet mire” and “reed-fen and pool” habitats (typical of mires and seepages which may have little open water but remain permanently wet), are well represented across Sizewell Marshes SSSI. The invertebrate assemblage associated with “mineral marsh and open water” habitats (typically found in floodplain wetlands, fluctuating meres, carr and wet woodland), while not as well represented, is also considered of high conservation value. The presence of these assemblages emphasizes the importance of the complex matrix of wetland habitats within Sizewell Marshes SSSI, and in the adjacent Minsmere European Site/SSSI⁴.
- 4.1.1.9 The invertebrate populations and habitats within the Zone of Influence (Zoi) of the wider Sizewell C works (as assessed in Appendix 14A4 of the Environmental Statement for the construction works associated with the wider project) were consolidated into a set of 15 Assessment Compartments on the basis of their distinct constituent invertebrate habitats and their position within the landscape, nine of the 15 compartments were located within or partly within Sizewell Marshes SSSI. Of the compartments, important habitats included the ditch network, reedbed, open water and wet woodland all contribute to the overall very high conservation value⁴.
- 4.1.1.10 The site is located in close proximity to a number of designated sites of International and National nature conservation importance for breeding, wintering and passage birds. To the north of the site is the Minsmere-Walberswick SPA and Ramsar site and Minsmere to Walberswick Heaths and Marshes SSSI which comprises a range of habitat types supporting a diverse assemblage of breeding, passage and wintering bird species. Sizewell Marshes SSSI supports an assemblage of bird species typical of lowland wet grassland⁵.
- 4.1.1.11 The main species likely to constitute an assemblage of wetland species present within Sizewell Marshes SSSI (based on most recent desk-study and survey results) are set out in Table 3.2. Although historically present, redshank, lapwing, teal and shoveler appear to no longer breed within Sizewell Marshes SSSI following national population declines⁶.

Table 3.2 Bird Species identified within Sizewell Marshes SSSI

Species / Assemblage	Baseline summary
Bird assemblage associated with Sizewell Marshes SSSI within the breeding season.	This feature comprises the breeding bird assemblage which forms one of the qualifying features of the Sizewell Marshes SSSI. The species typically present include: <ul style="list-style-type: none"> • Mute Swan (1 count) • Greylag (Present) • Mallard (27 pairs) • Gadwall (1 pair) • Bearded Tit (unknown)

⁴ Sizewell Co (202X) – Chapter 14, Appendix 14A4 Invertebrates

⁵ SZC Co (202X). Chapter 14 Appendix 14B2 Ornithology Synthesis Report.

⁶ SZC Co (2020) Chapter 14 Appendix 14A7 - Ornithology

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Species / Assemblage	Baseline summary
	<ul style="list-style-type: none"> • Kingfisher (1 pair) • Cettis Warbler (4 breeding territories) • Reed bunting (4 breeding territories)
<p>Bird assemblage associated with Sizewell Marshes SSSI within the Winter season.</p>	<p>Species observed during the winter period included:</p> <ul style="list-style-type: none"> • Mute Swan • Gadwall • Teal • Shoveler • Mallard • Moorhen • Coot • Bittern • Grey heron • Little Egret • Kingfisher • Water rail • Jack snipe • Snipe • Woodcock • Marsh Harrier

4.1.1.12 A review of the current condition of SSSI was undertaken in October 2023 using the Natural England Website⁷, to identify the existing baseline of the designated sites and its qualifying features.

4.1.1.13 Sizewell Marshes SSSI condition is currently Favourable, with a Medium condition threat risk. The qualifying features of the SSSI are noted as being:

- Assemblages of breeding birds;
- Ditches;
- Floodplain Fen;
- Invertebrate assemblages – pen water on disturbed sediments;
- Invertebrate assemblage reed fen and pools;
- Lowland mire grassland and rush pasture; and
- Vascular plant assemblage.

4.1.1.14 A number of these condition assessments date from May 2012 and therefore may have changed in the intervening period. Natural England note the condition was calculated from the historic unit-specific

⁷ Natural England 2023 - [Site feature condition \(naturalengland.org.uk\)](https://www.naturalengland.org.uk) [Online], Accessed November 2023.

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condition. Therefore, the current condition of the site and its features, as formally recorded by Natural England, is not confirmed.

4.2 Minsmere to Walberswick Heaths and Marshes SSSI

- 4.2.1.1 During the initial investigative stages of the DCO for the impact of the development, numerous surveys and assessments were conducted to characterize Minsmere to Walberswick Heaths and Marshes SSSI and the likely impacts of works on the designation.
- 4.2.1.2 The qualifying features of the SSSI in terms of habitats mirror those noted as qualifying features of Minsmere to Walberswick Heaths and Marshes SAC, including, Annual vegetation of drift lines, European dry heaths and perennial vegetation of stony banks.
- 4.2.1.3 Additional Specific notified habitat features include (codes refer to the relevant National Vegetation Classification (NVC) code):
- H1 – *Calluna vulgaris* – *Festuca ovina* heath.
 - H8 – *Calluna vulgaris* – *Ulex gallii* heath.
 - Lowland ditch systems.
 - M22 – *Juncus subnodulosus* – *Cirsium palustre* fen meadow.
 - M23 – *Juncus effusus* / *acutiflorus* – *Galium palustre* rush pasture.
 - M27 – *Filipendula ulmaria* – *Angelica sylvestris* mire.
 - S2 – *Cladium mariscus* swamp and sedge-beds.
 - 26 – *Phragmites australis* – *Urtica dioica* tall-herb fen.
 - S4 – *Phragmites australis* swamp and reed-beds.
 - S7 – *Carex acutiformis* swamp.
 - SD1 – *Rumex crispus* – *Glaucium flavum* shingle community.
 - SD11 – *Carex arenaria* – *Cornicularia aculeata* dune community.
 - SD12 – *Carex arenaria* – *Festuca ovina* – *Agrostis capillaris* grassland.
 - SD2 – *Cakile maritima*-*Honkenya peploides* strandline community.
 - SD6 – *Ammophila arenaria* mobile dune community.
 - Dune grassland.
 - SM14 – *Atriplex portulacoides* saltmarsh.
 - SM24 – *Elytrigia atherica* saltmarsh.
 - Saline coastal lagoons.
 - U1 *Festuca Ovina* – *Agrostis Capillaris* – *Rumex Acetosella* grassland
 - Vascular plant assemblage.
 - W6 – *Alnus glutinosa* – *Urtica dioica* woodland.
- 4.2.1.4 The invertebrate assemblages found within the designation mirror those within the Sizewell Marshes SSSI, with the complex matrix of wetland habitats and dry sandy habitats providing habitat for species with recognised conservation value.

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- 4.2.1.5 The invertebrate populations and habitats within the Zol of the proposed wider Sizewell C works were consolidated into a set of 15 Assessment Compartments, as set out above. Only a single compartment was located within the designation, this area supports an aquatic invertebrate fauna of national importance as well as invertebrate assemblages of very high conservation value associated with grassland and scrub².
- 4.2.1.6 Minsmere to Walberswick Heaths and Marshes SSSI comprises a range of habitat types supporting a diverse assemblage of breeding, passage and wintering bird species. Species listed as forming part of the Minsmere to Walberswick Heaths and Marshes SSSI qualification include bittern, gadwall, teal, shoveler, marsh harrier, avocet and bearded tit *Panurus biarmicus*. Collectively these species constitute a valuable breeding and wintering waterbird assemblage which could utilise habitats within, or adjacent to the site.

5 SCREENING ASSESSMENT

5.1 Sizewell Marshes SSSI

- 5.1.1.1 Sizewell Marshes SSSI is comprised of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates and breeding birds, along with several nationally scarce plants. Water abstraction is a known pressure on the SSSI.
- 5.1.1.2 The following 'Operations Requiring Consent' (ORC) that may cause damage to Sizewell Marshes SSSI are relevant to the proposed works, and therefore form the basis of this assessment:
1. 13a – Drainage (including the use of mole, tile, tunnel or artificial drains).
 2. 14 – The changing of water levels and tables and water utilisation (including irrigation, storage and abstraction from existing water bodies and through boreholes).
- 5.1.1.3 Table 5-1 sets out the assessment of the permit, which covers potential impacts and effects on the features of the SSSI (as relevant to the ORC listed above).

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Table 5-1 Sizewell Marshes SSSI Assessment

Potential Impact	SSSI Feature	Potential Significant Effects
Water quality / alteration of hydrology from discharge	Ditch system	Discharge points O6a, O6b, O6c are adjacent to the SSSI boundary, and discharge points DWO1 and O7 are on the SSSI boundary.
	Lowland, unimproved wet meadows	<p>Discharge rates are in accordance with the greenfield run-off rates approved within the DCO application (2 l/s/ha), the rates provided within Table 2.1 are the discharge rates from each outlet (which have been calculated based on meeting the required greenfield run-off rates from the proposed development). All run-off and discharge will be restricted to greenfield rates, including through the implementation of hydrobrakes (or other control measures) where necessary. Therefore, as discharge rates will continue at the baseline levels (greenfield rates), with infiltration being promoted, and given the continuity between surface and ground water, there will be no changes to the groundwater or surface water levels or regime as a result of the proposed discharge activities.</p> <p>As all discharge locations are hydrologically connected and several are located immediately adjacent to the SSSI, discharges from these locations could adversely affect water quality and subsequent supporting habitat via an increase in sediment concentrations within the watercourse as a result of sediment laden surface and groundwater discharges. Each individual discharge location has an associated treatment train which is set out in the Technical Supporting Document, each treatment train has been developed in accordance with the CIRIA SuDs methodology. A surface water baselining assessment⁶ has been undertaken to identify the limiting values for the proposed discharges for pH (between 6-9), suspended solids (60 mg/l) and visible oil and grease (no significant trace). Given the sensitivity of the downstream environment, spot sampling would be implemented alongside the treatment trains to ensure compliance with the limiting values, these locations are proposed to be at the final discharge location, prior to the discharge entering the receiving watercourse. Where samples are not meeting the identified limiting values proprietary treatment systems will be implemented, this could include pH correction (using carbon dioxide) and suspended solids settlement (flocculation and coagulation). Following the implementation of mitigatory measures to meet the limiting values, there would be no potential to negatively affect the water quality and subsequently the habitats or species they support, within the SSSI. If in any case sampling identified that the discharge was exceeding the limiting values, all discharge would cease until the cause of the issue was identified and resolved.</p>
Disturbance to species due to noise, vibration, and visual impacts of generators and pumps	Assemblage of breeding birds	The SoS HRA determined that noise level thresholds for disturbance to wintering birds of 70dB LAmax and breeding birds of 65dB LAmax, were suitable precautionary thresholds above which a potentially adverse behavioural response may be observed. The pumping of groundwater (both to be treated and discharged) and the use of a generator during the discharge of groundwater could result in noise levels of up to 83dB at source (falling below 66dB at 7m). Suitable habitat for breeding bird assemblages is present at all discharge

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locations adjacent to and within the SSSI, therefore, there is potential for disturbance impacts at each discharge location on breeding, foraging and wintering birds listed within the SSSI citation.

Visual disturbance may also occur due to the presence of machinery at the discharge locations, including treatment machinery and generators. In accordance with the DCO sHRA, a visual zone of influence for disturbance of 300m is considered appropriate; however, this may be reduced where screening is present as a result of topography and/or habitats (e.g. tree lines and woodland).

Embedded measures are used to avoid the low risk of an impact to all Schedule 1 species within the Site including annual breeding and non-breeding bird surveys are undertaken across the SZC Project Site. If nesting Schedule 1 birds are found present, including those that qualify as interest features within the Sizewell Marshes SSSI, a buffer is put in place to protect the nest and the nest is monitored until it is no longer active to ensure compliance with the Wildlife and Countryside Act, 1981 (as amended). The size of the buffer is determined by the onsite ornithologist ECoW. This buffer is based on contextual information that may reduce the need for the maximum area identified in this report to inform HRA as the ZoI for example, the location and stage of any nesting activity, baseline noise levels, and any intervening barriers.

The reedbeds at Sizewell Marshes SSSI are used as a breeding site by marsh harriers, these are located over 0.5km away from the closest discharge location. There is no potential for any effect on the marsh harrier breeding sites due to the separation distance.

Foraging marsh harrier have been observed within the wider Site and therefore disturbance impacts may arise at the new discharge locations. However, visual screening of existing habitat will provide some buffers to any perceived disturbance.

Within the wider Site, the ongoing presence of contractors will likely present a deterrent and in addition, the risk of foraging within the noise and visual ZoI is low due to the relatively small area influenced by the disturbance events (300m). The spatial zone of potential effect is insignificant in the context of the wider areas of habitats used by foraging interest features, and it can be concluded that the discharging activities will not result in undue disturbance to the species using the wider area.

5.2 Minsmere to Walberswick Heaths and Marshes SSSI

- 5.2.1.1 Minsmere to Walberswick Heaths and Marshes SSSI contains a complex series of habitats, notably mudflats, shingle beach, reedbeds, heathland and grazing marsh, which combine to create an area of exceptional scientific interest, with assemblages of breeding birds and invertebrate assemblages noted as qualifying features.
- 5.2.1.2 The following ‘Operations Requiring Consent’ (ORC) that may cause damage to Minsmere and Walberswick Heaths and Marshes SSSI are relevant to the proposed works, and therefore form the basis of this assessment:
- i) 11 – The destruction, displacement, removal or cutting of any plant or plant remains, including tree, shrub, herb, hedge, dead or decaying wood, moss, lichen, fungus, leaf-mould, turf, etc.
 - ii) 13a – Drainage including the use of mole, tile, tunnel or artificial drains.
 - iii) 14 – The changing of water levels and tables and water utilisation including irrigation, storage and abstraction from existing water bodies and through boreholes.
 - iv) 26 – Use of vehicles or craft likely to damage or disturb features of interest.
- 5.2.1.3 Table 5.2 sets out the assessment of the permit, which covers potential impacts and effects on the features of the SSSI (as relevant to the ORC listed above).

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Table 5.2 Minsmere to Walberswick Heaths and Marshes SSSI Assessments

Potential Impact	SSSI Feature	Potential Significant Effects
Water quality / alteration of hydrology from discharge	Water dependent habitats	<p>As all discharge locations are hydrologically connected and two (DW1 and O5) are located immediately adjacent to the SSSI, discharges from these locations could adversely affect water quality and subsequent supporting habitat via an increase in sediment concentrations within the watercourse as a result of sediment laden surface and groundwater discharges. Each individual discharge location has an associated treatment train which is set out in the Technical Supporting Document, each treatment train has been developed in accordance with the CIRIA SuDs methodology. A surface water baselining assessment⁶ has been undertaken to identify the limiting values for the proposed discharges for pH (between 6-9), suspended solids (60 mg/l) and visible oil and grease (no significant trace). Given the sensitivity of the downstream environment, spot sampling would be implemented alongside the treatment trains to ensure compliance with the limiting values, these locations are proposed to be at the final discharge location, prior to the discharge entering the receiving watercourse. Where samples are not meeting the identified limiting values proprietary treatment systems will be implemented, this could include pH correction (using carbon dioxide) and suspended solids settlement (flocculation and coagulation). Following the implementation of mitigatory measures to meet the limiting values, there would be no potential to negatively affect the water quality and subsequently the habitat of the SSSI. If in any case sampling identified that the discharge was exceeding the limiting values, all discharge would cease until the cause of the issue was identified and resolved.</p> <p>It is anticipated that with the baseline risk of contaminants within the existing groundwater background and via the implementation of propriety treatment measures, sampling and monitoring, the risk of alterations to water quality would be reduced. In accordance with this assessment, it is concluded that there will be no residual effects on Minsmere-Walberswick Heaths and Marshes SSSI, and as such the habitats and species they support will not be impacted.</p>
Disturbance to species due to noise, vibration, lighting and visual impacts of generators and pumps	Assemblage of breeding birds	<p>The SoS HRA determined that noise level thresholds for disturbance to wintering birds of 70dB L_{Amax} and breeding birds of 65dB L_{Amax}, were suitable precautionary thresholds above which a potentially adverse behavioural response may be observed. The pumping of groundwater (both to be treated and discharged) and the use of a generator during the discharge of groundwater could result in noise levels of up to 83dB at source (falling below 66dB at 7m). Suitable habitat is present at both discharge locations (DW01 and O5 (which also sits within the marsh harrier compensation habitat)) adjacent to the SSSI,</p>

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therefore, there is potential for disturbance impacts at each discharge location on breeding, foraging and wintering birds listed within the SSSI citation.

Visual disturbance may also occur due to the presence of machinery at the discharge locations, including treatment machinery and generators. In accordance with the DCO sHRA, a visual zone of influence for disturbance of 300m is considered appropriate; however, this may be reduced where screening is present as a result of topography and/or habitats (e.g. tree lines and woodland).

Embedded measures are used to avoid the low risk of an impact to all Schedule 1 species within the Site including annual breeding and non-breeding bird surveys are undertaken across the Site. If nesting Schedule 1 birds are found present, including those that qualify as interest features within the Sizewell Marshes SSSI, a buffer is put in place to protect the nest and the nest is monitored until it is no longer active to ensure compliance with the Wildlife and Countryside Act, 1981 (as amended). The size of the buffer is determined by the onsite ornithologist ECoW. This buffer is based on contextual information that may reduce the need for the maximum area identified in this report to inform HRA as the ZoI for example, the location and stage of any nesting activity, baseline noise levels, and any intervening barriers.

The reedbeds at Minsmere-Walberswick Heaths and Marshes SSSI are used as a breeding site by marsh harriers, these are located over 0.5km away from the closest discharge location. There is no potential for any effect on the marsh harrier breeding sites due to the separation distance.

Foraging marsh harrier have been observed within the wider Site and therefore disturbance impacts may arise at the new discharge locations. However, visual screening of existing habitat will provide some buffers to any perceived disturbance.

Within the wider Site, the ongoing presence of contractors will likely present a deterrent and in addition, the risk of foraging within the noise and visual ZoI is low due to the relatively small area influenced by the disturbance events (300m). The spatial zone of potential effect is insignificant in the context of the wider areas of habitats used by foraging interest features, and it can be concluded that the Works will not result in undue disturbance to the species using the wider area.

6 ASSESSMENT CONCLUSIONS

6.1 Assessment of the permits 'alone'

- 6.1.1.1 As set out in Table 5.1 and Table 5.2 there are potential pathways of effect; however, based on existing conditions on Site, the use of embedded mitigation measures, and the nature of the Works, there will not be any significant effects on Sizewell Marshes SSSI and Minsmere to Walberswick Heaths and Marshes SSSI.

6.2 In-combination assessment

- 6.2.1.1 Under the CRow Act, there is no formal requirement for an in-combination assessment to be undertaken.

DEFINITIONS

Term / Abbreviation	Definition
EDRMS	Electronic Document and Records Management System
EPR	European Pressurised Reactors
SZC	Sizewell C
EQS	European Quality Standards
DWS	Drinking Water Standards
CoCP	Code of Construction Practice
UXO	Unexploded ordnance
FRAP	Flood Risk Activity Permit
ECoW	Ecological Clerk of Works
RAMS	Risk Assessment and Method Statement

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REFERENCES

Ref	Title	Location	Document No.
1	The Sizewell C (Nuclear Generating Station) Order 2022. Made 20th July 2022, Coming into force 11th August 2022.	https://infrastructure.planninginspectorate.gov.uk/projects/eastern/the-sizewell-c-project/ .	
2	DEFRA "Designation of 'main rivers': guidance to the Environment Agency" 2017	Designation of 'main rivers': guidance to the Environment Agency - GOV.UK (www.gov.uk)	
3	Sizewell C, "Creation of Off-site Habitat Compensation Sites for Fen Meadow and Wet Woodland Shadow Habitats Regulations Assessment, 2022.		
4	Sizewell C "Volume 1: Environmental Statement Addendum Chapters, Chapter 2 Main Development Site," 2021.	SZC Bk6 ES V2 Ch2 Description of Permanent Development.pdf (sizewellcdco.co.uk)	
5	Sizewell C "Volume 2, Chapter 14 Terrestrial Ecology and Ornithology, Appendix 14C4 Fen Meadow Compensation Study," 2020	SZC Bk6 ES V2 Ch14 Terrestrial Ecology Ornithology Appx14C4 Fen Meadow Compensation Study.pdf (sizewellcdco.co.uk)	
6	Wood "Fen Meadow Compensation Study – Report of Visits to Target Sites," 2019	SZC Bk6 ES V2 Ch14 Terrestrial Ecology Ornithology Appx14C4 Fen Meadow Compensation Study.pdf (sizewellcdco.co.uk)	
7	Sizewell C "Draft Fen Meadow Plan" 2021	REP10-132-Book-10.6-Draft-Fen-Meadow-Plan-1.pdf (sizewellcdco.co.uk)	
8	Sizewell C " Fen Meadow Plan Report – Baseline Report, Appendix H", 2021	EN010012-005414-D3 - The Sizewell C Project - Other - Fen Meadow Plan Report 1 Baseline Report Part 1 of 2.pdf (planninginspectorate.gov.uk)	
9	Sizewell C, "Volume 3 Environmental Statement Addendum Appendices Chapter 2 Main Development Site, Appendix 2.9.D: Fen Meadow Strategy," 2021.	EN010012-007581-Sizewell C Project - Other- Volume 3 Chapter 2 Environmental Statement Addendum Terrestrial Ecology and Ornithology Appendices, Appendix 2.9.D- Fen Meadow Strategy.pdf (planninginspectorate.gov.uk)	
10	Sizewell C, "Code of Construction Practice	SZC Bk8 8.11 Code of Construction Practice.pdf (sizewellcdco.co.uk)	