The Sizewell C Project

6.3 Volume 2 Main Development Site
Chapter 14 Terrestrial Ecology and Ornithology
Appendix 14C Protected Species

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SIZEWELL C DEVELOPMENT – MAIN DEVELOPMENT SITE: VOLUME 2, CHAPTER 14:

APPENDICES 14C [IN PART]

Documents included within this Appendix group are as follows:

APPENDIX 14C1A – BAT MITIGATION STRATEGY

APPENDIX 14C1B – BAT METHOD STATEMENT

APPENDIX 14C2A – REPTILE MITIGATION STRATEGY

APPENDIX 14C2B – REPTILE METHOD STATEMENT

APPENDIX 14C6A – WATER VOLE MITIGATION STRATEGY

APPENDIX 14C6B – WATER VOLE DRAFT LICENCE

APPENDIX 14C7A – NATTERJACK TOAD MITIGATION STRATEGY

APPENDIX 14C7B - NATTERJACK TOAD DRAFT LICENCE

APPENDIX 14C9A – GREAT CRESTED NEWT METHOD STATEMENT

APPENDIX 14C10 – OTTER METHOD STATEMENT

APPENDIX 14C11 – DEPTFORD PINK DRAFT LICENCE

NOTE: ALL FIGURES ARE PROVIDED SEPARATELY.

EXCLUDED FROM THIS APPENDIX GROUP ARE:

APPENDIX 14C3A – BADGER MITIGATION STRATEGY **[CONFIDENTIAL]**

APPENDIX 14C3B – BADGER DRAFT LICENCE **[CONFIDENTIAL]**

APPENDIX 14C4 – FEN MEADOW PHASE 2 REPORT

APPENDIX 14C5 – MARSH HARRIER MITIGATION

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1. Bat Mitigation Strategy

1.1 Introduction

a) Purpose

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station.

1.1.2 This Bat Mitigation Strategy outlines the key approaches to mitigating potential impacts to bats' populations present within or adjacent to the construction site for Sizewell C main development site. It will be used by the consultant ecologist, SZC Co. and any relevant subcontractors, in relation to the proposal to build the Sizewell C.

1.1.3 This document has been drafted based on the survey data collected to date. In addition, the content of this document has also been devised based on consultation with Natural England and other stakeholders. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence. This document has been drafted to form part of the Development Consent Order (DCO) submission. This document will be subject to future updates prior to and during each phase of the proposed development to ensure the recommended mitigation remains relevant.

1.1.4 The requirements for mitigation are based on the impacts outlined in the ES chapter associated with the proposed main development site works. This document should be read alongside the following documents:

- Arcadis. 2020. Sizewell C Project, main development site, Environmental Statement. Chapter 14.21 Bats.
- Arcadis. 2020. Sizewell C Project, main development site, Ecology Technical Appendix 14A8 Bats (in draft); and
- Arcadis. 2020. Sizewell C Project, main development site, Bat Non-licensed Method Statement (in draft).

1.2 Background

1.2.1 The main development site (and wider study area), supports ten UK bat species that have legal protection, some of which are of particular nature conservation concern: Daubenton's bat (*Myotis daubentonii*); Natterer's bat (*Myotis nattereri*); noctule (*Nyctalus noctula*); Leisler's bat (*Nyctalus leisleri*); common pipistrelle (*Pipistrellus pipistrellus*); soprano pipistrelle (*Pipistrellus pygmaeus*); Nathusius' pipistrelle (*Pipistrellus nathusii*); serotine (*Eptesicus serotinus*); barbastelle (*Barbastella barbastellus*) and brown long-eared bat (*Plecotus auritus*).

1.2.2 Full details of their status and distribution within the EDF Energy Sizewell Estate are provided within the SZC Ecology Technical Appendix 14A8 Bats. The full results are not presented here, however the results of surveys conducted since 2007 are summarised in the key information used to inform this mitigation strategy. These results and the subsequent assessment of areas of key importance are presented in Figure 14C1.1.

1.2.3 This mitigation strategy outlines the measures proposed to ensure potential impacts on roosting (breeding), mating, hibernating, foraging and commuting bats of all of these species, are controlled. It is considered that if the prescriptions of this strategy are followed, the impacts to bats resulting from the project can be reduced to minor adverse – not significant' (as assessed within the ES).

1.2.4 Of the bat species present within the site, mitigation has to consider in particular barbastelle and Natterer's bats. These two species were identified as individual Important Ecological features (IEFs)[1] of 'National' and 'County' importance, respectively, within the Ecological Impact Assessment (EcIA), following the 2018 Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment (Ref 14C1.1). The rationale for this assessment is outlined in full in the Bat Technical Appendix. The assemblage is identified as being of Regional Importance.

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1 IEFs are defined as ecological features requiring a specific assessment within the Ecological Impact Assessment (EcIA). Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat / species rarity) (Ref 14C1.1)

a) Legal Status

1.2.5 All bats in the UK are protected under Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora (the European Council (EC) 'Habitats Directive') through their inclusion in Annex IV (animal and plant species of Community interest in need of strict protection) (Ref 14C1.2). Barbastelle are also listed in Annex II (species of Community interest which require the designation of SACs).

1.2.6 The Habitats Directive is transposed into UK law through the Conservation of Habitats and Species Regulations (Ref 14C1.3), known as the 'Habitats Regulations'. Other relevant legislation is the Wildlife and Countryside Act (Ref 14C1.4), the Countryside and Rights of Way (CROW) Act (Ref 14C1.5) and the Natural Environment and Rural Communities (NERC) Act (Ref 14C1.6) .

1.2.7 Four of the species identified within the main development site are also listed as species 'of principal importance for the conservation of biodiversity' under Section 41 of the Natural Environment and Rural Communities (NERC) Act (Ref 14C1.6): barbastelle, brown long-eared bat, noctule and soprano pipistrelle. All bat species identified within the main development site are included within a Grouped Bat Action Plan in the Suffolk Biodiversity Action Plan (BAP).

b) Document Structure

1.2.8 Appendix 2 provides a list of the information sources that have been consulted in the production of this Mitigation Strategy.

1.2.9 This Badger Mitigation Strategy has been set out as follows:

- Section 1: Introduction.
- Section 2: Bat baseline.
- Section 3: Potential impacts of the development.
- Section 4: Mitigation Principles.
- Section 5: Conclusions.
- Appendices:

- Appendix 1: Details of provision of replacement roosts
- Appendix 2: Details of provision of crossing points
- Appendix 3: References

1.2.10 The layout of the Sizewell C and the main development site is shown in Figure 14C1.1 a full description of the proposed development is provided within the Environmental Statement (ES).

c) Development Programme Timeline

1.2.11 The strategy for the delivery of the Sizewell C construction programme is summarised in Table 1. The programme requires that appropriate time is allowed for ecological mitigation and clearance works, in accordance with relevant seasonal constraints.

Table 1.1: Indicative programme

d) Roles and Responsibilities

1.2.12 The roles and responsibilities for implementation of this Mitigation Strategy are outlined below:

i. SZC Co.

- ensuring adequate land is available for the timely creation of any bats' mitigation requirements;
- providing a named member of staff to be the applicant for the licence, with the necessary authority and responsibility this requires;
- managing bat habitat areas to maximise their value for bats;
- ensure the Bat Mitigation Strategy is implemented and evolved as required through the development process.

ii. Consultant ecologist

- developing and updating the Mitigation Strategy and the plan for its implementation;
- undertaking survey work on the status the bat populations required to inform a derogation licence;
- providing a named ecologist to be the agent on behalf of the applicant, who will advise the applicant on how to fulfil any requirements of the NE licence;
- providing advice on any required bats' populations mitigation and monitoring;
- progress reporting.

iii. Contractors/sub-contractors

- adhering to agreed Method Statements, under a watching brief from an Ecological Clerk of Works (ECoW).

1.3 Bat baseline

a) Introduction

1.3.1 The SZC Ecology Technical Appendix 14A8 Bats summarises the baseline conditions for the bat species found within the Zone of Influence (ZoI)[2] of the main development site. The ZoI is defined individually for each species within the Technical Appendix; from 2km (for common pipistrelle, Daubenton's bat) up to 10km for barbastelle. The rationale behind this assessment is presented in the associated Bat Technical Appendix.

1.3.2 A brief summary of the baseline information relating to the main development site is presented in this section. The rationale and survey data behind the assignment of value to each species is included in the Technical Appendix and is not repeated here.

b) Desk-study and surveys conducted

1.3.3 Desk study data from the Suffolk Biodiversity Record Centre (SBRC) was obtained for bat records within 10km of the main development site boundary, and targeted surveys for bats have been carried out, including radio-tracking, transect surveys, automated detector surveys, tree assessments and roost inspections. This information has been used to determine the baseline conditions for bats within the ZoI.

c) Assessment of value of bat species and populations present

1.3.4 To ensure a robust Ecological Impact Assessment (EcIA) process, bat populations within the ZoI of the Project were assessed to determine whether or not they would qualify as Important Ecological Features (IEFs) as defined in CIEEM guidelines on EcIA (Ref 14C1.1). For each bat species, this assessment has included consideration of conservation status, distribution across the EDF Energy Sizewell Estate, the presence of breeding and/or hibernation roosts and the availability and quality of foraging and/or commuting habitat. In addition, the bat populations have been assessed in accordance with the standard Environmental Impact Assessment (EIA) methodology used elsewhere within the Environmental Statement (ES).

2 The ZoI is defined as '*the area over which ecological features may be affected by potential biophysical changes caused by a proposed project and associated activities*' (Ref 14C1.1).

1.3.5 On the basis of this assessment, the populations of bats within the ZoI of the main development site, have been assessed as follows:

- barbastelle are considered to be an IEF at the National level under the CIEEM guidelines, and of High importance following the EIA-specific assessment methodology;
- Natterer's bat are considered to be an IEF at the County level under the CIEEM guidelines, and of Medium importance following the EIA-specific assessment methodology;
- Leisler's bat and Nathusius' pipistrelle have both been assessed as important at the Local (District) level under the CIEEM guidelines, and of Low importance following the EIA-specific assessment methodology;
- Daubenton's bat, noctule, serotine, common pipistrelle, soprano pipistrelle and brown long-eared bat have been assessed as important at the Local (ZoI) level under the CIEEM guidelines, and of Low importance following the EIA-specific assessment methodology.

1.3.6 In summary, barbastelle and Natterer's bats will be assessed as individual IEFs of 'National' and 'County' importance, respectively, within the EcIA. The remaining species are of 'Local' importance and will also be assessed as IEFs, grouped as follows:

- Leisler's bat and Nathusius' pipistrelle will be assessed as a combined IEF, based on their 'edge-of-range' status/rarity within the EDF Energy Sizewell Estate;
- noctule/serotine will be assessed as a combined IEF as these are species adapted to foraging in open space; (these are the 'big bats' other than Leisler's bat); and
- Daubenton's bat; brown long-eared bat and pipistrelle species other than Nathusius' pipistrelle (i.e. common/soprano pipistrelles). These are the more common species but contribute to the overall bat assemblage.

1.4 Potential impacts upon bats

a) Impact Pathways

1.4.1 This section of the mitigation strategy outlines the key impact pathways relating to bats resulting from the proposed development within the main development site.

1.4.2 This Bat Mitigation Strategy considers (broadly) the following impact pathways (these are outlined in full in the associated ES Chapter):

- Direct loss of roosts (roosts in trees, buildings and other structures including bat boxes). Breeding, mating, hibernation and transitional roosts need to be considered.
- Direct loss of commuting corridors; disturbance resulting in the disruption of commuting (more broadly: disruption or prevention of movement between roosts and foraging areas).
- Direct loss of foraging areas.
- Disturbance resulting in roost abandonment, and disruption of commuting or inability to use foraging areas.
- Reduction in foraging habitat quantity: indirect loss through disturbance (noise, lighting etc. from a variety of sources).
- Reduction in foraging habitat quality: indirect loss through reduction in productivity.

1.5 Mitigation and Enhancement Principles

1.5.1 Key mitigation principles implemented to mitigate potential impacts on bats are listed below:

- There is a strong focus on the mitigation hierarchy:
  - Avoidance – avoiding the creation of impacts i.e. through consideration of the placement of the development and associated infrastructure

  - Minimisation – reducing the impacts i.e. through a reduction in the length of time the impacts are present for or the severity or range of the impact
  - Mitigation – the implementation of measures to protect, improve or provide alternative resources. Mitigation that is embedded into the design is considered ‘primary’ mitigation.
  - Compensation describes measures that are required to make up for residual effects (after avoidance and mitigation have been considered) resulting in the loss of, or permanent damage to, ecological features despite mitigation (Ref 14C1.1).
  - Enhancement is the provision of new benefits for biodiversity that are above those provided as part of mitigation or compensation measures.

- Consideration has been given to impacts across the different elements of each species’ life-cycle/ecology i.e. while roosting (breeding), mating, hibernating, foraging and commuting within the mitigation recommendations.

- The focus of mitigation is primarily barbastelle, followed by Natterer’s bat and then the remaining bat assemblage. However much of the focussed mitigation will benefit multiple species.

- Mitigation is designed to be proportionate and impact-driven given that much of the work associated with the development of Sizewell C is temporary in nature (albeit over ten years) and to result in positive impacts after the development is complete.

- Mitigation is evidence-based, where possible. Where this is not possible a precautionary approach is recommended in line with ES guidelines.

1.6 Mitigation and Enhancement Proposals

1.6.1 The main proposals are presented in outline in Table 2 below.

1.6.2 Further details are presented in the non-licensed Reasonable Avoidance Measures Method Statement presented in SZC Ecology Technical Appendix 14A8 Bats. Table 2 below shows the proposed Construction and Operational Phases in relation to bat mitigation and includes both primary and tertiary mitigation measures which incorporates enhancement measures as part of the mitigation design. The distinction between mitigation and enhancement within this document is to some extent artificial at this stage as in some cases the need for a particular item would only be defined by further survey and assessment of individual roosts prior to construction. For example, if an artificial roost is provided in advance but is not 'required' in the context of the pre-construction roost survey and assessment, i.e. no roost loss, then it would be regarded as an enhancement measure, rather than mitigation.

1.6.3 This includes further details on:

- Tool-box talks to be provided to contractors (tertiary mitigation);
- Micro-siting of works (tertiary mitigation);
- Approaches to vegetation clearance and pre works checks and surveys (tertiary);
- Approaches to light mitigation (primary mitigation); and
- Approaches to noise mitigation (primary mitigation).

Table 1.2: Mitigation proposals

Impact Pathway	Avoidance/Minimisation	Mitigation/Compensation	Enhancement
DIRECT IMPACTS TO ROOSTS – TREES Direct loss of roosts in trees and bat boxes. Breeding, mating, hibernation and transitional roosts to be considered.	Design/layout retains areas of valuable woodland in order to protect the wider tree resource – particularly Ash Wood and Kenton Hills. Trees known to be used as bat roosts are retained. This is shown in Figure 14C1.7. The majority of trees valued as of at least medium potential for roosting bats area retained. It is proposed that for every tree with medium or high roosting potential which is to be lost (this will be minimised through micro-siting), a minimum of one bat box will be erected. The types of bat boxes that are recommended are presented in Appendix 1. Micro-siting of layout around trees close to construction boundary is proposed as a component of the site set up is proposed and is outlined in the non-licenced method statement.	No roosts identified to date are proposed to be removed. Further assessments of trees requiring removal will be required prior to construction to ensure no legal infringement as the works progress. If any roosts are identified, the loss of the roosts will need to be conducted under an appropriate mitigation licence (an EPS licence from Natural England). The mitigation for this will be specified within the licence, but is likely to include the provision of replacement roosts. These Replacement roosts (number to be determined based on proportion of wider roost resource to be lost). This replacement is likely to largely comprise bat boxes. A specification for bat boxes recommended to be erected is provided in the Bat Non-Licensed Method Statement. As is not possible to accurately estimate the likelihood of roost abandonment, it is proposed to provide precautionary mitigation including the provision of a bat house (or comparable mitigation within an existing structure) likely to be at Lower Abbey Farm. If taken forward as a standalone structure the location is presented in Figure 14C1.5. Details and proposed sizes etc for this structure are presented in Appendix 1. The location of this proposed structure has connectivity to known roosts. This would be at a location sufficiently remote from the temporary construction area such that noise	Erection of additional bat boxes (beyond like-for-like roost replacement) for barbastelle has already been conducted as outlined below and is presented in Figure 14C1.11. A proportion of these boxes would be considered enhancement. A bat house or appropriate comparable mitigation within an existing structure is proposed to be erected, as presented on Figure 14C1.5. Details and proposed sizes etc for this structure are presented in Appendix 1.

Impact Pathway	Avoidance/Minimisation	Mitigation/Compensation	Enhancement
		levels are relatively low. In the event of confirmed bat roosts being lost, subject to further agreement with Natural England the following ratios for roost re-provision may be appropriate: • 1:1 potential roosting features • 2:1 low status roost of common species • 4:1 maternity roosts of common species • 4:1 low status roost of Annex 2 species	
INDIRECT IMPACTS TO ROOSTS – TREES Disturbance resulting in roost abandonment: trees.	Where possible, works are sited away from the most sensitive habitats for bats. Protection from disturbance is furthered through implementation of a 20 -25m buffer where practicable around the temporary construction area to minimise noise/lighting disturbance. Screening for noise/lighting in specific locations is proposed, including a 5m high bund along the north of the Kenton Hills and a number of noise fences. These are presented in Figure 14C1.4. Safeguarded ‘dark corridors’ which will not be illuminated (maximum indirect light spill of 1lux) are also identified and are presented in Figure 14C1.4.	The roost areas which are predicted to experience noise levels above 65dB (the level of noise at which these is considered to be a significant risk of roost abandonment / avoidance) are listed for each species within the ES. These key areas are presented in Figure 14C1.1. It is not possible to estimate at this stage confidently if the level of noise to which the roosts may be exposed or the risk that this will cause a significant variation in roost usage. However, as a precaution, additional roosts have been erected to offer alternative roosting locations for bats. These consist of 45 bat boxes of a design preferred by barbastelle, which have already been installed within: Sandypytle Plantation (10); The Grove (15); St. James Covert (10); Reckham Pits (5) and Leiston Carr (5)). The locations of these areas are presented in Figure 14C1.11. In addition, it is proposed that monitoring the areas which have been assessed as being sensitive to	Erection of additional bat boxes (beyond like-for-like roost replacement) has already been conducted as outlined below and is presented in Figure 14C1.11. A proportion of these boxes would be considered enhancement. Provision of a bat house or comparable mitigation within an existing structure at Lower Abbey Farm is proposed, as presented on Figure 14C1.5. Details and proposed sizes etc for this structure are presented in Appendix 1.

Impact Pathway	Avoidance/Minimisation	Mitigation/Compensation	Enhancement
		disturbance from noise will be monitored throughout the various phases of the proposed development, with monitoring surveys being carried out at a minimum of once a year (although greater survey effort is likely to be undertaken). The areas to which this applies are described in the Non licensed method statement. The monitoring will assess two key indicators: The noise levels actually produced by the works. The bats usage of roosts and foraging and commuting areas, as compared to the base line surveys. If noise levels are deemed to be at a level that an offence is considered more likely than unlikely, or significant changes in the assessed bat conservation status is identified, two approaches will be employed to safeguard bats: Implementation of noise abatement measures, which could include working methodologies, additional noise attenuation fencing or bunds; and / or mitigation focussed on the bat population, which could include further roost provision. If necessary, this is the appropriate juncture at which the requirement for an EPS derogation licence may be triggered.	
IMPACTS TO ROOSTS – NOT TREES Direct/indirect loss of roosts	All building roosts identified to date are all retained within the current proposals. Throughout the evolution of the proposals, the potential impact to	It is proposed that monitoring of the building roosting areas which have been assessed as being sensitive to disturbance will be monitored	Erection of additional bat boxes (beyond like-for-like roost replacement) has

Impact Pathway	Avoidance/Minimisation	Mitigation/Compensation	Enhancement
in buildings and other non-tree roosts. Breeding, mating, hibernation and transitional roosts to be considered.	roosts should be assessed. If any buildings supporting roosts are to be lost, this is the appropriate juncture at which an EPS derogation licence may be triggered. Where possible, works are sited away from the most sensitive habitats for bats. Protection from disturbance is furthered through implementation of a 20 -25m buffer where practicable around the temporary construction area to minimise noise/lighting disturbance. Screening for noise/lighting in specific locations is proposed, including a number of 5m high noise fences. These are presented in Figure 14C1.4. Safeguarded 'dark corridors' which will not be illuminated (maximum indirect light spill of 1lux) are also identified and are presented in Figure 14C1.4, these will prevent isolation of known roosts.	throughout the various phases of the proposed development. The areas to which this applies are described in the Non licensed method statement. The monitoring will assess two key indicators: The noise levels produced by the works. The bats usage of roosts and foraging and commuting areas, as compared to the base line surveys. If noise levels are deemed to be at a level that an offence is considered more likely than unlikely, or significant changes in the assessed bat conservation status is identified, two approaches will be employed to safeguard bats: Implementation of noise / light abatement measures, which could include working methodologies, additional noise attenuation fencing or bunds; and / or mitigation focussed on the bat population, which could include further roost provision. If necessary, this is the appropriate juncture at which the requirement for an EPS derogation licence may be triggered. As is not possible to accurately estimate the likelihood of roost abandonment, it is proposed to provide precautionary mitigation including the provision of a bat house (or comparable mitigation within an existing structure) likely to be at Lower Abbey Farm. If taken forward as a standalone structure the location is presented in Figure 14C1.5. Details and proposed sizes etc for this structure are	already been conducted as outlined below and is presented in Figure 14C1.11. A proportion of these would be considered enhancement. Provision of a bat house or comparable mitigation within an existing structure at Lower Abbey Farm is proposed to be erected, as presented on Figure 14C1.5. Details and proposed sizes etc for this structure are presented in Appendix 1.

Impact Pathway	Avoidance/Minimisation	Mitigation/Compensation	Enhancement
		presented in Appendix 1. The location of this proposed structure has connectivity to known roosts. This would be at a location sufficiently remote from the temporary construction area such that noise levels are relatively low.	
IMPACTS TO COMMUTING ROUTES Direct loss of commuting corridors Disturbance resulting in the disruption of commuting (more broadly: disruption or prevention of movement between roosts and foraging areas).	The strongest commuting routes / flight-paths (north from Ash Wood and The Grove; along the northern edge of Kenton Hills) will be physically retained during the construction and operational phase of the development. This is presented in Figure 14C1.6 and Figure 14C1.7. An approach to lighting is presented in the non-licenced method statement that will avoid mitigation. This provides further information on the lighting controls, a summary of the locations of safeguarded dark corridors is shown in Figure 14C1.4. Bisecting of key commuting and foraging and commuting routes is minimised, however some severance is unavoidable. In these locations, a suitable crossing will be installed. See Appendix 2 for the generic recommendations on crossing-points which will be followed.	During the construction and operation phase, key connectivity will be retained, including the creation of a protected corridor through use of a culvert beneath the SSSI crossing. The crossing would be part of a corridor skirting the edge of the development, linking to Ash Wood, Plantation Cottage Woodland and further north through Black Walks and The Grove. This is presented on Figure 14C1.2, Figure 14C1.3 and Figure 14C1.6 Where the SSSI is crossed, the proposed culvert dimensions provide a substantial cross-sectional area of approx. 20m^2 and would not be grilled. A culvert of this size should allow access for all species likely to use culverts (i.e. all species other than the open-adapted 'big bats'). See Appendix 2 for recommendations on crossing-points which will be followed. In addition, it is proposed that the areas which have been assessed as being sensitive to disturbance from noise will be monitored throughout the various phases of the proposed development, with monitoring surveys being carried out at a minimum of once a year (although greater survey effort is likely to be undertaken). The areas to which this applies are described in the Non licensed method	During the operational phase of the development, additional connectivity will be created across the site and beyond this to wider habitats. These areas are shown on Figure 14C1.8.

Impact Pathway	Avoidance/Minimisation	Mitigation/Compensation	Enhancement
		statement. The monitoring will assess two key indicators: The noise levels actually produced by the works (monitoring as outlined in ES chapter 14.21; The bats usage of roosts and foraging and commuting areas, as compared to the base line surveys (as reported in ES chapter 14.21). If noise or light levels are deemed to be at a level that an offence is considered more likely than unlikely, or significant changes in the assessed bat conservation status is identified, two approaches will be employed to safeguard bats: Implementation of noise and / or light abatement measures, which could include working methodologies, additional noise or light attenuation fencing or bunds.	
IMPACTS TO FORAGING AREAS Direct loss of foraging areas.	The design / layout retains the key areas of value to foraging bats i.e. Ash Wood, part of the Upper Abbey Bridleway, Kenton Hills/Nursery Covert. This is presented in Figure 14C1.12.	The operational phase provides more extensive foraging areas than at present and overall the operational development would secure a demonstrable improvement in biodiversity value. The post construction areas showing the retained roosts and foraging areas are presented as Figure 14C1.7 and Figure 14C1.8. The following habitat creation measures have already been undertaken by EDF Energy which, although not specifically aimed at bats will provide habitat of enhanced value during the construction of Sizewell C:	Extensive habitat creation and restoration post-construction of EDF Estate to heath and acid grassland will be of net benefit to foraging bats – not least through replacement of less valuable arable land with new acid grasslands, scrub and trees belts. An increase in overall

Impact Pathway	Avoidance/Minimisation	Mitigation/Compensation	Enhancement
		• 5ha of wetland (reedbed) has already been established at Aldhurst Farm together with approximately 60 ha of acid grassland. • 10ha of species-rich acid grassland at Broom Covert has been taken out of intensive cattle grazing and grassland and scrub allowed to recover and re-establish as part of the reptile mitigation. • 40ha of acid grassland with 40% scrub planting has been established on former arable fields as part of the reptile mitigation. • 40ha of grassland and scrub planting will be established to provide foraging habitat for marsh harrier. The location of these enhancement areas is presented in Figure 14C1.12.	biodiversity value is demonstrated in the net gain report. The post construction areas showing the retained roosts and foraging

1.7 Summary and conclusions

1.7.1 Overall, it is considered that if the measures described in this mitigation strategy and the non-licensed avoidance measures document ES Technical Appendix are implemented, potential impacts to bats can be minimised. This will reduce the impacts to all bat species to minor adverse – not significant as predicted by the ES.

1.7.2 Safeguards are put in place to account for any changes in proposals or unforeseen impacts from noise or lighting. These include monitoring of noise during the works and the holistic assessment of impacts to bats throughout the construction period.

1.7.3 It is proposed that sufficient mitigation is included to account for impacts that are not possible to quantify. Forty-five bat boxes have already been erected; however, the number that will be required overall is in part dependent on the calculation of the number of trees to be directly lost.

1.7.4 In addition, one bat house (or equivalent new roosting spaces within existing structures) is proposed.

References

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1.9 Berthinussen, A. & Altringham, J. (2015). WC1060 Development of a cost-effective method for monitoring the effectiveness of mitigation or bats crossing linear transport infrastructure. Report to Defra available at: http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=18518

Appendix 14C1A.1: Details of Provision Of Replacement Roosts

1.1 Bat Boxes

1.1.1 All bat boxes would be erected according to the following parameters:

- Bat boxes will be installed by the contractor, under the direction of the Ecologist, prior to tree felling and the commencement of works;
- The boxes will be positioned on suitable retained trees, within the red line boundary, around the site in order to provide continuity of roosting habitat throughout the site;
- Each box will be positioned approximately 3-5m high and any branches causing obstruction to a direct flight path to the boxes will be removed;
- The boxes will be from a tree branch near the trunk or fixed to the trunk with the supplied 'tree-friendly' aluminium nail.
- The bat boxes will be positioned on north, south-east and south-westerly aspects to account for seasonal variation in temperature.
- The boxes will be placed in areas which avoid illumination from the Scheme and will not be illuminated;
- The boxes will remain *in situ* for the duration of the works and after completion.
- Boxes will be monitored on an annual basis during the construction phase from one year after installation. Boxes would continue to be monitored for five-years beyond the completion of construction. This monitoring would aim to confirm the presence/absence of bats and the use of the bat boxes. If bat boxes have not been occupied within three years of installation, consideration would be given to moving them to alternative sites nearby, to be determined by a licensed bat ecologist.
- The optimal time to conduct this bat box survey is in September of each year (at the end of the breeding season). All monitoring would be conducted by an appropriately licensed bat ecologist. Monitoring

would consist of a check of the box for evidence of use, such as droppings, smoothing, feeding remains, smell, staining and bat fly (Nycteribiid) pupae.

1.1.2 The specific location of these bat boxes is highlighted in Figure 14C1.11. Recommended bat boxes are provided for information purposes in the table below (Table 3).

Table 1.1: Examples of bat boxes for tree mounting

Schwegler 2F bat box

Schwegler 1FD bat box

Schwegler 1FF *Schwegler 1FW*

1.2 Bat House

1.2.1 A bat house would be erected according to the following parameters (details presented in Table 4)[3]

- A bat house is to be built to the north of the site; location shown in Figure 14C1.5. A design for a bat house has been included below. The bat house has been designed to include features suitable for species found roosting at Upper Abbey Farm; barbastelle, Natterer's bat, Daubenton's bat. brown long-eared, common and soprano pipistrelle.

- The proposed location for the bat House is to be surrounded by suitably retained vegetation. This area will not be lit and will not be used for general public use. Existing vegetation is present around the proposed location of the bat house. Hedgerows will be retained along

3 Unless roosting provision is provided by increasing roosting provision within existing structures (e.g. Lower Abbey Farm)

Upper Abbey Bridleway, which has been shown to be a key existing commuting route and will provide connectivity to the bat House.

- The bat house will need to have a suitable thermal regime in order to be successful; features to help create a range of temperatures have been included within the building design and are described in Table 4 below. The bat house will be draft free and a stable temperature environment will be created. The bat house will be load bearing to allow for safe internal monitoring visits.

- Temperature and humidity data loggers will be placed inside the bat house after construction to measure the environmental conditions. Data for the duration of the monitoring period will be collected and compared with the findings of the monitoring surveys.

- Like the bat boxes, monitoring will take place on an annual basis during the construction phase from one year after installation. Boxes would continue to be monitored for five-years beyond the completion of construction.

Table 1.2: Example bat house parameters

Size	5m X 4m minimum
Planning	May need planning permission unless included within the DCO
Roof height	>2m
Roof design	Maximise gable-end provision. Minimum two gable ends with access, ideally 4, one at each direction. Unobstructed flying spaces in roof (i.e. no internal beams supporting the roof, king posts, struts etc.). Ridge tiles not to be fully cemented down to create void. Overhanging soffits.
Human access	Through trapdoor in floor to roof. Locked door to structure at ground level.
Internal features	• Free flying areas, • Baffles, • Hot boxes, • Cooler areas, • Hanging tiles, • Crevices, • Wooden hibernation boxes
Access	Access at gable ends (approx. 30 x50mm), at eaves, soffits and in the roof skin (i.e. access slates / tiles.
Surrounding habitats	To be located close to existing flight lines.

./ location

No lighting directly on the roost, particularly not access points for bats. dark corridor to the building from off-site and adjacent habitats. Surrounded by vegetation insofar as is possible. Access to pond areas desirable.

Potential locations shown in image 1.

Structure

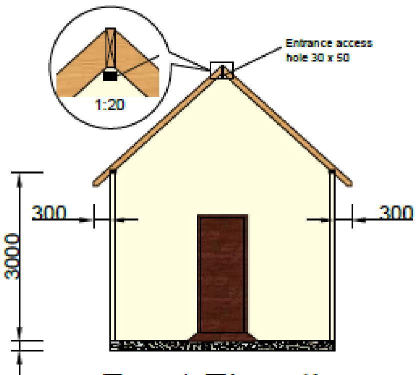
Structure of wood, with cladding / weatherboarding. Can also be masonry / block if required. Ideally one cavity wall at north aspect with 15,mm x 50mm access.

Pitched roof, pitch as steep as possible. Dark coloured slates / tiles if possible. Membrane under tiles / slates to be roofing felt, not Breathable Roofing Membrane.

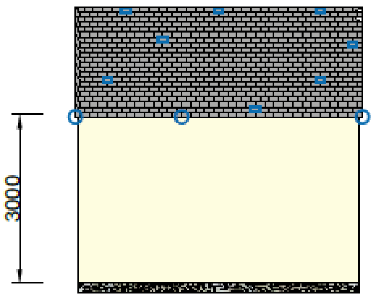
Will need to deter vandalism / unauthorised access. 'water pumping house' or similar sign can be used as a deterrent.

Exterior view

Examples of potential scale and design



Front Elevation



Side Elevation

Appendix 14C1A.2: Details of Provision of Crossing-points

1.1.1 This Appendix provides information on the proposed provision of crossing points. Where these have not been designed, the design will follow these parameters.

1.1.2 Any feature required to function as a protected corridor for bats needs to be adequately protected from light-spill and noise, or the area of the crossing/corridor will be avoided by the majority of (and potentially all) bat species. There is consensus that corridors used by bats should be unlit, with any lighting in the surrounding area directed away from the corridor; thresholds for noise levels are unknown, but the effects will be dependent on the frequency of the noise.

1.1.3 At the proposed Sizewell Marshes SSSI crossing, the most effective mitigation would be to guide the bats along the existing ditch and underneath the proposed Sizewell Marshes SSSI crossing (rather than a structure designed to take the bats over the top of the crossing).

1.1.4 Factors which determine whether a bat species will use a particular type/size of structure include its length, width and cross-sectional area, and the degree of 'clutter-adaption' of that species.

- Clutter-adapted species (for example, Natterer's bat and brown long-eared bat) have flight and echolocation characteristics which are designed to allow them to manoeuvre and feed in cluttered environments; this mean they are able to use narrower structures, of extended length.

- In contrast, edge-space species (for example, barbastelle and pipistrelle species) hunt for prey in the boundary between open spaces and the background (e.g. the adjacent vegetation) and avoid clutter. For this reason, they are unable/unwilling to use narrow-bore culverts.

- In general, the higher and broader the tunnel or culvert, the more readily bats will use it. Larger structures accommodate a wider range of species (edge-species use them, and clutter-adapted species do not avoid them), and bats are less likely to fly over them (thereby putting themselves at risk) instead of using them.

- Little research appears to have been done to establish the smallest effective cross-sectional area of underpasses. One study which does so (based on a 95% probability that a culvert is used more than ‘incidentally’) suggests cross-sections of 7m^2 for Daubenton’s bats and 47m^2 for common pipistrelles. This is far greater than that suggested in other published guidance (outlined below), but is again an indication that ‘bigger is better’.

1.1.5 Specifications for different structures crossing over and under roads have been published in the Netherlands and are reproduced in UK Highways guidance. These indicate that barbastelle use tunnels of 4m x 4m dimensions, and several studies have reported use by barbastelle of tunnels of significant length (in the order of 30m) with these dimensions.

1.1.6 The Conference of European Directors of Roads (CEDR) (Ref 14C1.7) conducted a review of bat mitigation across Europe, and published ‘tentative’ minimum estimates for the recommended height and width of tunnels and culverts for each bat species group: ‘Group’ is based on based on flight and echolocation characteristics; only species recorded at the proposed main development site are included in Table 5 below.

Table 1.1: Species ‘groups’ used in crossing design

Group	Species included in group	Dimensions; H = height; W = width
Group A	Natterer’s bat; brown long-eared bat	H >2 m, W >2 m
Group B	Daubenton’s bat	H >2 m, W >2 m over waterways; H >4 m, W >4 m over land
Group C	Common, soprano, Nathusius’ pipistrelle	H >4.5 m, W >5 m
Group D	Serotine, barbastelle	H >4.5 m, W >5 m.
Group E	Noctule; Leisler’s bat;	Not a recommendable mitigation method for these species

1.1.7 For Group D, effectiveness is caveated as ‘very questionable’, but this applies more to serotine than barbastelle.

1.1.8 Since the initial HyderCresswell (now Arcadis) (Ref 14C1.8) literature review was compiled, Berthinussen & Altringham (Ref 14C1.9) have published a report which includes ‘best practice principles’ for bat mitigation along linear transport infrastructure (summarised in Table 6). These are reproduced below, though not all are of relevance to the Sizewell Marshes SSSI crossing.

Table 1.2: Summary of Berthinussen & Altringham recommendations for bat mitigation

Best practice principles	Relevance to Sizewell
Mitigation should be integrated into the scheme from the earliest opportunity. Mitigation should be considered during the planning and design stage of the infrastructure so that it can be incorporated effectively.	Relevant and adopted.
Crossing structures should be placed on the exact location of existing bat commuting routes. Attempts should not be made to divert bats from their existing commuting routes.	This relates to the provision of safe crossing-points over linear developments (road, rail) and is of less relevance to the provision of a protected corridor through a 'hostile' landscape.
Crossing structures should not require bats to alter flight height or direction. This will depend on the topography of the site. If the road is to be elevated above ground level an underpass may be used to preserve the commuting route below it, or if the road is in a cutting a green bridge may be used to carry the commuting route over the road.	• Should be adopted as far as possible; may be less important to the provision of a protected corridor through a 'hostile' landscape. • It is important to note that bats must seek new connections to adapt to a changing landscape; for example, in relation to changing agricultural practices, and seasonal food availabilities. Thus, if bats are prevented or deterred from using a traditional flight route, they are likely to seek alternatives.
Crossing structures should maintain connectivity with existing bat commuting routes. Connectivity must be maintained with undisturbed bat flight paths (e.g. treelines, hedgerows, woodland rides and streams), and bat habitat (e.g. woodland) within the surrounding landscape. Crossing structures should not be exposed or sited within open ground.	• This is important for crossing-points over linear developments, or the existing commuting routes may continue to be used unsafely. • This is of less relevance at Sizewell, where options for traversing the sites during construction will be reduced to protected corridors. If bats 'choose' to cross outside of the protected corridors, this is unlikely to result in mortality. • Note also the comment re seeking alternatives, above
Over-the-road structures such as green bridges should be planted with vegetation. Vegetation should be continuous and connected (see above) and sufficiently mature before road construction (e.g. by planting either relatively mature trees or fast-growing tree species in advance of construction commencing).	The structures proposed at Sizewell do not fall into the category of 'green bridges'; however, the retention/ strengthening of vegetation along corridors is important (and may help to a degree with protection from light).
Underpasses should be of sufficient height. Underpasses should be as spacious as possible with height being the critical factor. The minimum requirements for underpass height will be species-specific. Required heights will generally be lower for woodland-adapted	• These dimensions are generous in comparison with previously published recommendations.

Best practice principles	Relevance to Sizewell
species (~3 m) compared to generalist edge-adapted species (~6 m), but larger underpasses will accommodate more species.	
Crossing structures should be unlit. The effects of light on bats are species-specific and lighting should be avoided.	Noted: protection from lighting is a critical consideration.
Access and connectivity must be maintained It is important that access to crossing structures is maintained (e.g. grilles should not be installed on underpasses) and that connecting vegetation is retained indefinitely or for as long as the mitigation structure is required.	Noted: grilles on culvert to be avoided, and vegetation will be maintained.
Disturbance should be minimised during installation of mitigation structures. For example, by limiting noise and light pollution along the bat flight path, minimising vegetation clearance, installing suitable temporary crossing structures (which should also be subject to monitoring and evaluation), completing the installation as quickly as possible and ideally avoiding the summer months when bats are most active.	Noted

VOLUME 2, CHAPTER 14 APPENDIX 14C.1B: BAT METHOD STATEMENT

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Executive Summary

This document is compiled in relation to the proposed development of Sizewell C Main Development Site (main development site). It is provided alongside an Environmental Statement (ES). The purpose of this document is to outline how bats will be safeguarded within the site preparation and construction phases of the development, in order that no offences are triggered under applicable wildlife legislation.

SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station.

It is located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

This Bat Non Licensable Method Statement compiled by Arcadis Consulting (UK) Limited (hereafter referred to as 'Arcadis') outlines the key approaches to avoiding impacts to bat populations present within or adjacent to the construction site for Sizewell C main development site (main development site). It will be used by the ecological consultant, SZC Co. and any relevant subcontractors, in relation to the proposal to build the Sizewell C.

This document is produced as a draft non-licenced method statement as under the current proposals, it is considered that impacts can be controlled sufficiently that no offences under wildlife legislation will be triggered and no European Protected Species Derogation Licence (EPS) will be required. This will be reassessed throughout the construction of Sizewell C.

Currently, it is considered that if the prescriptions of this document be followed, it is considered that it is extremely unlikely that an offence will be triggered under wildlife legislation. As such, it is considered that there is no need for a derogation licence to be obtained in relation to bats.

The avoidance of the requirement for a protected species licence in relation to bats has been achieved through following the mitigation hierarchy and design iterations which safeguard bat roosts within and around the development. Measures as outlined within this report to minimise direct impacts are also key to ensuring that licensable impacts to bats are avoided.

The information within this report is underpinned by a suite of surveys conducted across the site since 2007. These surveys have included but are not limited to desk studies, radio tracking of bats, tree inspections, automated detector surveys, emergence and re-

entry surveys, tree inspections. The full details of the surveys conducted and the results of the surveys which were utilised to inform this method statement are provided in the associated ES, Appendix 14A8 and the associated annexes. However, the key information is provided here where required for clarity.

Measures outlined within this report which are proposed to be implemented to safeguard bats during the site preparation and construction phases of the project are outline within this document. These include:

- Pre-clearance checks and surveys of vegetation;
- Micro-siting of construction phase features to minimise impacts;
- Prescriptive lighting approaches to minimise impacts on roosts and foraging and commuting bats; and
- Measures to control impacts from noise on retained roosts and foraging and commuting bats.
- Monitoring of bats and noise levels throughout the construction period.

This document also summarises measures proposed for compensation and enhancement. This is a summary of the approach, with further information presented in the bat mitigation strategy (Ref. 1.1).

Throughout the construction period, the success of the avoidance methodology provided in this document will be assessed and should it be necessary, the approach will be re-evaluated and the mitigation modified to control impacts, or an EPS licence obtained if required.

1 Bat Method Statement

1.1 Introduction

a) Background and scheme overview

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station.

1.1.2 It is located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

1.1.3 Sizewell C would comprise two United Kingdom European Pressurised Reactor (UK EPR™) units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The new nuclear power station would represent the Nationally Significant Infrastructure Project (NSIP) component of the proposed development

1.1.4 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction including an accommodation campus, and a series of off-site associated development sites in the local area. These include:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the 'northern park and ride'), and one to the south-west at Wickham Market (the 'southern park and ride') to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;
- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the 'two village bypass') to alleviate traffic on the A12 through the villages;
- A permanent road linking the A12 to the Sizewell C main development site (referred to as 'Sizewell link road') to alleviate traffic from the B1122 through Theberton and Middleton Moor;

- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the 'Yoxford roundabout') and other road junctions to accommodate Sizewell C construction traffic;
- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site;
- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site ('the green rail route') and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network; and
- Green rail route extension and rail improvements to the Saxmundham to Leiston branch line.

1.1.5 The components of the Project listed above are referred to collectively as the 'Sizewell C Project'. This method statement is compiled in relation to the works on the Main Development Site (main development site) only. Where required, mitigation and avoidance measures proposed in relation to the other aspects of the project are provided in support of the ES Chapters related to those components of the project.

1.1.6 In order to enable the proposed development of the main development site, as detailed above, a number of facilitating works (including tree felling, vegetation clearance works, ground-breaking works and lighting measures) are required. Given the opportunities afforded to bat species by the habitats present within the site, the proposed facilitating works have the potential to cause disturbance and / or injury / mortality of bats that may be present. Accordingly, the purpose of this document is to provide a reasonable avoidance measures (RAMs) method statement that can be used by the ecological consultant, SZC Co. and any relevant subcontractors, to ensure the safeguarding of bats during the facilitation works to be undertaken within the site.

b) Site location and setting

1.1.7 The main development site is located in Sizewell, East Suffolk. The site is illustrated in Plate 1.1 and is largely is dominated by arable fields with field boundaries comprising native, species poor hedgerows or tree lines. Several woodland blocks, comprising plantation, mixed plantation and broadleaved semi-natural woodland, are scattered across the Scheme. The larger area present to the north east includes Hilltop Covert, Dunwich Forest, Goose Hill and the northern boundary of Kenton Hills. Numerous farm buildings and structures are also scattered to the north and west of the site. Some of the site falls within the following designated sites:

- Sizewell Marshes SSSI – a small wetland area, including fen meadow habitat;
- Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB);
- Sizewell Levels and Associated Areas County Wildlife Site (CWS) – largely plantation woodland and acid grassland; and
- Suffolk Shingle Beaches CWS – dune grassland and vegetation shingle.

1.1.8 The area covered by this MS is presented in Plate 1.1 below.

Plate 1.1: Site location – Main Development (terrestrial area)

c) Purpose of this document

1.1.9 This method statement outlines how bats are going to be safeguarded within the development. This includes the site preparation (i.e. vegetation removal and site stripping) and construction phase (including non-licensed mitigation for noise and lighting impacts).

1.1.10 Details of measures to be implemented to safeguard bats during the operational phase of the development are presented within the mitigation strategy.

d) Key ecological constraints

1.1.11 The key potential legislative constraints associated with the facilitation works within the main development site (in addition to bats) are related to the presence of:

- Great crested newt (GCN);
- Natterjack Toad;
- Dartford Pink;
- Reptiles;
- Water vole;
- Nesting birds; and
- Otter.

1.1.12 Details of the mitigation being implemented to safeguard these receptors are presented in the appropriate section of the ES, namely:

- Appendix 14C1- Bat Mitigation Strategy
- Appendix 14C2- Reptile Mitigation Strategy
- Appendix 14C3- Badger Mitigation Strategy
- Appendix 14CC8- Water Vole Mitigation Strategy
- Appendix 14C9- Natterjack Mitigation Strategy

1.1.13 Where appropriate, draft license applications are also presented in ES Technical Appendix 14A8 (Ref. 1.2). No draft licence is considered to be required in relation to bats at this stage

1.1.14 Within this site, at least ten species of bat have been recorded within the site boundary: barbastelle (*Barbastella barbastellus*); serotine (*Eptesicus serotinus*); Daubenton's bat (*Myotis daubentoni*); Natterer's bat (*Myotis nattereri*); Leisler's bat (*Nyctalus leisleri*); noctule (*Nyctalus noctula*); Nathusius' pipistrelle (*Pipistrellus nathusii*); common pipistrelle (*Pipistrellus*

pipistrellus); soprano pipistrelle (*Pipistrellus pygmaeus*); and brown long-eared bat (*Plecotus auritus*).

1.1.15 This draft method statement only covers measures related to safeguarding bat species present on the main development site, there are associated draft method statements and draft protected species licences for other receptors and other aspects of the Sizewell C development provided separately.

1.1.16 This document has been drafted based on the survey data collected to date. In addition, the content of this document has also been devised based on consultation with Natural England and other stakeholders. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.2 Status of Bats within the site

a) Introduction

1.2.1 This section of this non-licensed method statement presents a high-level summary of the baseline data that underpins the thinking behind this document. Full details of the surveys conducted are presented in the ES Appendix 14A8.

1.2.2 A suite of surveys have been undertaken to inform the ES, and include:

- Assessment of desk study data obtained between 2007 and 2019;
- Bat tree and building assessments (internal and external inspections including hibernation assessments);
- Radio tracking surveys;
- Tree inspections for bats;
- Emergence / re-entry surveys on buildings;
- Automated detector surveys; and
- Walked and driven activity transects.

1.2.3 In summary, the main development site supports ten species of bat within the site boundary. A number of roosts, present in structures and trees, have been identified within the wider survey area including maternity roosts, hibernation roosts and non-breeding roosts; these are outlined below. None of these bat roosting locations will be lost during the development. See 1 for location of these roosts.

i. Roosts

1.2.4 This section of the report outlines the roosts found within and around the site which were considered when outlining the avoidance methods to be specified as a component of the project. These roosts are subdivided into a) building and b) tree roosts for clarity. All of these roosts are presented on Figure 14C1B.1.

Building roosts

1.2.5 This section of the report lists the roosts found within buildings during the surveys of the site.

1.2.6 The following roosts are located in Upper Abbey Farm:

- Building 1: barbastelle hibernation roost; Natterer's bat mating roost; common and soprano pipistrelle day roosts;
- Building 5: Pipistrellus sp. day roost;
- Building 9: brown long-eared bat day roost;
- Building 10: brown long-eared maternity roost; and
- Building 11: Natterer's bat, Daubenton's bat & brown long-eared hibernation roosts; common and soprano pipistrelle day roosts.

1.2.7 The following roost is located within Ash Wood Cottages (located outside of RLB but within the ZoI of the development). The location of this structure is presented in

- Brown long-eared maternity roost

1.2.8 The following roosts are located in Lower Abbey Farm (located outside of RLB):

- Building 1: common pipistrelle day roost;
- Building 2: unidentified bat species day/ transitional roost;
- Building 6: unidentified bat species day/ transitional roost;
- Building 8: common pipistrelle day roost; and

- Building 11: brown long-eared roost.
- Leiston Abbey (located outside of RLB):

1.2.9 The following roost is located within the Abbey Building bat box: Natterer's maternity roost

1.2.10 The following roost is located within the World War II Bunker (located outside of RLB) Brown long-eared hibernation roost.

ii. Tree roosts

1.2.11 This section of the report lists the roosts found within trees during the surveys of the site.

1.2.12 Barbastelle tree roosts (including maternity and non-breeding) were identified within the following woodland areas (see Figure 1 for roost locations):

- Northern edge of Kenton Hills (within RLB) – R1, R20, R2, R11;
- Ash Wood (outside of RLB) – R3, R9, R13, R14 & R26;
- Kenton Hills/ Nursery Covert woodland complex (outside of RLB) – R15, R16, R18 & R27;
- Grimseys (outside of RLB) – R4, R35 & R36;
- Leiston Abbey Woodland (outside of RLB) – R21;
- Greenhouse Plantation (outside of RLB) – R6;
- Plantation Cottages Woodland (outside of RLB) – R17, R19 & R32; and
- The Grove (outside of RLB) – R5, R7, R8 and R23.

1.2.13 Natterer's tree roosts (including maternity and non-breeding) were identified within the following woodland area:

- Kenton Hills/ Nursery Covert woodland complex (outside of RLB) – RD;
- Sandypytle Plantation (outside of RLB) – RE; and
- The Grove (outside of RLB) – RF.

1.2.14 One brown long-eared tree roost was identified within the woodland area at Rookyard Wood (outside of RLB);

1.2.15 One noctule roost was identified within a bat box at Kenton Hills/ Nursery Covert woodland complex (outside of RLB) – towards northern extent of the woodland complex.

1.2.16 Several common and soprano (maternity and non-breeding) roosts were identified within bat boxes at Kenton Hills/ Nursery Covert woodland complex (outside of RLB)

iii. Key commuting and foraging areas

1.2.17 Significant landscape changes will take place to facilitate the Scheme. The site also supports habitats (hedgerows, tree lines and woodland blocks) which are used by foraging and commuting bats. Important commuting routes/ and foraging areas have been identified in the following areas:

- Upper Abbey Bridleway and Fiscal Policy Junction – north to south commuting route;
- Black Walks – north to south commuting route between Ash Wood & Minsmere;
- Kenton Hills – east to west commuting route and foraging area;
- Goose Hill – eastern boundary used for commuting route and foraging;
- Stonewell Belt – north to south commuting route;
- SSSI Crossing – north to south commuting route and foraging area;
- The Grove – north to south from Goose Hill;
- Leiston Old Abbey woodland – foraging area; and
- Ash Wood – foraging area.

b) Legislation

1.2.18 All bat species in England are listed on Schedule 5 of the WCA 1981 (as amended) (HMSO, 1981) in respect of Section 9, which makes it an offence, inter alia, to:

- Intentionally or recklessly kill, injure or take a bat;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place that a bat uses for shelter or protection; or
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.

1.2.19 The offence "recklessly" was added by the Countryside and Rights of Way Act 2000 (CRoW) (HMSO 2000).

1.2.20 All bat species in England receive further protection under Regulation 41 of The Conservation of Habitats and Species Regulations 2017. They are listed on Schedule 2 of the Regulations, which makes it an offence, *inter alia*, to:

- Deliberately capture, injure or kill a bat;
- Deliberately disturb a bat, in particular any disturbance which is likely:
  - Impair their ability
    - to survive, to breed or reproduce, or to rear or nurture their young, or
    - to hibernate or migrate
  - Affect significantly the local distribution or abundance of that bat species; or
- Damage or destroy a breeding site or resting place of a bat.

1.2.21 Noctule (*Nyctalus noctule*), soprano pipistrelle (*Pipistrellus pygmaeus*) and brown long-eared bat (*Plecotus auratus*) are also included on Section 41 of the NERC Act 2006 (HMSO, 2006). This Act places a duty upon public bodies to have regard to the purpose of conserving biodiversity within all of their actions. The species listed under Section 41 are 'Species of Principal Importance for the conservation of biodiversity in England' for which conservation steps should be taken or promoted.

1.3 Reasonable avoidance measures method statement for bats

a) Introduction

1.3.1 This section provides a suite of dedicated Reasonable Avoidance Measures Method Statements required to safeguard bats during the site set up and construction works.

1.3.2 In all cases the aim of the Method Statement is to reduce the risk of causing disturbance / injury / mortality of a protected species and avoid contravention of the relevant applicable legislation. An Ecological Clerk of Works (ECoW) will determine exactly when and where it is appropriate to apply the measures described in the RAMs MS. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.3.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) Provision of a toolbox talk

1.3.4 Prior to commencement of any works with the potential to impact bats, the vegetation clearance works, all site contractors will be briefed by the ECoW, as part of the site induction, to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to bats. Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by bats and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on reptiles that could occur within or in the vicinity of the working area.

c) Micro-siting of works

1.3.5 A component of the ECoW's responsibilities will be to assist with micro-siting of works. This will include siting of features to minimise the need for removal of vegetation, particularly vegetation which may support roosting bats.

d) Precautionary working methods

1.3.6 This section of this RAMS provides the precautionary working methods required to safeguard bats prior to works being undertaken.

i. Tree felling

1.3.7 In line with the mitigation hierarchy, the proposed scheme layout retains areas of valuable woodland in order to avoid impacting the identified tree roosts listed in Section 3.1.1. These areas include the northern edge of Kenton Hills woodland complex and Ash Wood.

1.3.8 However, a number of trees identified to be felled in 2021 have been assessed as having low, **moderate or high** potential of supporting roosting bats. These following approach to safeguarding bats which may utilise the trees for roosting will be undertaken.

1.3.9 Initially all trees to be removed will be reassessed for bat roosting potential.

1.3.10 Any trees identified as having low bat roosting potential will be removed using a soft felling methodology with a suitability experienced, appropriately licensed, bat worker or bat worker assistant present. It is recommended that trees are removed in October, thereby avoiding the sensitive maternity (April-September) and hibernation (November-February) periods for bats.

1.3.11 For any trees with moderate or high roosting potential, a pre works check for roosting bats will be undertaken. The methodology and required survey effort for these pre works checks will depend upon the status of the roosting features within the trees, but may include:

- A climbed or ground based tree inspection using an endoscope and / or torch;
- Emergence / re-entry surveys.

1.3.12 Should any of the trees to be removed be found to support bat roosts, an EPS licence is likely to be required. The documents associated with this licence will outline the required mitigation, and the required measures are not discussed further within this report.

1.3.13 If no roosts are found, the approach outlined below will be undertaken.

1.3.14 For all tree with low, moderate or high bat roosting potential, Potential Roost Features (i.e. those with the potential to be used by roosting bats: PRFs) within trees will be thoroughly inspected using an endoscope immediately prior to felling.

1.3.15 All trees with PRFs should be soft felled using the following precautionary measures:

- Trees classed as having potential to support roosting bats, shall be felled under the watching brief of the ECoW;
- Where PRFs cannot be exhaustively checked they should be section felled, with each section carefully lowered to the ground. Cuts should be made at least 50 cm beyond the extent of the potential roost feature;
- Where possible, sections with these features need to be lowered carefully to the ground;
- If limbs or large branches require felling, consideration should be given to cracks which may close (crushing any bats inside) once the weight of the limb has been removed. If the crack cannot be thoroughly inspected to ensure bats are not present, the crack should be wedged open prior to prevent their closure when pressure is released during the removal of the limb/branch; The stems of dense ivy should be cut at ground level at least 48 hours before the tree is felled; and

- Once the trees have been felled the potential roost features should be checked on the ground by a suitably experienced bat ecologist. If any potential roost feature can still not be exhaustively checked that section should be allowed a rest period of at least 24 - 48 hours, with the openings clear, to ensure that any individual bats that may have been missed are given the opportunity to relocate.

1.3.16 If any bats are encountered during the felling operations all works and activity must cease immediately, until the ECoW has advised on the most appropriate manner to deal with the situation. In this event, it is likely that a European Protected Species Licence will need to be granted prior to the felling activities can continue.

ii. Measures to control the impact of lighting on site

1.3.17 This section of this RAMs outlines how impacts from lighting during the construction phase of the development will be controlled.

1.3.18 Lighting from construction activities are likely to increase light levels and could cause light intrusion into adjacent habitats. Lighting directly affects bats in their activity at night and can also affect the insects they feed on.

1.3.19 Impacts from lighting can include:

- Disturbance to roosting bats in roosts in adjacent habitats/ structures causing delayed emergence or roost abandonment; and
- Displacing foraging and commuting bats from lit areas.

1.3.20 In order to reduce the impact on bats using the site, a sensitive lighting strategy must be followed during the construction and operation of the site. The Lighting Management Plan for Construction and Operational Sites (Ref. 1.3) should be referred to when undertaking works, especially at night. Areas where lighting is most likely to negatively impact upon bats are presented in Figures 9 and 10.

1.3.21 The design of the development has been established to minimise the potential impacts upon bats from lighting. The development design ensures that works which will be highly lit are located in areas which are of a lower importance to bats and away from the more sensitive locations. Light screening is also proposed, as presented in Figure 14C1B.4.

1.3.22 The following guidelines and best practice outlined in the 'Bats and Artificial Lighting' Guidance Note (Ref. 1.4) should also be considered during and after construction.

General lighting for bats

- Artificial light should be avoided, where possible, and should only be installed where and when it is necessary e.g. safety reasons to complete a task. If lighting is **not required**, do not use artificial light.
- If lighting is unavoidable: The light should be as low as guidelines permit and the following mitigation measures should be adopted.
- **Use LED light sources**; light emitted has a narrow beam, which is more directional and easier to controlled. LEDs typically have no UV component, which attracts fewer invertebrates;
- Use a warm colour temperature (~2700 - 3000K);
- Use a tuneable LED Luminaire;
- Luminaries should be mounted horizontally i.e. no upwards tilt;
- Hoods, baffles or louvres should be fitted to minimise light spill and direct light to where it is needed;
- The shortest lighting columns should be used, to avoid light spill, for the task that the lighting is required; and
- The period during which lights are turned on at night should be minimised wherever possible;

Lighting around known bat roosts:

- Buildings at Upper Abbey Farm and Ash Wood Cottages support bat roosts;
- A number of trees roosts have been identified within areas of woodland across the site;
- No bat roost (buildings, vegetation and access points) should be directly illuminated and lighting should be directed away from these buildings and/or vegetation;

1.3.23 Throughout the construction process, it is proposed that there will be, at minimum, annual monitoring of known bat roosts and key commuting and foraging areas. This is outlined in the Bat Mitigation Strategy (1.1).

iii. Measures to control the impact of noise on bats

1.3.24 This section of this RAMs outlines how impacts from noise during the construction phase of the development will be controlled.

1.3.25 The construction of the proposed development will result in an increase in noise within the site boundary and adjacent areas. Noise disturbance may arise through construction activities (such as noise from machinery), increased vehicle movements and increased human presence of site during construction (as highlighted in Figures 9 and 10). The level (intensity), timing and duration of high frequency noise will be variable, depending on the nature of the construction activity. It is expected that noise levels will decrease over the course of the overall construction programme, with Phase 1 having the highest predicted noise levels. The locations of the impacts of noise during Phase 1 and Phase 2 of the development are shown in Figures 2 and 3.

1.3.26 As a result, safeguarding measures are recommended that would avoidance disturbance to bats, mitigate for any unavoidable disturbance to bats and monitoring the status of bats within the site and adjacent areas to determine the impact of noise in the long term. Each of these categories is set out in further detail below.

iv. Avoidance

1.3.27 In line with the mitigation hierarchy, avoiding measures with respect to bats within and in close proximity to the site are to be incorporated into the development. Such measures include the creation of earth bund along the northern boundary of Kenton Hills (as shown in Figure 4), which measures 3m high and reduces the noise pollution travelling from the development working area to sensitive areas such as Kenton Hills. Similarly, 5m tall acoustic fencing will be installed between the working areas and areas which have been identified as being sensitive to noise (listed below in **Table 1.1**) which functions by screening noise from working areas.

v. Mitigation

1.3.28 Where it is not possible to avoid impacting the roosting and foraging and commuting bats within and adjacent to the site, a number of mitigation measures have been proposed, including the provision of additional areas of foraging habitat within the site (as shown in Figure 12), the creation of a dedicated bat house (as shown in Figure 4) and the provision of 45 bat boxes (as shown in Figure 11). Such measures have been set out in detail above and Appendix 14C1A Bat Mitigation Strategy.

vi. Bat and noise monitoring

1.3.29 It is predicted that a number of roost locations and important commuting and foraging areas would exceed the threshold of 65dB with respect to noise disturbance to bats. However, there is insufficient data or evidence available to confirm that this will adversely impact the bats present within and in close proximity to the site, given that bats display a wide variety of tolerances and levels of habituation to noise. It is therefore considered that there is insufficient evidence at this stage to trigger the need for a European Protected Species derogation licence application with respect to bats.

1.3.30 A precautionary approach to monitoring both the roosts the important commuting and foraging areas and the noise levels in proximity to known roosts is proposed. Additional measures such as mobile noise screens could be employed if required. Such an approach will ensure that further information with respect to the impact of noise on bats will be clearer (as highlighted within Figures 7 and 8). It is recommended that this information be made publicly available to inform the approach to bats and noise for subsequent developments.

1.3.31 This should include the areas shown below in **Table 1.1**.

Table 1.1: Areas within the site where noise and bat monitoring is recommended due to sensitivity of species recorded to be present

Area Sensitive to Noise Disturbance	Area Important for Roosting/ Foraging/ Commuting	Species Susceptable to Disturbance
Upper Abbey Farm/ Upper Abbey Bridleway and Fiscal Policy Junction	Roosting	• Barbastelle • Natterer's Bat • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
	Foraging/ Commuting	• Barbastelle • Natterer's Bat • Leisler's Bat/ Nathusius Pipistrelle • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
Kenton Hills/ Fiscal Policy/ Nursery Covert complex	Roosting	• Barbastelle • Natterer's Bat • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
	Foraging/ Commuting	• Barbastelle

Area Sensitive to Noise Disturbance	Area Important for Roosting/ Foraging/ Commuting	Species Susceptable to Disturbance
		• Natterer's Bat • Leisler's Bat/ Nathusius Pipistrelle • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
Black Walks	Roosting	None
	Foraging/ Commuting	• Barbastelle • Natterer's Bat • Leisler's Bat/ Nathusius Pipistrelle • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
Goose Hill	Roosting	• Noctule and Serotine
	Foraging/ Commuting	• Barbastelle • Natterer's Bat • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
Stonewall Belt	Roosting	• Barbastelle
	Foraging/ Commuting	• Barbastelle • Natterer's Bat • Leisler's Bat/ Nathusius Pipistrelle • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
SSSI Crossing	Roosting	None
	Foraging/ Commuting	• Barbastelle • Natterer's Bat • Leisler's Bat/ Nathusius Pipistrelle • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
Leiston Old Abbey	Roosting	• Natterer's Bat

Area Sensitive to Noise Disturbance	Area Important for Roosting/ Foraging/ Commuting	Species Susceptable to Disturbance
		• Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
	Foraging/ Commuting	• Barbastelle • Natterer's Bat • Leisler's Bat/ Nathusius Pipistrelle • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
Grimseys	Roosting	• Barbastelle • Noctule and Serotine
	Foraging/ Commuting	None
Ash Wood	Roosting	• Natterer's Bat • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle
	Foraging/ Commuting	• Barbastelle • Leisler's Bat/ Nathusius Pipistrelle • Noctule and Serotine • Daubenton's Bat, Brown Long-eared Bat, Common Pipistrelle and Soprano Pipistrelle

1.3.32 The above areas which have been assessed as being sensitive to disturbance from noise will be monitored throughout the various phases of the proposed development, with monitoring surveys being carried out at a minimum of once a year (although greater survey effort is likely to be undertaken) with surveys being undertaken within the active bat season (May to September, inclusive) during appropriate weather conditions (minimum overnight temperatures exceeding 10^{o}C). Comparisons of these results with the baseline conditions are presented within this ES Chapter (Ref. 1.5). Such monitoring surveys will take the form of walked activity transects and emergence/ re-entry surveys, along with static detector surveys if required.

1.3.33 This will be achieved through detailed monitoring throughout the construction process of the key roosting, commuting and foraging areas. This will allow potential impacts to bats to be monitored and preventative measures taken, if required. The monitoring will assess two key indicators:

- The noise levels actually produced by the works (monitoring as outlined in ES chapter (Ref. 1.6);
- The bats usage of roosts and foraging and commuting areas, as compared to the base line surveys (Ref. 1.2).

1.3.34 If noise levels are deemed to be at a level that an offence is considered more likely than unlikely, or significant changes in the assessed bat conservation status is identified, two approaches will be employed to safeguard bats:

1.3.35 This could include the implementation of noise abatement measures, which could include working methodologies, additional noise attenuation fencing or bunds; and / or mitigation focussed on the bat population, which could include further roost provision. If necessary, this is the appropriate juncture at which an EPS derogation licence may be triggered.

1.3.36 A detailed Noise and Bat Monitoring Plan will be produced prior to work with the potential to disturb bats commencing. It is considered that under the current proposals, noise impacts to bats can be controlled sufficiently to result in a minor adverse, not significant impact, and that the requirement for a licence can be avoided.

e) Mitigation – roost features

1.3.37 This section outlines the proposed provision of alternative roosting provision.

i. Provision of bat boxes

1.3.38 It is recommended that for every tree with a medium or high value PRF lost, at least one bat box will be installed to provide alternative roosting opportunities, enhancing the remaining roost resource. A combination of different bat boxes (Schwegler 1FFs; Schwegler 2F; Schwegler 1FD; Schwegler 2FN, Schwegler 1FW hibernation box) will be used to provide roosting opportunities for a range of different species and present within the site. The following criteria for the erection of bat boxes will be followed:

- Bat boxes will be installed by the contractor, under the direction of the Ecologist, prior to tree felling and the commencement of works;
- The boxes will be positioned on suitable retained trees, within the red line boundary, around the site in order to provide continuity of roosting habitat throughout the site;
- Each box will be positioned approximately 3-5m high and any branches causing obstruction to a direct flight path to the boxes will be removed;

- The boxes will be hung from a tree branch near the trunk or fixed to the trunk with the supplied ‘tree-friendly’ aluminium nail.
- The bat boxes will be positioned on north, south-east and south-westerly aspects to account for seasonal variation in temperature.
- The boxes will be placed in areas which avoid illumination from the Scheme and will not be illuminated;
- The boxes will remain in situ for the duration of the works and after completion.

1.3.39 There has already been provision of additional roost resources. Overall, 45 boxes have been placed in suitable areas (the location of these bat boxes is presented in Figure 11). The rationale behind the erection of these boxes is presented in the Bat Mitigation Strategy (1.1).).

1.3.40 Photographs bat boxes which would be suitable for erection are provided for information purposes in **Table 1.2** below.

Table 1.2: Examples of suitable bat boxes

	
Schwegler 2F bat box	*Schwegler 1FD bat box*

	
Image X: Schwegler 1FF	*Image X: Schwegler 1FW*

ii. Provision of a bat house

1.3.41 As outlined in the Bat Mitigation Strategy, a precautionary approach to mitigation for indirect impacts to roosts is proposed. As a component of the mitigation, a bat house or enhanced structure for bats is proposed.

1.3.42 The bat house or enhanced structure (indicative location shown in Figure 5) below will be designed to include features suitable for species found roosting at on site, including; barbastelle, Natterer's bat, Daubenton's bat. brown long-eared, common and soprano pipistrelle.

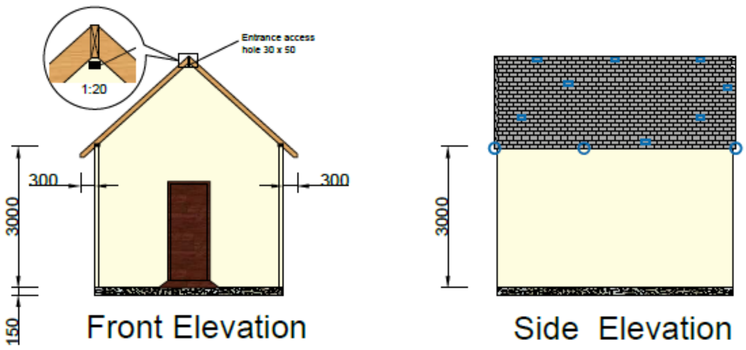
1.3.43 The proposed location for this structure is to be surrounded by suitably retained vegetation. This area will not be lit and will not be used for general public use. Existing vegetation is present around the proposed location of the bat house.

1.3.44 Features to help create a range of temperatures and conditions have been included within the building design and are described in **Table 1.3** below. The bat house will be draft free and a stable temperature environment will be created. The floors will be load bearing to allow for safe internal monitoring visits.

Table 1.3: Specifications for proposed bat structure

Feature	Bat Structure Design Parameters
Size	5m x 4m minimum
Planning	May need planning permission.
Roof height	>2m
Roof design	Maximise gable-end provision. Minimum two gable ends with access, ideally 4, one at each direction.

Feature	Bat Structure Design Parameters
	Unobstructed flying spaces in roof (i.e. no internal beams supporting the roof, king posts, struts etc.). Ridge tiles not to be fully cemented down to create void. Overhanging soffits.
Human access	Through trapdoor in floor to roof. Locked door to structure at ground level.
Internal features	• Free flying areas, • Baffles, • Hot boxes, • Cooler areas, • Hanging tiles, • Crevices, • Wooden hibernation boxes.
Accesses	Accesses at gable ends (approx. 30 x50mm), at eaves, soffits and in the roof skin (i.e. access slates / tiles.
Surrounding habitats ./ location	To be located close to existing flight lines. No lighting directly on the roost, particularly not access points for bats. dark corridor to the building from off-site and adjacent habitats. Surrounded by vegetation insofar as is possible. Access to pond areas desirable. Potential locations shown in image 1.
Structure	Structure of wood, with cladding / weatherboarding. Can also be masonry / block if required. Ideally one cavity wall at north aspect with 15,mm x 50mm access. Pitched roof, pitch as steep as possible. Dark coloured slates / tiles if possible. Membrane under tiles / slates to be roofing felt, not Breathable Roofing Membrane (BRM). Will need to deter vandalism / unauthorised access. 'water pumping house' or similar sign can be used as a deterrent.

Feature	Bat Structure Design Parameters
Bat house exterior (example)	 
Examples of scale and design	

References

1.1 Arcadis. 2020. Sizewell C Project, Terrestrial Ecology and Ornithology, Main Development Site, Appendix 14C1 Bat Mitigation Strategy. Vol 2, Chapter 14.

1.2 Arcadis. 2020. Sizewell C Project, Terrestrial Ecology and Ornithology, Main Development Site, Technical Appendix 14A8 Bats (in draft). Vol 2, Chapter 14.

1.3 EDF Energy. 2018. Lighting Strategy for Construction and Operational Sites. Sizewell C Project.

1.4 Institute of Lighting Professionals (2018) Bats and Artificial Lighting in the UK: Bats and the Built Environment Series. Guidance Note 08/18.

1.5 Arcadis. 2020. Sizewell C Project, Terrestrial Ecology and Ornithology, Main Development Site, Environmental Statement. Vol 2, Chapter 14.

1.6 Arcadis. 2020. Sizewell C Project, Noise and Vibration, Main Development Site, Environmental Statement. Vol 2, Chapter 11.

VOLUME 2, CHAPTER 14 APPENDIX 14C2A: REPTILE MITIGATION STRATEGY

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1. Reptile Mitigation Strategy

1.1 Introduction

a) Purpose

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C power station (hereafter referred to as Sizewell C) located to the north of the existing Sizewell B power station.

1.1.2 This Reptile Mitigation Strategy, compiled by Arcadis Consulting (UK) Limited (hereafter referred to as 'Arcadis') outlines the key approaches to mitigating potential impacts to reptiles' populations present within or adjacent to the construction site for Sizewell C main development site. It will be used by SZC Co., consultant ecologists and any relevant subcontractors, in relation to the proposal to build the Sizewell C power station.

1.1.3 This document has been drafted based on the survey data collected to date. In addition, the content of this document has also been devised based on consultation with Natural England and other stakeholders. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence. This document has been drafted to form part of the Development Consent Order (DCO) submission. This document will be subject to future updates prior to and during each phase of the proposed development to ensure the recommended mitigation remains relevant.

1.1.4 The requirements for mitigation are based on the impacts outlined in the ES chapter associated with the proposed main development site works. This document should be read alongside the following documents:

- Sizewell C main development site **ES Volume 2 Chapter 14 Terrestrial Ecology and Ornithology**;
- Sizewell C main development site **ES Ecology Technical Appendix 14A6 Reptiles**; and
- Sizewell C main development site **ES Ecology Technical Appendix 14C2B Reptile Non-Licensed Method Statement** (in draft).

b) Background

1.1.5 Four species of reptiles have been recorded within the proposal site, namely: adder (*Vipera berus*), slow-worm (*Anguis fragilis*), grass snake (*Natrix helvetica*[1]) and common lizard (*Zootoca vivipara*).

1.1.6 Although there have been declines in the populations of all these reptile species in the UK in the last few decades, primarily as a result of habitat loss, declines have been more severe in adder populations. The adder is more restricted in its habitat preferences and so less resistant to human-induced habitat changes [Ref. 1.1]. The Suffolk amphibian and reptile atlas [Ref. 1.2] states that the Brecks and Sandlings areas of Suffolk contain large tracts of important reptile habitat, which is becoming increasingly scarce in lowland Britain.

1.1.7 The assemblage of reptiles present has been evaluated as important within the Suffolk context and, in accordance with Froglife criteria [Ref. 1.3], the proposal site would constitute a 'Key Reptile Site'. The reptile assemblage has also been evaluated as being of 'Regional' importance within the Zone of Influence of the main development site under the Chartered Institute of Ecology and Environmental Management (CIEEM) [Ref. 1.4] guidelines. A range of reptile habitats used by all four common species would be lost under the main development site construction footprint and so there is the potential for the construction project to impact on reptile populations.

c) Legal Status

1.1.8 Reptiles are protected under the Wildlife and Countryside Act [Ref. 1.5]. The four species found within the proposal site are listed under Suffolk's Priority Species and Habitats list [Ref. 1.6], and are included within Section 41 of the Natural Environment and Rural Communities (NERC) Act [Ref. 1.7], which identifies them as 'species of principal importance for the purpose of conserving biodiversity'. **Appendix 1** summarises the legal status for reptiles.

1.1.9 None of the reptile species identified on the site requires a Natural England licence to capture and move (translocate) them to a new (receptor) site.

1.1.10 Adherence to this Reptile Mitigation Strategy would reduce any potential adverse impacts arising from of the construction of Sizewell C on the local reptile populations. It would also ensure compliance with all relevant legislation, policy and guidance.

[1] The grass snake in the UK was reclassified as *Natrix helvetica helvetica* rather than *Natrix natrix helvetica* (Kindler *et al.* (2017).

d) Document Structure

1.1.11 This Reptile Mitigation Strategy has been set out as follows:

- Section 1: Introduction.
- Section 2: Reptile baseline.
- Section 3: Potential impacts of the development.
- Section 4: Mitigation measures.
- Section 5: Reptile capture and translocation
- Section 6: Management of receptor sites
- Section 7: Criteria for success.
- Section 8: Conclusions.
- Appendices:
  - Appendix 1: Legal status.
  - Appendix 2: Information underpinning this mitigation strategy.
  - Appendix 3: Reptile baseline information.
  - Appendix 4: Minimum specifications of reptile mitigation features.
  - Appendix 5: Habitat suitability.
  - Appendix 6: A review of wetland habitat and water requirements for reptiles.
  - Appendix 7: Comparative reptile prey availability surveys in donor and receptor sites
  - Appendix 8: Receptor site photographs.
  - Appendix 9: Indicative long-term management plan for receptor sites.
  - Appendix 10: Potential constraints to the mitigation programme.
  - Appendix 11: Figures.
  - Appendix 12: References.

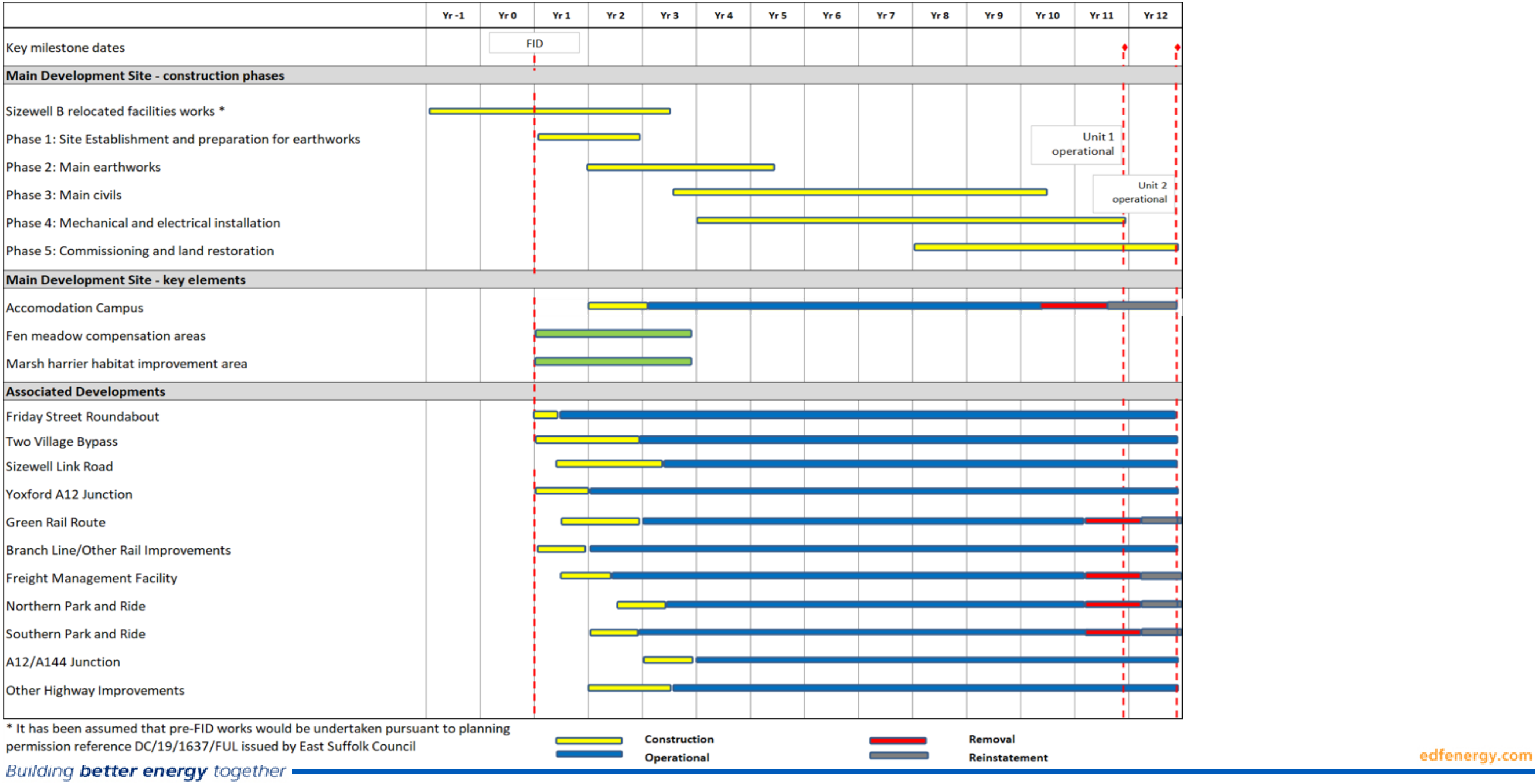
1.1.12 The layout of the Sizewell C main development site is shown in Figure 14C2A.1 and a full description of the proposed development is provided within the Environmental Statement (ES).

e) Development programme timeline

1.1.13 Construction would commence following the grant of a Sizewell C Draft Development Consent Order (Doc Ref. 3.1) (assumed 2022, Year 1), and is likely to be completed approximately nine to twelve years later (Years 9 to 12).

1.1.14 The programme requires that appropriate time is allowed for ecological mitigation and clearance works, in accordance with relevant seasonal constraints. The assumed construction programme is set out in Plate 1.

Plate 1.1: Assumed SZC Construction Programme.



1.1.15 The following timeline describes key milestones in the delivery of this Reptile Mitigation Strategy:

- 2015-2016: 'Pilot period' in which the reptile density in selected parts of the proposal site was assessed, together with survey to establish prey availability in the receptor areas, and oversight of the reptile habitat creation and management in the receptor areas, monitoring this process and adjusting as necessary;
- 2016 - 2021: Pre-construction: assessment of the impacts of construction based on current Construction Plan (from SZC Volume 2 Chapter 3 Description of Construction of Sizewell C main development site), production of this Reptile Mitigation Strategy, and consultation with Natural England to agree details of the strategy. On-going monitoring of the suitability of the receptor sites, and management of these receptor sites as required;
- prior to site clearance works, capture and translocation of reptiles from the main areas of the proposal site (excluding the area of Sizewell Marshes Site of Special Scientific Interest (SSSI) due to be lost) to the receptor sites (once they are judged to be ready). On-going management of the reptile habitat, and monitoring of both the translocation process and the suitability of the reptile habitat in the receptor sites;
- on granting of the DCO, capture and translocation of reptiles from the area of Sizewell Marshes SSSI due to be lost (this activity will require assent from Natural England);
- start of construction period: a destructive search for reptiles as part of site clearance, to rescue any animals not captured during the preceding trapping period(s);
- construction and post-construction: long-term management of the receptor sites to maintain and improve their suitability for reptiles, and monitoring of the translocated reptile population.

f) Roles and Responsibilities

1.1.16 The roles and responsibilities for implementation of this Reptile Mitigation Strategy are outlined below:

i. SZC Co.

- ensuring adequate land is available for the timely creation of any reptile receptor sites (which has already been created and in a suitable condition for use by reptiles in 2020);
- managing receptor sites and subsequent areas to maximise their value for reptiles;
- ensure the Reptile Mitigation Strategy is implemented and evolved as required through the development process.

ii. Consultant ecologist

- authoring this Reptile Mitigation Strategy and the plan for its implementation;
- providing advice on habitat creation and management at receptor sites in liaison with relevant stakeholders and site managers;
- if required by SZC CO., carrying out reptile capture and translocations;
- long-term monitoring of the translocations;
- progress reporting.

iii. Site Managers

- provision of expert local advice on the Reptile Mitigation Strategy;
- appropriate habitat management of receptor sites.

iv. Contractors/sub-contractor

- carrying out short-term habitat creation and management of the already largely established receptor sites, including installation and management of any reptile fencing required and after-care of any tree/shrub planting where appropriate;
- adhering to agreed Method Statements, under a watching brief from an Ecological Clerk of Works (ECoW).

1.2 Reptile baseline

a) Reptile surveys baseline

1.2.1 Please refer to **SZC ES Volume 2 Chapter 14 Technical Appendix 14A6 – Reptiles Baseline** for full details of the reptile baseline.

1.2.2 Desk-study data analysis demonstrated that all four species were widely distributed across the study area. Records within the EDF Energy estate were mainly associated with coastal habitats (dunes and shingle) and the plantation woodland of Kenton Hills and Goose Hill.

1.2.3 Reptile surveys of suitable habitat within the proposal site were carried out by Wood Group in 2007. **Figure 14C2A.2** shows the distribution of the artificial refuges used in 2007 surveys. These surveys recorded regular observations of all four reptile species throughout the survey period. **Figures 14C2A.3 to 14C2A.6** show their distribution and relative abundance. The majority of the reptiles recorded were distributed in two distinct areas: the mosaic of scrub and rough grassland to the north of the Sizewell B power station (the proposed location for the Sizewell C power station platform), and the forest rides and glades within both Goose Hill and Kenton Hills. Small numbers of reptiles were also recorded on the edge of hedgerows within the arable fields. Additional surveys since 2007 further indicate that reptile species are well distributed in the local area. Survey work of suitable habitat at Aldhurst Farm found common lizard, grass snake and adder, but no slow-worm.

1.2.4 Reptile surveys were also undertaken between 2006 – 2013 in relation to the development of the Galloper Wind Farm (GWF) onshore substation, located directly to the east of Pillbox Field [Ref. 1.8 and Ref. 1.9]. Woodland edge habitat and other boundary features supported populations of reptiles, whereas the woodland interior was not suitable. Translocation exercises allowed a comparison of the numbers of reptiles of each species caught as a result of trapping out during the translocation with the previous population density estimate from tinning surveys. For all reptiles combined, the ratio is 4.6 trapped out to 1 from previous population density estimates (5:1 in terms of whole animals). For the individual species, these ratios are: common lizard: 3:1; slow-worm: 10:1; adder: 2:1; and grass snake: 3:1.

1.2.5 To provide more clarity on the number of reptiles likely to be present at Sizewell C, a detailed targeted survey was carried out by Arcadis in 2015 and 2016, specifically investigating reptile densities in six donor sites (i.e. areas subject to potential development) and three proposed receptor sites. For further details of this survey see **SZC ES Volume 2 Chapter 14 Technical**

Appendix 14A6 – Reptiles Baseline. The locations of these survey sites are shown on **Figure 14C2A.7** and **Figure 14C2A.8.**

1.2.6 A summary of the reptile survey results is presented in **Table 1.1,** recording the maximum number of individual reptiles of each species seen on any one survey occasion. Four sites supported all four common reptile species: Goose Hill (Area 4); Kenton Hills (Area 5); St James (Area 6); and Goodrum's Fen (Area 10). Three sites (Goose Hill (Area 2); Goose Hill (Area 3); and Sizewell C station platform (Area 7)) supported three species and three sites (arable hedgerow margins (Area 1); Sizewell C station platform (Area 8); and Studio Field (Area 9)) supported two species present. For all the receptor sites, survey results indicated low reptile numbers.

Table 1.1: Maximum numbers of adult reptiles found per survey visit and population age class estimation for each of the seven donor sites and three receptor sites. NB Capture Mark Recapture (CMR) data is included for adders at three sites and grass snake at one site.

Site	Area ID	Area (ha)	Common lizard		Slow-worm		Adder		Grass snake	
			Max. no. adults	Population score	Max. no. adults	Population score	Max. no. adults	Population score	Max. no. adults	Population score
Donor site										
Arable hedgerow margin	1	0.24	0	Low	7	Good	0	Low	2	Low
									6[1]	Good
Conifer plantation, Goose Hill	2	1.0	1	Low	1	Low	0	Low	1	Low
Ride habitat, Goose Hill	3	0.27	2	Low	5	Good	0	Low	1	Low
Scrub habitat, Goose Hill	4	1.0	7	Good	15	Good	4	Low	2	Low
							22[1]	Exceptional		
Open grassland/ scrub habitat, Sizewell C station platform	7	0.7	11	Good	6	Good	4	Low	0	Low
							22[1]	Exceptional		
Landscape plantation, Sizewell C station platform	8	0.8	4	Low	0	Low	1	Low	0	Low
Goodrum's Fen	10	1.0	5	Good	16	Good	5	Good	2	Low

Site	Area ID	Area (ha)	Common lizard		Slow-worm		Adder		Grass snake	
			Max. no. adults	Population score	Max. no. adults	Population score	Max. no. adults	Population score	Max. no. adults	Population score
Receptor site										
Clear fell habitat, Kenton Hills	5	0.9	3	Low	4	Low	2	Low	1	Low
							5[1]	Good		
Clear fell habitat, St. James	6	1.1	1	Low	8	Good	1	Low	1	Low
Former arable land, Studio Field	9	1.1	2	Low	0	Low	1	Low	0	Low

[1] *CMR data.*

1.2.7 For the donor sites, the highest catch numbers (maximum numbers of adults seen on any one survey) recorded during surveys for both snake species were in the Goodrum's Fen area, scrub habitat in Goose Hill and open grass/scrub habitat in the Sizewell C station platform, along with the arable margin habitat (primarily in the Autumn) for grass snake.

1.2.8 The arable margins were not considered optimal habitat for grass snake, but rather may act as corridors used by grass snake when leaving and retuning to hibernation sites

1.2.9 Slow-worm numbers were highest in Goodrum's Fen and the arable margin, high in both the scrub and ride habitats in Goose Hill, less common in the open grass/scrub habitat in the Sizewell C station platform, but low or absent in the plantation habitats

1.2.10 Common lizard numbers were highest in the open grass/scrub habitat in the Sizewell C station platform, and common in Goodrum's Fen and the scrub habitats of Goose Hill. Common lizard were absent from the arable margins.

1.2.11 **Table 1.2** and **Table 1.3** present density estimates from the 2015-2016 Arcadis surveys, by donor site and species respectively.

Table 1.2: Average population density for the seven donor sites. N.B. CMR data is also included for adders and grass snakes at three sites; these figures are therefore population estimates.

Site	Area ID	Common lizard density/ha	Slow-worm density/ha	Adder density/ha	Grass snake density/ha
Arable hedgerow margin	1	0	29.2	0	8.3
		-	-	-	25.0[1]
Conifer plantation, Goose Hill	2	1.0	1.0	0	1.0
Ride habitat, Goose Hill	3	7.4	18.5	0	3.7
Scrub habitat, Goose Hill	4	7.0	15.0	4.0	2.0
		-	-	22.4[1]	-
Open grassland/ scrub habitat, SZC platform	7	15.7	8.6	5.7	0
		-	-	32.0[1]	-
Landscape plantation, SZC platform	8	5.0	0	1.3	0
Goodrum's Fen	10	5.0	16.0	5.0	2.0

[1] *Estimate by CMR for adders at Area 4 and Area 7 and for grass snakes at Area 1.*

Table 1.3: Mean density estimates of adult reptiles for the donor sites. N.B. CMR data is also included for adders and grass snakes; these figures are therefore population estimates.

Site	Common lizard density / ha	Slow-worm density / ha	Adder density / ha	Grass snake density / ha
Mean donor site density (incorporating CMR)	6.0	12.1	1.8	2.7
	-	-	9.3[1]	6.1[1]

[1] *Estimate includes CMR.*

b) Assessment of potential reptile population size

1.2.12 This section discusses how the past survey results, along with targeted reptile surveys carried out in 2015 and 2016 as part of the 'pilot period' works and reviews from published literature, have been used to develop reptile population density estimates within the main development site.

1.2.13 This information in this section has been used to inform both estimates of the number of reptiles likely to be affected by the proposed development (this is expanded on in **Section 3**) and likely carrying capacities of the receptor sites (this is taken forward in **Section 5**).

i. Population assessments and carrying capacities

1.2.14 Various criteria exist for estimating population size classes (see Table 1.4).

Table 1.4: Reptile population size class methods.

Source: HGBI [Ref. 1.10]			
In relation to minimum capture efforts to remove a reptile population. And density of tins required for this.			
Species	**Density / ha**		
	Low population	**Medium**	**High**
Common lizard	<20	20-40	>40
Slow-worm	<50	50-100	>100
Adder	<2	2-4	>4
Grass snake	<2	2-4	>4

Froglife [Ref. 3] Advice sheet 10; Foster & Gent [Ref. 1.11]			
Figures refer to maximum number of adults seen by observation and/or under tins (placed at a density of up to 10/ha) by one person in one day, or numbers presumed from long-term monitoring/reliable historical records.			
Species	**Low population**	**Good population**	**Exceptional population**
Common lizard	<5	5-20	>20
Slow-worm	<5	5-20	>20
Adder	<5	5-10	>10
Grass snake	<5	5-10	>10

1.2.15 Wood Group used Froglife [Ref. 3] guidance to undertake a population size class assessment based on the results of their tinning surveys over an area of approximately 26ha of habitat considered suitable to support reptiles. This indicated that the areas of the development site due to be affected support an 'exceptional' population of adders and slow-worms, and a 'good' population of common lizards and grass snakes. This information is presented in **Table 1.5**, along with the maximum daily counts for each species, for the main site and **Table 1.6** for Aldhurst Farm; data from Wood Group surveys [Ref. 1.12] [Ref. 1.13].

Table 1.5: Reptile population classification for the development site (as indicated in 2007).

Reptile species	Maximum adult count	Maximum adult density per ha	Population size class assessment
Common lizard	15	0.6	Good (5-20)
Slow-worm	31	1.2	Exceptional (>20)
Adder	17	0.7	Exceptional (>10)
Grass snake	9	0.3	Good (>10)

Table 1.6: Reptile population classification for Aldhurst Farm (2010).

Reptile species	Maximum adult count	Population size class assessment
Common lizard	7	Good (5-20)
Adder	1	Low (<5)
Grass snake	2	Low (<5)

A similar exercise was carried out for the GWF onshore population estimates based on comparing population counts and translocation surveys development [Ref. 9].

Table 1.7: Reptile population estimates for GWF onshore development.

Species	Peak count	Density per ha (within suitable habitat within 6.5 ha survey area)	Population size class assessment as quoted	Population size class (Froglife 1999)
Common lizard	10	1.5	Low (<20/ha)	Good (5-20)
Slow-worm	5	0.8	Low (<50/ha)	Good (5-20)
Adder	2	0.3	Low (<2/ha)	Low (<5)
Grass snake	4	0.6	Low (<2/ha)	Low (<5)

1.2.16 The population size class assessments for the main site (Wood Group data) and adjacent GWF onshore development site are broadly similar for common lizard and slow-worms, with either 'good' or 'exceptional' populations being present within or adjacent to the Sizewell C proposals. The population size class estimates are different for both snake species, reflecting that the habitat within the GWF onshore development was likely to be less suitable for foraging snake species.

1.2.17 In Arcadis's experience (based on previous project work), as many as ten times the maximum numbers of reptiles recorded in surveys may subsequently be captured during a translocation exercise. Arcadis has also carried out a web-based review of other reptile translocation projects to compare the number of reptiles identified by the survey with the actual number caught and moved. The results vary considerably, suggesting that survey work can under-estimate the actual population of reptiles by a factor of between four and 23, especially for slow-worm.

1.2.18 From the initial GWF surveys and subsequent translocation exercise, it is possible to demonstrate the extent to which surveys underestimate the number of individual reptiles actually present; the ratio is five individuals caught during translocation to one individual seen during surveys (5:1). For the individual species, the ratios were: common lizard: 3:1; slow-worm: 10:1; adder: 2:1; and grass snake 3:1.

1.2.19 These figures are of a similar order of magnitude as the data from the Arcadis 2015 CMR analyses, which indicated a ratio of 5.6 adders present to those actually seen, and a ratio of 3.0 for grass snake.

1.2.20 Based on these comparisons, the species-specific mark-ups from the GWF survey are considered to be the most representative to use given the proximity of the GWF site. That is, a 'mark-up factor' of three times for common lizard; ten times for slow-worm; two times for adder; and three times for grass snake.

ii. Density estimates and carrying capacities from published literature

1.2.21 Published figures for typical densities of reptiles in good and exceptional habitats in the UK are detailed in **Table 1.8. Table 1.9** uses these figures to provide an indicative estimate of the likely carrying capacity per ha of receptor sites at Sizewell, assuming the habitat has been assessed as 'good' for reptiles. These figures are discussed more in **Section 5**, but given the difficulty in estimating reptile populations and the carrying capacity of receptor sites, these figures will be supported by professional judgement.

Table 1.8: Density estimate for reptile species in good or exceptional habitat in the UK.

Species	Source of information		Simplified estimate
	Beebee & Griffiths[1]	RAUK[2]	
Common lizard	good: 100/ha exceptional: 400-800/ha	240/ha	good: 200/ha
Slow-worm	good: 600/ha exceptional: 2100/ha	good: 600/ha exceptional: 1,000 – 2,000	good: 600/ha exceptional: 1,000/ha
Adder	good: 1-10/ha exceptional: 94/ha	20/ha	good: 20/ha exceptional: 100/ha
Grass snake	3/ha	20/ha	good: 10/ha

1. *Beebee, T. & Griffiths, R. 2000. The New Naturalist. Amphibians and Reptiles. Harper Collins*
2. *Communication in Reptiles & Amphibians of the UK (RAUK) web forum by Steve Langham - Chairman Surrey Amphibian & Reptile Group, and Lee Brady - Kent Herpetofauna Recorder/Independent Ecological Consultant: http://www.herpetofauna.co.uk/forum/carrying-capacities_topic3083.html*

Table 1.9: Estimate of carrying capacity in good habitat at Sizewell.

Species	Indicative carrying capacity estimate (per ha) of 'good' receptor site available
Common lizard	Up to 200/ha
Slow-worm	Up to 600/ha
Adder	Up to 20/ha
Grass snake	Up to 10/ha

iii. 2015-16 'pilot period' reptile survey population assessments

1.2.22 The density estimates in **Table 1.2** are multiplied by the amount of good habitat in each of the five broad habitat areas, to give a population estimate for each species over the main development site (see **Table 1.10**).

Table 1.10: Population densities for reptiles in five broad habitat areas across the main development site, from 2015 - 2016 surveys.

Broad habitat area	Habitat type	Area (ha) of habitat type	Typical densities/ha from 2015-2016 surveys			
			Common lizard	Slow-worm	Adder	Grass snake
Sizewell C Platform, Coronation Wood and adjacent hard standing	Grassland/scattered scrub	20.1	15.7	8.6	32.0[2]	0
	Landscape plantation	15.7	5.0	0	1.3	0
Goose Hill/Kenton Hills complex	Conifer plantation	83.8	1.0	1.0	0	1.0
	Ride	3.8	7.4	18.5	0	3.7
	Scrub	2.8	15.0	7.0	22.4	2.0
	Clear fell (based on survey Area 5)	3.9	3.3	4.4	5.6	1.1
Northern arable fields, 'Campus' area, land north of Lovers Lane and Ash Wood	Arable margin	5.0	0	29.2	0	25.0[2]
Sizewell Marshes	Goodrum's Fen	5.9	5	16	5	2
Southern arable fields/acid grassland complex	Arable margin	2.6	0	29.2	0	25.0[2]
	Grassland 'Pillbox Field'[1]	7.0	1.5	0.8	0.3	0.6
	Clear fell (based on survey Area 6)	1.3	0.9	7.3	0.9	0.9

1. Surveys undertaken within Coronation Wood (and adjacent habitats) and Pillbox Field were unsuitable for use in the calculation of typical densities and the estimated number of reptiles present within this habitat. Therefore, data from reptile translocations undertaken for the Galloper Wind Farm Eastern Super Grid Transformer Project was used for these calculations.

2. Where CMR analysis has been possible the figures given here for adders and grass snakes are population estimates and so not subject to the species-specific mark ups in Section 3 Table 1.14, when trying to estimate total numbers of reptiles impacted on by the Project.

iv. Key reptile site

1.2.23 The main development site constitutes a 'Key Reptile Site' as defined by Froglife [Ref. 3] (see Appendix 3 for further details).

1.3 Potential impacts of the development on reptiles

a) Introduction

1.3.1 This section summarises the potential impacts of the main development site on reptiles. These include:

- direct habitat loss (construction only);
- direct habitat fragmentation (construction only);
- incidental injury or mortality (construction and operation); and
- disturbance effects on species populations (construction only).

1.3.2 As part of the Sizewell C main development site design, there will be embedded mitigation measures and/or industry standard protection procedures (identified as "primary" and "tertiary" mitigation, respectively), as well as additional secondary mitigation measures (determined following the completion of the ES ecological assessment), as required. These are described further in **Section 4**.

1.3.3 Full details of the impacts of the proposed development are outlined in the Sizewell C Environmental Statement and summarised below.

b) Direct habitat loss

1.3.4 The main development site comprises an area of approximately 368ha; however, much of this habitat is considered unsuitable for reptiles, being arable fields, forestry plantation, and/or hard standing. The area of suitable habitat for reptiles and their prey species during the construction phase comprises approximately 71ha, of which 57ha represents permanent loss (access road and Sizewell Marshes SSSI crossing, car parking, security buildings, coastal defences, and the Sizewell C station platform).

1.3.5 The lost habitat includes area suitable for foraging, mating and egg-laying (where relevant), basking, and hibernation. The temporary habitat loss would last for up to ten years throughout the construction period. Following completion of the construction works, the habitat would be reinstated.

c) Direct habitat fragmentation

1.3.6 The construction footprint of the main development site would cause a temporary (9-12 year) barrier to reptiles moving across the wider landscape, running from the Campus area, through the arable fields east of Upper Abbey

Farm, the woodlands of Goose Hill, through the north-east corner of the Sizewell Marshes SSSI, and the Sizewell C station platform.

1.3.7 This scale of habitat fragmentation has the potential to lead to temporary population isolation, particularly for the two large and more mobile snake species in the reptile assemblage. It may also affect the ability of individuals in retained habitat to migrate from hibernation sites to basking, breeding and/or foraging areas. Several European studies suggest barriers to snake movement may reduce gene flow, and have a significant effect on the conservation status of the local snake populations. Reptiles generally have relatively limited dispersal abilities which make them particularly susceptible to the effects of habitat fragmentation [Ref. 1]. Following completion of the construction works and habitat reinstatement, any barriers to movement would be reduced or removed.

d) Incidental mortality

1.3.8 There is the potential for incidental injury or mortality to reptiles from construction plant carrying out vegetation and ground clearance works, during the preliminary works and site establishment phases of construction.

1.3.9 As adder and slow-worm (and sometime grass snake) hibernate communally, occupied hibernation sites would be particularly vulnerable. Grass snake egg-laying sites are communal and traditional, and so would be particular vulnerable to damage and disturbance in June and July. The adder is diurnal, and when threatened, its first line of defence is to move into deep cover. The grass snake is diurnal, and relies initially on wariness to avoid predation, but then may ‘play dead’ if attacked by a predator. Common lizards are diurnal and movements are limited to a few tens of metres. Slow-worm live primarily underground, underneath objects on the ground, or in vegetation litter and tussocks. All four species are therefore vulnerable to harm or accidental mortality during vegetation clearance of movement of construction vehicles/machinery.

1.3.10 Once initial ground clearance and vegetation work has finished, the construction footprint would effectively be devoid of reptiles, so this impact would then be minimised. The effect would occur during the Phase 1 (site establishment and preparation of earthworks).

1.3.11 Traffic on the access road could have a negative impact on the reptile assemblage, particularly for the more mobile snake populations moving between hibernation and foraging sites, through the risk of incidental injury or mortality. Andrews *et al*. [Ref. 1.14] present a literature review on the ecological effects of roads on herpetofauna, stating that most evidence comes from studies on snakes on highways; road mortality on herpetofauna results in significant losses of individuals, and in some situations threatens the sustainability of populations.

1.3.12 Given the mitigation discussed below, Incidental mortality would have a low impact on the reptile assemblage.

e) Disturbance effects on species populations

1.3.13 Adder and grass snake are primarily diurnal, but are known to be active at night in the Summer, and so may be disturbed by extraneous lighting. Slow-worm primarily live at or below ground level, so are less likely to be affected. Adder are able to detect low frequency sounds and are most likely to avoid humans, but there is little information on the impact of anthropogenic noise on adders and UK reptiles [Ref. 1.15].

1.3.14 After the initial site clearance phase, reptiles would be (largely) absent from the construction footprint, so disturbance would have a low impact on the reptile assemblage.

f) Habitat loss and numbers of reptiles potentially impacted

1.3.15 Figure 14C2A.1 shows the Draft Construction Plot Plan (CPP), indicating the total area of land likely to be required for the construction of Sizewell C. The CPP may be subject to change; nevertheless, this provides useful context in which to consider the proposed reptile receptor sites. Please note that the red line boundary used in the figures within this document was amended after this document was finalised, and therefore does not reflect the boundaries in respect of which development consent has been sought in this application. However, the amendment to the red line boundary does not have any impact on the findings set out in this document and all other information remains correct.

1.3.16 The areas of suitable reptile habitat to be lost during site clearance (including short grassland/scrub mosaic, woodland rides, the bases of hedgerows on arable margins, wetland habitats, etc.) are highlighted on **Figure 14C2A.9**. Much of the construction footprint is intensively farmed arable land or plantation coniferous woodland, both poor-quality reptile habitats. The two large fields between Upper Abbey Farm and Eastbridge Road have also had reptile exclusion fencing in the past (though now removed) further reducing the likelihood of these areas supporting reptiles. The GWF surveys (see **Section 2**) confirmed that the woodland edge habitats supported reptiles, but that there was an absence of reptiles in the woodland interior. A walk-over survey of Land East of Eastlands Industrial Estate (LEEIE) in 2015 indicated that the arable margins in this field were not suitable for reptiles.

1.3.17 The area of suitable habitat permanently or temporarily lost under the construction footprint, from which reptiles would need to be moved, comprises the following areas:

- 37.4ha in the area of the Sizewell C station platform footprint, sub-divided into 19.0ha of grassland/scattered scrub of the platform (marked ‘A1’ on **Figure 14C2A.9**), 8.5ha landscape plantation (A2) and 9.9ha of Sizewell Marshes SSSI (marked ‘A3’ on **Figure 14C2A.9**);

- 0.5ha open grassland/scrub and woodland margin adjacent to the existing SZB power station (marked ‘B1’ on **Figure 14C2A.9**) and 1.4ha landscape plantation in Coronation Wood (marked ‘B2’ on **Figure 14C2A.9**);

- 46.4ha of mixed and plantation woodland and broadleaved woodland (marked ‘C1’ and ‘C3’ on the **Figure 14C2A.9**) and 1.0ha of rides and/or open glade habitat within Goose Hill (marked ‘C2’ on the **Figure 14C2A.9**) [based on 2.8m of ride, with a width of 4m;

- 2.5ha of arable hedgerow margin in arable fields to the north of Kenton Hills woodland (marked ‘D’ on **Figure 14C2A.9**) [based on 6170m of hedgerow, with a width of 4m];

- 5.9ha of semi-improved acid grassland/dry heath or neutral grassland in Black Walks (marked ‘E1’ on **Figure 14C2A.9**) and 0.2ha of arable margin in fields south of Sandypytle plantation (marked ‘E2’ on **Figure 14C2A.9**) [based on 393m of hedgerow, with a width of 4m];

- 7.0ha of open grassland in Pillbox Field to the south of Coronation Wood (marked ‘F1’ on **Figure 14C2A.9**) and 0.3ha of arable hedgerow margin in arable fields to the east of Eastlands Industrial Estate (marked ‘F2’ on **Figure 14C2A.9** [based on 645m of hedgerow, with a width of 4m];

- 7.6 ha of semi-improved acid grassland and semi-improved grassland (marked ‘G1’ on **Figure 14C2A.9**) and 1.1ha of plantation woodland (marked ‘G2’ on **Figure 14C2A.9**), associated with a cable route from National Grid’s Leiston substation to the proposed location of the construction electricity supply primary substation, would require temporary removal of reptiles to allow cables to be installed.

1.3.18 This gives 57.0ha of permanent and 15.6ha of temporary optimal habitat loss.

1.3.19 Using the above areas of reptile habitat to be lost during construction, with the average densities for each of the four reptile species in each of the donor sites (**Table** 1.**2**), it is possible to estimate the number of reptiles likely to be found in the areas of suitable habitat that are under the proposed construction footprint (see **Table 1.11**). As surveys were not carried out in the land next to Coronation Wood (Area 'F'), comparable density estimates are based on the translocation results from the GWF development, that covers a broadly similar mix of habitat.

1.3.20 For the two survey area sites (survey areas 4 and 7), CMR analysis was possible for adders, and so the population estimate for adder numbers in habitat to be lost equating to these survey areas (namely C1, A1 and E1) in **Table 1.14**, was based on these figures. Similarly, for one survey area (survey area 1), CMR analysis was possible for grass snakes, and so the population estimate for grass snake numbers in habitat to be lost equating to these survey areas (namely D, E2 and F2 respectively) in **Table 1.14**, was based on these figures. For the remaining survey area sites (and for habitat to be lost equating to these survey areas, namely A2, A3, B1, B2, C2, C3, F1, G1 and G2), it is necessary to apply a species-specific mark up to convert survey data into estimates of numbers of individual present (i.e. population estimates), as discussed in **Section 2.2**. The species-specific mark-ups from the GWF survey are used (as these are likely to be the most representative figures to use given the proximity of the site). For the individual species, the ratios are: common lizard: 3:1; slow-worm: 10:1; adder: 2:1; and grass snake 3:1. The estimated numbers of reptiles within the main development site are presented in **Table 1.11** and total:

- common lizard: 1,935;
- slow-worm: 5,300;
- adder: 1,116; and
- grass snake: 271.

Table 1.11: Estimate of the number of reptiles likely to be found under the construction footprint in suitable reptile habitat.

Broad habitat area	Habitat type	Area on Fig. 10	Area (ha) of habitat type	Typical densities/ha from 2015-16 surveys				Estimated numbers of reptiles in habitat to be lost			
				Common lizard	Slow-worm	Adder	Grass snake	Common lizard	Slow-worm	Adder	Grass snake
Permanent habitat loss											
Sizewell C Platform	Grassland/scattered scrub	A1	23.7	15.7	8.6	32.0	0	372	204	*759*[1]	0
	Landscape plantation woodland	A2	8.5	5.0	0	1.3	0	43	0	11	0
	SSSI triangle/ Goodrum's Fen	A3	6.5	5	16	5	2	33	104	33	13
Land adjacent to Sizewell A/B	open grassland/scrub and woodland margin	B1	0.6	1.5	0.8	0.3	0.6	1	1	1	1
	Landscape plantation - Coronation Wood[2]	B2	1.4	1.5	0.8	0.3	0.6	2	1	1	1
Goose Hill/Kenton Hills complex	Scrub	C1	2.8	15.0	7.0	22.4	2.0	42	20	*63*[1]	6
	Ride	C2	1.1	7.4	18.5	0	3.7	8	20	0	4

[1] Where CMR analysis has been possible the figures given here for adders and grass snakes are population estimates and so not subject to the species-specific mark ups in this table when trying to estimate total numbers of reptiles impacted on by the Project.

[2] Surveys undertaken within Coronation Wood (and adjacent habitats) and Pillbox Field were unsuitable for use in the calculation of typical densities and the estimated number of reptiles present within this habitat. Therefore, data from reptile translocations undertaken for the Galloper Wind Farm Eastern Super Grid Transformer Project (Ref. 13A6.18, Ref. 13A6.19) was used for these calculations.

Broad habitat area	Habitat type	Area on Fig. 10	Area (ha) of habitat type	Typical densities/ha from 2015-16 surveys				Estimated numbers of reptiles in habitat to be lost			
				Common lizard	Slow-worm	Adder	Grass snake	Common lizard	Slow-worm	Adder	Grass snake
	Conifer plantation	C3	35.5	1.0	1.0	0	1.0	36	36	0	36
Northern arable fields, 'Campus' area, land north of Lovers Lane and Ash Wood	Arable margin	D	2.5	0	29.2	0	25.0	0	73	0	*63*[1]
Black Walks and fields to south of Sandypytle Plantation	Semi-improved acid grassland/dry heath or neutral grassland[3]	E1	6.2	15.7	8.6	32.0	0	97	53	*198*[1]	0
	Arable margin	E2	0.2	0	29.2	0	25.0	0	6	0	*5*[1]
Southern arable fields/acid grassland complex	Grassland 'Pillbox Field'[2]	F1	7.6	1.5	0.8	0.3	0.6	11	6	2	5
	Arable margin	F2	0.2	0	29.2	0	25.0	0	6	0	*5*[1]
Total			96.8					645	530	1,068	139
Total with mark up (not calculated on data in italics)								1,935	5,300	1,116	271
Temporary habitat loss											
Land associated with National Grid cabling	Semi-improved dry heath[2]	G1	9.3	1.5	0.8	0.3	0.6	14	7	3	6

[3] Based on Sizewell C grassland/scattered scrub survey area 7.

Broad habitat area	Habitat type	Area on Fig. 10	Area (ha) of habitat type	Typical densities/ha from 2015-16 surveys				Estimated numbers of reptiles in habitat to be lost			
				Common lizard	Slow-worm	Adder	Grass snake	Common lizard	Slow-worm	Adder	Grass snake
	Plantation woodland[2]	G2	1.2	1.5	0.8	0.3	0.6	2	1	1	1
Total			10.5					16	8	4	7
Total with mark up								48	24	12	21

1.4 Mitigation Measures

a) Overview

1.4.1 In summary, the proposed strategy involves:

- preparation and management of receptor sites to receive translocated reptiles (primary mitigation);
- catching and translocation of reptiles from the construction footprint into the receptor sites (tertiary mitigation);
- measures to avoid incidental mortality associated with construction (tertiary mitigation); and
- pre-, during- and post-construction monitoring of reptile populations (tertiary mitigation).

1.4.2 **Table 1.12** shows the proposed Construction and Operational Phases in relation to reptile mitigation and includes both primary and tertiary mitigation measures which incorporates habitat improvement measures as part of the mitigation measures. Potential constraints to components of the mitigation strategy are outlined in **Appendix 10**. Due to the primary mitigation in place no additional enhancement measures are proposed.

1.4.3 All works that have the potential to impact reptiles would be undertaken following the agreed Method Statement and would be overseen by an ECoW.

1.4.4 Managed reptile receptor sites have been provided to mitigate the loss of reptile habitat. The receptor sites cover a larger area than reptile-suitable habitat lost and have enhanced features for reptiles (e.g. provision of cover, management to ensure prey availability, and hibernacula; see Section 6).

1.4.5 The final restoration plans as shown in the indicative Outline Landscape and Ecology Management Plan (oLEMP) [Ref. 1.16] will provide a long-term gain in suitable reptile habitat and connectivity on a wider, landscape scale, as a result of the restoration of dry Sandlings grassland from the arable fields east of Upper Abbey Farm, Aldhurst Farm and areas south of Sandy Lane (including Broom Covert).

1.4.6 Although the construction period would result in temporary habitat fragmentation across the EDF Energy estate, this would be mitigated in the long term by greater landscape-wide opportunities for enhanced connectivity, including to the north of the EDF Energy estate (through management of

Great Mount Walk);; the middle of the estate (through management of the receptor sites at Kenton Hills); to the south-west (through management of Aldhurst Farm); and to the south (through management of Broom Covert and the Studio Field complex) (see Section 6 for further detail).

Table 1.12: Construction and Operational Phases in relation to reptile mitigation

Phase	Description of phase	Specific action	Timing
Preliminary works	Activities proposed prior to a DCO being granted, to expedite the delivery of the works.	Selection, preparation and management of potential receptor sites.	2012-Y0
		Pilot period surveys of reptiles on donor sites.	2015-2016
		Pilot period assessment of prey availability at receptor sites.	2015
		Habitat monitoring at receptor sites.	Two years prior to Y0
		Commencement of reptile translocation (excluding any translocation from Goodrum's Fen).	Y0
Phase 1: Site establishment and preparation for earthworks	Establishment of the site and preparations for the main earthworks, focussing on securing and clearing the site and provision of early access routes.	Completion of reptile translocation and destructive searches to provide reptile-free construction footprint.	Y1
		On-going monitoring programme at receptor sites	Y1
Phase 2: Earthworks	Main ground materials which overlay construction area transported to the stockpile areas within the temporary construction area.	On-going monitoring programme at receptor sites.	Y2-5
Phase 3: Main civil works	Main civil engineering works.	On-going monitoring programme at receptor sites.	Y3-10
Phase 4: Fit out, instrumentation and commissioning	Mechanical and electrical plant installation phase.	On-going monitoring programme at receptor sites.	Y4-11
Phase 5: Removal of temporary facilities and restoration	As the main construction phases conclude, temporary facilities would start to be removed and the temporary construction site areas restored to an agreed	On-going monitoring programme at receptor sites.	Y8-12

Phase	Description of phase	Specific action	Timing
	state consistent with **Landscape Strategy** for the EDF Energy estate.		
Operational phase	-	On-going monitoring programme at receptor sites.	Y12 - onwards

1.4.7 Capturing and translocating reptiles from the construction footprint, followed by destructive searches (and, where appropriate, reptile-proof fencing) would provide a reptile-free construction footprint and minimise the potential for incidental injury or mortality to reptiles.

1.4.8 The impacts of noise and light disturbance on reptiles are sufficiently controlled by embedded primary mitigation, and no further measures are proposed.

1.4.9 A regular monitoring programme, both before, during and after construction, would be implemented to ensure receptor site habitats develop in a way suitable for the reptiles translocated into them, and that translocated reptiles are surviving (and thriving).

b) Receptor site selection and habitat improvement

1.4.10 This section outlines the generic principles and specific actions for creation and establishment of the receptor sites before and during reptile translocation.

1.4.11 The Reptile Habitat Management Handbook [Ref. 1] provides detailed advice relating to creating and improving habitat quality and capacity to support reptile species. For receptor sites to be suitable to support translocated reptiles, a range of habitat and lifecycle features need to be provided to ensure that reptiles have all the features required to achieve each stage of their life cycles; these are presented in **Appendix 4**.

c) Assessing the overall habitat suitability of the receptor sites

1.4.12 Before any receptor site receives reptiles, there would be an assessment to ensure that the receptor site is suitable. The same assessment process would also be used to monitor the receptor sites on a regular basis for the pre-, during-, and post-construction periods.

1.4.13 A checklist has been developed that would be used to assess the habitat suitability of each receptor site, taking on board the principles outlined in Brady & Phillips [Ref. 1.17] (see **Appendix 5**). This checklist outlines the key habitat and lifecycle features required for reptile species to thrive. As the suitability of receptor sites is likely to improve over time as habitats develop and management activities are undertaken, the checklist identifies three possible suitability grades of receptor site as follows:

- moderate – the minimum requirements to allow reptiles to survive; the majority of the lifecycle features are provided but vegetation structure requires considerable improvement, and prey availability may be limited;
- good – the standard for use as a receptor site; all of the life cycle features required for reptiles are present, but the site may benefit from some further management (and/or additional time) to further improve its suitability;
- exceptional - all life cycle features are present and vegetation structure is considered to be optimal for reptiles. The receptor sites have an abundance of well-established and well-designed life cycle features present and are considered resilient to change under their adopted management regime.

1.4.14 Professional judgement would be used to determine which suitability grade a receptor site is. This checklist is generic for all four reptile species, but if there was a specific requirement to assess receptor site suitability for individual species, it could be adjusted to take into account the different life cycle requirements of the different species. Habitat suitability assessments will need to be updated but have been carried out for the three most advanced receptor sites (Kenton Hills, St James and Studio Field) based on the information available as of November 2015. The details are presented in **Appendix 5,** whilst a summary is given below in **Table 1.13** (excluding Aldhurst Farm). The remaining receptor sites would be assessed prior to the construction phase commencing and any reptile translocation works and the existing assessments updated.

Table 1.13: HSI Assessment of individual receptor sites at November 2015.

Site	Current suitability assessment (Autumn 2015)
Kenton Hills	Currently reached Good Suitability Grade
St James Covert	Currently reached Good Suitability Grade
Broom Covert	Currently does not meet Moderate Suitability Grade
Studio	Currently reached Moderate Suitability Grade
Lovers	Currently majority of site does not meet Moderate Suitability Grade. But area of dense vegetation around existing bund (1/4 of area) has reached Good Suitability Grade

Site	Current suitability assessment (Autumn 2015)
Land West of Studio	Currently does not meet Moderate Suitability Grade
Half Way	Currently does not meet Moderate Suitability Grade
Great Mount Walk	Currently does not meet Moderate Suitability Grade

1.4.15 The assessment process would be repeated following the completion of habitat and lifecycle features creation works and then annually so that any changes or improvements in habitat suitability can be assessed. This process would enable decisions to be prioritised about which receptor sites are brought into use and when. It is envisaged that no receptor sites would be used until they have achieved at least good status, but the process would be kept under review.

1.4.16 There is a relationship between the suitability grade of a receptor site and its reptile carrying capacity, i.e. a receptor of exceptional suitability would support a greater number of reptiles than a site of moderate suitability grade of the same extent. This relationship is discussed further in **Section 5**.

d) Specific habitat issues

i. Comparison of reptile prey availability in donor and receptor sites

1.4.17 To ensure that the proposed reptile receptor sites have sufficient prey items to support translocated populations, comparative surveys of the availability of reptile prey (small mammals and invertebrates) were conducted in 2015 at the nine reptile survey sites described in **Section 2** and **Figure 14C2A.7**. Full methodologies and results of these surveys are presented in **Appendix 7**.

1.4.18 Seven species of small mammal were trapped. The number of individual small mammals caught per site ranged from five to 99, with the highest number of individuals caught in the arable margins (99 different individuals) donor site, followed by the St James Covert receptor site (49 different individuals). Although the mean number of mammals was greater in the receptor sites (29.3) than donor sites (24.5), analysis of variance (ANOVA) revealed no significant difference between small mammal abundance in the donor and receptor sites ($P = 0.841$).

1.4.19 The invertebrates were classified into taxa that are considered typical reptile prey items (earthworms, slugs, snails, spiders, harvestman, centipedes/millipedes, diptera, orthopteran, coleoptera, hemiptera, lepidoptera, lepidoptera caterpillars, hymenoptera, and ‘other insects’), and in size classes that correlate to what the different reptile species may eat. The analysis was also carried out for taxa that are more likely to be the diet of common lizards and slow-worm.

1.4.20 An ANOVA revealed no significant difference between invertebrate abundance in the donor and receptor sites (P = 0.813). The ANOVA for invertebrate diversity between the donor and receptor sites also revealed no significant difference (P = 0.601). There was also no significant difference in the abundance of prey items considered typical prey for either common lizards or slow-worm between the donor and receptor sites.

1.4.21 These results indicate that there are suitable reptile prey items within the receptor sites and that prey availability is at acceptable levels prior to translocation (i.e. there is sufficient prey to support a translocated population) and, given that translocation would not start until at least 2021, both habitat structure and small mammal and invertebrate abundance will have diversified further since the receptor sites were created.

ii. Comparison of reptile prey availability in donor and receptor sites

1.4.22 In March 2015, consultees raised the question '*do reptiles require a permanent water supply for their survival, in particular within fenced receptor sites*'. A literature review, described in **Appendix 6**, examines this question and the results discussed below.

1.4.23 Reptile species make use of wetland habitat features; in particular, grass snakes. However, there is less published evidence on water supply requirements and no evidence has been identified that indicates reptile species require a permanent water supply to ensure their long-term survival.

1.4.24 In the long term, all receptor sites would be in close proximity to wetland habitat: the areas of reedbed, open water and ditch habitat created at Aldhurst Farm; and ditches, fen meadow and reedbed within Sizewell Marshes.

1.4.25 In addition, the receptor sites would be monitored post-construction and should evidence show that the translocated populations are not thriving(for example no young are recorded), then the potential to install a water supply would be investigated.

iii. Status of existing reptile populations in receptor sites

1.4.26 Reptile surveys were carried out in 2015 in three of the proposed receptor sites (Kenton Hills - compartment 2, St. James Covert – larger compartment and Studio Field). Initial survey results indicate a 'good' population of slow-worms in St James' Covert (maximum eight on any one visit), with four or fewer at the other two sites. From CMR data, there was an estimated five adders in one compartment of the Kenton Hills receptor site, with only one adder seen in each of the other two receptor sites. There were low numbers of adult grass snake (one or less), and common lizard (three or less) within all proposed receptor sites.

1.4.27 Population numbers at the two reptile-fenced receptor sites (Kenton Hills and St James Covert) were monitored in 2016 and any individuals caught were removed to adjacent habitat to ensure the continued availability of reptile-free receptor sites prior to the translocation exercise.

1.4.28 It is considered that the numbers of individual reptiles found with Studio Field (which is not fenced with reptile-fencing) are sufficiently low, and habitat establishment not yet sufficiently developed, making it unlikely that an explosion in reptile numbers would occur in the short term. However, this would be kept under review in case of delays to the construction programme and appropriate measures implemented if required.

iv. Receptor sites selected

1.4.29 The locations of the proposed receptor sites (see **Figure 14C2A.10**) have been selected to maximise connectivity with the wider landscape using existing ecological features and corridors (see **Figure 14C2A.11**) and to maximise the establishment and spread of other biodiversity including reptile prey species. Photographs illustrating the current condition of the receptor sites are presented in **Appendix 8**.

1.4.30 Broom Covert supports flower-rich acid grassland and scrub which was managed by heavy stock grazing which ceased in 2016. Once grazing pressures stopped, botanical diversity and its associated insect and small mammal assemblages increased, ensuring abundant reptile prey as well as sources of prey to colonise Studio Field and beyond. In addition, habitat features (such as brash piles) have been strategically placed to provide habitat linkages for reptiles to the Studio Field complex, and via St James Covert to Sizewell Marshes SSSI and its wetland habitat features. The Studio Field complex also provide connectivity to optimal reptile habitat within the heathland and forestry glades at Aldringham Walks.

1.4.31 Kenton Hills already supports good quality reptile habitat and the creation of enormous brash piles/hibernacula will boost its carrying capacity significantly. Once fencing is removed, there would be excellent connectivity with the adjacent wetland habitat of Sizewell Marshes SSSI to the rest of the site.

1.4.32 Great Mount Walk has good connectivity with the extensive wetland habitat at Minsmere, together with the established acid grassland and scrub mosaic at Black Walks and Retsom's Field. The 2015 survey work within the arable margins indicate that grass snakes use the margins of the arable fields as corridors between wetland foraging habitat and hibernation sites.

1.4.33 In the longer term, following the construction of Sizewell C, the oLEMP for the wider estate would create a landscape-scale mosaic of habitat suitable for reptiles. There would be minimal fragmentation and reptiles would still be able to move within the wider landscape (subject to the removal of any exclusion fencing that may be needed at some sites).

1.4.34 **Section 6** provides more site-specific details for each of the selected receptor sites, describing on-going and planned habitat creation/improvement and management.

e) Monitoring receptor site creation and establishment

1.4.35 The receptor sites would be monitored on a regular basis during the pre-construction period to confirm that agreed reptile habitat features have been appropriately created, to assess how the establishment of grassland and landscape planting is proceeding, and to confirm that appropriate management is occurring. This would allow any problems to be quickly addressed. Similar long-term monitoring would occur during and after the translocation process.

1.4.36 The qualitative assessment described at the start of **Section 4**, along with the management targets/objectives described in **Section 6**, would be used to determine when an individual receptor site is suitable to be included in the translocation programme.

1.5 Reptile capture and translocation

a) Introduction

1.5.1 The translocation of the reptile assemblage may take many months, potentially over several survey seasons, and therefore has programme implications for construction. Outside of Sizewell Marshes SSSI, it is envisaged that that translocation would occur over two seasons, otherwise there may be an unacceptable programme risk. Within Sizewell Marshes SSSI, it is envisaged that translocation would not commence until after the DCO decision has been made and would be carried out in tandem with other protected species translocation activities e.g. water voles. In this instance, vegetation clearance within the Sizewell Marshes SSSI may occur in the Winter prior to the DCO decision being made, subject to assent being granted by Natural England, if this is required by the programme.

1.5.2 Commencing reptile translocation ahead of receipt of the DCO decision would be a significant undertaking. Stakeholders would be consulted on the details in advance, and the public communication strategy would be developed.

1.5.3 A phased approach would be adopted in the translocation exercise to prioritise resources and facilitate the clearance of reptiles from areas that would need to be released for development in the first six months after construction commencement. This would focus on the Permanent Construction Area (PCA) north of the Sizewell B power station. The phasing plan would be developed in conjunction with the SZC Co. construction team.

1.5.4 The reptile translocation would follow broad principles as given in HGBI [Ref. 10], and McClean [Ref. 1.18] and set out below.

b) Translocation procedures

i. Catching effort

1.5.5 A number of survey techniques would be used to capture reptiles from the donor sites, including: checking natural refugia and hibernacula features, laying and checking artificial refugia in suitable habitat, walking transects and attempting to hand-catch any observed reptiles (e.g. basking reptiles). Effort would be made to identify particular features, such as grass snake egg-laying sites and possible adder hibernation sites, so that catching effort at the start of the translocation period can target these sites. Any reptiles caught would be placed in a suitable container and moved to a receptor site. Any amphibians captured at the same time as the reptile translocation process would be moved to the reptile receptor sites. Habitat manipulation and fencing may be required to aid the capture.

1.5.6 Unpublished Natural England guidelines suggest that for species more easily found using artificial refuges, a very high refuge density should be used (minimum 500/ha, ideally 1000/ha of potential habitat where conditions indicate this is merited) as this would increase capture rates over the densities typically used for surveys. Using a high density of refuges is especially useful for capturing animals unlikely to move far, such as juvenile lizards, and can also result in more rapid population depletion.

1.5.7 Each morning or afternoon visit would be counted as a separate capture visit with a possible two capture visits per day. The number of visits necessary would be determined by the pattern of reptile captures but would continue until there have been at least seven consecutive visits with no animals caught or sighted. The capture exercise for reptiles would be deemed complete when the capture rate within the donor areas reach zero, or numbers caught plateau. Depletion modelling techniques may be used to establish when this point is reached. Once this point is reached, a destructive search would be undertaken under an ecological watching brief.

1.5.8 Reptile translocation would take place during the period when reptiles are above ground and active (March to late October), as outside of this period they are in hibernation, with the caveat that it is recommended that captures should stop about one month before hibernation is expected to commence, typically mid-September, re-commencing the following Spring. Seasonal variation in catchability would be taken into account.

1.5.9 It is estimated that the translocation exercise could take two field seasons to complete, in any given area, depending on the size of the area, habitat suitability, ability to carry out habitat manipulation and fencing, although the deployment of a more intensive approach to translocation could reduce this period of time if required in critical areas.

ii. Data recorded during capture and translocation

1.5.10 **Table 1.14** outlines the information that would be recorded for the capture and release of each reptile species. To maximise the efficiency of data recording and facilitate the supply of data in a digital format, the use of hand-held data loggers (with an in-built camera, OS-base map and GIS capability) would be used.

Table 1.14: Data to be recorded during translocation.

Data
Species
Sex
Age class
Location of capture (which part of the donor site) or release (which receptor site)
Time of capture
Date of capture
Weather conditions
Health status
Other information

iii. Welfare issues

1.5.11 Welfare measures will be implemented to minimise stress to the animals and/or the risk of injury or death. Animals would be kept in captivity only for as long as is necessary and would be transported in cloth bags and/or plastic vivaria between the donor habitats and the reptile receptor areas. Adders and grass snakes would be transported separately from the other species to avoid the risk of predation and reduce stress.

1.5.12 The staff responsible for undertaking the mitigation measures, and specifically the capture and translocation exercise, would be experienced reptile handlers. They may be assisted at times by trainees who would undergo training on the identification of reptiles, and safe/appropriate handling techniques for venomous snakes.

iv. Receptor sites and specific species

1.5.13 It is not intended to translocate all species of reptiles to all receptor sites as different reptile species have different habitat requirements; for example, adder and slow-worms are likely to prefer the ex-forestry clear-fell habitat (Kenton Hills and St James Covert) so would be placed in these sites in preference, whilst grass snakes require wetland features or at least easy access to wetland features in the wider landscape (Aldhurst Farm receptor site and receptor site complex south of Sandy Lane).

1.5.14 It is unlikely that the two fenced receptor sites at Kenton Hills and St James Covert would be suitable as initial receptor sites for grass snake, as long as their fencing remains in place and limits access to wetland habitats. Once construction has started, and the construction footprint is unsuitable for reptiles, then the fencing at Kenton Hills and St James can be removed and these two sites would be suitable for accepting grass snakes.

1.5.15 Given the proximity of Aldhurst Farm to Leiston and the possibility of opening up parts of this area to the public, this site would not be used for adders due the potential conflict with people.

1.5.16 The Great Mount Walk receptor area is also a harrier mitigation area, and so has 'dual' management objectives. Survey work by the RSPB (J. Miller, *pers. comm*.) looked at marsh harrier prey items between 2013-2015, for eight marsh harrier nests across five locations in England. Reptile prey items (slow-worm only) were only found in one of the eight nests, and overall constituted less than 3% of the total prey items for all nests. This research indicates that there would be little conflict of interest in using Great Mount Walk for both reptile and marsh harrier mitigation.

v. Fencing and habitat manipulation

1.5.17 A flexible approach is needed to the requirement for reptile-proof fencing and habitat manipulation to ensure that any cleared areas remain free of reptiles. This approach would be guided by the development of the construction phasing plan.

1.5.18 Consideration would be given to sub-dividing and compartmentalising the areas to be cleared of reptiles with additional internal/drift fencing to allow the sequential phasing of the clearance operation, so capture efforts may be focussed upon particular areas or features of the site (especially those areas with the highest populations and/or where the reptiles would be hardest to capture). Without fencing, a capture and translocation process may 'draw in' reptiles from the surrounding habitat. Again, this approach would be guided by the development of the construction phasing plan.

1.5.19 Habitat manipulation (for example, strimming a series of mown strips through any grassland and tall ruderal herbs) can be carried out to produce 'edges' attractive to reptiles; reptile tins can then be placed along the edges of these strips. Careful strimming to create increasingly small islands of vegetation over a number of weeks/months is an effective method of increasing the numbers of reptiles using the refugia and, therefore, capture rates. Strimming would take place over two phases, with at least 24 hours between them: an initial cut of vegetation down to 150 and 300mm, and a final cut to ground level, with raking off and removal of arisings at each stage.

1.5.20 Once catch-rates are approaching zero, and/or the number of reptiles captured and moved is similar to the estimated population density of the habitat in question, the area would be actively managed to maintain an unfavourable condition and avoid recolonization. Vegetation clearance would need to consider other ecological constraints, for example nesting birds and hedgehogs.

vi. Destructive search

1.5.21 A destructive search methodology would be implemented as part of a final site clearance immediately prior to vegetation clearance and the start of construction to rescue any animals not caught during the preceding translocation. Destructive searching would require oversight by suitably experienced ecologists.

c) Receptor site carrying capacity

1.5.22 As outlined above, the number of reptiles being translocated into the various receptor sites would be recorded. This would be used to monitor when a receptor site is likely to be approaching carrying capacity.

1.5.23 To assess whether the carrying capacity of the receptor sites is adequate for the numbers of reptiles likely to be translocated, the following needs to be understood:

- an understanding of the size of the reptile population potentially present within the main development site footprint and therefore requiring to be translocated;
- the theoretical carrying capacity of receptor sites supporting good quality habitat based on previous translocation studies;

- the habitat suitability of the receptor sites that are to be used for the translocation.

1.5.24 The estimated reptile population potentially present within the footprint of the development site is set out below**.**. The receptor sites, therefore, need to provide sufficient carrying capacity to accommodate a reptile population of this magnitude with a sufficient error of margin to allow for the translocation of additional individuals if a greater number are caught than expected.

1.5.25 As outlined in **Section 2**, guidance has been developed giving theoretical receptor site carrying capacities for both 'Good' and 'Exceptional' quality habitat. As the theoretical carrying capacity figures have been developed from multiple studies, these are considered to be robust but, as a precautionary measure, the lower carrying capacity estimates defined for 'Good' quality receptor site habitat have been chosen. There is no exact definition in the literature for what constitutes 'Good' or 'Exceptional' quality reptile habitat; profession judgement has been used to define these (see **Appendix 5**).

1.5.26 Based on this, the following carrying capacity of the receptor sites used (assuming they meet the criteria for 'Good' suitability see **Section 4** and **Appendix 5**) could be:

- common lizard – up to 200 individuals per ha of receptor site habitat;
- slow-worms – up to 600 individuals per ha of receptor site habitat;
- adders – up to 20 individuals per ha of receptor site habitat;
- grass snake – up to 10 individuals per ha of receptor site habitat.

1.5.27 Using the estimated carrying capacity per ha for each species, **Table 1.15** provides an estimated carrying capacity for each receptor site. As the habitat present within each of the individual receptor sites requires time to develop, these figures would be applied with some caution and with professional judgement, together with a qualitative assessment of the habitat suitability of each individual receptor site, when determining if and when an individual receptor site has reached carrying capacity. This 50% level would be used as the threshold triggering an early warning that a receptor site may be approaching capacity.

1.5.28 **Table 1.15** compares the theoretical carrying capacity for all the receptor sites combined (assuming they meet the 'Good' quality habitat criteria), with estimated number of reptiles to be moved (see above), and indicates the proportion of this theoretical carrying capacity that this estimated figure represents. The habitat requirements for the four reptile species are sufficiently different that all can be accommodated within a given receptor area, with the following provisos. As described in **Sections 5.2.9-14**, it is likely that not all species of reptiles will be translocated to all receptor sites. Therefore has been recalculated, removing Aldhurst Farm as receptor sites for adders, and removing Kenton Hills and St James Covert for grass snakes, and the revised assessment presented in **Table 1.16**. This indicates that there is sufficient receptor site area to accommodate this number of reptiles likely to require moving, leaving a substantial margin of error for common lizards and slow worms.

1.5.29 As indicated in **Section 2**, there is a relationship between carrying capacity and the habitat suitability of a receptor site, such that if the habitat suitability increases so does the carrying capacity. The habitat assessment would be repeated on a regular basis, and this could lead to the receptor site being graded a higher suitability level (from Good to Exceptional). If the 50% precautionary threshold (based on 'Good' habitat quality) is triggered, and if the habitat assessment is judged to be exceptional, this (together with professional judgement) would be used to determine if the carrying capacity could be increased for the receptor site in question.

Table 1.15: Indicative carrying capacity of individual receptor sites (assuming 'Good' quality).

Site	Area (ha)	Species	"Theoretical" carrying capacity	50% threshold review trigger
Kenton Hills	3.9	Common lizard	780	390
		Slow-worm	2,340	1,170
		Adder	78	39
		Grass snake	39	20
St James' Covert	1.4	Common lizard	280	140
		Slow-worm	840	420
		Adder	28	14
		Grass snake	14	7
Broom Covert	11.1	Common lizard	2,220	1,110
		Slow-worm	6,660	3,330
		Adder	222	111
		Grass snake	111	56
Studio Field	16.7	Common lizard	3,340	1,670
		Slow-worm	10,020	5,010

Site	Area (ha)	Species	"Theoretical" carrying capacity	50% threshold review trigger
		Adder	334	167
		Grass snake	167	84
Land west of Studio, Lovers Field, and Half Way Field	22.9	Common lizard	4,580	2,290
		Slow-worm	13,740	6,870
		Adder	458	229
		Grass snake	229	115
Great Mount Walk	19.2	Common lizard	3,840	1,920
		Slow-worm	11,520	5,760
		Adder	384	192
		Grass snake	192	96
Aldhurst Farm	67	Common lizard	13,400	6,700
		Slow-worm	40,200	20,100
		Grass snake	670	335
Total area	142.2			

Table 1.16: Indicative carrying capacity of individual receptor sites and estimated number of reptiles to be translocated, excluding adders from Aldhurst Farm and grass snakes from Kenton Hills and St James Covert.

Species	Area available (ha)	"Theoretical" carrying capacity	50% threshold review trigger	Estimated numbers of reptiles to be moved	% of the theoretical carrying capacity of the estimated numbers to be moved
Common lizard	142.2	28,440	14,220	1935	5%
Slow worm	142.2	85,320	42,660	5300	5%
Adder	75.2	1,504	752	1116	75%
Grass snake	136.2	1362	681	271	20%

d) Monitoring the effectiveness of reptile capture and translocation

1.5.30 It would be important to monitor the results of the translocation exercise to ensure that habitat suitability of the receptor sites is maintained or enhanced, and that translocated reptile populations are breeding, thus ensuring long-term establishment and viability. Survey work in 2015 showed that reptile prey was present in the receptor sites monitored, including the newly established Studio Field; therefore, it is envisaged that as long as habitat condition and vegetation structure is suitable, then prey species would also be present. With ongoing management, the invertebrate populations and other reptile prey species are expected to have increased in these areas since the 2015 survey.

1.5.31 A monitoring strategy would be developed (in parallel with the construction phasing plan) that would include:

- measuring the habitat suitability of each receptor site to ensure suitability is maintained or enhanced;
- monitoring to ensure that a stable age class of reptiles is present (i.e. all age classes present), providing evidence that the translocated population has become established and is breeding.

1.5.32 Monitoring would continue for as long as is deemed necessary, i.e. until the above conditions are met.

1.6 Management of receptor sites

a) Introduction

1.6.1 It is important that the receptor sites continue to provide suitable conditions to support the populations of reptiles that have been translocated from the donor areas, for the duration of the proposed ten-year construction programme and beyond. Each of the receptor sites would be actively managed to maximise their reptile population carrying capacity. This would be implemented through the production of a management plan for each receptor site to cover the construction period. This management plan would be produced in consultation with site managers who would be responsible for the longer-term management of these sites. The management plan would be a working document, flexible and adaptable. Following completion of construction works, the management plan would be reviewed and revised in accordance with the wider landscape aspirations for the EDF Energy estate.

1.6.2 This section outlines some broad management objectives and actions for the receptor sites during the establishment phase to ensure that they meet the required HSI standard before they are used in the translocation programme. These have been produced following consultation with SWT. These broad objectives and actions have been refined to include specific management actions for individual receptor sites. These would be further refined as the habitat creation on the receptor sites develops and would be finalised into a detailed Habitat Management Plan similar to the existing Aldhurst Farm LEMP. .

b) Integration with wider landscape strategy

1.6.3 A key element of the Sizewell C proposals is the development of a long-term Sizewell C **Outline Landscape and Ecology Management Plan** (oLEMP) (Ref 16), detailing how the application boundary would be developed and managed following the construction of the Sizewell C. Part of the long-term aspiration is to recreate habitats characteristic of the Suffolk Sandlings, which are of particular value to reptiles, and to ensure that linkages exist across the whole of the EDF Energy estate to optimise movement and minimise the effects of fragmentation. Following the construction of Sizewell C, there would be a much larger (and better-linked) area of habitat suitable for reptiles than is currently the case, enabling the expansion and dispersal of the existing reptile populations. The oLEMP seeks to provide clear objectives and general principles for the establishment and longer-term management of the landscape, and ecological mitigation proposals identified for the area within the application within the wider context of the EDF Energy estate. The aim of the oLEMP is to complement the existing management aims of the site to ensure newly created post-construction habitats are integrated within the wider estate and the surrounding landscape.

1.6.4 The habitat creation proposals for receptor sites are aligned with the long-term aspirations of the oLEMP. Whilst sufficient area has been included in the mitigation strategy to accommodate those reptiles that would need to be translocated from the construction area, it is anticipated that the longer-term proposals for the application boundary, including the extensive creation of ‘Sandlings’ acid grassland and additional areas of scrub and trees on the temporary construction area, would facilitate a significant long term expansion of the populations of reptile species at Sizewell. Furthermore, the receptor sites that have been selected would serve to enhance connections for reptiles to designated sites to the north and south of the main development site, as well as to wider landscape features. This is in accordance with “Making Space for Nature" [Ref. 1.19] and the ability of reptiles to move within the wider landscape would be enhanced. These benefits have already begun to be realised in the short to medium term through the early establishment of reptile receptor sites prior to the construction of Sizewell C.

1.6.5 **Figure 14C2A.12** provides a current overview of the long-term landscape strategy post construction.

c) Seasonality and timing of management activities

1.6.6 Management activities often involve large pieces of machinery and can cause harm or injury to reptiles and other species, such as ground-nesting birds. Therefore, management activities need to be undertaken at an appropriate time of year to avoid causing incidental harm or injury. An indicative reptile management calendar is outlined in **Table 1.17** (adapted from Edgar *et al.* [Ref. 1]).

d) Short-term site-specific management actions

1.6.7 This section provides a summary of the works already completed to establish the receptor sites, followed by any outstanding actions to be completed for individual receptor sites to ensure that each contain the range of habitat features required to support reptiles, and therefore meet the habitat suitability 'Good' (see **Section 7**).

1.6.8 Although individual receptor sites are discussed, it is not the intention to consider each in isolation. St James Covert, Broom Covert, Studio Field, land west of Studio, Halfway and Lovers, form a contiguous block of well-connected habitat. These areas are considered as a single extensive tract of reptile habitat with management actions aimed at linking existing reptile-suitable features, creating corridors of dense cover to enable reptiles to move across the landscape and populate the whole area.

1.6.9 **Table 1.18** summarises the receptor site management actions for each of the below sites.

Table 1.17: Reptile habitat management calendar.

Management activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mowing or flailing of vegetation		Avoid cutting vegetation from mid-February until August to avoid ground-nesting birds.										
Scrub/tree coppicing or cutting												
Stump treatment												
Bracken cutting				Take care to avoid ground-nesting birds in early August								
Bracken or bramble spot spraying												
Birch spot spraying												
Maintenance of reptile habitat features such as brash piles and hay bales												
Tree and shrub planting												

	Most effective and least damaging time of year for both reptiles and ground nesting birds
	Work may be less effective and requires more care to avoid disturbance

i. Kenton Hills

1.6.10 The cleared area within this conifer woodland (see **Figure 14C2A.13**) is divided into four sub-compartments; the western-most of these was clear-felled, the timber removed and brash mulched in 2008, and the remaining three sub-compartments were clear-felled and mulched in 2011. Reptile exclusion fencing was erected around all four sub-compartments in October 2011, this is still in place at the time of reporting.

1.6.11 Once construction is under way, the construction footprint should be unsuitable for reptiles. The southern parts of the reptile exclusion fencing could be taken down, to allow reptiles access to Sizewell Belts.

ii. St James Covert

1.6.12 This area (see **Figure 14C2A.14**) was clear-felled, the timber removed and brash mulched in 2010, and reptile exclusion fencing erected in 2011 to create a large and small exclusion compartment. This is still in place at the time of reporting.

1.6.13 Once construction is under way, the construction footprint should be unsuitable for reptiles. The reptile exclusion fencing could be taken down to allow reptile access to Leiston Common and Sizewell Marshes SSSI.

iii. Broom Covert

1.6.14 This is an unfenced area (see **Figure 14C2A.15**) of 11.1ha of lowland acid grassland/gorse scrub mosaic. Winter grazing ceased at the end of Spring 2016 and the grassland has recovered well from grazing pressure.

1.6.15 The site supports large gorse bushes providing some cover for reptile species, although these are rather discrete and isolated. Management is required to enhance connectivity from the receptor sites south of Sandy Lane through to St James Covert and Sizewell Marshes SSSI, including management of the gorse (to prevent it becoming over mature and gappy) with some shrub planting and installation of brash piles connecting up the existing areas of gorse bushes.

iv. Studio Field

1.6.16 Studio Field (see **Figure 14C2A.16)** is contiguous with Land west of Studio Field, Lovers Field and Half Way Field (described below), all former agricultural land south of Sandy Lane. Studio Field was ploughed, cultivated and sown with grass seed mix in Autumn 2012. The aim was to encourage plants to tiller and thus aid the creation of a denser sward. Heather brashings were applied (and half were rolled) in Winter 2014/2015 to increase the diversity of heathland plants within the grassland sward. These were applied in 'patches' to add diversity by providing seeds of heather and other heathland/acid grassland plants and invertebrates to colonise the wider area.

1.6.17 In addition to the above, south-facing basking banks, hay piles and extensive hibernacula features have also been provided.

1.6.18 Maintenance of the plantations would continue until all plants are well established, and for at least five years. Shrub and tree plant losses would be assessed and all failed plants replaced on a like-for-like basis during the following dormant season.

v. Lovers, Halfway, and land west of Studio Fields

1.6.19 This area (see **Figure 14C2A.16**) comprises a group of former arable fields. The aim is to maintain these fields as fairly open, with cutting/flailing to maintain a mix of areas of shorter and taller grass, and several bunds/brash piles running across the fields linking in with similar features and hedges in Studio Field, to provide shelter and connectivity for reptiles across the site. This would increase the current relatively limited structural diversity of habitat over the majority of these three fields, and their suitability for reptiles would increase as the sown grass and scrub planting develop. In addition, there is some rough tussocky grassland/dense thatch in the area around and to the north of the pond in Halfway Field.

1.6.20 Part of Lovers Field has previously been used for trials to establish if spreading peat would lower soil pH, aiding the creation of heath and acid grassland. In these trials, the higher peat application plot was unsuccessful, and the central part of Lovers Field now supports an area of bare ground with sparse vegetation. The peat trials also involved the creation of a 2m-high south-facing earth bank providing perfect basking opportunities for reptiles. In addition, the southern part of Lovers supports grassland with a dense thatch and large tussocks, providing cover for foraging reptiles and small mammals.

1.6.21 In addition to the above, south-facing basking banks, hay piles and extensive hibernacula features have also been provided.

vi. Great Mount Walk/Low 40 Acres

1.6.22 This area is 19.2ha of former arable land (see **Figure 14C2A.17**) which is also a marsh harrier mitigation area Reptile mitigation features (hibernation structures and brush piles) would be restricted to the southern and eastern edges, around existing hedges.

vii. Aldhurst Farm

1.6.23 The Aldhurst Farm site (see **Figure 14C2A.18**) comprised, up until 2014, approximately 67ha of arable farmland immediately west of the main development site. 6ha of reedbed and 2km of ditch and open water (in the form of four lagoons) were created in 2014 and completed in 2016. In addition, grassland was established on 60ha on adjacent valley sides and managed by failing-off the arable weeds and spreading heather brashings to encourage heathland species to colonise the open grassland. One of the central management objectives of the existing Aldhurst LEMP is to provide suitable habitat for reptile species.

e) Monitoring on-going management

1.6.24 Management objectives and actions required to maintain good habitat suitability of each receptor site would be agreed on an annual basis in consultation with stakeholders and in conjunction with the oLEMP, as this is developed for the EDF Energy estate**. Table 1.19** sets out indicative long-term management actions. These have been designed to be flexible to allow for any unexpected developments or situations that might arise. An indicative annual management plan is presented in **Appendix 9**.

Table 1.18: Receptor site management actions.

Site	Area (ha)	Previous use	Management
Kenton Hills	3.9	Forestry	Clear-felled 2008-11 and surrounded with reptile exclusion fencing to create 4 compartments. South-facing windrows created to provide shelter and hibernation sites running full length of each compartment. 4 dedicated hibernation structures built per compartment. Management of scrub and open ground to create and maintain habitat mosaic, with areas within fencing partially flailed to maintain a diverse mosaic of low grassy vegetation with irregularly spaced clumps of shrubs and low birch. Twice-yearly strimming 1m around edge on both sides of the reptile fencing and regular checking for any damage to the fencing.
St James' Covert	1.4	Forestry	Clear-felled 2010 and surrounded by reptile exclusion fencing to form two compartments. Internal area of larger compartment extended by including some small areas of broadleaved trees that were coppiced and brash-piled. 5 south-facing windrows created to provide shelter and hibernation sites, with dedicated hibernation structures built. A limited amount of shrub planting has been undertaken to bulk up and link existing areas of scrub, with adjacent large brash piles to provide cover. Management of scrub and open ground to create and maintain a rich mosaic of open grassland, native woodland and scrub. Twice-yearly strimming 1m around edge on both sides of the reptile fencing and regular checking for any damage to the fencing. Coppicing within compartment of any trees from the redundant woodland areas coppicing down to 100cm, (then coppiced on a 5-7 year rotation). Trees to the southern edges of both compartments between receptor site and Broom Covert have been scalloped at edges and thinned to allow more light into receptor area.
Broom Covert	11.1	Grazing	Unfenced area of 11.1 ha of lowland acid grassland/gorse scrub mosaic, grazed with sheep and over-winter cattle up until winter 2016. Cattle and sheep have been excluded from the area to allow the heathland/dry grassland species to recover; grassland appears to have recovered well. Management (including shrub planting) required to link up existing gorse patches and provide connectivity between Studio complex and St. James Covert/Sizewell Marshes. 3-4 large piles of composting vegetation (such as old hay bales) to act as egg laying sites for grass snakes.

Site	Area (ha)	Previous use	Management
Studio Field	16.7	Arable	Former arable field ploughed, cultivated and sown with grass seed mix in autumn 2012. 2 large south-facing bunds (1m high, 5-6m wide at base) created across the field, linking with existing hedgerows on the eastern and western boundaries. 4 large hibernation features and 30 large log/brash piles have been created, located close to the south-facing bunds and scrub planting, to provide additional cover for reptiles as the site vegetation establishes and connectivity. Large piles of composting hay provided and placed close to the existing pond/wetland scrape to provide a suitable egg-laying location for grass snakes, and management of the small wetland area. Heather brashings applied in winter 2014/2015 in order to increase the diversity of heathland plants within the grassland sward and allow invertebrates to colonise the wider area. Native woody shrubs planted to enhance the area by creating edge and shelter habitat, in a way to connect with other habitat features like hedgerows with sinuous edges to maximise edge habitat. Areas of dense native scrub planting have been established, encompassing approximately 20% of the field area. The planting mixture comprised: Broom (35%), Hawthorn (35%), Field Maple (20%) and Blackthorn (10%). Planting commenced in 2014, and was completed in 2015. To maintain a diversity of sward height, a short cut of the existing tracks (to a width of ~5m) around the site to maintain areas of short sward, before skylarks start to nest.
Land west of Studio, Lovers Field, and Half Way Field	22.9	Arable	Former arable fields managed in a way similar to Studio Field. All areas (except the dense tussocky grassland that exists in the southern portion of Lovers) sown in the winter of 2014/2015 with an acid grassland seed mix comprising a mix of: Sheep's fescue (19%); Slender creeping red fescue (25%); Chewing's fescue (17%); Hard fescue (17%); Crested dog's tail (15%); Sweet Vernal grass (2%); and Common bent (5%). Management to maintain an open area, with cutting/flailing to maintain a mix of areas of shorter and taller grass. Heather brashings applied (and half rolled) in six areas in the land west of Studio and Lovers fields, in order to increase the diversity of heathland plants within the grassland sward. Several large, south-facing bunds and brash piles running across the fields linking in with similar features and hedges in Studio Field, to provide shelter and connectivity for reptiles across the site. Scalloped landscape planting along the west and southern boundaries to increase the barrier between the field and Lover's Lane to discourage reptiles from moving onto road. Management of a number of small wetland features to create habitat suitable for grass snakes. 3 large piles of composting vegetation (such as old hay bales) to act as egg-laying sites for grass snakes.

Site	Area (ha)	Previous use	Management
Great Mount Walk	19.2	Arable	Sown to create short-sward acid grassland as part of dual-purpose marsh harrier/reptile mitigation area. Hibernacula, brash piles and composting hay piles to create features for reptiles on southern and eastern edges.
Aldhurst Farm	67	Arable	Former arable land use until 2014. 6ha reedbed and 2km of ditch and open water created in 2014 in the form of four lagoons and completed in 2016. Grassland established on 60ha on adjacent valley sides and managed by flailing-off the arable weeds and spreading heather brashings to encourage heathland species to colonise the open grassland. Reptile hibernacula/refugia and patches of bare, open ground created.
Total area	142.2		

Table 1.19: Long term management actions.

Broad Objective	Broad Management Actions
Ensure continued availability of hibernation and foraging features	• Monitor the windrows, log and brash pile features provided, and add more material to these as required to replace loss of material through decomposition. • Replace a fresh layer of hay or other material to each of the grass snake egg-laying piles. This should occur in the spring of each year. • Monitor the hibernation features provided and if required place additional logs and brash on top of these features to replace loss of material through decomposition.
Ensure continued availability of dense cover	• Replant any failed areas of shrub planting to maintain the correct proportion of scrub. • Maintain areas of low, thick scrub cover (in particular gorse) by cutting or coppicing selected areas at intervals to ensure scrub does not become open and gappy at the bottom. • Control naturally-regenerating birch by cutting individual trees or weed-wiping in the spring to ensure that individual tall trees to not become established in dense scrub areas. • Control self-seeded conifers by cutting off at ground level in spring to ensure that individual tall trees do not become established in dense scrub areas. • Maintain diversity of dense scrub planting by the control of dominant species such as gorse and bramble by occasional cutting.
Ensure continued availability of open areas	• Repair any slumping to south-facing banks. • Flail-mow vegetation on banks on rotation to ensure a mosaic of short and longer patches of vegetation. • Maintain a diversity of sward heights and diversity of species by flail mowing (the frequency to be determined based on the extent of rabbit browsing and any problem plant species which may require control). • Control regenerating birch and conifers by weed-wiping and cutting, as required. • Control bracken by flailing to reduce the vigour of the rhizomes, whilst allowing some bracken to remain and become established, and use spot treatment if required. • Control low-growing bramble by flailing lower to the ground in some areas on a rotational basis. • Review (with the exception of Kenton Hills and St James Covert) when it may be appropriate to introduce low-intensity grazing to maintain open areas. This would not be until shrub planting has become well established (5-6 years minimum) and would require stock-proof fencing and provision of a water supply (bowser).
Keep the public informed about the reptile capture and translocation process	• SZC CO. to develop appropriate communication strategy.

Broad Objective	Broad Management Actions
Monitor the establishment and development of heath and acid grassland	• Implement a botanical monitoring programme to review establishment of heath and acid grassland vegetation [Monitoring undertaken in 2018]
Monitor the effectiveness of the capture and translocation exercise	• Develop a translocation monitoring programme.
Ensure receptor sites are kept free from excessive disturbance	• Fence the northern boundary of Lovers, adjacent to Sandy Lane, with stock-proof fencing to restrict access to the established bridleway.

1.7 Criteria for Success

1.7.1 Surveying and monitoring of reptiles and their habitat (at donor and receptor sites) would provide evidence to assess the success of the reptile mitigation strategy.

1.7.2 Success would be measured by maintaining and enhancing the conservation status of the reptile assemblage, as determined by the following criteria:

- successful capture and translocation of reptiles from the construction footprint, delivering a reptile-free site construction footprint in line with the timings required for the construction programme;
- development of sufficient receptor site habitat, to accommodate any translocated reptiles from the construction footprint;
- successful establishment of reptiles in the receptor sites (as determined by reptile and habitat monitoring);
- no incidental mortality to reptiles during construction;
- long-term, landscape-wide increase in reptile habitat.

1.7.3 SZC CO. would have overall responsibility for the implementation of this mitigation strategy, for ensuring the criteria for success are met and, if monitoring shows long-term impacts on the reptile population, responsibility for assessing why this is occurring and implementing appropriate additional actions to rectify this.

1.8 Conclusions

a) General conclusions

1.8.1 The Reptile Mitigation Strategy provides information on the status of reptile populations on the proposal site, the legislation relating to any work that may impact reptiles, any potential constraints on reptile mitigation works, an assessment of the impacts of the proposed development on reptiles, and suitable mitigation proposals.

1.8.2 This plan would be reviewed and updated on a regular basis as the programme outlined in it progresses. Feedback on this Reptile Mitigation Strategy would be sought from consultees and incorporated, as appropriate, in future versions. Feedback on the previous draft of this Reptile Mitigation Strategy from consultees given in March 2015 has been addressed and incorporated into this version.

1.8.3 The population of reptiles that occupy parts of the EDF Energy estate would be affected by the development within the application boundary. Compensation and mitigation measures are outlined that are aimed to maintain the site as a 'Key Reptile Site' and avoid breaches of relevant legislation and policy.

1.8.4 Reptile survey work at potential donor sites has provided reliable density estimates for the four common reptile species found on site. These figures, along with a literature review on carrying capacity, have been used in the mitigation strategy to give a better understanding of the numbers of reptiles likely to be translocated, and the carrying capacities of the potential receptor sites.

1.8.5 Reptile receptor sites have been established, and a survey comparing reptile prey availability at donor and receptor sites has demonstrated that there would be suitable amounts of prey available in the receptor sites. A detailed pro-forma for assessing and monitoring receptor site suitability for reptiles has been developed and trialled. All receptor sites pass the simple receptor site checklist based on Natural England guidelines. Current assessments indicate that some of the receptor sites are either already at 'Good 'status or should reach this level by the time the current phase of mitigation has been completed, prior to any translocation programme. For those receptor sites that do not yet reach 'Good' status, management actions are planned to address this.

1.8.6 Comparing estimates of the numbers of reptiles likely to be translocated from the construction footprint, to the theoretical carrying capacity of the receptor sites (assuming they are 'good' quality), indicates that there is sufficient receptor site area to accommodate this number of reptiles likely to require moving whilst still allowing for a substantial margin of error.

1.8.7 A detailed reptile monitoring programme would be required to ensure the effectiveness of any proposed mitigation.

1.8.8 On-going work pre-translocation would include:

- completion of vegetation management and creation of habitat features;
- review the habitat assessment scores for each receptor site to ensure suitability has been maintained or if possible enhanced;
- on-going monitoring of the receptor sites, and removal of any small number of reptiles from within the fenced area to have increased availability of receptor sites that do not currently support reptiles;
- undertake surveys to establish (if possible) the location of hibernation features within areas of habitat to be affected by the development proposals (e.g. Goose Hill) to aid the prioritisation of the translocation programme;
- development of a detailed construction phasing plan.

b) Risks to the implementation of this mitigation strategy

1.8.9 Current methodologies to assess the ‘actual’ numbers of reptiles in an area (as opposed to those seen by conventional surveys) are limited, and there is the risk of underestimating the number of reptiles (particularly slow-worms and, to some extent common lizards) that would need to be captured and translocated from the construction footprint. This can be addressed by:

- planning to provide sufficient receptor areas of high-quality habitat to cope with this possibility;
- using the best available evidence to estimate reptile numbers, and working on a ‘precautionary principle’.

1.8.10 The area of Sizewell Marshes SSSI which would be subject to is difficult to access to trap reptiles, and health and safety issues will need to be addressed due to the presence of deep water and silt. This area also supports water voles and nesting birds, and any programme to clear reptiles from this area would need be aligned to the programmes for water vole and vegetation clearance (with their own seasonal restrictions).

1.8.11 Catching and translocating reptiles in this location would be labour-intensive and would require significant trained manpower.

1.8.12 Once reptiles are translocated from the construction footprint, delay in the construction programme may result in attempted recolonization. As soon as reptiles are removed, vegetation removal and destructive searches would be carried out, and maintained as long as necessary, to make and retain the habitat unsuitable for reptiles to recolonise.

Appendix 14C.2A.1: Legal Status

1.1 Legislation

1.1.1 All four common reptile species are protected under Schedule 5 (Section 9) of the W&CA (as amended) [Ref. 5] and are also listed under Section 41 of the NERC Act [Ref. 7].

1.1.2 The W&CA makes it an offence (subject to exceptions):

- to intentionally kill, injure or take [trade] any wild animal listed on Schedule 5; and
- prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places; and
- prohibits certain methods of killing, injuring, or taking wild animals.

1.1.3 Where it is predictable that reptiles are likely to be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injury [Ref. 1.20].

1.2 Licensing

1.2.1 None of the four common species identified requires a licence to capture and move (translocate) to a new (receptor) site.

Appendix 14C.2A.2: Information underpinning this mitigation strategy

1.1.1 This Reptile Mitigation Strategy is underpinned by the following information:

- desk-study records held by the Suffolk Biodiversity Information Service (SBIS);
- reptile surveys and assessment of the reptile population status and habitat quality of the proposal site and the surrounding area conducted by Wood Group, Ecology Consulting, SWT and Arcadis, summarised in the SZC ES Volume 2 Chapter 14 Technical Appendix 14A6 – Reptiles Baseline and SZC ES Volume 2 Chapter 14 Terrestrial Ecology and Ornithology;
- Arcadis' 2015 Capture Mark Recapture (CMR) analysis [see SZC – Main Development Site Volume 2 Chapter 14 Appendix 14A6 – Reptiles Annex 14A6.4 Primary Data];
- information on the on-going habitat creation works for reptiles provided by Freedom Group;
- 'pilot work' carried out in 2015 and 2016 to assess reptile density, habitat quality and pre availability in selected donor and receptor sites;
- the current Construction Plan (from SZC Volume 2 Chapter 3 Description of Construction of Sizewell C);
- the Outline Landscape and Ecology Management Plan (oLEMP) for the proposal site and the surrounding area;
- the Ecology and Landscape Management Plan for Aldhurst Farm [Ref. 1.21];
- EDF Energy estate Studio Complex – Management Plan 2016-21 [Ref. 1.22];
- feedback from Consultees following presentation of the draft RMP in March 2015;

- technical guidelines and reports on herpetofauna surveys and habitat management;
- Natural England's [Ref. 20] standing advice for planning authorities who need to assess the impacts of development on reptiles.

Appendix 14C.2A.3: Reptile baseline information

1.1 Wood Group, Freedom and Galloper Wind Farm surveys

1.1.1 Reptile surveys of suitable habitat within the proposal site were carried out by Wood Group (formerly Entec and Amec Foster Wheeler) in 2007. **Figure 14C2A.2** shows the distribution of the artificial refuges used in the survey. These surveys recorded regular observations of all four reptile species throughout the survey period. **Figures 14C2A.4 to 14C2A.7** show the distribution and relative abundance (as indicated by the size of the dot) of each of the four reptile species. The majority of the reptiles recorded were distributed in two distinct areas: the mosaic of scrub and rough grassland to the north of the Sizewell B power station (the proposed location for the Sizewell C power station platform), and the forest rides and glades within both Goose Hill and Kenton Hills. Small numbers of reptiles were also recorded on the edge of hedgerows within the arable fields.

1.1.2 Additional *ad hoc* reptile surveys have been carried out since 2007 in areas close to Sizewell B power station, within the plantation woodland of Kenton Hills and Goose Hill, close to Coronation Wood, in Pillbox Field, and in Black Walks. These add to the knowledge of the abundance and distribution of reptiles within the proposal site and environs, indicating that reptile species are well distributed in the local area.

1.1.3 Survey work by Wood Group of 5ha of suitable habitat at Aldhurst Farm found common lizard, grass snake and adder, but no slow-worm.

1.1.4 Reptile surveys were also undertaken between 2006 – 2013 in relation to the development of the Galloper Wind Farm (GWF) onshore substation, located directly to the east of Pillbox Field [Ref. 8 and Ref. 9]. The surveys concluded that the woodland edge habitat and other boundary features, such as hedge-filled paths, supported populations of reptiles, whereas the woodland interior was not suitable reptile habitat given the dense shade and lack of suitable cover. Translocation exercises allowed a comparison of the numbers of reptiles of each species caught as a result of trapping out during the translocation with the previous population density estimate from tinning surveys. For all reptiles, the ratio is 4.6 trapped out to 1 from previous population density estimates (5:1 in terms of whole animals). For the individual species, these ratios are: common lizard: 3:1; slow-worm: 10:1; adder: 2:1; and grass snake: 3:1.

1.2 Arcadis surveys

1.2.1 Arcadis carried out reptile surveys in Autumn 2014 of the Kenton Hills, St James Covert and Broom Covert proposed receptor sites. These surveys revealed small numbers of common lizard and slow-worm, and a single adder in the receptor sites surveyed.

1.2.2 Surveys were also carried out in Pillbox Field in Autumn 2015. Small populations of all four common reptile species were recorded.

1.2.3 To provide more clarity on the number of reptiles likely to be present within the main development site, a detailed targeted survey was carried out by Arcadis in 2015 and 2016, specifically investigating reptile densities in donor sites and receptor sites, as described in Section 2.

1.3 Limitations of assessments of potential reptile population size

1.3.1 The Wood Group, Freedom and GWF surveys, whilst broadly establishing the status of the reptile population, do not provide a total population count except where it has been possible to use CMR techniques and analysis. This is because survey work would only ever identify a proportion of the total population likely to be present, and there is a marked difference between numbers of reptiles counted during normal surveys and those actually caught during translocation exercises.

1.3.2 Published reptile survey protocols have changed little over the past 20 years, and are usually based on simple counts (of maximum numbers seen during a survey) rather than statistical models. There are often substantial variations in capture rates due to changes in capture effort, weather and seasonal behavioural changes; this may be particularly true for slow-worms that spend a significant proportion of their time underground and so have limited availability for capture. This makes it difficult to compare estimates of reptile population density from different surveys.

1.4 Assessment of the reptile population

1.4.1 Froglife [Ref. 3] present criteria for assessment of a Key Reptile Site (see **Table 1.1**).

Table 1.1: Criteria for assessment of a Key Reptile Site.

Species	Low population	Good population	Exceptional population
	Score 1	Score 2	Score 3
Common lizard	<5	5-20	>20
Slow-worm	<5	5-20	>20
Adder	<5	5-10	>10
Grass snake	<5	5-10	>10

1.4.2 Numbers in the table refer to maximum number of adults observed/under tins (at a density up to 10per ha), by one person in one day.

1.4.3 **Table 1.2** details the Key Reptile Site assessment of the main development site. The main development site and its ZoI would constitute a 'Key Reptile Site' as it fulfils all of the first four criteria (supports three or more reptile species; supports two snake species; supports an exceptional population of one species; supports an assemblage scoring at least 4.

Table 1.2: Assessment of the main development site as a Key Reptile Site based on Wood Group and Arcadis data.

Species	Wood Group data		Arcadis data	
	Population assessment	Score	Max. no. adults seen per day	Score
Common lizard	Good	2	11	2
Slow-worm	Exceptional	3	16	2
Adder	Exceptional	3	5	2
Grass snake	Good	2	2	1
Total Score		10		7

1.4.4 The reptile assemblage as a whole is, therefore, considered to be an Important Ecological Feature at the **Regional level** under the CIEEM guidelines [Ref. 4].

Appendix 14C.2A.4: Minimum specifications of reptile mitigation features.

Minimum specifications for reptile mitigation features can be found in Highways Agency [Ref. 1.23] and Edgar *et al*. [Ref. 1]. This Appendix details what these minimum specifications are, and shows how they have been attained and/or exceeded for the Sizewell C reptile mitigation work. Materials for windrow construction and other refugia would be provided from planned forestry thinning operations within Kenton and Goose Hills. Landscape planting would be locally-sourced where possible, as would heathland brashings applied on some receptor sites to increase heathland plant establishment and diversity.

1.1 Habitat and lifecycle features required

1.1.1 There are a number of factors that need to be taken into account when selecting potential receptor sites (English Nature 2005 [Ref. 1.24]), namely:

- location: reptiles should be retained on site or released into an adjacent area of land;
- area: the amount of habitat suitable for the species to be relocated should be no less, and preferably greater than that to be lost through development;
- existing habitat: receptor sites must include habitat that is suitable for foraging, sheltering and protection;
- extant reptile population: the proposed receptor site should not support a population of the species to be relocated, but must be capable of supporting such species with appropriate habitat improvement works;
- site safeguards: the proposed receptor site should not be subject to planning or other threats (including unsympathetic management work);
- site monitoring: the proposed receptor site should be subject to an agreed monitoring programme.

1.1.2 Each reptile species has slightly different habitat and prey preferences. All species favour edge habitat (i.e. the interface between shorter and longer vegetation) as this provides basking sites in close proximity to the safety provided by cover.

1.1.3 The habitat creation and improvement works within the receptor sites need to provide a diverse range of habitats and features to support all four species of reptiles, which are considered to be as follows:

- areas of habitat suitable to support thriving populations of prey items the reptiles require;
- south-facing banks and areas of bare ground to allow reptiles to bask and raise their body temperature;
- areas of dense scrub and other vegetation into which reptiles can move to avoid predators, ideally located close to basking sites;
- structures that provide an area below ground that is dry and frost-free for hibernation during the winter period;
- piles of cut/composting vegetation (for grass snakes to use as egg-laying sites); and
- log piles and piles of brash to introduce cover (and additional hibernation sites) for reptiles, and also to provide habitat structure supporting prey species.

1.1.4 All of the above aspects have been taken on board when designing the receptor site assessment methodology and criteria. Specifications for the creation of basking banks, hibernacula, log/brash piles and grass snake egg-laying heaps are provided below.

1.2 Basking banks

1.2.1 South facing banks should be excavated to a depth of 600mm with logs and brash piled on top, before capping with turf and topsoil to create a dry, frost-free refuge earth pile to a height of 1m with a base of at least 5m wide to ensure stability. The banks should be sown with an acid grassland mix and some scattered shrub. It would be advantageous if a hibernaculum could be incorporated into the bank.

Plate 1.1: Basking banks incorporating hibernacula in St James.

Plate 1.2: Basking banks Studio.

1.3 Specifications for the creation of hibernacula

1.3.1 The key design features of hibernacula are as follows:

- a sunny position;
- a well-drained site not prone to flooding;

- orientation so that one of the long banks faces south;
- access for reptiles through openings;
- location in a patch of habitat such as tussocky grassland;
- minimal public disturbance; and
- size - at least 4m long and 2m wide, by 1m high, but can be much larger.

1.3.2 Hibernacula can be made of a range of materials including timber, brash, inert hardcore and bricks, grubbed up roots, or general building rubble. Hibernacula can be constructed by digging a pit and then placing the materials partially buried inside, rather than creating a mound on the surface. There is no risk of Winter flooding at Sizewell on any of the sites, so partially buried hibernacula would be suitable. The top surface of the hibernacula should be covered in soil and seeded or have excavated turves from the base placed on top. It is important to create access holes that are continuous with voids deeper within the structure. Shrubs on the northern side of the hibernacula would provide shelter and cover. At Sizewell there are many excavated tree root plates that have been placed in receptor sites to act as hibernacula.

Plate 1.3: Tree root plate acting as hibernacula St James.

1.4 Specifications for the creation of log and brash piles

1.4.1 Log and brash piles should be at least 10m by 10m in area and 1m high. The material should only be moderately compacted. They should be in sunny locations and preferably set within existing vegetation; for example, on the edge of shrub areas.

1.4.2 There is no shortage of conifer logs and brash at Sizewell, but the material must be uneven in size and the piles should have an uneven, complex shape. Log piles would need to be regularly topped up as the material decomposes, particularly as they would be predominantly softwood.

Plate 1.4: Log piles acting as hibernacula Studio Field.

1.5 Specifications for maintenance of diverse sward height

1.5.1 To prevent regeneration of scrub/bracken and to create a mosaic of different grass heights in a receptor area, the core area needs to be cut/flailed twice a year to keep the sward short and the various 'fingers' of this area should be cut on a three year rotation to allow a range of different heights of grass to be maintained (e.g. cut one area one year, a second area the next year and the final area the third year, then start again at the first area on the fourth year). Some areas of the short grass should be scraped on an annual basis to maintain bare earth – to be delayed until the year before translocation.

Plate 1.5: Diverse sward height and cover Studio Field.

1.6 Specifications for the creation of grass snake egg-laying heaps

1.6.1 Grass snakes usually nest in heaps of decaying vegetation where the heat of decomposition incubates the eggs. Suitable material for the heaps can include grass cuttings, manure, sawdust, leaf mould, old straw, hay bales or cut reeds, but the material must be actively decomposing and producing heat. Grass snake egg-laying heaps can also be constructed by piling cuttings on top of a log base which aerates the heap and creates easy access for females. The decaying vegetation could comprise old hay bales, which are available at Sizewell.

1.6.2 The heaps need to be large, at least 1m tall, and ideally much larger. They should be placed in sunny or partially sunny areas. The heaps would need replenishing, or alternatively new egg-laying sites should be regularly created. The heaps should not be interfered with between June and September, to avoid disturbance. Topping up of the heaps should therefore be undertaken at least every two years, in April or October. Grass snakes require access to wetland habitat such as ponds, marshes and ditches that support amphibians which are their principal prey species, which may dictate the locations for the grass snake egg-laying heaps.

Plate 1.6: Grass snake grass heap, St James.

Appendix 14C.2A.5: Habitat suitability.

1.1 Assessing the overall habitat suitability of the receptor sites

1.1.1 Brady & Phillips (2012) [Ref. 17] have undertaken work to design a suitable protocol to enable a Habitat Suitability Assessment to be carried out on sites thought to support reptile species, in much the same way that a HSI can be calculated for ponds thought to contain breeding great crested newts. Ideally, the broad aim of a site-level HSI assessment is to generate a score (that is repeatable within the same site by fieldworkers with different skill levels). Although example definitions are provided for appropriate habitat variables, these are likely to require significant additional refinement before a site-level HSI model can be more widely applied. Further detailed survey work is required to determine relationships between reptile presence and individual habitat variable values, and modelling work is likely to involve analysis of results using principal components analysis (PCA) or logistic regression.

1.1.2 Taking on board the principles outlined in Brady & Phillips (2012) [Ref. 17] a checklist has been developed that would be used to assess the habitat suitability of each receptor site. The HSI checklist outlines all the key habitat and lifecycle features required in order for reptile species to prosper and thrive. As the suitability of receptor sites is likely to improve over time as habitats develop and management activities are undertaken, the checklist identifies three possible current suitability grades of receptor site as follows:

- moderate – the minimum requirements to allow reptiles to survive; the majority of the lifecycle features are provided but vegetation structure requires considerable improvement, and prey availability may be limited;
- good – the standard for use as a receptor site; all of the life cycle features required for reptiles are present, but the site may benefit from some further management (and/or additional time) to further improve its suitability for reptiles;
- exceptional - all life cycle features are present and vegetation structure is considered to be optimal for reptiles. The receptor sites have an abundance of well-established and well-designed life cycle features present, and are considered resilient to change under their adopted management regime.

1.2 Species-specific habitat requirements

1.2.1 The different habitat and prey preferences for the four common reptile species are outlined in **Table 1.1**.

Table 1.1: Species-specific habitat requirements (after Edgar et al. 2010 [Ref. 1]).

Species	Habitat requirement	Diet
Common lizard	Sunny areas with structurally-diverse vegetation cover (particularly a range of heights of vegetation). Abundant grass tussocks provide food, shelter, basking, and hibernation sites.	A range of soft-bodied invertebrate prey
Slow-worm	Tolerate a broader range of habitats than other lizard species. Require dense vegetation (especially grasses) with sunny areas for basking and loose soil to burrow in.	Soft-bodied invertebrates, especially slugs and worms.
Adder	Dry, open sunny areas with adjacent dense ground cover. Hibernation sites tend to be south facing slopes, tree root systems, crevices in banks, and voids in piled materials.	Small mammals, especially voles, along with lizards, nestling birds and frogs.
Grass snake	Often associated with wetlands. Some cover and a degree of structural diversity, but, due to its mobility, is not reliant on a single site providing the necessary habitat for hibernation, feeding and egg-laying. Sunny areas are preferred, but woodland and other shaded habitats are also used. Warm, humid, decomposing organic material is required for egg-laying.	Primarily amphibians, but also fish, small mammals and fledgling birds.

1.3 Development of habitat assessment criteria

1.3.1 A Reptile Habitat Suitability Form (RHSF) would be used to assess the quality of each receptor site for its suitability to support reptiles prior to any translocations. An assessment of prey availability (see **Appendix 7**) has also been made separately.

1.3.2 Ideally, the broad aim of a site level RHSF assessment is to generate a score (that is repeatable). **Table 1.2** shows a generic attempt at developing an RHSF based on the key reptile habitat features described for site assessment in Brady & Phillips (2012) [Ref. 17]. This has been simplified in Section 4 for current use at Sizewell C.

1.3.3 A similar protocol would be used to monitor the establishment of the receptor sites, for example the establishment of scrub and tree planting and tussock grassland. Should a receptor site be deemed unsuitable for reptiles, it would not be used to receive reptiles until remedial habitat management or improvement works have occurred.

1.3.4 **Table 1.2** has been simplified for current use (see **Table 1.3** Reptile RHSF assessment form.), and applied for the three most developed receptor sites (Kenton Hills, St James and Studio) with the results shown in **Table 1.4**, **Table 1.5**, and **Table 1.6** respectively.

Table 1.2: Reptile Habitat Suitability Form (RHSF) based on Brady & Phillips (2012) [Ref. 17].

Habitat Variable	Assessment	Comment
Local Range	Y/N	Within core local range of specific reptile species
Area	Area of receptor site (ha)	
Slope	Flat (<1 degree) Low (1-15 degrees) Moderate (16-45 degrees) Steep (>45 degrees)	Can be measured with a clinometer
Aspect	N; NE; E; SE; S; SW; W; NW	Prevailing bearing measured by compass to determine broad category
Topography	Absent Simple Moderate Complex	Absent: featureless Simple: generally featureless, some refugia may be present Moderate: ground not featureless (e.g. bank, gully or similar structure present). Surface refugia may be present. Some mammal burrows present Complex: Varied topography with banks and gullies. Many refugia offering opportunities for basking and shelter. Potential hibernacula clearly evident
Vegetation Structure	Absent Simple Moderate Complex	Absent: no vegetation Simple: generally short (<1cm), or if taller, sward lacks variability in height and apparent structure. No mature clumps of vegetation present Moderate: Medium to high sward (> 1cm) that may show some variability in height and structure. Few vegetation clumps and dead stems visible in sward Complex: medium to high sward with significant variability in height and structure. Many vegetation clumps, dead stems etc. visible in sward
Hibernation Sites	Numbers of refugia per ha	Georeferenced locations of hibernation sites where possible (especially those created) and numbers per ha

Habitat Variable	Assessment	Comment
Hibernation Sites	Y/N for specific species based on whether target species observed within habitat at relevant time of year	Common lizard: species records Jan-mid Mar. Slow-worm: species records Jan-early Apr. Adder: species records Jan-mid Mar. Grass snake: species records Jan-early Apr.
Breeding Sites	Y/N on whether neonates observed at relevant time of year	
Grass snake egg-laying features	None Low High	None: no suitable features Low: limited quantities of material present High: moderate to large quantities of suitable material present
Prey Availability	None Below average Above average	Species specific assessment of whether suitable prey available None: no evidence of preferred prey species Below average: some evidence of preferred prey species present Above average: prey species frequently encountered
Predators	None Below average Above average	Species-specific assessment of whether important predators present None: no evidence of important predators Below average: some evidence of important predators Above average: important predator species frequently encountered
Public pressure	None Minor Moderate Major	None: no public access Minor: low/infrequent public usage Moderate: some public use of site but access restricted to certain areas Major: frequent and high public usage and evidence of disturbance (e.g. rubbish/fires).
Connectivity	Isolated Low	Isolated: Low:

Habitat Variable	Assessment	Comment
	Moderate High	Moderate: High:
Vegetation cover	% cover of different broad habitat classes	Bare ground Short / close-grazed grass <2cm Medium grass 2-10cm Tall grasses >10cm Scrub Shrub/trees: (height > 1.5m)
Management	Unfavourable/favourable	Is management following the site-specific targets and are site-specific objectives being met?
Grazing Pressure	None Below average Above average	None: no grazing Below average: low grazing pressure Above average: moderate to high grazing pressure
Pond Density	Number of ponds or wetland features within 1km	

Table 1.3: Reptile RHSF assessment form.

Variable to be assessed	Assessment Criteria	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
Area (ha)	0.5 ha considered to be minimum area required		-	0.5ha	0.6-10 ha	>10 ha
Appropriate management regime in place	Site is in secure ownership with sufficient access to enable management activities to occur and agreed management aims and objectives in place (Y or N)	Y/N	-	-	-	-
Site subject to public pressure	Site is located in an area subject to excessive public pressure and fencing and other works unlikely to mitigate for the effects of this (None/Minor/Moderate/Major). These to be determined by professional judgement on site.	-	Major	Moderate	Minor	None
Vegetation Complexity	Overall appearance and impression of vegetation Absent: no vegetation Simple: generally short (<1cm), or if taller, sward lacks variability in height and apparent structure. No mature clumps of vegetation present Moderate: Medium to high sward (> 1cm) that may show some variability in height and structure. Few vegetation clumps and dead stems visible in sward Complex: medium to high sward with significant variability in height and structure. Many vegetation clumps, dead stems etc. visible in sward	-	Absent	Simple	Moderate	Complex
Detailed Vegetation Attributes	Areas of bare ground present (bare ground good for basking and catching prey; too large an extent increases predation risk)	-	-	< 5% bare ground present	5-10% bare ground present or > 30% bare ground present	10-15% bare ground present

Variable to be assessed	Assessment Criteria	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
				or > 30% bare ground present		
	Short sward grassland < 2cm	-	-	<10% of area	10-30% of area	30% of area
	Medium sward height grassland 2-10cm	-	-	<5% of area	5-10% of area	15% of area
	Tall grass sward present > 10cm)	-	-	< 5% of area	5-10% of area	15% of area
	Scrub: extent of scrub/bramble/bracken and other dense cover patches at least 3m x 3m in area	-	-	<5% of area or > 30%	5-10% of area or 15-30% of area	10-15% of area
	Shrub/trees >1.5m	-	-	<2% or >30%	2-5% or > 20%	5-10 % of area
Sufficient dense cover to act as refuge from avian predators	Number and extent of areas of dense cover/large brash piles at least 2m x 2m in extent in close proximity to basking sites	-	None	At least 2 such structures in close (less than 2m) proximity to sunny basking sites	At least 4 such structures in close (less than 2m) proximity to sunny basking sites	At least 6 such structures in close (less than 2m) proximity to sunny basking sites
Access to south facing basking sites	Number and extent of south facing basking structures at least 2m long by 0.6m high	-	None	At least 1 such structure	At least 2 such structures	At least 3 such structures
Access to egg laying habitat (grass snake)	Number and extent of large piles of composting material at least 2m x 2m in area and 1m high	-	None	At least 1 such structure	At least 2 such structures	At least 3 such structure
Evidence of breeding	Evidence that translocated reptiles have established and breed successfully	-	No evidence of young	Evidence of young from all reptiles species	Evidence of young from all reptiles species translocated	Evidence of young from all reptiles species translocated

Variable to be assessed	Assessment Criteria	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
				translocated over 1 breeding season	over 2 breeding season	over 3 breeding season
Access to hibernation features	Number and extent of man-made or natural hibernation structures (including linear structures at least 0.6m deep, 1m wide and 1m or longer; and log piles/root plates).	-	None	At least 4m of linear structure and or 2 buried root plates or similar	At least 10m of linear structure and 5 buried root plates or similar	At least 30m of linear structure and 10 buried root plates or similar
Access to sufficient prey species (invertebrates and small mammals)	Density and abundance of small mammal populations and invertebrate families. Survey work undertaken in 2015 has established that receptor sites Kenton Hills, St James Covert and Studio already support sufficient small mammal and invertebrate prey items to support reptiles. It is reasonable to assume that as habitat diversity and heterogeneity increases so would prey suitability	-	Site fails to meet all of the vegetation attribute requirements for moderate standard	Site meets all of the vegetation attribute requirements for moderate standard.	Site meets all of the vegetation attributes requirements for good standard.	Site meets all of the vegetation attributes requirements for exceptional standard.
Grazing pressure	None/Below average/Above average (the results of grazing pressure would be assessed against the detailed vegetation attributes but no stock grazing is proposed in the short term management of the sites)	-	Above average grazing pressure is poor for reptiles resulting in poor vegetation structure	Below average grazing pressure is moderate creating moderate vegetation structure	Below average grazing pressure is moderate creating moderate vegetation structure	No (none) grazing pressure creating good vegetation structure for reptiles
Connectivity	Low/Moderate/High	-	Low connectivity – no other	Moderate – Suitable reptile habitat within 200m but currently	Good – no barriers to dispersal and	High – no barriers to dispersal on a substantial landscape

Variable to be assessed	**Assessment Criteria**	**Receptor Site Suitability Grading**				
		Y/N	**Poor**	**Moderate**	**Good**	**Exceptional**
			Habitat suitability for reptiles improves as further to the right in this column			
			suitable reptile habitat within 500m	isolated due to reptile fencing.	adjacent good quality reptile habitat	scale and adjacent good quality reptile habitat
Wetland feature density	Number of wetland habitats and features (ponds/scrapes/ditches) within 1km. The greater the number the better for reptiles, assessed as None/Moderate/Good	-	None	1-3	3 - 10	>10

Table 1.4: Reptile RHSF assessment for St James (November 2015).

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
Area (ha)	1.4 ha	-			Good (1.4 ha)	
Appropriate management regime in place	Y	Y	-	-	-	-
Site subject to public pressure	N	-				None - Exceptional
Vegetation Complexity	Complex	-				Complex
Detailed Vegetation Attributes	Bare ground: 0% Short / close-grazed grass <2cm: 30% Medium grass 2-10cm: 30% Tall grasses >10cm: 25% Scrub: 10% Shrub/trees: (height > 1.5m): 5%	-			Vegetation meets majority of Good Suitability except for bare ground attribute (would become exceptional once some bare ground established and management regime in place to maintain sward diversity and extent of cover)	

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
Sufficient dense cover to act as refuge from avian predators	20	-				Exceptional (at least 20 such piles of cover good mix of areas of scrub and large brash piles)
Access to south facing basking sites	8	-				Exceptional (eight earth-covered large brush piles built)
Access to egg laying habitat (grass snake)	2	-			Good (2 hay piles)	
Evidence of breeding	Young slow-worms observed in 2015	-		Moderate (NB reptiles would be removed from the fenced area in 2016)		
Access to hibernation features	15 log piles/tree root plates and 110m of linear feature	-				Exceptional
Access to sufficient prey species (invertebrates and small mammals)	Good diversity and abundance of invertebrates, and good numbers of small mammals	-			Site meets Good suitability for the detailed vegetation attributes criteria	

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
Grazing pressure	None	-				Exceptional
Connectivity	Currently moderate due to reptile fencing	-		Currently moderate due to reptile fencing but would be Good or Exceptional once this is removed		-
Wetland feature density	Currently None due to reptile fencing	-	Currently None due to reptile fencing limiting access but once this is removed, there would be at least 8 significant ditches/ponds or other wetland features within 1km which would be raise suitability for this criteria to Good.			-

Table 1.5: Reptile RHSF assessment for Kenton Hills (November 2015).

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
Area (ha)	3.9 ha	-			Good (3.9 ha)	
Appropriate management regime in place	Y	Y	-	-	-	-
Site subject to public pressure	Limited public pressure currently due to reptile fencing, but may increase when this is removed although clear rides in Kenton hills should reduce this becoming excessive	-			Limited - good	
Vegetation Complexity	Complex	-				Complex
Detailed Vegetation Attributes	Currently meets Good suitability	-			Vegetation meets majority of Good Suitability except for bare ground attribute and extent of scrub (would become Exceptional once some bare ground established and management regime in place to control scrub cover)	
Sufficient dense cover to act as	Exceptional	-				Exceptional

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
refuge from avian predators						(Exceptional mix of areas of scrub and large brash piles)
Access to south facing basking sites	At least 4 large earth-covered brush piles	-			Good (four earth-covered large brush piles built piles and areas at south of each sub-sector would be managed as shorter sward for basking)	
Access to egg laying habitat (grass snake)	At least 4	-			Good (4 hay piles)	
Evidence of breeding	Young slow-worms and adders observed in 2015	-		Moderate (NB reptiles would be removed from the fenced area in 2016)		
Access to hibernation features	28 log piles/tree root plates and ~400m of linear feature	-				Exceptional
Access to sufficient prey species	Survey work in 2015 showed Good abundance but low diversity of invertebrates, and	-		Despite vegetation attributes criteria meeting Good suitability, survey work recorded		

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
(invertebrates and small mammals)	moderate numbers of small mammals			only moderate prey abundance (numbers of small mammals likely to increase once scrub managed over winter 2015)		
Grazing pressure	None	-				Exceptional
Connectivity	Currently moderate due to reptile fencing	-		Currently moderate due to reptile fencing but would be Good or Exceptional once this is removed		-
Wetland feature density	Currently None due to reptile fencing	-	Currently None due to reptile fencing limiting access but once this is removed, there would be at least 6 significant ditches/ponds or other wetland features (mainly in Sizewell			-

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Poor	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
			Belts/Marshes) within 1km which would be Good suitability.			

Table 1.6: Reptile HS assessment for Studio (November 2015).

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Below Moderate	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
Area (ha)	16.7 ha	-				Exceptional (16.7ha)
Appropriate management regime in place		Y	-	-	-	-
Site subject to public pressure	No public pressure and would be fenced off in the future	-				None
Vegetation Complexity	Meets moderate suitability	-		Moderate		Complex
Detailed Vegetation Attributes	Meets moderate suitability	-		Vegetation meets majority of Moderate Suitability except for bare ground attribute and establishment of scrub (would become good once some bare ground established and management regime in place to control scrub cover)		
Sufficient dense cover to act as refuge from avian predators	Meets goods suitability	-			Good (more than 6 structures (brash piles and windrows	

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Below Moderate	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
					and areas of scrub becoming established)	
Access to south facing basking sites	2 large bunds built across site running east-west	-			Good	
Access to egg laying habitat (grass snake)	Meets goods suitability 3 piles of hay present	-			Good	
Evidence of breeding	One gravid adder observed in 2015	-		Moderate (NB reptiles would be removed from the fenced area in 2016)		
Access to hibernation features	37 log piles/tree root plates and similar features	-				Exceptional
Access to sufficient prey species (invertebrates and small mammals)	Good diversity but low abundance of invertebrates, and good numbers of small mammals.	-			Vegetation attributes criteria only reaches moderate but survey wok in 2015 identified good numbers small mammals and good diversity invertebrates	
Grazing pressure	None	-				Exceptional
Connectivity	High connectivity (see Figure 14C2A.12)	-			High - good	

Variable to be assessed	Field Assessment	Receptor Site Suitability Grading				
		Y/N	Below Moderate	Moderate	Good	Exceptional
			Habitat suitability for reptiles improves as further to the right in this column			
Wetland feature density	At least 10 significant ditches/ponds/wetland features within 1km	-				Exceptional

Appendix 14C.2A.6: A review of wetland habitat and water requirements for reptiles

1.1.1 References cited in Table 1.1.

1 Cumbria Biological Data Network (2008). Cumbria Species and Habitats Statements (with habitat targets, planning considerations and enhancement opportunities). Cumbria Biodiversity Data Centre.

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5 Phelps, T. (2004). Population dynamics and spatial distribution of the adder *Vipera berus* in southern Dorset, England. Mertensiella 15: 241-258.

6 English Nature (1993) Herptile sites Volume 2: National common reptile survey - Final report (ENRR039). English Nature.

7 Phelps, T. (2004) Beyond hypothesis – a long-term study of British snakes. British Wildlife, 319-327.

8 Edgar, P., Foster, J. & Baker, J. (2010) Reptile Habitat Management Handbook. ARC.

9 http://www.herpetofauna.co.uk/forum/adders-and-wetland-habitat-features_topic4971.html

Table 1.1: Literature review on wetland habitat requirements.

Title	Comment	Reference
Cumbria species and habitat statements	P47 Lowland raised bog habitat– states common lizard and adder would benefit from enhancement of this habitat. No other supporting evidence.	1
Effect of water constraint on growth rate	Authors found that under laboratory conditions, a lower water supply induced a lower growth rate and lower activity rate in common lizards. Also observed six natural populations of common lizard, and found that growth rate was constrained by water availability.	2
Hibernation, habitat and seasonal activity of adders	Studied adders north of the Arctic Circle. Andersson found that all hibernation sites identified had open areas of peat bog and marshland within 1km. In the summer months, adders travelled from the hibernation sites to the marshland and peat bogs to feed on voles.	3
Habitat preferences of adder in Scotland	The adder is one of the most investigated reptiles, with much known about its biology. Research, particularly in Europe, has revealed information about the annual breeding cycle and habitat requirements. Such studies have shown that populations of adders undergo regular behavioural patterns during the year. They hibernate through the winter in underground sites known as hibernacula, emerging in early spring to bask at sunning positions for a few weeks before undergoing ecdysis, as a prelude to courtship and mating. Males and unmated females then move to adjacent wetter areas to feed, with gravid females remaining near hibernacula while incubating young, giving birth to live young in mid to late summer. Animals return to hibernacula areas in late summer to bask, before entering hibernation in late autumn. At all 3 sites studied containing adder populations, areas of wet, marshy ground were found in the vicinity, which provided areas for snakes to move into in the summer to look for prey.	4
Spatial distribution of adder in Dorset	Study mainly focuses on population dynamics rather than habitat selection. However, the paper does mention that wet heath and mire are a feature adjacent to much of the dry heath and represent summer feeding ground for adders. All six species of reptile native to the UK are present on the sites in good numbers.	5
EN Report 039 part 2	Habitats associated with records of each species – most common habitats were woodland (28%), heath or moorland (27%), and grassland (25%). The next most common habitat was wetlands (ponds/rivers) (12%). • Slow-worms less frequently associated with wetland habitats (5%).	6

Title	Comment	Reference
	• Grass snake most frequently associated with wetland habitats (29%). • Adders less frequently associated with wetland habitat (no percentage given).	
A long-term study of British snakes	Long term study of adders in Dorset. An important discovery was that adders migrated a short distance from dry-heath areas to wet ditches and woodland clearings.	7
Reptile Habitat Management Handbook	Common lizard habitat requirements: Not all areas within occupied sites support viviparous lizards; the species avoids structurally uniform vegetation, whether it is rank and completely closed or short and completely open. Typically, the viviparous lizard differs from the other widespread lizard species, the slowworm, in preferring sites with a greater variation in the height of vegetation cover. Both humid and dry microhabitats are selected by viviparous lizards but the highest densities tend to be found in damp or wet areas, especially where abundant grass tussocks are present to provide food, shelter, basking and hibernation sites. However, as long as the vegetation is located in a sunny area, is structurally diverse and provides adequate cover, viviparous lizards can attain extraordinary population densities. Slow-worm habitat requirements: all habitats, slow-worms require dense vegetation, especially grasses coupled with sunny areas to allow thermoregulation and, preferably, loose soil into which to burrow. Very wet and very dry habitats are usually avoided. Adder habitat requirements: In all suitable habitats, dry, open, sunny areas with adjacent dense ground cover are essential. Hibernation sites tend to be on south-facing slopes; tree root systems, crevices in banks, and voids in piled materials are often used. Wetter areas around ponds, lakes, bogs or mires are also used (especially in the summer) providing there are dry banks or grass tussocks for basking.	8
Post on Herpetofauna discussion forum	Question: I am looking for evidence as to how much adders need/prefer access to ponds/wetland features in their habitat. Answers: • Would, I guess one of the things is how far they would travel to get to such places. I know of adders that live where there is no obvious water feature or damp ground. Adders living on cliff faces are often in quite dry conditions. Maybe if the food supply is adequate in dry places there is no need to seek out damper places.	9

Title	Comment	Reference
	• I have always seen plenty of adders in the past that live pretty close to some of Studlands wetland. Keith. • Some of our adder sites are close to ponds and marshy/fen type areas where there are a lot of small mammals and some people have seen adders swimming in these places. However other sites are in dry locations with no wetland or water within hundreds of metres. The best two sites in terms of numbers are of course one from each habitat type - a completely dry area and a site by a stream and important valley fen. However for the latter site after a decade of recording they have moved this year to a drier area up the valley side a couple of hundred metres from the fen and stream.	

Appendix 14C.2A.7: Comparative reptile prey availability surveys in donor and receptor sites

Surveys of the availability of reptile prey (small mammals and invertebrates) were conducted in 2015 at the nine reptile survey sites described in Appendix 4 and **Figure 14C2A.7**.

1.1 Small mammals

a) Methodology

1.1.1 Small mammal trapping using Longworth traps took place at all nine sites. At each location, 66-72 traps were left pre-baited over the weekend, followed by three full days of mammal trapping throughout the week, with traps checked twice a day.

1.1.2 Trap position was chosen carefully depending on the habitat. In woodland and along hedgerows, traps were placed alongside natural objects such as tree trunks, fallen branches or logs, or under low shrubs, whereas in grassland habitats traps were placed along small mammal surface runs or small holes in the ground. Within the reptile receptor sites traps were often placed adjacent to reptile refugia. At the end of the catching period at each site, traps were removed, cleaned and relocated to the next survey area.

1.1.3 Individual small mammals were fur-clipped so that recaptures during the survey period could be identified, as described in Gurnell & Flowerdew (2006) [Ref. 1.25].

b) Survey limitations

1.1.4 In some cases, traps were triggered and closed, without small mammals inside. This therefore removed the trap from the sample set, and so may have resulted in a lower catch rate. Also, on two of the donor sites (rides within Goose Hill and scrub on the southern edge of Goose Hill) and one of the receptor sites (Studio), throughout the survey week several traps had been tampered with (trap and nest box had been pulled apart, with the bedding and food removed), therefore removing the traps from the sample set. This happened to a maximum of 14 traps per survey, and are detailed on the survey results at the end of this Appendix when this occurred. Further investigation revealed that magpies had found these Longworth traps and were emptying them for the food.

c) Small mammal survey data analysis

1.1.5 Small mammal data was analysed by calculating the 'minimum number alive' for each survey area. This was done by calculating the total number of marked animals (and therefore different individuals) within each area. This data has then been extrapolated to gain an estimation of small mammal prey availability throughout the Main Development Site.

1.1.6 A one way analysis of variance (ANOVA) was undertaken on the abundance of small mammals between the donor and receptor sites. This will allow a comparison between mammal prey availability between the donor and receptor sites.

d) Results

1.1.7 Seven species of small mammal were caught in the traps, namely wood mouse (*Apodemus sylvaticus*), yellow-necked mouse (*Apodemus flavicollis*), field vole (*Microtus agrestis*), bank vole (*Myodes glareolus*), common shrew (*Sorex araneus*), pygmy shrew (*Sorex minutus*) and water shrew (*Neomys fodiens*). Results of the small mammal trapping surveys (Table 1.1 Small mammal trapping results within the nine survey sites.) show that the highest number of small mammals caught was in the arable margins, followed by St James Covert. Full results of the small mammal surveys can be found at the end of this Appendix.

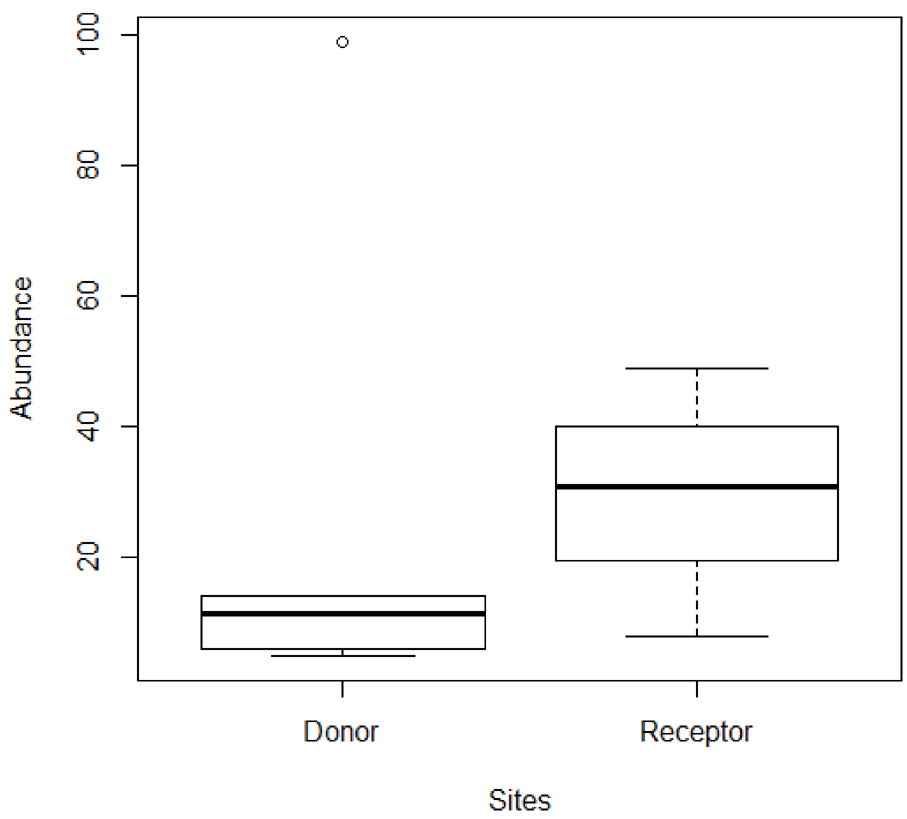
Table 1.1: Small mammal trapping results within the nine survey sites.

Site		Site ID	Total number of different individuals caught	Total number of voles	Total number of mice	Total numbers of shrews
Donor sites						
Arable margins		1	99	37	28	32
Conifer plantation		2	11	0	5	6
Ride		3	6	0	0	6
Scrub		4	12	3	3	5
Platform grassland		7	14	0	14	0
Platform landscape plantation		8	5	2	3	0

Site		Site ID	Total number of different individuals caught	Total number of voles	Total number of mice	Total numbers of shrews
Receptor sites						
Kenton hills (eastern section)		5	8	1	1	6
St James covert		6	49	7	34	8
Studio		9	31	4	17	6

1.1.8 The analysis of variance (ANOVA) revealed no significant difference between small mammal abundance in the donor and receptor sites (P = 0.841). The mean number of mammals was greater in the receptor sites than donor sites, but the difference is not significant. Results of the ANOVA are shown below in **Plate 1.2**.

Plate 1.2. ANOVA of small mammal prey availability in the donor and receptor sites (thick black bar denotes median value).



1.1.9 Results from individual sites surveyed are summarised below.

i. Donor sites

Arable margins (Area 1)

1.1.10 99 different individuals were caught and marked. There was a large variety of species of small mammals recorded, namely wood mouse, yellow-necked mouse, field vole, bank vole, common shrew, pygmy shrew and water shrew. Species caught mainly consisted of wood mouse, common shrew and both vole species.

Conifer plantation (Area 2)

1.1.11 Within this area, 11 different individuals were caught and marked. The area surveyed was a combination of conifer 'edge habitat', dense scrub under conifer, and open areas under conifer. Species caught consisted of wood mice and common shrew.

Ride (Area 3)

1.1.12 Six different individuals were caught and marked within this area. All individuals were common shrew, and were mainly found along the ride with a thick layer of moss on the ground. It is worth noting that within this area throughout the survey week several traps had been tampered with, (trap and nest box had been pulled apart, with the bedding and food removed) therefore removing the traps from the sample set. This happened to a maximum of 15 traps per survey, and are detailed on the survey results when this occurred. Although the cause of this is not known, it is predicted that crows found the Longworth traps and were emptying them for the food.

Scrub (Area 4)

1.1.13 A total of 12 individuals were caught and marked within the scrub area. Species included wood mice, yellow-necked mice, field vole, bank vole, common shrew, pygmy shrew and water shrew. Traps were also tampered with at this location; a maximum of seven traps per survey.

Platform grassland (Area 7)

1.1.14 14 different individuals were caught and marked. All individuals caught were wood mouse, with one unconfirmed mouse species (though probably this was also wood mouse).

Platform landscape plantation (Area 8)

1.1.15 5 different individuals were caught and marked in this area. The area surveyed was a combination of conifer 'edge habitat' (gorse scrub), and throughout the dense conifer. Of the five small mammal individuals caught, three were wood mice and two were field vole.

ii. Receptor sites

Kenton Hills eastern section (Area 5)

1.1.16 Eight different individuals were caught and marked in this area. Species caught comprised common shrew, field vole and wood mouse, with the majority of individuals being common shrew.

St James' Covert (Area 6)

1.1.17 49 different individuals were caught and marked in this area. The species present comprised: wood mouse, yellow-necked mouse, field vole, bank vole, common shrew and pygmy shrew. The majority of individuals caught were wood mice.

Studio (Area 9)

1.1.18 Within this receptor area, 30 different individuals were caught and marked. The area sampled included an area of newly created bund through the middle of the site, and a hedgerow around the western edge.

1.2 Invertebrates

a) Methodology

1.2.2 Five rows of six invertebrate pitfall traps, and five pan traps, were set at all nine survey sites detailed above. Each row of pitfall traps were placed within the same micro-habitat, with the rows being placed in areas representing the ratio of different microhabitats on site as a whole. Information on the different microhabitats surveyed can be found at the end of this Appendix.

1.2.3 With the exception of Studio, which was not available at the time of survey, invertebrates were collected from all sites at the start of May and stored within industrial methylated spirit (IMS). Traps were then set at the Studio receptor site at the end of May, with samples being collected in early June. Pitfall trapping methodology followed advice given in Woodcock (2004) [Ref. 1.26].

b) Survey limitations

1.2.4 Within some survey areas, a small number of the pitfall traps had blown over, split or been tampered with. In addition, a couple of the pan traps had blown over or dried out. To overcome this limitation, final totals of invertebrates were adjusted during analysis to remove pitfall traps which were damaged or missing from the survey set.

c) Invertebrate data analysis

1.2.5 Invertebrates collected were identified to family level and size class (Table 1.2 Terrestrial invertebrate identification. below). An overall abundance of invertebrate prey was calculated, and the abundance of invertebrate families which make up the majority of slow worm and common lizard diets were looked at in more detail (see Table 1.3 Prey items for common lizards and slow worms.). Slow worms mainly feed on small snails, slugs, millipedes and Lepidoptera larvae [Ref. 1.27, Ref. 1.28]. The diet of common lizards mainly consists of spiders, grasshoppers, flies, and beetles [Ref. xxvii].

1.2.6 A Simpsons Diversity Index was used to measure the diversity within each site. This method takes into account the number of families present, as well as the relative abundance of each species. A community dominated by one or two families is considered to be less diverse than one in which several families have a similar abundance. With Simpsons Diversity Index, a number is generated between 0 and 1, 0 indicating no diversity and 1 indicating infinite diversity.

1.2.7 A one way analysis of variance (ANOVA) was undertaken on the abundance and diversity of invertebrates between the donor and receptor sites. This will allow a comparison between invertebrate prey availability between the donor and receptor sites.

Table 1.2: Terrestrial invertebrate identification.

Taxon	Size		
Earthworms	<3cm	>=3cm	
Slugs	<3cm	>=3cm	
Snails	<3cm	>=3cm	
Spiders	<5mm	5-10mm	>10mm
Harvestman	<5mm	5-10mm	>10mm
Centipedes/millipedes	<5mm	5-10mm	>10mm
Diptera	<5mm	5-10mm	>10mm
Orthoptera	<5mm	5-10mm	>10mm

Taxon	Size		
Coleoptera	<5mm	5-10mm	>10mm
Hemiptera	<5mm	5-10mm	>10mm
Lepidoptera	<5mm	5-10mm	>10mm
Hymenoptera	<5mm	5-10mm	>10mm
Other insect	<5mm	5-10mm	>10mm
Lepidoptera caterpillars	<5mm	5-10mm	>10mm
Other insect larvae	<5mm	5-10mm	>10mm

Table 1.3: Prey items for common lizards and slow worms.

Taxon	Common lizard prey item	Slow worm prey item
Earthworms		y
Slugs		y
Snails		y
Woodlice		y
Spiders	y	
Centipedes/millipedes		y
Diptera	y	
Orthoptera	y	
Coleoptera	y	
Hemiptera	y	
Hymenoptera	y	
Lepidoptera caterpillars		y

d) Results

1.2.8 Results of the invertebrate pitfall and pan trap surveys are found below in Table 1.4. The total abundance and diversity of invertebrate populations within each of the nine survey sites.. Results show that the highest invertebrate abundance was found in the arable margins, with the lowest abundance being found in Studio. In addition, the highest invertebrate diversity was found in Studio, with the lowest diversity identified in Kenton Hills. Full results of the invertebrate surveys are found at the end of this appendix, and are summarised below.

Table 1.4: The total abundance and diversity of invertebrate populations within each of the nine survey sites.

Site	Site ID	Total abundance	Diversity
Donor sites			
Arable margins	1	10568	0.589
Conifer plantation	2	5896	0.539
Ride	3	3423	0.586
Scrub	4	3713	0.59
Platform grassland	7	4076	0.698
Platform landscape plantation	8	3986	0.454
Receptor sites			
Kenton hills (eastern section)	5	9484	0.188
St James covert	6	3717	0.472
Studio	9	916	0.848

1.2.9 The analysis of variance (ANOVA) revealed no significant difference between invertebrate abundance in the donor and receptor sites (P = 0.813), **Diagram Appendix 2**. The ANOVA for invertebrate diversity between the donor and receptor sites revealed no significant difference (P = 0.601), **Diagram Appendix 3**. The mean abundance of invertebrates at the donor sites (5,277) is higher than that of the receptor sites (4,706), and the range of diversity at the donor site is also smaller than that across the receptor sites.

Plate 1.3: ANOVA of invertebrate abundance between the donor and receptor sites (thick black bar denotes median value).

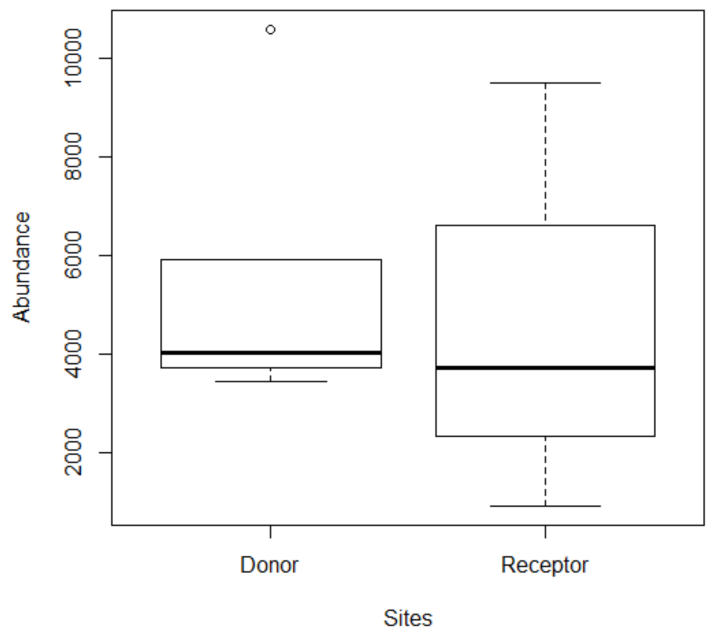
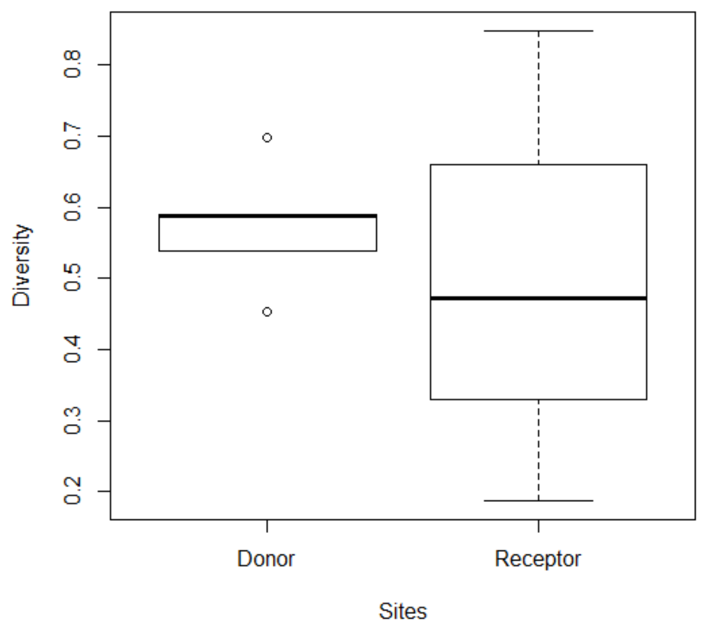


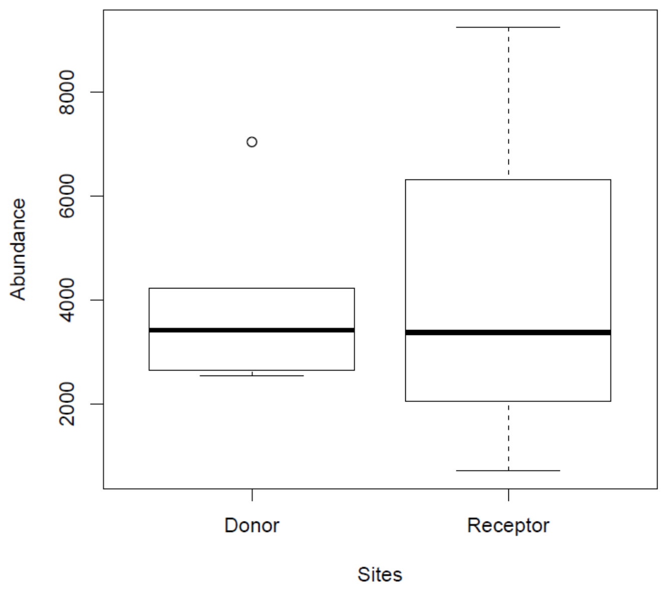
Plate 1.4: ANOVA of invertebrate diversity between the donor and receptor sites (thick black bar denotes median value).



1.2.10 The abundance of the main invertebrate families that make up the diet of slow worms and common lizards are found in Table 1.5 and Table 1.6 below.

1.2.11 A one way analysis of variance was undertaken on the abundance of invertebrates deemed to be suitable common lizard prey between the donor and receptor sites. No significant difference between the abundance of common lizard prey at the receptor and donor sites (P=0.778, df=1,7, F=0.086), see Plate 1.5.

Plate 1.5: ANOVA of invertebrate diversity for common lizard prey items between the donor and receptor sites (thick black bar denotes median value).



1.2.12 A one way analysis of variance was undertaken on the abundance of invertebrates deemed to be suitable slow worm prey between the donor and receptor sites. Although slow worm prey abundance was lower in the receptor sites compared to the donor sites, the difference was not significant (P=0.136, df = 1,7, F=2.831), with a 95% confidence or 0.05 cut off, see **Plate 1.6**.

Plate 1.6: ANOVA of invertebrate diversity for slow worm prey items between the donor and receptor sites (thick black bar denotes median value).

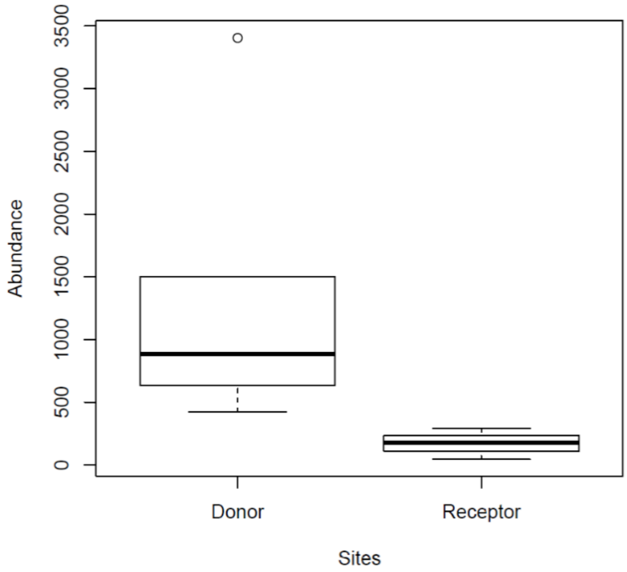


Table 1.5: The abundance of common lizard prey taxa.

Site	Site ID	Earthworm	Slug	Snail	Woodlice	Spider	Centipede/ millipede	Diptera	Orthoptera	Coleoptera	Hemiptera	Hymenoptera	Lepidoptera caterpillars
Donor Site													
Arable margins	1					107		5805	4	375		47	
Conifer plantation	2					53		3947		31	15	41	
Ride	3					295		2130	15	41	3	159	
Scrub	4					107		2240	1	80	3	101	
Platform grassland	7					865		2001	5	220	8	221	
Platform landscape plantation	8					117		2859		147		273	
Receptor site													
Kenton Hills	5					505			8527	132	7	79	
St James covert	6					326		2658		81		308	
Studio	9					107		251	1	105	3	100	

Table 1.6: The abundance of slow worm prey taxa.

Site	Site ID	Earthworm	Slug	Snail	Woodlice	Spider	Centipede/ millipede	Diptera	Orthoptera	Coleoptera	Hemiptera	Hymenoptera	Lepidoptera caterpillars
Donor Site													
Arable margins	1	10	254	37	2727		31						6
Conifer plantation	2		91	9	588		760						2
Ride	3	3	30	4	204		391						2
Scrub	4	2	20	11	620		469						6
Platform grassland	7	13	165	36	353		73						2
Platform landscape plantation	8	11	53	13	305		28						1
Kenton Hills	5	8	32		86		50						3
St James covert	6	23	118	4	79		61						6
Studio	9		12		22	107	2						

1.2.13 Results from individual sites surveyed are summarised below.

i. Donor sites

Arable margins (Area 1)

1.2.14 The highest abundance of invertebrate prey was found within this area, and Simpson's Diversity Index revealed a medium invertebrate diversity. The main invertebrate groups found within the pitfall traps were coleoptera (beetles) and woodlice. A high abundance of slugs was also found in this area. The main invertebrate group found within the pan traps was diptera (flies).

Conifer plantation (Area 2)

1.2.15 Surveys within the conifer plantation revealed the third highest abundance of invertebrate prey, and a medium invertebrate diversity. The main groups of invertebrates found within pitfall traps were centipedes, millipedes and woodlice. Within the pan traps, the invertebrate prey found mainly comprised diptera.

Ride (Area 3)

1.2.16 The second lowest abundance of invertebrates was found within this area, and Simpsons Diversity Index revealed a medium invertebrate diversity. Spiders, woodlice, centipedes and millipedes were the main invertebrate groups found within the pitfall traps. The pan traps contained mainly diptera, with a high number of hymenoptera (sawflies, wasps bees and ants) also present.

Scrub (Area 4)

1.2.17 Surveys within the scrub area revealed a low-medium abundance of invertebrates and a medium-high diversity. Woodlice, centipedes and millipedes were the main groups of invertebrates found within the pitfall traps, and mainly diptera were found within the pan traps, with a large number of woodlice, centipedes and millipedes also being found.

Platform grassland (Area 7)

1.2.18 A medium abundance of invertebrate prey was found within the platform grassland survey area, with the second highest diversity also being found. The main invertebrate groups found within the pitfall traps were spiders, woodlice and coleoptera, and within the pan traps mainly diptera were found, along with a large number of hymenoptera.

Platform landscape plantation (Area 8)

1.2.19 Within this area, a medium abundance and a low diversity of invertebrates was identified. The main groups of invertebrates found within the pitfall traps were spiders, woodlice, coleoptera and hymenoptera. Within the pan traps, mainly diptera were found.

ii. Receptor sites

Kenton Hills eastern section (Area 5)

1.2.20 Within the Kenton Hills receptor site, a high abundance and low invertebrate diversity was found. During pitfall trapping, mainly spiders and *coleoptera* were found. The pan traps mainly contained diptera, with a number of hymenoptera also being found.

St James' Covert (Area 6)

1.2.21 Surveys revealed a fairly low abundance of invertebrates in St James Covert and a medium diversity. There were a number of different invertebrate groups found within the pitfall traps, mainly being made up of spiders, slugs, hymenoptera, and *coleoptera*. Within the pan traps, mainly *diptera* were found, with a number of hymenoptera also identified.

Studio (Area 9)

1.2.22 Within the Studio receptor site, a low invertebrate abundance and the highest diversity was identified. Spiders, harvestman and *co*leoptera made up the majority of the pitfall trap samples, and within the pan traps mainly *diptera* and hymenoptera were found.

1.3 Detailed survey results

1.3.1 Detailed survey results for small mammals (Table 1.7) and invertebrates (Table 1.8) are presented below.

Table 1.7: Detailed survey results for small mammals.

Date	Site	Site ID	Results										
			WM	YNM	FV	BV	CS	PS	WS	U	Number of small mammals	Number of new individuals	Total number of different individuals
20/04/2015 (PM)	Arable margins	1	0	0	4	12	5	0	0	0	21	21	99
21/04/2015 (AM)	Arable margins	1	11	3	9	2	10	1	0	1	37	36	
21/04/2015 (midday)	Arable margins	1	0	0	2	7	3	1	1	1	15	6	
21/04/2015 (PM)	Arable margins	1	1	0	2	6	7	0	0	0	16	8	
22/04/2015 (AM)	Arable margins	1	14	3	6	8	6	1	1	1	40	17	
22/04/2015 (PM)	Arable margins	1	1	0	1	6	6	1	0	0	15	4	
23/04/2015 (AM)	Arable margins	1	11	5	4	7	8	2	1	2	40	7	
27/04/2015 (PM)	Kenton East	5			1						1	1	8
28/04/2015 (AM)	Kenton East	5			1		1				2	1	
28/04/2015 (PM)	Kenton East	5			1						1	0	

Date	Site	Site ID	Results										
			WM	YNM	FV	BV	CS	PS	WS	U	Number of small mammals	Number of new individuals	Total number of different individuals
29/04/2015 (AM)	Kenton East	5	1				4				5	5	
29/04/2015 (PM)	Kenton East	5					1				1	0	
30/04/2015 (AM)	Kenton East	5					3				3	1	
05/05/2015 (PM)	St James Covert	6			1	1	2				4	4	49
06/05/2015 (AM)	St James Covert	6	22	1	1	1	1				26	26	
06/05/2015 (PM)	St James Covert	6			1	1	1				3	1	
07/05/2015 (AM)	St James Covert	6	20	2	1	2	2	2			29	13	
07/05/2015 (PM)	St James Covert	6	1		2		2				5	2	
08/05/2015 (AM)	St James Covert	6	14	1	2	1	1				19	3	
11/05/2015 (PM)	Platform grassland	7									0	0	14

Date	Site	Site ID	Results										
			WM	**YNM**	**FV**	**BV**	**CS**	**PS**	**WS**	**U**	**Number of small mammals**	**Number of new individuals**	**Total number of different individuals**
12/05/2015 (AM)	Platform grassland	7	6							1	7	7	
12/05/2015 (PM)	Platform grassland	7									0	0	
13/05/2015 (AM)	Platform grassland	7	5								5	4	
13/05/2015 (PM)	Platform grassland	7									0	0	
14/05/2015 (AM)	Platform grassland	7	8								8	3	
18/05/2015 (PM)	Platform conifer plantation	8									0	0	5
19/05/2015 (AM)	Platform conifer plantation	8	2		1						3	3	
19/05/2015 (PM)	Platform conifer plantation	8									0	0	
20/05/2015 (AM)	Platform conifer plantation	8	1		1						2	0	
20/05/2015 (PM)	Platform conifer plantation	8									0	0	

Date	Site	Site ID	Results										
			WM	YNM	FV	BV	CS	PS	WS	U	Number of small mammals	Number of new individuals	Total number of different individuals
21/05/2015 (AM)	Platform conifer plantation	8	2		1						3	2	
26/05/2015 (PM)	Conifer	2	1				2				3	3	11
27/05/2015 (AM)	Conifer	2	2				1				3	1	
27/05/2015 (PM)	Conifer	2					1				1	1	
28/05/2015 (AM)	Conifer	2	2				2				4	3	
28/05/2015 (PM)	Conifer	2	1				1				2	1	
29/05/2015 (AM)	Conifer	2	1				2				3	2	
01/06/2015 (PM)	Rides	3									0	0	6
02/06/2015 (AM)	Rides	3					2				2	2	
02/06/2015 (PM)	Rides	3					2				2	1	

Date	Site	Site ID	Results										
			WM	YNM	FV	BV	CS	PS	WS	U	Number of small mammals	Number of new individuals	Total number of different individuals
03/06/2015 (AM)	Rides	3					2				2	0	
03/06/2015 (PM)	Rides	3									0	0	
04/06/2015 (AM)	Rides	3					4				4	3	
08/06/2015 (PM)	Scrub	4									0	0	12
09/06/2015 (AM)	Scrub	4		1		1	2	1	1		6	6	
09/06/2015 (PM)	Scrub	4									0	0	
10/06/2015 (AM)	Scrub	4	1	1	1			1			4	3	
10/06/2015 (PM)	Scrub	4							1		1	0	
11/06/2015 (AM)	Scrub	4	1	1	2		2				6	3	
15/06/2015 (PM)	Studio	9									0	0	30

Date	Site	Site ID	Results										
			WM	YNM	FV	BV	CS	PS	WS	U	Number of small mammals	Number of new individuals	Total number of different individuals
16/06/2015 (AM)	Studio	9	2	6	1		1			3	13	13	
16/06/2015 (PM)	Studio	9	1		1						2	2	
17/06/2015 (AM)	Studio	9	9	1	3		2	1			16	10	
17/06/2015 (PM)	Studio	9	2		1						3	1	
18/06/2015 (AM)	Studio	9	11	1	2		1	1		1	17	4	

Table 1.8: Habitat descriptions and survey results for invertebrates.

Location	Sub-habitat	Results
Arable Margins	Row 1: Dense vegetation – Alexanders under deciduous trees	Large number of woodlice and flies (5-10mm) and notable numbers of Coleoptera
	Row 2: Scrub under trees	Large numbers of slugs compared to other rows. Large numbers of flies (5-10mm) and notable number of Coleoptera and woodlice.
	Row 3: Sparsely vegetated ground under trees	High numbers of woodlice (5-10mm) and flies. Also high numbers of slugs (<3cm).
	Row 4: Scrub under hawthorn / blackthorn hedge	Smaller numbers of woodlice, slugs and flies compared with other rows. Notable number of all sizes of Coleoptera.
	Row 5: Arable field margin, under hawthorn / blackthorn hedge	Largest number of all sizes of Coleoptera compared to other rows.
Conifer plantation	Row 1: Edge of conifer plantation	Very high numbers of woodlice and centipedes/ millipedes. Higher numbers of Hymenoptera compared to other rows. Large numbers of Diptera in pan trap.
	Row 2: Edge of conifer plantation	Notable numbers of woodlice and centipedes/ millipedes. A large number of Diptera and a few Hymenoptera within the pan trap. One damaged pitfall trap.
	Row 3: Middle of the conifer plantation, grassy area with less scrub or bracken	Overall lower numbers of invertebrates, but notably high numbers of spiders and ticks/mites (but not as many as rows 1 and 2). Lower numbers of woodlice, and comparatively low numbers of Diptera in pan trap.
	Row 4: Dense bracken	Overall low abundance of invertebrates, but a number of ticks/ mites and centipedes/ millipedes. Not a particularly high number of Diptera identified, and 14 Hemiptera were identified in the pan trap.
	Row 5: Dense bracken	Overall numbers of most groups of invertebrates, but the highest number of centipedes/millipedes found compared to other rows within the conifer.

Location	Sub-habitat	Results
Rides	Row 1: On the edge of bracken/ bramble scrub	Low numbers of most groups of invertebrates, with the exception of centipedes/ millipedes. Highest number of Diptera in the pan trap (mainly <5mm) compared to other rows within the rides.
	Row 2: On the edge of bracken/ bramble scrub	Low numbers of most groups of invertebrates, with the exception of spiders (mainly 5-10mm) and centipedes/ millipedes. Medium abundance of *Diptera* in the pan trap (mainly 5-10mm) and *Hymenoptera* in both pan and pitfall traps.
	Row 3: Long grassland	Low numbers of most groups of invertebrates, with spiders making up the majority of the catch. Notable numbers of *Orthoptera* (12 – none found in other rows). Medium abundance of *Diptera* (mainly <5mm) and a few *Hymenoptera* in the pan trap.
	Row 4: Short grassland	Low numbers of most groups of invertebrates, with notably high numbers of *Coleoptera*. Low numbers of Diptera, but very high numbers of *Hymenoptera* and 22 other insect larvae identified in the pan trap.
	Row 5: bracken/ bramble with short grassland	Higher abundance of most invertebrate groups compared with other rows, in particular centipedes and millipedes. The pan trap was damaged and so no results were gained.
Scrub	Row 1: Open grassland area within scrub habitat	Large numbers of woodlice and centipedes, with a small number of *Coleoptera* and spiders. Smaller numbers of *Diptera* compared with other rows.
	Row 2: Under gorse scrub	Large numbers of *Diptera* within pitfall traps (5-10mm), and the pan trap.
	Row 3: Open grassland area	Fairly large numbers of woodlice and centipedes/ millipedes within the pitfall traps. Low numbers of *Diptera* compared with other habitats.
	Row 4: Dense bramble scrub	Pitfall traps mainly contained woodlice and centipedes/ millipedes. Small numbers of *Coleoptera* and spiders. Low numbers of *Diptera* compared with other habitats.

Location	Sub-habitat	Results
	Row 5: Dense bracken / bramble scrub	Results were consistent with other rows within the scrub. Notable numbers of woodlice and centipedes/ millipedes. Larger numbers of *Diptera* compared with other rows.
Platform Grassland	Row 1: Open grassland	High numbers of spiders (5-10mm) in pitfall traps. Small numbers of *Diptera* and notable numbers of *Hymenoptera* (5-10mm) in the pan trap. Pan trap was damaged and so did not contain many invertebrates.
	Row 2: Scrub area on the bund consisting of gorse and tussock grass	Large number of woodlice within the pitfall traps, with a small number of *Diptera* and other invertebrates within the pan trap.
	Row 3: Open grassland	Large number of spiders and *Coleoptera* compared with other rows. This row also contained a greater number of *Diptera* compared with other pan traps within the platform grassland area.
	Row 4: Scrub area on the bund – under hawthorn saplings	High numbers of spiders (<5mm), with *Coleoptera* (<5mm) also in relatively high numbers. Large numbers of *Diptera* and Hymenoptera (5-10mm) in the pan trap.
	Row 5: Wet, marshy grassland	Larger numbers of slugs and ticks/ mites compared with other habitats. Also contained a fairly large number of *Coleoptera* (5-10mm). Low numbers of *Diptera* compared with other habitats within the pan trap.
Platform landscape plantation	Row 1: Open grassland area with immature deciduous trees	Large numbers of woodlice, spiders and centipedes/ millipedes. Very high numbers of *Diptera* within the pan trap (mainly 5-10mm).
	Row 2: Dense conifer woodland	Overall fewer numbers of invertebrates, however high numbers of *Coleoptera* (mainly 5-10mm). Low numbers of *Diptera* compared with other pan traps within the platform landscape plantation.
	Row 3: Dense conifer woodland	High numbers of woodlice, slugs and *Coleoptera*. Low numbers of *Diptera* within the pan trap.

Location	Sub-habitat	Results
	Row 4: Edge of conifer woodland	Overall low abundance of invertebrates compared with other rows, with the exception of large numbers of spiders and Hymenoptera. The pan trap contained a high abundance of *Diptera* (mainly 5-10mm).
	Row 5: More open conifer woodland	Low overall abundance of invertebrates, with large numbers of Hymenoptera (162). Large numbers of Diptera within the pan trap. One broken pitfall trap.
Kenton Hills	Row 1: Open mid-length grassland	Largest number of spiders in pitfalls (5-10mm). Large numbers of flies and notable numbers of *Hymenoptera, Coleoptera* and *Lepidoptera* in pan trap.
	Row 2: Dense gorse area	Smaller numbers of spiders compared with other traps. Large number of flies in pan traps. Notable numbers of *Lepidoptera*.
	Row 3: Open mid-length grassland	Small numbers of invertebrates in pitfall traps. Large number of flies in pan trap. Notable numbers of *Lepidoptera* in pan trap.
	Row 4: Dense gorse area	Large number of spiders and slugs compared to other pitfall traps. Consistent number of flies in pan trap with no *Lepidoptera*.
	Row 5: Dense gorse area	Notable numbers of spiders in pitfall traps, and a large number of flies in the pan trap.
St James Covert	Row 1: Short grassland with mossy under layer.	Low numbers of all invertebrate groups in relation to other areas. Fairly high numbers of *Diptera* (mainly 5-10mm) within the pan trap.
	Row 2: Tufted, long open grassland	Mainly low numbers of invertebrate groups, with the exception of spiders (mainly >10mm) and *Coleoptera* (mainly 5-10mm). Within the pan trap, there was a high number of *Diptera* and a few Hymenoptera.
	Row 3: Tufted, long open grassland	Slightly higher numbers of invertebrates in comparison to rows 1 and 2. Notably higher numbers of spiders (mainly <5mm), Hymenoptera (mainly <5mm), earthworms and slugs. Fairly high numbers of *Diptera* within the pan traps, with 33 spiders and 113 *hymenoptera* also identified.

Location	Sub-habitat	Results
	Row 4: Tufted, long open grassland	Low numbers of all invertebrate groups within the pitfall traps. Within the pan traps, low numbers of *Diptera* and fairly large numbers of slugs were identified.
	Row 5: Tufted, long open grassland	Low abundance of most invertebrate groups, with the exception of a notable number of spiders being identified. Relatively low numbers of *Diptera* were found within the pan trap, and a notable number of Hymenoptera (67) were also found.
Studio	Row 1: Long grassland under newly planted hawthorn and gorse	Low numbers of *Coleoptera* and spiders within the pitfall traps. One missing pitfall trap within the row. Notable numbers of *Hymenoptera* within the pan trap.
	Row 2: Mid-length grassland within the heather brash	Reduced catch (3 damaged pitfall traps) within this row. One pitfall trap was missing. Notable numbers of *Hymenoptera* and harvestmen in the pan trap.
	Row 3: Long grassland along bund	Low numbers of all invertebrate groups. Small numbers of *Coleoptera* and spiders within the pitfall traps. Large numbers of *Diptera* in the pan trap compared to other rows.
	Row 4: Long grassland	Low numbers of all invertebrate groups. Relatively high numbers of ‘other insects’ compared to other rows.
	Row 5: Long grassland	Low numbers of all invertebrate groups, with the exception of *Coleoptera* within pitfall traps. One missing pitfall trap.

Appendix 14C.2A.8: Receptor site photographs

1.1.1 Photographs showing how receptors sites have been created and managed.

Plate 1.1: Receptor site photographs.

Broom Covert	
March 2015	**October 2015**
	

2019	2019 – recovery of grassland	2019 – recovery of cover
		

Great Mount Walk	
March 2015	**October 2015**
	

<table>
<tr><th>Half Way</th><th></th></tr>
<tr><th>March 2015</th><th>October 2015</th></tr>
<tr><td></td><td></td></tr>
</table>

Kenton Hills	
March 2015	**October 2015**
	

Development of reptile mitigation features in Kenton Hills	
March 2015	**October 2015**
	

Development of reptile mitigation features in Kenton Hills	
March 2015	**October 2015**
	

Development of reptile mitigation features in Kenton Hills	
March 2015	**October 2015**
	

Land West of Studio	
March 2015	**October 2015**
	

2019	
	

Lovers	
March 2015	October 2015
	

St James	
March 2015	**October 2015**
	

Development of reptile mitigation features in St James	
March 2015	**October 2015**
	

Development of reptile mitigation features in St James	
March 2015	**October 2015**
	

Studio	
March 2015	**October 2015**
	

2019


Development of reptile mitigation features in Studio	
March 2015	**October 2015**
	

Development of reptile mitigation features in Studio	
March 2015	**October 2015**
	

Appendix 14C.2A.9: Indicative long-term management plan for receptor sites

Table 1.1: Indicative annual long-term management plan.

Objective	Management activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ensure continued availability of hibernation and foraging features	Monitor the windrows, log and brash pile features provided, and add more material to these as required to replace loss of material through decomposition												
	Replace a fresh layer of hay or other material to each of the grass snake egg laying piles. This should occur in the spring of each year.												
	Monitor the hibernacula features provided and if required place additional logs and brash on top of these features replace loss of material through decomposition.												
Ensure continued availability of dense cover	Replant any failed areas of shrub planting to maintain the correct proportion of scrub planting.												
	Maintain areas of low, thick scrub cover (in particular gorse) by cutting or coppicing selected areas at intervals to ensure scrub does not become open and gappy at the bottom												

Objective	Management activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Control naturally regenerating birch by cutting individual trees or wed wiping in the spring to ensure that individual tall trees to not become established in dense scrub areas												
	Control self-seeded conifers by cutting of at ground level spring to ensure that individual tall trees to not become established in dense scrub areas.												
	Maintain diversity of dense scrub planting by the control of dominant species such as gorse and bramble by occasional cutting.												
Ensure continued availability of open areas	Repair any slumping to south facing banks.												
	Flail mow vegetation on banks on rotation to ensure a mosaic of short and longer patches of vegetation.												
	Maintain a diversity of sward heights and diversity of species by flail mowing. The frequency to be determined based on the extent of rabbit browsing and which problem plant species may require control.												

Objective	Management activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Control regenerating birch and conifers by weed-wiping and cutting, as required.												
	Control bracken by flailing to reduce the vigour of the rhizomes, or spot treatment, whilst allowing some bracken to remain and become established and spot treatment if required.												
	Control low growing bramble by flailing lower to the ground in some areas on a rotational basis.												
	Review (with the exception of Kenton Hills and St James Covert) when it may be appropriate to introduce low intensity grazing to maintain open areas.			Review as appropriate after receptor sites have been established for 5- 6 years									
Keep the public informed about the reptile capture and translocation process	Implement appropriate signage or other activities to keep the public informed about the reptile translocation works		Review and implement as appropriate throughout the year										
Monitor the establishment and development of heath and acid grassland	Implement a botanical monitoring programme to review establishment of heath and acid grassland vegetation							Review monitoring programme after completion of translocation exercise					

Objective	Management activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monitor the effectiveness of the capture and translocation exercise	Implement a programme to monitor the capture and translocation programme.			On-going throughout translocation exercise									
Ensure receptor sites are kept free from excessive disturbance	Fence the northern boundary of Lovers, adjacent to Sandy Lane with stock proof fencing to restrict access to the established bridleway.												

Appendix 14C.2A.10: Potential constraints to the mitigation programme

1.1 Licensing constraints

1.1.1 There are no licensing constraints with regards the four common reptile species.

1.2 Designated site

1.2.1 Part of Goodrum's Fen is under the proposed construction footprint, and this area forms part of the Sizewell Marshes SSSI, although reptiles are not a cited interest feature. Translocation would not commence until after the DCO decision has been made.

1.3 Ecological constraints

a) Survey and translocation season

1.3.1 Reptile translocation should only take place during the period when reptiles are above ground and active (March to late October), with the caveat that it is recommended that captures should stop about one month before hibernation is expected to commence, typically mid-September. No captures should occur after this time, and captures should re-commence the following spring.

1.3.2 Catching reptiles would be weather-dependent, and a wet or cold year could reduce their catchability.

b) Habitat requirements

1.3.3 The four common reptile species have different habitat requirements that would dictate the management of the receptor sites.

1.3.4 The amount and quality of land available for use as receptor sites should more than outweigh the land potentially suitable for reptiles that is being lost under the development footprint.

c) Other land uses for receptor sites

1.3.5 Parts of Aldhurst Farm would be prioritized for recreational use, so would not be used as receptor areas for adders.

Appendix 14C.2A.11: Figures

Appendix 14C.2A.12: References

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VOLUME 2, CHAPTER 14 APPENDIX 14C2B: REPTILE METHOD STATEMENT

Contents

Tables

None provided.

Plates

Figures

None provided.

Appendices

1. Reptile Method Statement

1.1 Introduction

a) Background and Scheme Overview

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station.

1.1.2 It is located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston.

1.1.3 This Reptile Method Statement compiled by Arcadis Consulting (UK) Limited (hereafter referred to as 'Arcadis') outlines the key approaches to mitigating potential impacts to the reptile populations present within or adjacent to the construction site for Sizewell C Main Development Site. It will be used by the ecological consultant, SZC Co. and any relevant subcontractors, in relation to the proposal to build the Sizewell C.

1.1.4 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.5 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction including an accommodation campus and a series of off-site associated development sites in the local area. These are:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the 'northern park and ride'), and one to the south-west at Wickham Market (the 'southern park and ride') to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;

- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the 'two village bypass') to alleviate traffic on the A12 through the villages;
- A permanent road linking the A12 to the Sizewell C main development site (referred to as 'Sizewell link road') to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the 'Yoxford roundabout') and other road junctions to accommodate Sizewell C construction traffic;
- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site;
- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site ('the green rail route') and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network; and
- Green rail route extension and rail improvements to the Saxmundham to Leiston branch line.

1.1.6 The components of the Project listed above are referred to collectively as the 'Sizewell C Project'.

b) Site Location and Setting

1.1.7 The main development site is located on the Suffolk coast, to the north of the existing Sizewell A and B power station complex. The total size of the proposed development is approximately 365ha, which encompasses five land parcel components, which are described below:

- Main platform: the area that would become the power station itself;
- Sizewell B relocated facilities and National Grid land: the area that certain Sizewell B facilities would be moved to in order to release Sizewell B land for the proposed development and the area required for the National Grid transmission network;
- Offshore works area: the area where offshore cooling water infrastructure and other marine works would be located;

- temporary construction a: the area located primarily to the north and west of the proposed Sizewell Marshes Site of Special Scientific Interest (SSSI) crossing, which would be used to support construction activity on the main platform; and
- Land east of Eastlands Industrial Estate (LEEIE): the area including and directly to the north of Sizewell Halt, which would be used to support construction on the main platform and TCA.

1.1.8 The existing EDF Sizewell power station complex comprises a series of buildings associated with the power station, parking areas, access infrastructure and ancillary structures. The proposed development footprint is dominated by arable fields with field boundaries comprising native, species poor hedgerows or tree lines. Areas of woodland encompasses the EDF power station complex on the northern, western and southern boundaries, whilst several woodland blocks, comprising plantation, mixed plantation and broadleaved semi-natural woodland, are scattered across the site. The larger area present to the north east includes Hilltop Covert, Dunwich Forest, Goose Hill and the northern boundary of Kenton Hills. Numerous farm buildings and structures are also scattered to the north and west of the site. Portions of the site falls within the following designated sites:

- Sizewell Marshes SSSI – a small wetland area, including fen meadow habitat;
- Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB);
- Sizewell Levels and Associated Areas County Wildlife Site (CWS) – largely plantation woodland and acid grassland; and
- Suffolk Shingle Beaches CWS – dune grassland and vegetation shingle.

1.1.9 The area covered by this method statement is presented in Image 1 below.

Plate 1.1: Site location

1.1.10 The purpose of the works is to install a new nuclear power station at the Sizewell site. However, as a component of this, vegetation clearance and ground-breaking works (collectively referred to as "facilitating works" within this report) will be required in order to facilitate the proposed development. Accordingly, a number of potential ecological constraints are associated with the proposed facilitating works, as are set out below.

c) Key Ecological Constraints

1.1.11 The key potential legislative constraints associated with the facilitation works within the site include:

- Bats;
- Deptford Pink;
- Great Crested Newt (GCN);
- Natterjack Toad;
- Reptiles

- Water Vole; and
- Otter.

This method statement only covers guidance relating to reptiles, however method statements and / or draft protected species licences for the other species listed above have also been prepared.

1.1.12 In order to enable the proposed development of main development site, as detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Given the presence of reptiles within the site, the proposed works have the potential to cause injury/ mortality of reptiles that may be present within the site at the time of the works. Accordingly, the purpose of this document is to provide a reasonable avoidance measures (RAMs) method statement that can be used by the ecological consultant, SZC Co. and any relevant subcontractors, to ensure the safeguarding of reptiles during the facilitation works to be undertaken within the site.

1.1.13 The content of this document has been devised based on consultation with Natural England and other stakeholders. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Mitigation measures for reptiles are set out in detail in Appendix 14C2A Reptile Mitigation Strategy.

1.2 Site reasonable avoidance measures (RAMS) method statements for reptiles

a) Introduction

1.2.1 This section provides a suite of dedicated RAMs Method Statements (MS) for the ecological constraints that may be encountered for reptiles during the facilitation works.

1.2.2 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality of the protected species and avoid contravention of the relevant legislation. The Ecological Clerk of Works (ECoW) will determine exactly when and where it is appropriate to apply the measures described in the RAMs MS. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.2.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) Toolbox Talk

1.2.4 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (Appendix 1) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to the legally protected species / other species of conservation concern present on within the site that may be encountered during the works.

1.2.5 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.

1.2.6 There is a declaration (Appendix 2) for those present to sign to confirm they have understood the constraints and actions presented.

1.3 Reptiles

a) Site Status

1.3.1 Given that the site supports large areas of long sward open grassland, arable hedgerow margin, conifer plantation, ride, scrub, a portion of Sizewell Marshes Sites of Special Scientific Interest (SSSI) and the landscape plantations on the main platform, reptiles are relatively widespread within the site. Moreover, desk-study data received from the Suffolk Biodiversity Information Service (SBIS) returned a large number of records of reptiles within the immediate 2km surrounds of the site.

1.3.2 Surveys carried out between 2007 and 2016 by Wood Group and Arcadis Consulting (UK) recorded regular observations of all four reptile species including adults, sub-adults and juveniles. Following the completion of the reptile survey work, mean population density estimates were calculated for each of the species encounter, as set out below:

- Common lizard, 6.0 per ha;
- Slow-worm, 12.1 per ha;
- Adder, 9.3 per ha; and

- Grass snake, 6.1 per ha.

1.3.3 Froglife present criteria for assessment of a Key Reptile Site. To qualify, the site in question must meet at least one of the following criteria:

- supports three or more reptile species;
- supports two snake species;
- supports an exceptional population of one species;
- supports an assemblage of species scoring at least 4; and
- does not satisfy the previous criteria but which is of particular regional importance due to local rarity.

1.3.4 As a result, given that the site satisfies the first four of these criteria, it is considered to constitute a Key Reptile Site. As such, measures have been set out below to ensure that this species group is safeguarded during the proposed facilitating works.

b) Legislation

1.3.5 There are four common and widespread species of reptile that are native to Britain, i.e. common or viviparous lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*), adder (*Vipera berus*) and grass snake (*Natrix natrix*). Grass snake is also listed on Schedule 5 of the Wildlife and Countryside Act (WCA) (as amended) (HMSO, 1981 as amended) in respect of Section 9, which makes it an offence, inter alia, to intentionally (or recklessly) kill or injure this species (recklessly as added by the Countryside and Rights of Way Act (CroW) Act (HMSO 2000)).

1.3.6 Common lizard, slow worm, adder and grass snake are also included on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006). This Act places a duty upon public bodies to have regard to the purpose of conserving biodiversity within all of their actions. The species listed under Section 41 are 'Species of Principal Importance for the conservation of biodiversity in England' for which conservation steps should be taken or promoted.

c) Toolbox Talk

1.3.7 Prior to commencement of the vegetation clearance works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to reptiles.

1.3.8 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by reptiles and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on reptiles that could occur within or in the vicinity of the working area. The toolbox talk will stress that potential reptile refugia / hibernation features should be left undisturbed; and reptiles should not be handled by contractors.

d) Precautionary Working Methods

1.3.9 The exact timings of the vegetation clearance works are currently unknown. However, these works will need to consider potential impacts to other receptors in addition to reptiles, particularly nesting birds, dependent upon the timings of the works.

1.3.10 Vegetation clearance which does not disturb the ground or vegetation below 150mm can be conducted year-round with a low risk of impacting upon reptiles, however there are seasonal constraints in relation to birds. Potential impacts to nesting birds will need to be considered of vegetation removal is required between March and August inclusive (generally considered to be the bird nesting season).

1.3.11 Any vegetation clearance likely to impact vegetation below 150mm or which is likely to impact the ground layer or features which offer reptiles shelter or protection should take place during the active reptile period (March to October (inclusive), although the exact timings are weather dependant). In order to avoid disturbing reptiles during hibernation (the period where reptiles are most vulnerable). Accordingly, with respect to the proposed clearance of suitable reptile habitat, it is proposed that a staged vegetation clearance exercise is undertaken under the direct supervision of the ECoW, in order to reduce the suitability of the habitats within the site.

1.3.12 Where it is necessary to undertake vegetation clearance in and around suitable reptile habitat the following precautionary measures will be put in place to avoid encountering and accidentally injuring reptiles:

- Vegetation clearance (below 150mm) and ground-breaking works will only be conducted in the active season (March to October inclusive seasonally dependant)[1] and when the weather is suitable (i.e. it is warm, approximately 8ºC should be the minimum temperature). The

[1] Advanced works approach would integrate vegetation clearance in relation to breeding birds, reptiles, water voles and bats as necessary; each having preferential periods for vegetation removal; an integrated approach could include cutting to near ground level during winter, then clearance of the lowest trunks and roots under supervision in spring

works should not be conducted early in the morning before reptiles have had a chance to 'warm up';

- The ECoW will work with the contractor to determine a cutting regime whereby any animals present are encouraged away from the cutting into retained habitats and not isolated in an unsuitable area. This area will be walked by the ECoW to disturb reptiles prior to works commencing;
- The ECoW will also consider any impacts to ground nesting birds, if appropriate and assess any risk;
- Initially, vegetation is to be cleared to reduce cover for reptiles (at a minimum 150mm from the ground in the first pass);
- Subsequent to this, a suitable period of time as decided by the ECoW will be given to allow for any reptiles present at the time of works to move away from the cut areas;
- The grassland / remaining vegetation will then be cut to as close to ground level as possible;
- Vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to reptiles within the site;
- Any suitable reptile sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). Any removal of sheltering habitats will be supervised by the ECoW. These will be dismantled by hand; this should be overseen by the ecologist. If a reptile is found the ecologist will decide whether or not it is appropriate to relocate the animal;
- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential reptile shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area; and
- If reptiles are found, the ECoW will move the animals out of the way to a place of safety. This location would be decided on a case-by-case basis, but it would be within the one designated reptile receptor areas (Kenton Hills, St. James Covert and Broom Covert) near to a suitable refuge or hibernation feature, surrounded by suitable foraging and basking habitat and judged to be a safe distance from the ongoing vegetation clearance works. Reptiles will not be handled by contractors,

as common lizards and slow worms may shed their tails if handled inappropriately.

1.3.13 Should any reptiles be found on site during the works when the ECoW isn't present, the ECoW should be contacted immediately for advice.

1.4 Facilitating work requirements

a) Vegetation Clearance Methods

1.4.1 As set out above, vegetation clearance works are required in order to facilitate the development of the site. A staged vegetation clearance exercise at a suitable time of year will be undertaken in order to safeguard any reptiles present at the time of works. Such works will take place under the supervision of the ECoW. Such an approach will minimise the potential harm caused to reptiles within the site as it will avoid disturbing this species group during the hibernation period.

1.4.2 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working areas.

1.4.3 If shelter features are present (i.e. log and vegetation piles), those will be checked by the ECoW before their removal (should this be required).

1.4.4 If shelter features are present that require removal, those should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential reptile shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.

1.4.5 Should works be required in winter (November to February inclusive) or in cold weather (below 8°C overnight temperature) the ECoW will advise upon bespoke working methods. Likely to require a hand search and a staged vegetation clearance approach under direct supervision.

1.4.6 The vegetation arisings will be collected and used to create habitat piles in areas adjacent to the site (which are to be retained during the development works).

b) Vegetation Clearance Equipment

1.4.7 The vegetation clearance contractors on site will utilise equipment specific to their clearance methods as per their RAMS. For example:

- John Deere 3 series compact with cut and collector flail;

- John Deere 4 series compact tractor with side arm flail; and
- Brushcutter, rakes, pitchforks and other hand tools.

Plate 1.2: Vegetation clearance equipment

	
John Deere 3 series compact tractor	*John Deere 4 series tractor*
	
Brushcutter	

c) Ground-breaking Works Methods

1.4.8 Given that vegetation clearance works are to take place within the site prior to the commencement of any ground-breaking works, it is likely that the risk of encountering reptiles will be reduced, due to the absence of suitable habitat within the areas proposed for ground-breaking works.

1.4.9 Reptiles are known to enter hibernation by burrowing underground, by settling into tree root systems or by entering voids and crevices in the ground or surrounding material. Accordingly, should the works take place during the reptile hibernation period (the dormancy period runs from November to February (inclusive) and ideally should be avoided where possible), it is considered necessary for the ground-breaking works to be undertaken under direct supervision of the ECoW. Small sections of the topsoil removed and inspected by the ECoW. Hand-digging under ECoW supervision may also be required.

d) Ground-breaking Works Equipment

1.4.10 Contractors will utilise the equipment as per their RAMS. For example:

- JCB 16C-I new generation 1 tonne mini digger;
- Spade;
- Spill kits; and
- Chapter 8 barrier/ Heras fencing.

Plate 1.3: Ground-breaking works equipment

	
JCB 16C-I New Generation 1 Tonne Mini Digger	*Chapter 8 barrier/ Heras fencing*

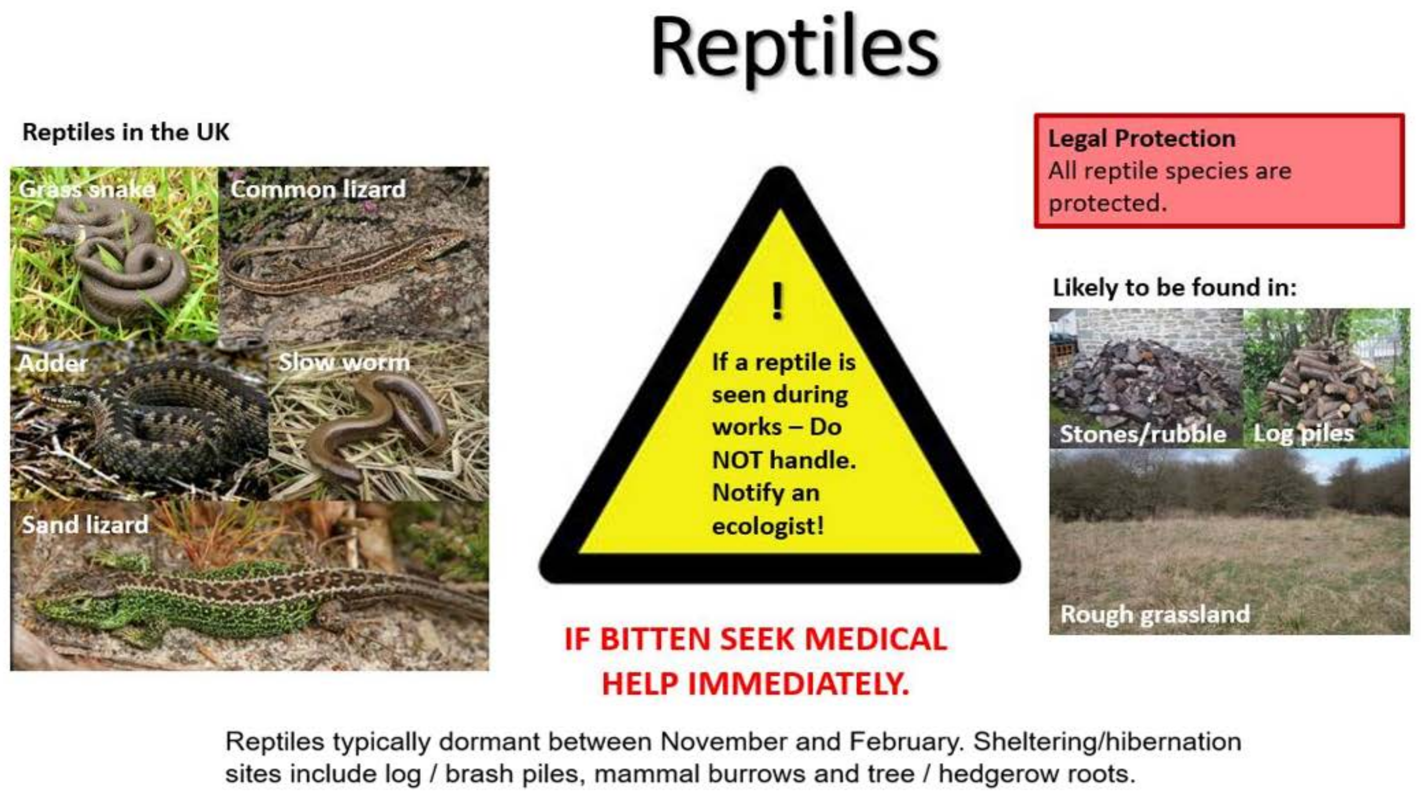
References

1.1 HMSO (1981). The Wildlife and Countryside Act (as amended). HMSO, London.

1.2 HMSO (2000) The Countryside Rights of Way (CRoW) Act. HMSO, London

1.3 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London

Appendix 14C2B.1: Toolbox Talk Example



Appendix 14C2B.1: Declaration of Understanding

Toolbox talk title:	Ecology
Given by:	
Site:	
Date:	

Name	Company	Signature

Name	Company	Signature

VOLUME 2, CHAPTER 14 APPENDIX 14C6A: WATER VOLE MITIGATION STRATEGY

Contents

Tables

Plates

Figures

Please note that the red line boundary used in the figures within this document was amended after this document was finalised, and therefore does not reflect the boundaries in respect of which development consent has been sought in this application. However, the amendment to the red line boundary does not have any impact on the findings set out in this document and all other information remains correct.

Appendices

1 Water Vole Mitigation Strategy

1.1 Introduction

a) Purpose

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C power station (hereafter referred to as Sizewell C) located to the north of the existing Sizewell B power station.

1.1.2 This Water Vole Mitigation Strategy compiled by Arcadis Consulting (UK) Limited (hereafter referred to as 'Arcadis') outlines the key approaches to mitigating potential impacts to water vole populations present within or adjacent to the construction site for Sizewell C Main Development Site (MDS). It will be used by the consultant ecologist, SZC Co. and any relevant subcontractors, in relation to the proposal to build the Sizewell C.

1.1.3 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.1.4 The requirements for mitigation are currently based on the impacts outlined in the ES chapter associated with the proposed MDS works. This document should be read alongside the following documents:

- Sizewell C MDS ES Volume 2 Chapter 14 Terrestrial Ecology and Ornithology [Ref. i];
- Sizewell C MDS Ecology Technical Appendix 14A9 Terrestrial Mammals [Ref. ii]; and
- Sizewell C MDS Ecology Technical Appendix 14C8B Draft Water Vole Method Statement for Conservation Licence [Ref. iii].

b) Background

1.1.5 This report presents a strategy to mitigate potential impacts on water vole (*Arvicola amphibius*) populations present within the main development site for Sizewell C. The purpose of this document is to provide a Water Vole Mitigation Strategy that can be used by Arcadis Consulting (UK) Limited (hereafter referred to as 'Arcadis') SZC Co. and any relevant subcontractors, in relation to the proposal to build Sizewell C.

1.1.6 Desk study and survey data indicate that water voles are present at above average densities within Sizewell Marshes Site of Special Scientific Interest (SSSI) (part of the EDF Energy estate), and within the Minsmere South Levels (part of the Minsmere to Walberswick Heath and Marshes Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar and SSSI). Two of the 15 water vole National Key Site Monitoring Programme (NKSMP) sites are located either side of the Main Development Site, namely Sizewell and Minsmere.

1.1.7 Some water vole habitat in the Sizewell Marshes SSSI will be lost due to the construction footprint and so there is the potential for the construction of the Project to impact water voles.

c) Legal Status

1.1.8 Water voles are protected under Schedule 5 of the Wildlife and Countryside Act (Ref. 1.1). They are included within Section 41 of the Natural Environment and Rural Communities (NERC) Act (Ref. 1.2), which identifies them as species of principal importance for the purpose of conserving biodiversity in England and are included on the Suffolk Priority Species and Habitats list (Ref. 1.3). A conservation licence from Natural England is required for any activity which will result in impacts on water voles. Appendix 1 summarises the legal status and licensing requirements for water voles.

1.1.9 Water voles have been evaluated as being of 'National' importance within the Zone of Influence[1] (ZoI) of the Main Development Site under the Chartered Institute of Ecology and Environmental Management (CIEEM) (Ref. 1.4) guidelines.

1.1.10 Adherence to this mitigation strategy would ensure maintenance of the favourable conservation status of water voles, and reduce any potential adverse impact arising from the construction of Sizewell C on the local water vole populations. It would also ensure compliance with the relevant legislation, policy and guidance.

[1] ZoI is defined as *'the area over which ecological features may be affected by biophysical changes caused by a proposed project and associated activities'*

d) Document Structure

1.1.11 This Water Vole Mitigation Strategy has been set out as follows:

- Section 1: Introduction.
- Section 2: Water vole baseline.
- Section 3: Likely impacts of the development.
- Section 4: Mitigation measures.
- Section 5: Criteria for success.
- Section 6: Conclusions.
- Appendices:
  - Appendix 1: Legal status and licensing.
  - Appendix 2: Information underpinning this mitigation strategy.
  - Appendix 3: Review of literature regarding use of crossing structures by otters and water voles.
  - Appendix 4: Trapping protocol.
  - Appendix 5: Destructive search protocols.
  - Appendix 6: Sites with facilities to hold water voles in captivity.
  - Appendix 7: Soft Release Protocol.

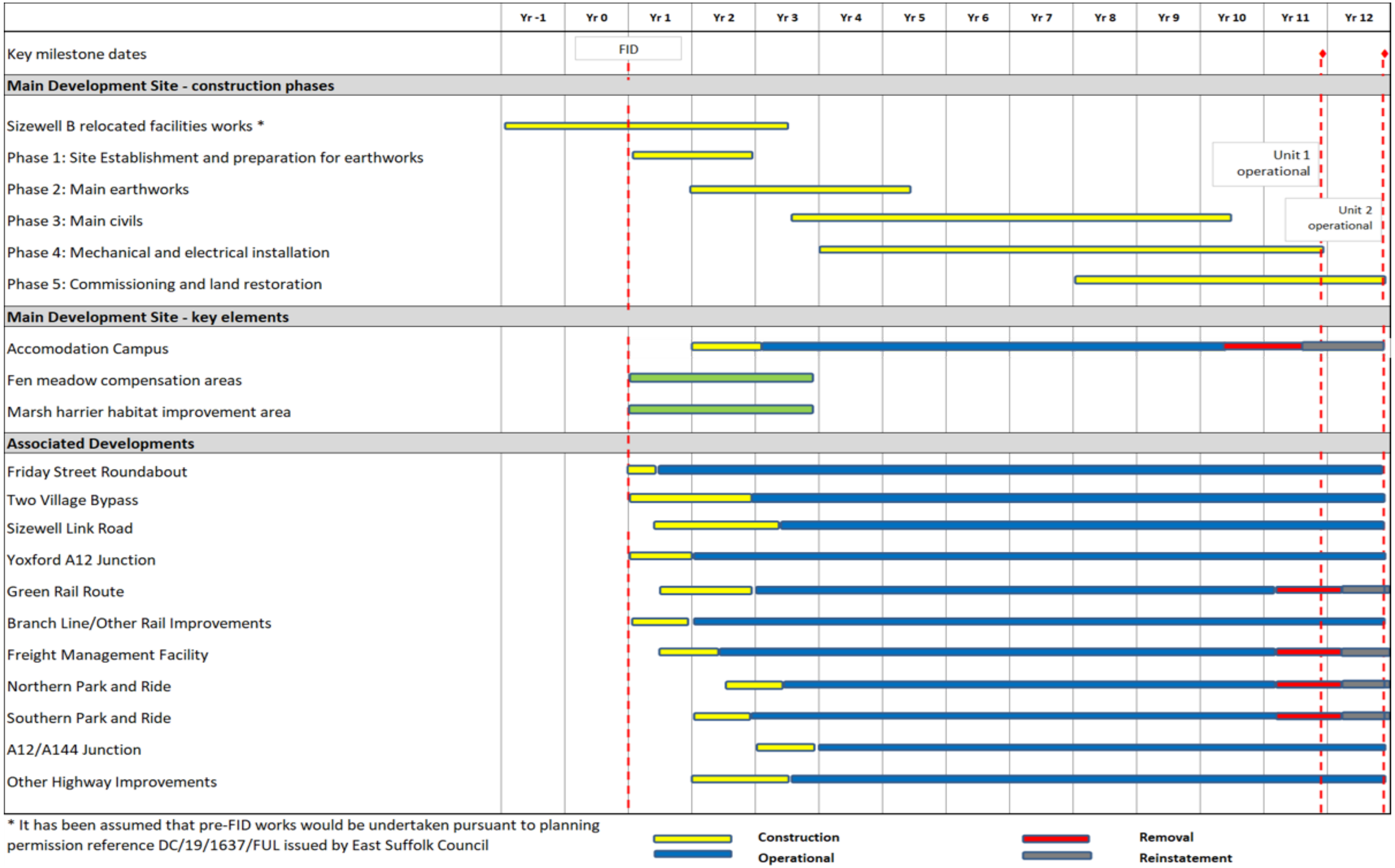
1.1.12 The layout of the Sizewell C and the Main Development Site is shown in **Appendix H Figure 14C6A.1.1** and **Figure 14C6A.1.2** and a full description of the proposed development is provided within the Environmental Statement (ES).

e) Development programme timetable

1.1.13 Construction would commence following the grant of a Sizewell C Draft Development Consent Order (Doc Ref. 3.1) and is likely to be completed approximately nine to twelve years later (Years 9 to 12).

1.1.14 The programme requires that appropriate time is allowed for ecological mitigation and clearance works, in accordance with relevant seasonal constraints. The assumed construction programme is set out in Plate 1.1.

Plate 1.1: Assumed Sizewell C Construction Programme



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1.1.15 The following timeline describes key milestones in the delivery of this Water Vole Mitigation Strategy:

- Assessment of the impacts of construction based on the current construction plan.
- Completion of this Water Vole Mitigation Strategy, and consultation with Natural England to agree details of the strategy.
- Issue of a draft derogation licence application to Natural England in tandem with Development Consent Order (DCO) submission for Natural England to approve in principle.
- On granting of the DCO, submission of a final derogation licence application to Natural England.
- Surveys to estimate water vole population size and distribution within the development site to inform the final Natural England derogation licence.
- Prior to construction, implementation of any required mitigation processes, including:
  - ensuring the suitability of the water vole receptor site as part of a translocation programme; and
  - translocation of water voles from the construction footprint.
- During and post-construction monitoring of water vole populations at donor and receptor locations.
- During and post-construction management of any mitigation.

f) Roles and responsibilities

1.1.16 The roles and responsibilities for implementation of this Water Vole Mitigation Strategy are outlined below.

i. SZC Co.

- Maintenance of the water vole receptor site (and associated fencing) at Aldhurst Farm.

- Creation of the new reedbed and wet woodland at the north eastern extent of the site.
- Managing habitat areas to maximise their value for water vole.
- Ensure the Water Vole Mitigation Strategy is implemented and evolved as required through the development process.
- Providing a named member of SZC Co. staff to Natural England to be the applicant for the licence, with the necessary authority and responsibility this requires.

ii. Consultant ecologist

- Developing and updating the Water Vole Mitigation Strategy and the plan for its implementation. Reviewing the Water Vole Mitigation Strategy with SZC Co. and agreeing its contents.
- Undertaking detailed survey work on the water vole population size required to inform a derogation licence.
- Providing a named ecologist who will advise the applicant on how to fulfil any requirements of the Natural England licence.
- Providing advice on any required water vole mitigation and monitoring.
- Providing regular progress reporting on the implementation of this Water Vole Mitigation Strategy to SZC Co..

iii. Contractors/sub-contractors

- Adhering to agreed Method Statements, under a watching brief from an Ecological Clerk of Works (ECoW).

1.2 Water vole baseline

a) Water vole ecology

1.2.1 Water vole are rodents that inhabit locations near water, where riparian vegetation provides food and cover. Good water vole habitat includes slow-flowing water (with extensive aquatic or emergent vegetation, and soft earth banks they can burrow into), and reedbeds. Populations typically consist of small, discrete colonies comprising a few individuals and having a finite lifespan; groups of colonies persist through dispersal and colonisation. Dispersal movements are frequent and extensive and can take place both along waterways and across land. Densities vary seasonally and are highest in autumn.

1.2.2 Distribution data for water vole demonstrates that the water vole population in Britain had suffered a long-term decline since 1900 (Ref. 1.5), with the major threats including predation and habitat loss. Reintroduction schemes, combined with mink control programmes and habitat management, suggest that population recovery may be possible. Surveys in Suffolk in the 1990s showed that water voles were largely absent from the west and north of Suffolk but were present in central and eastern areas of the county, including the area around the EDF Energy estate. More recent surveys have indicated water vole population recovery in parts of Suffolk.

b) Water vole baseline and assessment of the water vole population

1.2.3 For full details of the water vole surveys conducted within the main development site and their subsequent results, please refer to **SZC ES Volume 2 Technical Appendix 14A9 – Terrestrial Mammals**.

1.2.4 Surveys in 2009 identified evidence of water vole activity (latrines, burrows and footprints) in the majority of ditches surveyed within Sizewell Marshes SSSI. All field signs were found near ditches or other areas of open water, indicating that water voles were not active within the drier areas of reedbed, but restricted to the wetter margins. The NKSMP data demonstrated that Sizewell Marshes SSSI showed an overall steady population.

1.2.5 Sizewell Marshes SSSI has a wide extent of good habitat (ditches with extensive aquatic or emergent vegetation and reedbeds). The Sizewell Marshes SSSI NKSMP survey area was described as 'one of the best sites in Suffolk for these animals' (Ref. 1.6). The Sizewell Marshes SSSI NKSMP is adjacent to the Minsmere NKSMP, with connectivity between the two likely via the Leiston Drain. The Suffolk Wildlife Trust (SWT) recognise the coastal grazing marshes and associated dyke system as being nationally important for water voles (Ref. 1.7).

1.2.6 Estimated water vole densities in England range from 2.4 to 14.0 per 100m of bank, with a UK average of 6.1 individuals per 100m. The average population size for the ditches surveyed in 2009 within Sizewell Marshes was estimated at 5.2 individuals per 100m ditch, which is close to the national average density.

1.2.7 Surveys for Sizewell C indicate persistent water vole presence since 1996, with a population showing the typical level of cyclical population changes found in all vole species when in a stable environment with no American mink predation.

1.2.8 As part of the baseline surveys, an appropriate translocation site for water voles was identified, this being Aldhurst Farm. Surveys were conducted in 2010 at this location to determine its suitability as a receptor site, as well as to identify the habitat improvement measures that would be required in order to receive water voles as part of any translocation exercise.

1.2.9 Aldhurst Farm was identified as having ditches with suitable aquatic habitat for water voles, and evidence of water vole field signs. Habitat creation and improvement measures were implemented in 2014 to 2016. Subsequent surveys of Aldhurst Farm in 2018 confirmed the absence of water voles from the proposed receptor site, a fenced-off lagoon (Lagoon A) to the west of Aldhurst Farm. The lagoon had been fenced off to ensure no natural colonisation by water voles in order to ensure that the lagoon would remain suitable to receive translocated water voles from the main development site.

1.3 Likely impacts of the development on water voles

a) Introduction

1.3.1 This Section describes potential impacts of the Sizewell C and the main development site on water voles, which will include: direct habitat loss; habitat fragmentation; incidental mortality; pollution; changes to water levels; noise; and visual disturbance.

1.3.2 These are the potential impacts prior to any mitigation measures. As part of the Sizewell C design, there will be embedded mitigation measures and/or industry standard protection procedures (identified as ‘primary’ and ‘tertiary’ mitigation, respectively), as well as additional secondary mitigation measures (determined following the completion of the ES ecological assessment), if required. These are described further in **Section 4**.

b) Habitat loss

1.3.3 The water vole population within the main development site would experience an impact of habitat loss through the following:

- vegetation clearance and site preparation for a causeway crossing (‘the SSSI crossing’) the Leiston Drain that would connect the proposed Sizewell C Power Station to the new access road and the temporary construction area to the north;

- preparation of the land at the north-west corner of the proposed Sizewell C Station Platform that is located within the Sizewell Marshes SSSI (see Appendix H Figure 14C6A.1.2).
- installation of a sheet-pile barrier between Sizewell Marshes SSSI and the main development site;
- the sheet-pile will provide the platform to conduct the ditch realignment works for the diversion of the Sizewell Drain within Sizewell Marshes SSSI for approximately 500m (see Appendix H Figure 14C6A.1.3); and
- infilling of part of Sizewell Marshes SSSI to form the north-west corner of the proposed Sizewell C Station Platform.

1.3.4 These activities would result in the loss of foraging habitat for water voles and destruction of burrows.

1.3.5 The construction option chosen for the drain alignment, would require work over approximately 4.22ha of habitat that water vole may occupy, along approximately 1740m of ditch or drain. Water voles would need to be removed or displaced from these areas prior to the works commencing. Once completed, the realigned Sizewell Drain would be available for water vole to use. The location of this drain is presented in Appendix H Figure 14C6A.1.3.

1.3.6 **Table 1.1** shows the area (or length) of water vole habitat which is due to be lost due to the construction footprint. This is an approximate estimate which would be refined as more detailed construction plans are further developed, and further water vole survey work (to support any future Natural England derogation licence) is carried out.

Table 1.1 Components of water vole habitat to be lost

Location	Length/area to be lost	Reason for loss
Leiston Drain	390m (including 70m of culvert and 20m stand-off either side)	To create Sizewell Marshes SSSI crossing
Habitat lost within Sizewell Marshes SSSI	665m perimeter, 0.67ha of wet reedbed 1736m perimeter, 3.55ha of suboptimal dry reedbed	Infill for north-west corner of proposed Sizewell C Station Platform
Sizewell Drain	1319m	Drain realignment
East-west running drains west of Sizewell Drain by SZB	31m (one section)	Drain realignment

c) Habitat fragmentation

1.3.7 The construction of the SSSI crossing (see Appendix H Figure 14C6A.1.4**,** Figure 14C6A.1.5 and Figure 14C6A.1.6) could potentially lead to habitat fragmentation for water voles, preventing dispersal movements between Sizewell Marshes SSSI and Minsmere South Levels, along the Leiston Drain. The causeway would be approximately 68m wide at its base, and the culvert would therefore have a similar length. The drain would be unimpeded during construction, and whilst the banks would be retained within the culvert, the banksides would lose all vegetation, other than at each end of the culvert, due to shading impacts. For further details of the Sizewell Marshes SSSI crossing, please refer to [**Chapter 3 Vol. 2 MDS Description of development - construction**] of the ES.

1.3.8 There is limited evidence as to whether culverts act as a barrier to water vole movement along watercourses. The Water Vole Conservation Handbook (Ref.) states that 'culverting does not seem to provide a major problem to water vole movement or fragmentation', although it also says that 'length may present a problem to water vole daily movement and dispersal'.

1.3.9 **Appendix 3** presents a review of the literature regarding the use of crossing structures by water voles, carried out to assess the potential impacts for culverts and bridges to form a barrier, and to assess potential mitigation options. From this review:

- in terms of distance alone, a 68m culvert within the territory of a water vole would not be too great a distance for water voles to negotiate;
- in terms of distance alone, a dispersing water vole could readily move 68m through a culvert, if required; and
- the Sizewell Marshes SSSI and Minsmere South Levels water vole colonies are likely to be large enough to be genetically viable in the long term. If a barrier effect were to occur as a result of the construction of the Sizewell Marshes SSSI crossing, i.e. assuming that neither territorial nor dispersing individuals are prepared to use a structure (whether bridge or culvert), then the link along the Leiston Drain between the two populations is unlikely to be critical to the maintenance of either the Sizewell Marshes SSSI or Minsmere South Levels populations in the long term

1.3.10 The greatest potential for short-term habitat fragmentation would be during the Phase 1 construction period, when the site clearance and construction work associated with the establishment of the Sizewell Marshes SSSI crossing is taking place. During the construction of the culvert that would form the Sizewell Marshes SSSI crossing, the integrity of the Leiston Drain and adjacent banks would be maintained, so a barrier to water vole movement via the Leiston Drain is only likely to occur for a short duration during the ground improvement works and the installation of the pre–cast culvert sections. The culvert itself has been designed with sufficient width to maintain the bank, allowing movement by water voles along the culvert. Any potential barrier to dispersal would be most significant when the water vole population builds up and disperses towards the end and after the breeding season (March to October). Therefore, this impact would be temporary and reversible.

1.3.11 Potential fragmentation effects resulting from the SSSI culvert are assessed in Appendix 3 and also in **Chapter 14 MDS Vol. 2 Section 14.22 Terrestrial Ecology and Ornithology** of the ES.

d) Incidental mortality

1.3.12 Water voles use a series of burrows with many entrances and interconnecting tunnels. They also occasionally build woven nests in the bases of sedges and reeds. Outside of their burrows, water vole activity is largely confined to runs in dense vegetation with 2-5m of the water's edge.

1.3.13 There is the potential for incidental injury or mortality to water voles from construction plant carrying out vegetation and ground clearance works, installation of security fencing, ditch realignment during the Phase 1 preliminary works, and site establishment phases of construction. Water voles would be particularly vulnerable when they are in their burrows.

e) Pollution

1.3.14 Although water voles are known to survive in watercourses with very poor water quality, the pollution of wetland habitat could have a significant effect on water voles through degradation of habitat (Ref. 1.8).

1.3.15 Construction works for Sizewell C have the potential to impact on water quality through pollution; however, as discussed in the ES, all potential water quality issues associated with the terrestrial (i.e. non-marine) environment, would be dealt with through embedded (primary) mitigation measures. Therefore, no impacts on freshwater habitats or their component species (including water voles) are considered likely as a result of water quality issues.

f) Changes in water level

1.3.16 Altered water levels have the potential to lead to the flooding of burrows or the drying out of a standing waterbody (Ref. 1.8). Construction works for

Sizewell C have the potential to alter the hydrological regime of Sizewell Marshes SSSI. Detailed hydrological modelling work, outlined in the ES, suggests that there would no significant changes in water levels within the ditches of Sizewell Marshes SSSI as a result of the development proposals, due to the primary mitigation. No impacts from changes to water level on water voles are therefore predicted.

g) Noise and visual disturbance

1.3.17 Noise and visual disturbance are unlikely to have a significant effect on water voles (Ref. 1.8). No impacts from noise and visual disturbance on water voles are therefore predicted.

h) Summary

1.3.18 In summary, the three impact pathways which therefore require mitigation, and are dealt with in this Water Vole Mitigation Strategy are:

- habitat loss;
- habitat fragmentation; and
- incidental mortality.

1.4 Mitigation measures

1.4.1 In summary, this Water Vole Mitigation Strategy involves:

- Displacement techniques and monitoring requirements are proposed where there is a working area with maximum length of 50m (for watercourse this equates to 50m on each bank). However, should displacement be unsuccessful (i.e. programme, season, signs continuously recorded following vegetation clearance), trapping will be undertaken within those areas. Displacement is proposed to mitigate habitat loss/disturbance within the 31m section of the east-west running drains west of Sizewell Drain by SZB that is due to be impacted.

- Trapping out water vole from the Sizewell Marshes SSSI crossing construction footprint. The preference is for animals to be released directly into the receptor area at Aldhurst Farm. Should the weather be cold (night-time temperature below freezing (0^{o}C)) in the autumn, a contingency option for water vole captured during the 15 September to 30 November trapping is to be over-wintered in captivity. These water vole would then be released into the receptor area the following spring (between 1 March and 15 April). Trapping is proposed to mitigate habitat loss/disturbance within:

- Leiston Drain (where the SSSI crossing is to be installed);
- Habitat within Sizewell Marshes SSSI (where the SZC development requires the loss of this area); and
- Sizewell Drain (where the ditch is being realigned).

- As soon as water voles have been removed from the Sizewell Marshes SSSI crossing footprint, their habitat would be rendered unsuitable for re-colonisation.
- The Sizewell Marshes SSSI crossing would be a culvert of sufficient dimensions to ensure connectivity along the Leiston Drain between Sizewell Marshes and Minsmere South Levels.
- Pre-, during- and post-construction monitoring of water vole populations would occur.

1.4.2 **Table 1.2** shows the proposed construction and operational phases in relation to water vole mitigation.

1.4.3 Overall, in the long term, as a result of the proposed SZC MDS works, it is considered that there will be an overall increase in the conservation status of water vole, as a result of an increase in habitat availability.

1.4.4 All works that have the potential to impact water voles would need to be undertaken under licence from Natural England following an agreed Method Statement and would be overseen by an ECoW.

1.4.5 Potential constraints to components of the mitigation strategy (including when surveys can be undertaken, when translocations can occur and issues relating to displacement) are described in The Water Vole Mitigation Handbook (Ref. 1.8).

Table 1.2 Construction and Operational Phases in relation to water vole mitigation

Phase	Generic action	Specific action	Timing
Preliminary works	Activities proposed prior to a DCO being granted, to expedite the delivery of the works.	Fencing to exclude water voles from proposed Aldhurst Farm receptor site, and further habitat improvements.	Initial habitat creation/improvements completed 2018 Management ongoing
		Surveys to confirm absence of water voles at proposed Aldhurst Farm receptor site.	Completed 2018 To be updated in 2021
		Surveys to check the evaluate the ongoing management of the proposed Aldhurst Farm receptor site	Completed 2019
		Draft licence preparation as part of the DCO application.	2020
		Pre-licence population surveys at Sizewell Marshes SSSI crossing construction footprint	2020-2021
		Final licence preparation.	2021
Phase 1: Site establishment and preparation for earthworks	Establishment of the site and preparations for the main earthworks, focussing on securing and clearing the site and provision of early access routes.	Licence submission.	Y0
	Ditch realignment.	Spring (ideally) or autumn trapping of water voles from Sizewell Marshes SSSI crossing construction footprint (and if required, over-wintering in captivity)	Y0-Y1
	Installation of Sizewell Marshes SSSI crossing	Release of water voles from captivity (if required) into Aldhurst Farm receptor site	Y1
		Displacement of water vole from 30m sections of Sizewell Drain	Y0-Y1

Phase	Generic action	Specific action	Timing
Phase 2: Earthworks	Main ground materials which overlay construction area transported to the stockpile areas within the temporary construction area. New reedbed and wet woodland habitats to be created in the north eastern extent of the site.	On-going monitoring programme at receptor site and Sizewell Marshes SSSI crossing construction footprint.	Y1 onwards
Phase 3: Main civil works	Main civil engineering works.	On-going monitoring programme at receptor site and Sizewell Marshes SSSI crossing construction footprint.	TBC
Phase 4: Fit out, instrumentation and commissioning	Mechanical and electrical plant installation phase.	On-going monitoring programme at receptor site and Sizewell Marshes SSSI crossing construction footprint.	TBC
Phase 5: Removal of temporary facilities and restoration	As the main construction phases conclude, temporary facilities would start to be removed and the temporary construction site areas restored to an agreed state consistent with Landscape Strategy for the EDF Energy estate.	On-going monitoring programme at receptor site and Sizewell Marshes SSSI crossing construction footprint.	TBC
Operational phase	On-going monitoring programme at receptor site and Sizewell Marshes SSSI crossing footprint.		TBC

a) Mitigation Strategy

1.4.6 The mitigation strategy described below would mitigate against the impact pathways of habitat loss, habitat fragmentation and incidental mortality.

i. Pre-construction surveys and Natural England derogation licence

1.4.7 Prior to any water vole mitigation, a pre-construction survey to support the final Natural England derogation licence application would be conducted. The pre-construction survey would take place during the survey season (March to October) prior to when trapping is required to take placed. A minimum of two visits would be conducted and all survey work would be in accordance with Dean *et al*. (Ref. 1.8) (see **Appendix 1** for further details).

1.4.8 Following the completion of the pre-construction survey, a Natural England derogation licence would be submitted.

ii. Capture and translocation of water voles to a receptor site

Capture

1.4.9 Once the licence has been granted, water vole trapping within the areas identified in **Table 1.1,** except within the east-west running drains west of Sizewell Drain from SZB where displacement will be undertaken**.** The trapping would take place 1 March to 15 April inclusive (ideal period) and/or 15 September to 30 November inclusive, subject to agreement with Natural England as to whether trapping could start earlier and proceed longer.

1.4.10 Water voles captured during the spring (1 March to 15 April inclusive) and autumn period (15 September to 30 November inclusive) would be immediately released into the receptor site at Aldhurst Farm. Should the weather be cold (night-time temperature below freezing (0ºC)) in the Autumn, there would be a contingency option for any water voles captured in the 15 September to 30 November window to be held in captivity over-winter and subsequently released into the receptor area the following spring (between 1 March and 15 April). See **Appendix 4** for further details.

1.4.11 If trapping is permitted beyond 30 November, traps would require wooden covers over the nesting areas of the trap to help insulate the bedding area, and/or additional insulation with a covering of 'bubble-wrap' if poor weather conditions persist.

1.4.12 Traps would be placed at a density of at least 1 per 10m of bank, and, where necessary, on floating Celotex platforms. Trapping within the Sizewell Marshes SSSI crossing construction footprint would require installation of a floating boardwalk or pontoon every 50m across the reed bed, with baited traps placed on these. Traps would be checked at least twice a day, with an early morning check, and a late afternoon/evening check (before dusk).

1.4.13 Vegetation clearance would not take place within 5m of any traps or within 5m of the toe of the bank prior to the completion of the trapping effort as this would hinder trapping.

1.4.14 To avoid 'drawing in' water voles at the periphery of trapping locations from areas outside the red line boundary, (e.g. at either end of the Sizewell and Leiston Drains, along the east-west running cross-connecting drains, and either side of the Sizewell Marshes SSSI crossing), it may be necessary to use water vole-proof fencing across the drain with a return either side to deflect water voles back up the respective ditches, and/or 'box fencing' sections of the drains.

1.4.15 Trapping would be complete once there has been a period of five days or more (when temperatures have not dropped below 0ºC overnight) with no further captures and no new field signs. Once complete, a destructive search of the area would be undertaken.

1.4.16 Health and safety issues would need to be addressed to ensure there is safe access for surveying (and subsequent capture) to the ditch banks and the reed-fringed area of water within the Sizewell Marshes SSSI crossing footprint. All field staff would also be aware that water voles can carry leptospirosis, and be familiar with its symptoms, pathways for transmission to humans, and the precautions necessary when handling water voles to minimise the risk of infection.

1.4.17 A detailed trapping protocol (from Dean *et al*., Ref. 1.8) is given in **Appendix 4.**

Habitat removal and destructive searches

1.4.18 After trapping out any water voles from the Sizewell Marshes SSSI crossing footprint, the trapped-out habitat would then be made unsuitable for water voles to prevent re-colonisation, particularly if there is a risk of delay in the programme. This would be completed immediately after the capture and translocation.

1.4.19 Making the habitat unsuitable would involve an initial destructive search of burrows (using hand-tools), followed by clearing ditches, removing vegetation, and scraping banks. Soil would be removed to 30-40cm in depth to create, as far as possible, a trapezoidal cross-section with no burrowing materials.

1.4.20 Detailed protocols for destructive searches and techniques to render habitat unsuitable for water voles are provided in **Appendix 5**.

1.4.21 Key site-specific issues relating to vegetation clearance include:

- Reptiles also use the Sizewell Marshes SSSI crossing footprint. It is recommended that reptile captures would stop approximately one month before hibernation is expected to commence (mid-September). Reptiles may be hibernating below ground during the period November to March.
- Vegetation would need to be cut to ground level and be removed before the end of February to prevent use by nesting birds.
- All plant/equipment would need to be brought in from the existing power station side. Safe access routes would need to be constructed and co-ordinated with water vole mitigation activities.
- Vegetation clearance would involve significant tree felling and stump removal, as well as the removal of reeds, on ground that is very wet/unstable in places.
- Some vegetation removal would be possible in the dry, middle section of the Sizewell Marshes SSSI crossing footprint in advance of completing trapping operations on the ditches and lagoons. However, a 5m buffer of vegetation adjacent to both Leiston and Sizewell Drain needs to remain in place until water vole trapping has finished, as removing over-shading scrub and trees would make the habitat more suitable for water voles.

Water voles in captivity

1.4.22 A contingency plan is required for over-wintering water voles in captivity before any Spring release to improve the survival rates of any individuals captured late in the capture window (towards end of November). This may be as a result of weather conditions (i.e. temperature) or if there are delays in the works programme delaying the start of water vole capture.

1.4.23 A list of facilities capable of holding water voles in captivity is given in **Appendix 6**. Guidelines on keeping water voles in captivity are provided in Dean *et al*. (Ref. 1.8). Where captured water voles are to be taken into captivity, they may be transported to a central care facility in their traps or appropriate holding cages.

Release of water voles into receptor area

1.4.24 Water voles which are relocated by trapping would be released into their receptor site at Aldhurst Farm using a soft- release technique (see **Appendix 7**).

1.4.25 The Aldhurst Farm area (bounded by Lovers Lane to the north and east, Valley Road to the south-east, and Leiston to the west and south-west) was in arable use up until 2014. It has the upper reaches of the Leiston Drain crossing the site from east to west and is immediately adjacent to the Sizewell Marshes SSSI to the east. Surveys found water vole present in the Leiston Drain.

1.4.26 Approximately 6ha reedbed and 2km of ditch and open water were created on this site in 2014 in the form of four lagoons either side of the Leiston Drain (Ref. 1.9). These lagoons were designed to ensure that the reedbed and lowland ditch habitats could establish and develop a similar biodiversity value to those within the adjacent Sizewell Marshes SSSI. They were created through lowering the ground to expose the water table, securing water levels during rainfall, with weirs to maximise water-level control.

1.4.27 The newly created lagoon banks and reedbed have established well and currently provides suitable habitat for water voles to burrow in; the reedbeds provide habitat for water voles to build nests in, and the diverse flora provides suitable foraging habitat.

1.4.28 The western-most lagoon (Lagoon A, see Appendix H Figure 14C6A.1.7) has an area of approximately 1.9ha and a ditch perimeter of approximately 790m. This lagoon has been designed to be the receptor site for water voles translocated from Sizewell C. A site visit on 6 October 2016 and subsequent visits in 2018 confirmed that Lagoon A has established well and provides ideal habitat as a potential water vole receptor site (see **Plate 4.1**). Lagoon A was therefore fenced with water vole-proof fencing in the Spring of 2018. The outflows to the ditch system were covered in fine mesh to prevent ingress by water voles. Further site visits in 2018 (19 June and 7 August) confirmed the absence of water voles and the on-going development of the habitat as suitable for water voles.

1.4.29 A visit was undertaken in November 2019 to evaluate the ongoing management of the area and additional management prescriptions were recommended to ensure optimum quality.

Plate 1.2: Photographs of Lagoon A, Aldhurst Farm in 2016 and 2018

	
From west, looking east (06/10/16).	From east, looking west (06/10/16).
	
From west, looking east (22/06/18).	From west, looking east (22/06/18).

1.4.30 Plants identified within the reedbed in 2018 include: Water-plantain (*Alisma plantago-aquatica*), Bulrush (*Typha latifolia*), Purple-loosestrife (*Lythrum salicaria*), Water-cress (*Nasturtium officinale*), Pendulous Sedge (*Carex pendula*) and Hoary Willowherb (*Epilobium parviflorum*). Patches of Bramble (*Rubus fruticosus agg.*) were also developing around edge of reedbed. Therefore, the reedbeds and banks have developed into optimal habitat for water voles.

1.4.31 It should be noted that the other created lagoons at Aldhurst Farm (Lagoons B, C and D, see Appendix H Figure 14C6A.1.7) have also been created as compensatory habitats to support flora and fauna characteristic of reed and ditch habitats within the adjacent Sizewell Marshes SSSI, including water voles. Whilst Lagoons B, C and D have not been fenced off to prevent the natural colonisation of water voles, they do as a whole provide a positive benefit to water voles and compensate for the overall habitat loss from the Sizewell C project.

1.4.32 A management plan for Aldhurst Farm (Ref. 1.9) has been prepared and approved by the Local Planning Authority, ensuring the maintenance of habitat suitable for water voles.

1.4.33 A new reedbed and wet woodland habitats would be created in the north eastern extent of the site. The area will comprise a mosaic of reedbed (1.2ha), wet woodland (0.7ha) as well as dry grassland surrounded by existing woodland to the north and east of the newly created habitat (see Appendix H Figure 8).

Comparison of habitat lost with habitat potentially available in receptor site(s)

1.4.34 **Table** 1.3 shows a comparison of the amount and quality of habitat to be lost with the amount of habitat that has been created and enhanced for the conservation benefit of water voles, including the receptor site. Overall, the release site at Aldhurst Farm offers a greater habitat extent (approximately 6.2ha and 3km of ditch) than that being lost (approximately 4ha and 1.7km of ditch) to the development.

Table 1.3 Habitat loss and gain as a result of the development

Donor site		Receptor/habitat improvement areas	
Location	**Habitat loss - Size (perimeter/ length in m, or area in ha)***	**Location**	**Habitat Created/Improved - Size (perimeter/ length in m, or area in ha)**
Leiston Drain	390m of permanent habitat loss (Inc. 68m of culvert and 20m stand-off either side) on two banks	Aldhurst Farm lagoons and reedbed habitat creation/improvements (including the release site, Lagoon A which has been fenced to maintain it as water vole free)	The total area created / enhanced within Aldhurst Farm is approximately 6.2ha which includes: Wet reedbed (excluding open water areas) 3.15ha Open water within wet reedbed (assume 25% from 20—30% stated in Ecology and Landscape Management Plan, Appendix 1) 1.05ha Dry reedbed and reed-based tall herb fen 1.2ha Approximately 2km of ditch (0.8ha) Of which the release area (Lagoon A) is approximately 1.9ha with approximately 790m of ditch
Sizewell Drain	Within SSSI triangle: 1319m of permanent habitat loss on two banks	Ditch realignment of Sizewell and Leiston Drain	Ditch realignment of Sizewell and Leiston Drain will create 1.09km of ditch
East-west running drains west of Sizewell Drain	31m (one section)	New habitat in the north eastern extent of the site	New habitat to be created in the north eastern extent of the site will comprise of 1.2ha of reedbeds and 0.7ha of wet woodland
Lagoon and associated reedbed in SSSI	0.67ha of wet reedbed 3.55ha dry reedbed		
Total Area Lost:	1740m	Total Area Available:	Total Area

Donor site		Receptor/habitat improvement areas	
Location	**Habitat loss - Size (perimeter/ length in m, or area in ha)***	**Location**	**Habitat Created/Improved - Size (perimeter/ length in m, or area in ha)**
	4.22ha		7.4ha Reedbed 0.7ha Wet woodland Approximately 3km of ditches and open water.

iii. Habitat connectivity

1.4.35 The Sizewell Marshes SSSI crossing would comprise a causeway over a culvert. The culvert would be approximately 68m long by 6m high by 3.6m wide (with a cross sectional area of approximately 21.6 m^2). The final dimensions will be confirmed as the design progresses. It would be installed at the north-east corner of the Sizewell Marshes SSSI, so that flow could be maintained from the west and south (via the Sizewell Drain) through the Leiston Drain and the north to its discharge point at the Minsmere Sluice.

1.4.36 The culvert would be designed to facilitate passage by water voles by being of sufficient size ensuring the existing bank is left intact and would also include berms, gabions or similar and ledges/banks, to allow passage at times of high flows and provide a refuge for water voles to leave the water at intervals whilst moving along the culvert. Therefore, whilst a 68m culvert may be likely to discourage daily movement, it is unlikely to represent a barrier to dispersal (and thus genetic movement between the populations centred on Sizewell Marshes SSSI and Minsmere).

b) Monitoring

1.4.37 A monitoring programme, both during and after construction, will be required to:

- assess the effectiveness of the mitigation; and
- provide early warning of any changes in the population so that appropriate action can be taken.

1.4.38 This will ensure sure there is no short- or long-term impact on the water vole populations.

1.4.39 This will occur both at the construction site (and several hundred metres either side of it) and at the receptor site.

1.4.40 Surveys monitoring water vole signs will provide information on:

- the establishment and success of the translocated population at the Aldhurst Farm receptor site;
- colonisation of the realigned Sizewell Drain; and
- re-colonisation of the Leiston Drain.

1.4.41 These will be carried out during the breeding season (March to October), and at a time of year when field sign survey results can be compared with pre-construction survey data. All monitoring will be conducted for five years after the completion of the translocation or completion of the ditch realignment.

1.4.42 The management of the receptor site will continue throughout the life cycle of the Sizewell C reactor and will be the responsibility of the site operator (SZC Co.). The management of the receptor site and of the existing ditches impacted by the works, realigned ditches and newly created habitats at Aldhurst Farm is designed to prevent incidental mortality and to achieve an optimum habitat as outlined in the Water Vole Conservation Handbook (Ref 1.6). An approved (by the Local Planning Authority) management plan is in place.

c) Net Conservation Gain

1.4.43 Macpherson & Bright (Ref. 1.10) considered the landscape approach to water vole conservation. They have shown, from population modelling, the importance of creating (through habitat creation/restoration of large reedbeds and grazing marsh sites) 'patches' of core water vole habitat which can sustain water vole metapopulations in the surrounding landscape where conditions are less favourable.

1.4.44 Although water voles were recorded in the Leiston Drain at Aldhurst Farm prior to the habitat creation programme, only a small number of signs were found, and the surrounding land was agricultural land, of negligible value for water voles. Habitat creation at Aldhurst Farm has created, and will maintain, a mosaic of habitat suitable for water vole including: approximately 6.2ha of wet reed habitat, incorporating between 20-30% open water; approximately 1.2ha of reedbed based tall herb fen; and approximately 2km of ditch habitat characteristic of lowland ditch habitat.

1.4.45 In addition, the new reedbed and wet woodland habitats in the north eastern extent of the site, it will be created during the construction phase and will likely to have established and available for use during the final stages of construction. These compensatory habitats represent a net gain of water vole habitat.

1.4.46 Effective management of one newly-created area of water vole habitat (Aldhurst Farm and the area to the north eastern extent of the site), coupled with on-going management of the Sizewell Marshes SSSI would provide significant conservation benefits and net gains for the overall water vole population.

1.5 Criteria for success

1.5.1 Surveying and monitoring of water vole populations and their habitat (at donor and receptor sites) would provide evidence to assess the success of this Water Vole Mitigation Strategy.

1.5.2 Success would be determined by the following criteria:

- successful capture and translocation of water voles from the construction footprint, delivering a water vole-free construction footprint in line with the timings required for the construction programme;
- successful establishment of water voles in the Aldhurst Farm receptor site following successful translocation;
- no incidental mortality to water voles during construction;
- rapid establishment of suitable habitat for water voles on both the realigned Sizewell Drain and the section of the Leiston Drain affected by the Sizewell Marshes SSSI crossing installation; and
- monitoring water vole movements to show successful dispersal both between Sizewell Marshes SSSI and Minsmere South Levels (along the Leiston Drain, using the Sizewell Marshes SSSI crossing culvert) and between Aldhurst Farm and Sizewell Marshes SSSI (using the new culvert under Lovers Lane);

1.5.3 The licence holder would have responsibility for the implementation of this mitigation strategy, for ensuring the criteria for success are met and, if monitoring shows long-term impacts on the water voles, responsibility for assessing why this is occurring and implementing appropriate additional actions to rectify this.

1.6 Conclusions

a) General conclusion

1.6.1 The Water Vole Mitigation Strategy provides:

- up-to-date information on the status of the water vole population on the Sizewell C Main Development Site;
- the legislation and licensing requirements of any work that may impact on this population and/or its place of rest;
- details any potential constraints on water vole mitigation works;
- an assessment of the impacts of the proposed development on water vole; and
- suitable mitigation proposals.

1.6.2 This plan is to be reviewed and updated (as necessary) on a regular basis as both the design and construction progress. Feedback on this mitigation strategy would be sought from Consultees and incorporated, as appropriate, in future versions.

1.6.3 The main development site works have the potential to impact water voles within Sizewell Marshes SSSI, as a result of the planned Sizewell Drain realignment, infilling of part of the area to form the north-west corner of the Sizewell C Platform and the construction of the Sizewell Marshes SSSI crossing. A derogation licence from Natural England would therefore be required, including a detailed Method Statement (which would be based on this document) to include measures to ensure the avoidance of any breaches of relevant legislation and policy, and ensure net conservation gain for water voles, as demonstrated through monitoring. Any licensable work carried out would need to be overseen by an ECoW named on the licence.

1.6.4 Mitigation, compensation and habitat improvement measures have been outlined in this document. The core component of this strategy involves capture and translocation of water voles from within the construction footprint, and their release in an established receptor site at Aldhurst Farm.

1.6.5 The timing of any licence application, design of any required mitigation, and monitoring of licensable work should be confirmed in advance of the construction programme, due to the constraints of both water vole ecology and the licensing process.

b) Risks to the implementation of this mitigation strategy

1.6.6 Water vole populations are known to be cyclical and it is possible that more water voles than predicted will need to be captured and translocated from the construction footprint. This can be addressed by:

- fencing an additional lagoon at the Aldhurst Farm receptor site to accommodate for this possibility; and
- rapid habitat improvement of the realigned Sizewell Drain to allow water voles to be released into this area in the autumn after the initial capture. This may necessitate retaining 'spare' animals in captivity over the summer after the granting of the DCO.

1.6.7 Licences to capture and translocate water voles in the autumn window are only issued for work between 15 September to 30 November. Therefore, the date of any DCO grant could impact on the ability to capture all water voles from the construction footprint and provide a 'water vole free' area.

1.6.8 The area of Sizewell Marshes SSSI where the SSSI crossing is proposed is difficult to access to trap water voles, and health and safety issues would need to be addressed due to the presence of deep water and silt. Floating pontoons in the lagoon, an inflatable boat and rigorous attention to health and safety protocols in an appropriate Risk Assessment and Method Statement (RAMS) would address these issues.

1.6.9 Trapping would be relatively labour-intensive and would require significant trained man-power and traps.

1.6.10 Once water voles are trapped out from within the construction footprint, any further delay in the construction programme may result in attempted re-colonisation. As soon as water voles are fully removed, vegetation removal and destructive searches would need to be carried out. Habitat unsuitability would need to be maintained for as long as necessary to prevent water voles recolonising.

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1.24 Water voles and the Aberdeen Western Peripheral Route http://www.transportscotland.gov.uk/system/files/documents/projects/AWPR/Environmental%20Statement/December%202006/Environmental%20Statement%20Appendices/Appendices%20Part%20B%20-%20Northern%20Leg/A10.8%20-%20Water%20voles.pdf

1.25 Derek Gow – Nationally Recognised Water Vole Expert (Personal Communication with Aline Brodzinski of Arcadis)

1.26 Animal Welfare Act. 2006. (Online) Available from http://www.legislation.gov.uk/ukpga/2006/45/contents (Accessed 8 January 2019)

Appendix 14C6A.1: Legal status and licensing

1.1 Legislation

1.1.1 Water voles are protected under Schedule 5 of the Wildlife and Countryside Act (WCA) (Ref. 1.1), are NERC Act species of principal importance (Ref. 1.2), and are included on Suffolk's Priority Species and Habitats List (Ref. 1.3).

1.1.2 Under Schedule 5 of the WCA (Ref. 1.1), it is illegal to:

- intentionally kill, take or injure a water vole;
- intentionally or recklessly damage or destroy a water vole's place of shelter or protection;
- intentionally or recklessly disturb a water vole whilst it is occupying a structure or place which it uses for shelter or protection; and
- intentionally or recklessly obstruct access to a water vole's place of shelter or protection.

1.2 Licensing

1.2.1. A licence is required to permit actions that would otherwise be illegal.

1.2.2. Licences cannot be issued for the specific purpose of development. In some circumstances, Natural England would consider issuing a licence in relation to a development proposal if the licensed action would provide a conservation benefit for water voles. If a project needs planning permission, consent is required before applying for a licence. The scale of the potential project dictates that a site-specific licence would be required. Note, in the case of a Nationally Significant Infrastructure Project (which Sizewell C would be), the relevant planning authority would be the Planning Inspectorate (PINS).

1.3 Summary advice from the Water Vole Mitigation Handbook (Ref. 1.8)

1.3.1. There has been a recent review of the interpretation of the legislation relating to water voles by the relevant Statutory Nature Conservation Organisations (SNCOs). This has included clarification of what constitutes an offence, and what defences could apply. Information on the legal protection afforded to water voles and relevant aspects of planning policy are included within the 2016 Water Vole Mitigation Handbook (Ref. 1.8). The guidance set out in this document therefore supersedes the 2011 Water Vole Conservation Handbook (Ref. 1.5) in all aspects relating to development (i.e. those relating to legislation, survey and impact assessment and mitigation in the context of development). Note these guidelines are in a state of ongoing review, particularly with regards displacement activities.

a) Surveys

1.3.2. In most cases, water vole field sign surveys would include searches for field signs undertaken over at least two separate visits conducted sufficiently far apart to account for variations in habitat suitability across the season. One survey would be undertaken in the first half of the season (between mid-April/early May and the end of June) and one in the second half of the season (between July and September). The survey visits would be undertaken at least two months apart. Survey methodologies are discussed further in Dean et al. (Ref. 1.8). The survey would aim to gather information on the size and extent of the population on and adjacent to the development site as indicated in **Table 1.1**.

Table 1.1: Survey design in relation to development scale, from Dean *et al.* (Ref. 1.8)

Type of work	To confirm presence or likely absence of water voles	Additional information (if water voles present)
Works with *permanent* impacts affecting more than 50m of watercourse	Field survey – footprint of the works, including temporary work areas, plus 200–500m upstream and downstream of the works (proportionate to the likely fragmentation effects). Desk study – site and up to 2–5km around it, or a habitat assessment combined with 'spot checks' for water voles.	The study area for the desk study (or habitat assessment combined with 'spot checks' for water voles) may need to be increased to inform the approach to mitigation.

b) Licensing in relation to displacement

1.3.3. In England, activities aimed at displacing water voles in the context of a development project have previously been routinely undertaken without a licence, with reliance on the 'incidental result' defence. It is now considered that such activities are not covered by this defence, and therefore require a licence. In England, certain displacement operations can be carried out under a Class Licence by a registered person. Other displacement operations require a site-specific licence. The development project must deliver a net benefit for water voles because the licence would be issued for the purpose of conservation.

c) Trapping versus displacement

1.3.4. There is a lack of evidence on which to judge the efficacy of displacement and, in the interim, displacement is recommended only under the following circumstances:

- where there is a working area with a maximum length of 50m (for watercourses this equates to 50m on each bank), although a shorter maximum length would be appropriate in situations where water voles are at high density;
- works are conducted between 15 February and 15 April inclusive (although some seasonal variation is accepted depending on weather and geographical location); and
- where there is sufficient available alternative habitat for water voles to move into.

d) Appropriate timing for trapping and relocation

1.3.5. Ideally, water voles would be trapped during early Spring (between 1 March and 15 April inclusive). In southern England during mild weather, trapping can begin as early as mid-February. Water voles can also be trapped during Autumn (between 15 September and 30 November inclusive), but this would only be considered as a last resort since water voles trapped during the Autumn period may require over-wintering in captivity to improve survival rates. It is not recommended to trap water voles during the height of the breeding season, as this can have a significant effect on their breeding success and therefore the status of the population. It is also not recommended to trap water voles during the Winter months when they are no longer breeding, as their behaviour makes them difficult to catch. Trapping should be timed to avoid periods of heavy rain or snow, fluctuating water levels, and periods when the overnight temperatures fall below freezing (0ºC).

Appendix 14C6A.2: Information underpinning this mitigation strategy

1.1.1 This Mitigation Strategy is underpinned by the following information:

- Desk-study records held by the Suffolk Biodiversity Information Service (SBIS).
- Survey work carried out by: Wood Group (formerly Entec and Amec Foster Wheeler) and Arcadis as part of the Sizewell C proposals; Suffolk Wildlife Site (SWT) and Royal Society for the Protection of Birds (RSPB) for the National Water Vole Key Site Monitoring Programme.
- SZC Environmental Statement (ES) Ecology **Chapter 14 Technical Appendix 14A9 – Terrestrial Mammals Baseline** and **SZC ES Ecology Chapter 14**.
- A literature review: S-EX166 Technical note: Review of literature regarding use of crossing structures by otters and water voles.
- Water Vole Mitigation Handbook (Ref. 1.8).
- Discussions with Natural England.
- Natural England's Standing Advice (Ref. 1.11) for planning authorities who need to assess the impacts of development on water voles

Appendix 14C6A.3: Review of literature regarding use of crossing structures by water voles

1.1 Purpose of appendix

1.1.1. This is an update of the water vole component of the following document S-EX166 Technical note: Review of literature regarding use of crossing structures by otters and water voles.

1.1.2. This appendix presents the results of a detailed literature review regarding the following:

- the potential for culverts and bridges to form a barrier to the movement of water voles;
- whether or not there are any material differences in the potential for culverts as opposed to bridges in this respect; and
- whether or not measures can be implemented to reduce the potential for culverts and/or bridges to act as potential barriers to the movement of water voles.

1.1.3. A summary of the key points obtained from the literature is presented below, with the detailed results of the review presented in **Section A3-2 g)**.

1.2 Summary review

a) Water voles

1.2.1. Professional opinion from the literature suggests that culverts can act as potential barriers to the movement of water voles along a watercourse, that the longer the culvert the worse the barrier effect, and that bridges are preferred based on the assumption that they allow more light to reach the watercourse and allow the retention of riparian vegetation. In contrast, the 2011 Water Vole Conservation Handbook (Ref. 1.5) states that '*culverting does not seem to provide a major problem to water vole movement or fragmentation*', although it also says that '*length may present a problem to water vole daily movement and dispersal*'.

1.2.2. There is, however, a lack of evidence in support of either position, and no evidence has been found in the literature to suggest that culverts would not be used by water voles, nor indeed that bridges are materially different from culverts. A number of studies do, though, suggest measures to make it more likely that culverts would be used by water voles.

1.2.3. The following paragraphs provide a summary of the issues likely to influence the use, or otherwise, of crossing structures (whether open-span bridges or culverts) by water voles.

b) Water vole habitat and territory

1.2.4. Water voles prefer easily penetrable earth or silt-shored banks alongside slow-flowing, relatively deep (over 1m depth) watercourses. Factors such as rocky or otherwise impenetrable substrates, over-shading by trees, and fast-flowing or shallow water tend to be correlated with their absence.

1.2.5. Water voles typically have a home range of a few hundred square metres, although a population in Scotland has been found to be moving 2-3km, with a few individuals even moving as much as 15km between the site of their birth and their first reproduction (Ref. 1.12).

1.2.6. Depending on overall population density, season and habitat quality, the length of territory varies between 30m and 150m for females, and 60m and 300m for males. The larger territory sizes tend to occur when the population density is low, and/or the habitat is poor (Ref. 1.5).

1.2.7. Therefore, in terms of distance alone, a 70m culvert (the approximate length of the proposed longest culverts in the Sizewell Marshes SSSI crossing options) within the territory of a water vole would not be too great a distance to negotiate.

c) Water vole dispersal distances

1.2.8. Although individual water voles have a relatively restricted home range for the majority of their life cycle, young voles do disperse over greater distances when establishing new breeding territories. Telfer *et al.* (Ref. 1.13) recorded the average dispersal distance in an upland area to be 2.18km (+/- 0.27 standard error) for females and 1.65km (+/- 0.27) for males. In lowland areas (as Sizewell C would be classified), the corresponding figures were 1.04km (+/- 0.19) for females and 1.50km (+/- 0.25) for males. In a study in the Peak District (Ref. 1.14) recorded the maximum distance from an occupied transect to a core colony as 1.3km, with single latrines recorded at 1.9km.

1.2.9. Therefore, again in terms of distance alone, a dispersing water vole could readily move 70m through a culvert, if required.

d) Population status of water voles at Sizewell Marshes SSSI/Minsmere

1.2.10. As part of the National Key Sites initiative (Ref. 1.15), 12 transects within the Sizewell Marshes SSSI are monitored annually for water voles for the Sizewell National Key Site, and 24 transects are also monitored by the RSPB at the Minsmere National Key Site, to the north. These two Key Sites are connected via the Leiston Drain and are approximately 1km apart.

1.2.11. A review of data for the Sizewell Marshes NKSMP from 2001-2012 (Ref. 1.16) showed the typical level of cyclical population changes found in all vole species, when in a stable environment with no American mink predation. The Sizewell NKSMP survey area was described as ‘one of the best sites in Suffolk for these animals’ (Ref. 1.16).

1.2.12. Wood Group surveys of Sizewell Marshes SSSI (see ES for further details) indicated that the water vole population were persistent and bucking the trend of national decline, with records going back to 1982 and high water vole populations being referred to in the Sizewell Land Management reports dating back to 1997-1998. Due to wealth of desk study data available for water voles, it was concluded that Sizewell Marshes SSSI supports a good population.

1.2.13. Therefore, there is a stable and persistent population of water voles present, with a sizeable area of suitable habitat and no predatory mink present.

e) Habitat fragmentation and water voles

1.2.14. Water vole populations have been considered to have a meta-population dynamic (Ref. 1.17) (Ref. 1.18). Populations typically consist of small, discrete colonies comprising a few individuals and having a finite lifespan. Groups of colonies persist through dispersal and colonisation (Ref. 1.19), and genetic interchange is a feature in the successful survival of water vole meta-populations.

1.2.15. The Minimum Viable Population (MVP) for water voles is considered likely to be in excess of 100 individuals at peak breeding season (30-50 at the beginning of the breeding season), and to require approximately 1.5-2km length of good quality habitat (Ref. 1.5). Where a development may result in the unavoidable isolation of a colony that is smaller than this figure, it is normally considered appropriate to translocate or relocate the animals into compensation habitat within the local area, where the colony would have sufficient habitat to exist in numbers greater than the MVP (Ref. 1.5). Otherwise, the population would be susceptible to local extinction.

1.2.16. Sizewell Marshes SSSI has been identified as a Key National Site for water voles. Based on the area of Sizewell Marshes SSSI, and the fact that water vole signs have been found on the majority of the drainage ditches, it is safe to assume that the resident population is large and viable, with a significant extent of habitat available. Likewise, the populations within the Minsmere South Levels and the wider Minsmere reserve are also large and genetically viable in the long term (notwithstanding the risk presented by mink incursion into the area).

1.2.17. Long-term survival of populations of water voles can only be ensured through connectivity between various colonies, allowing range expansion and dispersal of water voles (Ref. 1.10). The Sizewell Marshes SSSI crossing point has the potential to result in habitat fragmentation between the Sizewell Marshes SSSI and Minsmere South Levels water vole colonies.

1.2.18. The evidence suggests that the Sizewell Marshes SSSI crossing would not represent a barrier to territorial or dispersing individuals during construction. However, even if a barrier effect were to occur, as the two populations are individually considered to be genetically viable, the link along the Leiston Drain between the two colonies is unlikely to be critical to the maintenance of either of the affected populations.

f) Special culvert design features for water voles

1.2.19. The literature review **Table 1.1** suggests the following design measures would increase the likelihood of a structure being used by water voles, although robust evidence that such measures work is lacking.

- Large box culverts allow maximum light to pass through.
- Ideally, the diameter of any culvert should be at least 2000mm with a berm included, and culverts should be straight with no bends, so light can be viewed at both ends.
- Box culverts are better for water voles than pipe culverts.
- Gabions installed within each culvert can be used to provide a shelf just above mean water level, to permit water voles to pass easily from one end of the culvert to the other; these should be fully integrated into the existing bank at either end. This may also allow water voles to leave the water to rest, if required.
- Disturbed banks and gabions should be hydro-seeded to encourage rapid regeneration of vegetation.
- The provision of natural or artificial light within a culvert, potentially along with a water spray system, is likely to improve the growth of vegetation within a soil-embedded culvert system (Ref. 1.20). This could increase the likelihood of the structure being used by water voles. [Note it is not necessarily advocated to light a culvert to encourage

vegetation growth, but it is a potential mitigation measure, if required. This measure would conflict with the objective to maintain the culvert as a dark corridor for bats, at least during construction.]

g) Detailed literature review

Table 1.1: Results of detailed literature review

Evidence of water voles using culverts	
Small mammal use of modified culverts on the Lolo South Project of Western Montana (Ref. 1.21).	Several small mammal species were found using a culvert in Montana under a highway. A total of six culverts were monitored over a distance of three miles along a series of wetlands – three with 25inch shelves and three without as controls. Small and large mammals used the shelving.
An evaluation of corrugated steel culverts as transit corridors (Ref. 1.22).	• In 1995, 12 dry corrugated steel pipe culverts (35 x 1m) with soil substrate were installed at 50 m intervals under a four-lane highway at one wetland. Eight of the culverts were monitored. At another wetland, two wet cross-drainage corrugated steel pipe culverts (31 x 0.6m) were monitored. Aluminium track-plates covered with soot were installed 1-2m inside each culvert and were monitored nine times in July-October 2000. • Small mammals used most of the eight dry culverts, particularly racoons (11% of plates), species from the weasel family (32%) and mice, voles and shrews (31%). Similar species, although in much lower numbers were recorded using wet culverts.
Water voles wander across 'fragmented' Scottish habitat” (Ref. 1.12).	"Those animals typically have a home range of a few hundred square meters, and we found them moving two to three kilometres, a few even moving 15km between [the site of] their birth and their first reproduction."
Water Vole Conservation Handbook (Ref. 1.8).	Open – sized box culverts up to 30-35m in length have been shown to be used by water voles. Water voles were shown to colonise from an existing population isolated by culverts of this length. Radio-collared water voles in Northumberland were shown to move considerable distances in an upland environment with many small culverts and pipes.
Kevin O’Hara, Project Officer Northumberland Wildlife Trust, pers. comm.	Kevin has undertaken studies looking at water voles and culverts. In his professional opinion: • a 70m culvert would not be considered a major barrier to the movement of water voles. • culverts should be straight with no bends, so light can be viewed at both ends. • a minimum circumference of 600mm is recommended.

Evidence of water voles using culverts	
	• an option that allowed pockets of vegetation to establish may improve the suitability of any corridor for the passage of water voles.

Mitigation measures to improve passage of water voles	
Water voles and development – a case study of mitigation techniques (Ref. 1.23). Case study is a site at Avonmouth.	• For those projects where voles can be persuaded to move of their own accord, it is important that there is no barrier between the existing water vole population and the alternative habitat, e.g. that a physical barrier such as a weir, road, mill etc. is not between the two sites; that there is no significant stretch of unsuitable habitat (approx. >250m), and no significant stretch of habitat (approx. >250m) occupied by predators or competitors (e.g. brown rat (*Rattus norvegicus*). Special design features for water voles include: • Large box culverts to allow maximum light to pass through • Length of culverts kept to a minimum (approx. 17m) on Rhines known to support water voles • Gabions installed within each culvert to provide a shelf just above mean water level to permit water voles to pass easily from one side of the culvert to the other. Gabions fully integrated into the existing bank at the end. Disturbed banks and gabions hydro-seeded to encourage rapid regeneration of vegetation.
Water Vole Conservation Handbooks (Ref. 1.5) (Ref. 1.8)	Culverting does not seem to provide a major problem to water vole movement or fragmentation. Water voles are known to use culverts under roads of certain types and sizes, but it is not known which culvert design and size works best, nor which would not be used at all by water voles. There is little available information relating to the length and design of culvert which act as barriers to water vole movement. The following types/lengths of culverts are known to be effective in allowing the movement of water voles, based on the authors' personal observations: • Over-sized box culverts (which are considered better than pipe culverts) up to 30–35m in length, with ≥ 1m of headroom above normal water levels; – Water voles have been shown to colonise a new section of watercourse 'isolated' from the existing water vole population by two culverts of this type and size;

Mitigation measures to improve passage of water voles	
	– Ledges immediately above water level on either side of the channel within the culvert are likely to be used by water voles, particularly where these are formed from earth/silt. one option is to use stone filled gabion baskets that is then turfed to encourage plant growth within the culvert tunnel. However, it is unclear whether these are necessary to allow water voles to use the structure; • Circular culverts of 1200mm diameter, up to 10m in length, with ≥ 300mm of headroom above normal water levels.
Water voles and the Aberdeen Western Peripheral Route (Ref. 1.24).	Generic mitigation proposed for the potential presence of water vole populations. The incorporation of bridges and box culverts (with mammal ledges) on every watercourse crossing to reduce risk of road traffic accidents and reduce habitat fragmentation. However, given the length of some of the culvert crossings (the longest culverted reach extends to 241m) it is likely that such crossing points would only be used infrequently by any water voles. Despite this, culverts would reduce the impacts of habitat fragmentation with the aim that enough water voles would be able to traverse the road to permit the colonisation of new areas. No evidence of success of long culverts has been proposed.
Derek Gow (pers. comm.) (Ref. 1.25)	His professional opinion is that a 70m culvert would not be an insurmountable barrier to the movement of water voles, but any option that allowed more light to reach the river bank and hence more riparian vegetation to establish would be a preferred option.

Appendix 14C6A.4: Trapping Protocol

1.1 Introduction

1.1.1. The following is from Dean et al. (Ref. 1.8).

1.1.2. Trapping of water voles can only be undertaken by a person licensed to do so by the relevant Statutory Nature Conservation Organisation (SNCO) (Natural England in England) and would only be carried out by those with sufficient experience to ensure the welfare of the animals.

1.2 Time of year/weather conditions

1.2.1. Trapping of water voles should only be undertaken at an appropriate time of year (1st March – 15th April, 15th September – 30th November). Trapping would also not be undertaken during the following conditions:

- cold conditions – night-time temperatures below freezing (0°C);
- hot conditions – daytime temperatures above 20°C; and
- high rainfall/flooding – where water-level rises could be sufficient to flood the traps (the use of floating platforms may allow trapping to continue during minor water level fluctuations, but not during major flooding events which would capsize the rafts).

1.2.2. The weather forecast should be monitored daily during a trapping exercise, and the traps would be securely closed or removed if adverse weather conditions arise or are forecast.

1.3 Traps

1.3.1. An ideal metal trap type for capturing water voles is constructed from 1cm × 1cm weld mesh with an aluminium or wooden shelter at one end. Its basic dimensions are 50cm long × 15cm wide × 15cm high. The aluminium shelter sits over the far end of the trap and is 215mm in length. The traps have a spring-loaded mechanism allowing a very light treadle weight and have a simple locking bar fitting in their doors which activates on closure. These traps are light and easy to handle.

1.3.2. Other trap types which have been used for water voles include folding metal traps, such as those produced by Sherman. These are relatively small in size, and therefore have limited space for bedding and bait, which means that the mechanisms can become fouled and need to be checked regularly; they should only be used by those with considerable experience.

1.3.3. Traps would be thoroughly cleaned, disinfected, rinsed in clean water and dried after use and between trapping sites. In areas with bovine tuberculosis (TB), care needs to be taken to ensure that the agent is effective against mycobacteria (e.g. Trigene © is an effective agent whereas Virkon is not).

1.3.4. Trapping terrestrial water voles is difficult and specialist advice and expertise is required.

1.3.5. If trapping is undertaken during inclement weather conditions, then wooden covers over the nesting areas of the trap help to insulate the bedding area. These can be additionally insulated with a covering of 'bubble-wrap' if poor weather conditions persist.

1.3.6. Traps must be checked prior to use to ensure that they are in complete working order. Any traps which break, or malfunction would be immediately replaced. Each trapping team would have enough traps to allow for a replaceable reserve.

1.4 Locating and securing traps

1.4.1. Traps should be placed at a density of at least one per 10m of bank and should be located parallel to the bank edge and immediately adjacent to latrine sites or in areas where runs are obvious. The ground beneath the trap should be flattened as far as possible without damaging the bank, to allow the trap to sit securely, but ideally placed on a slight incline with the nest chamber highest, to prevent submersion in the event of minor fluctuations in water level. All traps should be secured with pegs, to prevent them being dislodged.

1.4.2. Traps must not be set in precarious positions where the movement of captured animals could lead them to fall into water, or in situations where human interference is likely to occur. Where it is necessary to trap water voles in locations used by the public, they should be set in locations that are difficult to reach and be covered with vegetation.

1.4.3. Traps can also be set on floating platforms (such as mink rafts, or purpose-built structures). This approach is particularly helpful in capturing animals from wetland habitat where there is no bank; where the bank is too steep to allow traps to be set safely; where most of the latrines are located some distance from the bank on floating vegetation; or where water levels are likely to fluctuate, such as downstream of an outfall or in an artificially or tidally impounded reach. Floating platforms are also useful where the disturbance of traps by dogs or foxes is likely. They must be sufficiently buoyant and stable to ensure that they can support a water vole's weight (or that of any non-target species), and therefore must be of higher specification than those simply used for undertaking surveys. The traps must be secured to the platform, to ensure that they do not roll into the water, and the platforms must be secured using canes or similar, to prevent them floating away. They also need to be tethered in a way which allows them to rise and fall with changes in water level, and they should not be used in situations where there is significant water wash from boat traffic, which could cause them to capsize.

1.4.4. Each trap must be uniquely numbered with indelible pen and either clearly marked using flags (where interference by the public is unlikely) or their locations mapped accurately to ensure they can be relocated. All trap locations should also be recorded using a hand-held Global Positioning System (GPS).

1.5 Provisioning traps

1.5.1. Traps must be provisioned with dry straw bedding and half a fresh, sweet apple. Additional food can also be provided (e.g. pieces of carrot). These materials must be checked daily and changed at least every second day.

1.6 Checking traps

1.6.1. Traps should be checked at least twice daily:

- early morning check, between 6am and 10am, with all traps checked by 10am; and
- late afternoon/evening check, before dusk.

1.6.2. During warm weather conditions a third check in the middle of the day should be undertaken.

1.7 Handling captured animals

1.7.1. Handling of water vole can only be undertaken by individuals holding an SNCO licence, or their accredited agents. Captured water voles to be released into an on-site receptor area, should be examined upon release from the trap to determine their sex and approximate size (animals can also be weighed when necessary, but this procedure can be stressful for the animals so should be avoided if not necessary. They should then be placed in a suitable container for transportation, such as a standard rodent laboratory cage.

1.7.2. Where captured water voles are to be released into an off-site receptor area or taken into captivity, they may be transported to a central care facility in their traps or appropriate holding cage as described above. If traps are used for transport, then the doors must be secured using wire or cable ties prior to movement.

1.7.3. When water voles are captured, traps should be replaced on the same spot, as it is likely that more than one animal would be present. Particular care should be taken to ensure that more than a single trap is placed side by side at any location where very small juveniles (30–50g in weight) have been captured. The chance of catching other sibling litter mates at the same point is high. These can be placed in holding cages together if they are captured at the same location but should not be mixed with any other adults.

1.7.4. All field staff should be aware that water voles can carry leptospirosis, and be familiar with its symptoms, pathways for transmission to humans, and the precautions necessary when handling water voles to minimise the risk of infection.

1.8 Completion of trapping

1.8.1. Trapping would be considered to be complete once there has been a period of five days or more when overnight temperatures are above freezing, with no captured animals, AND there are no new field signs within the capture site. Once completed, a destructive search of the area should be undertaken (see **Appendix 5**). Any animals found during the destructive search should be captured with nets or by hand and transported as described above.

1.8.2. For large trapping exercises, it may be appropriate to consider completing trapping in some parts of the site before others, to prevent the chances of animals recolonising the cleared areas.

Appendix 14C6A.5: Destructive search protocols

1.1.1. The following steps are taken from Dean *et al.* (Ref. 1.8). Note, the protocol in Dean *et al.* refers to displacement processes but is equally applicable for a site once trapping has removed water voles.

Table 1.1: Destructive search protocol

Step	Action	
1	Before vegetation removal, identify and mark the position of all burrows in the working area so that these can be located later to ensure that they are not blocked. Confirm the absence of other constraints to the works, such as nesting birds.	
2	Remove vegetation on the bank face within the area subject to development works, plus at least an additional 3m either side of the working area, and on the bank top (i.e. at least 3m back from the bank). This would be achieved using a strimmer until only bare earth remains. If feasible, also cut the emergent aquatic vegetation located along the water margin to below water level.	
3	Rake off and remove any arisings from the cleared area.	
4	Check that burrow entrances have not become blocked and remove any latrines or feeding remains.	
5	If feasible and environmentally acceptable, combine with de-watering of the affected section of watercourse.	
6	Leave the strimmed area intact for five days to allow animals time to relocate.	
7	Re-survey the site for fresh evidence of water voles. If there is no evidence that water voles are still present, undertake a destructive search of the burrows (under the supervision of a suitably experienced ecologist) as follows.	
7	a	Excavate burrows to ensure that no animals are present. Hand tools would preferably be used, and excavation would extend as far as possible, bearing in mind practical health and safety constraints.
7	b	Using an excavator with a toothed bucket, rake through the turf and topsoil on the bank face and top on the side that the excavator is positioned. Then with a second or third sweep of the bucket, remove the turf and topsoil to a depth beyond which any burrows would be present.
7	c	Remove in-channel vegetation within 50cm of the toe of the bank to prevent regrowth.
7	d	Smooth the surface of the bank using an excavator with a ditching bucket (or the back of the toothed bucket). Ensure that any lumps of topsoil that might provide a refuge for water voles are removed.
7	e	Repeat the process for the opposite bank (if necessary).
8	Ensure that water voles do not return prior to the development works commencing by: • undertaking the works within five days of completing the destructive search; or	

Step	Action
	• in-filling the channel immediately following the destructive search; or • maintaining the works area as bare ground until the works have taken place. This is likely to require a repeat scraping/smoothing of the banks; or • covering the ground with a suitable matting to ensure that vegetative regeneration cannot occur; or • installing suitable water vole resistant fencing to prevent water voles returning.

Appendix 14C6A.6 Sites with facilities to hold water voles in captivity

1.1.1. The following organisations are believed to have the facilities to hold water voles in captivity (should this be required if the weather turns cold (night-time temperature below freezing (0^{o}C)) during an autumn trapping programme):

- Chester Zoo: British and Irish Association of Zoos and Aquariums (BIAZA) registered.
- Derek Gow Consultancy.
- M&H Ecology.
- Wildwood Ecology: BIAZA registered.

1.1.2. All facilities and care regimes for water voles must be fully compliant with the legislative requirements present in the Welfare of Animals Act (Ref. 1.26). Ideally animals would be held by organisations registered with the British and Irish Association of Zoos and Aquariums (BIAZA) or in similar facilities (such as those orgnisations listed above) which can maintain a consistently high standard of captive care and maintenance.

1.1.3. All operatives handling water voles must be suitably experienced and use appropriate equipment.

Appendix 14C6A.7: Soft release protocol

The following is from Dean *et al.* (Ref. 1.8).

1.1 Introduction

1.1.1. Water voles that are relocated by trapping should be released into their receptor site using a soft-release technique. Although there is a lack of evidence of the additional benefits of soft-release versus hard-release (or indeed of the potential benefits of a longer-term soft-release than that described below), it is the professional opinion of the authors that the use of soft-release pens is likely to increase the number of animals surviving at release sites by providing animals with time to adjust to their new location. There are two basic methodologies for this process:

- The creation of pens with no base that are sunk into the ground to a depth of at least 25cm adjacent to the water's edge. These can be complete (fold-up) units or constructed from separate materials.

- Complete cages positioned in the riparian vegetation next to the water's edge from which animals cannot escape until a front section (with 6cm diameter holes in either side of a predator-proof baffle) is fitted.

1.1.2. Although both systems can work well each has its advantages and disadvantages discussed in the following sections.

1.2 Pens with no base

1.2.1. Using this release technique, the water voles burrow out of the holding pen. Studies of radio-collared individuals (P. Franklin, personal communication) demonstrated that they would remain under these structures, in the burrow systems they have established, for many days before moving out into the wider environment. Once in position, these cages are difficult to move and if water levels fluctuate, they can rapidly be submerged. In addition, if they are not designed as complete units and their construction materials leave gaps in the overall structure then the voles can readily escape before they have settled. Under certain ground conditions, such as stony soils, they can be hard to reliably install. They need to be covered at least partially from the weather and securing predator-proof lids can be difficult.

1.2.2. A successfully used design is constructed from aluminium, which folds down for transport, and has a hinged lid for feeding access. It is completely weather-proof, with a floor area of approximately 45cm × 45cm and a maximum height of 25cm. Once dug in, these pens are fitted with a cardboard sheet (5mm thick) in their base through which the water voles have to gnaw to access the soil beneath. The top lid functions as an access door for feeding and maintenance. These cages needed to be well shaded to avoid them heating up excessively, so they would be located to avoid direct or dappled sunlight.

1.3 Complete cages

1.3.1. Using this technique, water voles are completely contained. Although they cannot establish burrow systems they would rapidly come and go from both their own and adjacent cages once the fronts are folded under the main cage and a baffle (to deter large predator access) is placed in position. These types of release cages are easier to install in some cases (such as stony soils) and are easier to move if this is needed during the release. The water voles are released from this structure by folding the front section under the main cage and then fitting a baffle with 6cm diameter holes at either side.

1.3.2. These cages can also be used as an on-site holding facility in situations where the release of water voles needs to be delayed, such as to allow vegetation within the receptor site to become better established. In such cases the cages must have a covered section on their top, back and sides to prevent the bedding getting damp. This can be achieved by partially covering the cage with a tarpaulin. The pens must be positioned in an entirely secure location where they cannot be removed or interfered with in any way by predators or people. Their position in a receptor habitat must be well above the level of any potential rises in water level.

1.4 Release

1.4.1. If groups of siblings are being released together, up to seven individuals can be released using either technique. Family groups of a mother and young can also be released together. In other circumstances, water voles should be released as individuals rather than in groups. Individuals of the same sex should be separated by a minimum of 40m intervals along the waterway (two pens, one containing a male, one a female, per 40m length). The pens should be sited as close to the water as possible, in (or near) tall vegetation. Release pens should be situated away from public access. If this is impossible then a security fence may be required to prevent interference.

1.5 Provisioning

1.5.1. Release pens must be checked daily during the relocation operation to ensure that the animals have enough food. They should be supplied with a straw-bale-section (one-sixth of a bale) to provide cover and bedding. In the experience of the authors, each water vole should be provided with quarter of a sweet apple, half a carrot and cut external vegetation daily; and the animals should be supported with food for eight days in the dug-in cage system before these are removed, leaving the old bedding in place. In the complete cage system, they should be supported with food for five days, released on the sixth day and then fed for another three days. Once again, all the old bedding from these pens should be left in situ on the bank. In situations where water voles are to be held in complete cages for longer than six days, as an on-site holding facility (see above), they should also be provided daily with a small bowl of dry alfalfa-rich rabbit feed and drinking water (clip-on water bottles should be attached to the side of the cage). Shallow metal trays, 60cm long × 30cm wide × 10cm deep can also be provided as swimming trays. The cages should need to be checked daily to ensure that they are intact, and food and water must be replenished daily.

VOLUME 2, CHAPTER 14 APPENDIX 14C6B: WATER VOLE METHOD STATEMENT

Contents

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None provided.

Appendices

Please note that the red line boundary used in the figures within this document was amended after this document was finalised, and therefore does not reflect the boundaries in respect of which development consent has been sought in this application. However, the amendment to the red line boundary does not have any impact on the findings set out in this document and all other information remains correct.

1. Water Vole Method Statement

1.1 Background Information

a) Introduction

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station. The Sizewell C Main Development Site is located in Suffolk, centred at the grid reference TM 472 640. An aerial image of the site is presented in Plate 1.1.

Plate 1.1: Aerial imagery of the site and redline boundary (not including sports pitches at Leiston)

1.1.2 A suitably qualified contractor would lead the delivery of the prescriptions of this water vole licence on behalf of the applicant (SZC Co.).

1.1.3 This report presents methods to mitigate potential impacts on water vole (*Arvicola amphibius*) populations present within the main development site for Sizewell C. The purpose of this document is to provide a draft method statement for Water Vole trapping and displacement that can be used by the consultant ecologist, SZC Co. and any relevant subcontractors, in relation to the proposal to build Sizewell C. See Appendix A Figure 1 and Figure 2 for construction Areas and site layout respectively.

1.1.4 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

b) Description of the Proposed Works

1.1.5 SZC Co. is proposing to build a new nuclear power station at Sizewell in East Suffolk, known as Sizewell C, located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The power station, together with the proposed associated developments, is referred to as the Sizewell C Project.

1.1.6 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units and would have an expected electrical capacity of approximately 3,340 megawatts (MW). This would provide enough electricity to supply approximately six million (or about 20%) of Britain's homes, and help facilitate the shift to a low carbon economy, using technology which has been used successfully and safely around the world for many years, and has been enhanced by innovations to improve performance and safety.

1.1.7 As part of the wider Sizewell C development, the new power station will be constructed at the main development site, adjacent to the existing Sizewell B power station. The construction of the Sizewell C power station will require substantial amounts of construction material to be transported to the site and a number of off-site associated developments to support the Scheme during its construction and long-term operation.

1.1.8 This licence draft method statement only applies to impacts within the main development site.

1.1.9 The on-site area includes the main platform and associated power station infrastructure and Sizewell B relocated facilities. Off-site areas include the Green Rail Route, Darsham Park and Ride, Wickham Market Park and Ride, Sizewell Link Road (SLR), Two Village Bypass (TVB) and Yoxford Junction and the Freight Management Facility (FMF).

c) Purpose of the Works

1.1.10 The purpose of the works is to construct a new nuclear power station at the Sizewell site. However, in constructing the power station, the proposed works will impact upon water voles. Water voles are present within the areas within the eastern edge of the Sizewell Marshes SSSI which will be used to create the western edge of the new power station platform and the SSSI Crossing to the north of this. Water vole are protected under Schedule 5 of the W&CA

(Ref 1.1), and are included under Section 41 of the NERC Act (Ref 1.2). As a result, this licence is required to permit the project.

d) Proposed Licensable Activities

1.1.11 In the absence of mitigation, the works proposed have the potential to impact water vole through:

- Direct mortality;
- Fragmentation of habitats;
- Loss of habitats; and
- Disturbance of water vole.

1.1.12 Trapping and displacement activities are proposed under this draft method statement for Water Vole to mitigate potential impacts on water vole in relation to the proposal to build Sizewell C. This licence will permit the development to proceed without triggering offences under wildlife legislation.

e) Planning Status

1.1.13 The project is being submitted as a Nationally Significant Infrastructure Project (NSIP) and if consented, this would be via a Development Control Order (DCO).

f) Compliance with Best Practice

1.1.14 The proposed survey methodology, trapping, displacement techniques and monitoring requirements all comply with the guidance as set out in the latest Water Vole Mitigation Handbook (Dean et al., 2016) (Ref 1.3).

1.1.15 The staff named on the licence by the appointed contractor would be members of the Chartered Institute of Ecology and Environmental Management (CIEEM) at the appropriate level and follow their code of professional conduct when undertaking ecological work.

1.2 Site information and survey

a) Introduction

1.2.1 This section briefly outlines the results of relevant previous surveys conducted on the application site in 2007, 2009, 2018 and updated surveys in 2020 by Arcadis.

b) Previous Surveys

1.2.2 A walkover survey of the site was undertaken in October 2007, in conjunction with the surveys for otter. Twenty potentially suitable ditches were surveyed. Suitable terrestrial and aquatic habitat along these ditches were assessed for potential to support water vole and searched for field signs including a search of the bankside vegetation (where conditions were suitable) for latrines/droppings, feeding stations, burrows and footprints.

1.2.3 Further water vole surveys of 16 ditches, using the same methodology as in 2007, were carried out in 2009, aimed at obtaining a better understanding of how water vole use the habitats across the EDF Energy estate and to establish a generalised population assessment.

1.2.4 Additionally, five transects (approximately 500m in length) were surveyed within the reedbeds in the Sizewell Marshes SSSI. Artificial latrines were installed at a density of one every 10m; these were left in place undisturbed for two to three weeks prior to the surveys. Each reedbed transect was surveyed twice in 2009, between 20 to 21 August 2009, and again between 13 and 14 October 2009. Any field signs of water vole were recorded.

1.2.5 Two sets of surveys, in June 2018 and August 2018 were undertaken within the fenced off Lagoon A at Aldhurst Farm which is the proposed receptor site The surveys aimed to determine if the receptor site remained free from colonisation from the species.

c) Previous Survey Results

1.2.6 Surveys in 2009 identified evidence of water vole activity (latrines, burrows and footprints) in the majority of ditches surveyed within Sizewell Marshes SSSI. All field signs were found near ditches or other areas of open water, indicating that water vole were not active within the drier areas of reedbed, but restricted to the wetter margins. The NKSMP data demonstrated that Sizewell Marshes SSSI showed population that was stable overall.

1.2.7 Estimated water vole densities in England range from 2.4 to 14.0 per 100m of bank, with a UK average of 6.1 individuals per 100m. The average population size for the ditches surveyed in 2009 within Sizewell Marshes was estimated at 5.2 individuals per 100m ditch, which is close to the national average density. See Appendix A **Figure 14C6B.3** for a summary of the results.

1.2.8 As part of the baseline surveys, an appropriate translocation site for water vole was identified, this being Aldhurst Farm. Surveys were conducted in 2010 at this location to determine its suitability as a receptor site, as well as to identify the enhancement measures that would be required in order to receive water vole as part of any translocation exercise.

1.2.9 Aldhurst Farm was identified as having ditches with suitable aquatic habitat for water vole, and evidence of water vole field signs. Habitat enhancement and creation measures were implemented in 2014 to 2016. This included four new lagoons, described in full in section 1. One of the new lagoons was fenced to prevent water vole colonising this area.

1.2.10 Subsequent surveys of Aldhurst Farm in 2018 confirmed the absence of water vole from the proposed receptor site, a fenced-off lagoon to the west of Aldhurst Farm. The lagoon had been fenced off to ensure no natural colonisation by water vole in order to ensure that the lagoon would remain suitable to receive translocated water vole from the Main Development Site.

d) Updated Survey Results

1.2.11 The water bodies on the application site or within 50m of the application site boundary were surveyed on [to be completed in 2020-2021]. A summary of the results of the survey and an assessment of the potential density of the water vole populations are provided in Table 1. See Appendix A **Figure 4** for updated results.

Table 1.1: Results of Water Vole Survey Donor Site 20XX

Ditch/Pond Reference	OS Grid Reference	Frequency of Water Vole Activity Signs and Observations	Assessment of Potential Population Density
Leiston Drain			
Habitat lost within Sizewell Marshes SSSI			
Sizewell Drain			
East-west running drains west of Sizewell Drain by SZB			
Ditch XX			

1.2.12 See section 3 for further details of the likely impacts on water vole as a result of the development.

1.3 Impact assessment (before mitigation or compensation)

a) Introduction

1.3.1 This Section describes potential impacts of the Sizewell C and the main development site on water vole.

1.3.2 The impact assessment showed the potential for the works to have an impact upon water vole and their habitats, namely a proportion / section of Leiston Drain, Sizewell Marshes SSSI, Sizewell Drain and East-west running drains west of Sizewell Drain by SZB. Potential impacts are detailed within the sub-sections below.

b) Incidental mortality

1.3.3 Water vole use a series of burrows with many entrances and interconnecting tunnels. They also occasionally build woven nests in the bases of sedges and reeds. Outside of their burrows, water vole activity is largely confined to runs in dense vegetation with 2-5m of the water's edge.

1.3.4 There is the potential for incidental injury or mortality to water vole from construction plant carrying out vegetation and ground clearance works, installation of security fencing, ditch realignment during the Phase 1 preliminary works, and site establishment phases of construction. Water vole would be particularly vulnerable when they are in their burrows.

c) Habitat loss (Permanent)

1.3.5 The water vole population within the main development site would experience an impact of habitat loss through the following:

- vegetation clearance and site preparation for the SSSI crossing - a causeway crossing the Leiston Drain that would connect the proposed Sizewell C Power Station to the new access road to the north;
- vegetation clearance and site preparation of land to form the north-west corner of the proposed Sizewell C Station Platform located within the Sizewell Marshes SSSI (see Appendix A **Figure 14C6B.2**); and
- installation of a sheet-pile barrier between Sizewell Marshes SSSI and the main development site; which would provide the platform to conduct the ditch realignment works for the diversion of the Sizewell Drain within Sizewell Marshes SSSI for approximately 500m (two options under consideration) (see Appendix A **Figure 14C6B.5**).

1.3.6 These activities would result in the loss of water vole foraging habitat and destruction of burrows.

1.3.7 The construction option chosen for the drain alignment, would require work over approximately 4.22ha of habitat that water vole may occupy and in a linear context, this represents approximately 1740m of ditch or drain. Water voles would need to be moved from these areas prior to the works commencing. Once completed, the realigned Sizewell Drain would be available for water vole to use. The location of this drain is presented in Appendix A Figure 14C6B.5.

1.3.8 Table 1.2 shows the area (or length) of water vole habitat which is due to be lost due to the construction footprint. This is an approximate estimate which would be refined as construction plans are further developed, and further water vole survey work (to support any future Natural England derogation licence) is carried out.

Table 1.2: Components of water vole habitat to be lost

Location	Length/area to be lost	Reason for loss
Leiston Drain	390m (including 70m of culvert and 20m stand-off either side)	To create Sizewell Marshes SSSI crossing
Habitat lost within Sizewell Marshes SSSI	665m perimeter, 0.67ha of wet reedbed 1736m perimeter, 3.55ha of suboptimal dry reedbed	Infill for north-west corner of proposed Sizewell C Station Platform
Sizewell Drain	1319m	Drain realignment*
East-west running drains west of Sizewell Drain by SZB	31m (one section)	Drain realignment*

* Although new sections of realigned ditch will be created, this is still considered a permanent habitat loss, with replacement habitat provision. The details of the replacement realigned ditch are presented in section 1.

d) Habitat fragmentation

1.3.9 The construction of the Sizewell Marshes SSSI crossing (see Appendix A **Figure 14C6B.6** and **Figure 14C6B.7**) could potentially lead to habitat fragmentation for water vole, preventing dispersal movements between Sizewell Marshes SSSI and Minsmere South Levels, along the Leiston Drain. The causeway would be approximately 68m wide at its base, and the culvert would therefore have a similar length. The drain would be unimpeded during construction, and whilst the banks would be retained within the culvert, the banksides would lose all vegetation, other than at each end of the culvert, due to shading impacts.

1.3.10 The greatest potential for short-term habitat fragmentation would be during the Phase 1 construction period, when the site clearance and construction work associated with the establishment of the Sizewell Marshes SSSI crossing is taking place. During the construction of the culvert that would form the Sizewell Marshes SSSI crossing, the integrity of the Leiston Drain and adjacent banks would be maintained, so a barrier to water vole movement via the Leiston Drain is only likely to occur for a short duration during the ground improvement works and the installation of the pre–cast culvert sections. The culvert itself has been designed with sufficient width to maintain the bank, allowing movement by water vole along the culvert.

1.3.11 Potential fragmentation effects resulting from the SSSI Crossing have been assessed in Appendix B and also within **Chapter 14 Vol. 2 section 14.22** of the Environment Statement.

1.4 Mitigation strategy overview

a) Introduction

1.4.1 This section outlines the proposed mitigation strategy for water vole, a justification of why this strategy was chosen and an explanation of how this strategy will be implemented.

1.4.2 In summary, this Draft Water Vole Method Statement involves:

- Displacement techniques and monitoring requirements are proposed where there is a working area with maximum length of 50m (for watercourse this equates to 50m on each bank). However, should displacement be unsuccessful (i.e. programme, season, signs continuously recorded following vegetation clearance) trapping will be undertaken within those areas. Displacement is proposed to mitigate habitat loss/disturbance within the 31m section of the east-west running drains west of Sizewell Drain by SZB that is due to be impacted.

- Trapping out water vole from the Sizewell Marshes SSSI crossing construction footprint would be undertaken during spring and autumn periods as necessary. In spring, animals would be released directly into the receptor area at Aldhurst Farm. In the autumn and if the weather is cold (night-time temperature below freezing (0^{o}C)), a contingency option for water vole captured during the 15 September to 30 November trapping is to be over-wintered in captivity. These water vole would then be released into the receptor area the following spring (between 1 March and 15 April). Trapping is proposed to mitigate habitat loss/disturbance within:

- Leiston Drain (where the SSSI crossing is to be constructed);
- Habitat Sizewell Marshes SSSI (where subject to landtake associated with the SZC platform); and
- Sizewell Drain (where the ditch is being realigned).
- As soon as water voles have been removed from the areas to be impacted, their habitat would be rendered unsuitable for recolonization;
- monitoring of water vole populations will occur prior to, during and after the above approach at the receptor site, the areas impacted by the works and the areas reinstated, such as the Sizewell Drain.

1.4.3 Once the proposed SZC main development site works have been completed, it is considered that there will be an overall increase in the population of water voles across the EDF Energy estate as a result of an increase in greater habitat availability.

1.4.4 All works that have the potential to impact water vole will be undertaken under licence from Natural England following an agreed Draft Method Statement and would be overseen by an Ecological Clerk of Works.

1.5 Water vole displacement

a) Displacement approach background

1.5.1 In England, activities aimed at displacing water vole in the context of a development project have previously been routinely undertaken without a licence, with reliance on the ‘incidental result’ defence. It is now considered that such activities are not covered by this defence, and therefore require a licence. The development proposals must therefore deliver a net benefit for water voles as the licence would be issued for the purpose of conservation.

1.5.2 Displacement will be used as the method for preventing incidental mortality. It is considered that the likely impacts of the project fall within the recommended restrictions of the project. According to the best practice guidelines (Ref 1.3) displacement can be employed under the following circumstances (the project response is listed below in italics):

- where there is a working area with a maximum length of 50m (for watercourses this equates to 50m on each bank), although a shorter maximum length would be appropriate in situations where water vole are at high density;

The works impacting upon the 31m section of the East-west running west of Sizewell drain is less than 50m in length. The water vole population in the ditch is low.

- works are conducted between 15 February and 15 April inclusive (although some seasonal variation is accepted depending on weather and geographical location); and

  The project is proposing to conduct the displacement in this time period as far as possible, although the autumn period may also be used, subject to agreement.

- where there is sufficient available alternative habitat for water vole to move into

  Extensive areas of water vole habitat are available both upstream and downstream of the areas of construction impact.

b) Displacement and destructive search methodology

1.5.3 In areas where impacts to water bodies supporting water vole are foreseen, displacement will be conducted followed by a destructive search. The protocol for this displacement and destructive search is presented in Table 1.3 below.

Table 1.3: Displacement and Destructive search protocol

Step	Action
1	Before vegetation removal, identify and mark the position of all burrows in the working area so that these can be located later to ensure that they are not blocked. Confirm the absence of other constraints to the works, such as nesting birds.
2	Remove vegetation on the bank face within the area subject to development works, plus at least an additional 3m either side of the working area, and on the bank top (i.e. at least 3m back from the bank). This would be achieved using a strimmer until only bare earth remains. If feasible, also cut the emergent aquatic vegetation located along the water margin to below water level.
3	Rake off and remove any arisings from the cleared area.
4	Check that burrow entrances have not become blocked and remove any latrines or feeding remains.
5	If feasible and environmentally acceptable, combine with de-watering of the affected section of watercourse.
6	Leave the strimmed area intact for five days to allow animals time to relocate.
7	Re-survey the site for fresh evidence of water vole. If there is no evidence that water

Step		Action
		vole are still present, undertake a destructive search of the burrows (under the supervision of a suitably experienced ecologist) as follows.
7	a	Excavate burrows to ensure that no animals are present. Hand tools would preferably be used, and excavation would extend as far as possible, bearing in mind practical health and safety constraints.
7	b	Using an excavator with a toothed bucket, rake through the turf and topsoil on the bank face and top on the side that the excavator is positioned. Then with a second or third sweep of the bucket, remove the turf and topsoil to a depth beyond which any burrows would be present.
7	c	Remove in-channel vegetation within 50cm of the toe of the bank to prevent regrowth.
7	d	Smooth the surface of the bank using an excavator with a ditching bucket (or the back of the toothed bucket). Ensure that any lumps of topsoil that might provide a refuge for water vole are removed.
7	e	Repeat the process for the opposite bank (if necessary).
8		Ensure that water vole do not return prior to the development works commencing by: • undertaking the works within five days of completing the destructive search; or • in-filling the channel immediately following the destructive search; or • maintaining the works area as bare ground until the works have taken place. This is likely to require a repeat scraping/smoothing of the banks; or • covering the ground with a suitable matting to ensure that vegetative regeneration cannot occur; or • installing suitable water vole resistant fencing to prevent water vole returning.

1.5.4 If monitoring after the displacement but prior to the destructive search finds evidence of water vole, steps 1 – 6 will need to be repeated, or trapping will subsequently be conducted, as outlined in section a).

1.5.5 During destructive search the excavator will work in the direction that the water vole are being encouraged to move (towards retained habitat of good quality for water vole.

1.5.6 It is not foreseen that there will be any necessity to capture water vole by hand as a component of the works.

1.5.7 Throughout the construction period there will be monthly monitoring of active works areas along ditch 1 to ensure that water vole have not recolonised these areas.

1.5.8 If a licence is obtained, the approach to displacement and destructive search would be implemented as outlined within this report.

c) Works timetable

1.5.9 Table 3 outlines the indicative timescale for the licensable activities [to be completed].

Table 1.4: Works timetable

Activity	Timeframe	Notes
Displacement as outlined in Table 2	TBC	
Destructive search as outlined in Table 2	TBC	To be conducted immediately following displacement
Construction period	TBC	Monitoring of the impacted areas to ensure that water vole have not recolonised will occur monthly throughout this period
Reinstatement of realigned ditch sections to allow recolonization of vegetation to occur	TBC	Immediately following construction completion

1.6 Water vole trapping and translocation

a) Trapping Introduction

1.6.1 Trapping of water voles can only be undertaken by a person licensed to do so by the relevant Statutory Nature Conservation Organisation (SNCO) (Natural England in England) and would only be carried out by those with sufficient experience to ensure the welfare of the animals. Much of the following is adapted from the approach defined in Dean et al. (Ref 1.3).

1.6.2 Trapping is proposed to mitigate habitat loss/disturbance within:

- Leiston Drain (where the SSSI crossing is to be installed);
- Habitat in the Sizewell Marshes SSSI (where subject to landtake for the north-west corner of the platform); and
- Sizewell Drain (where the ditch is being realigned).

1.6.3 Trapping of water vole would only be undertaken at an appropriate time of year (1st March – 15th April 15th September – 30th November). Trapping would also not be undertaken during the following conditions:

- cold conditions – night-time temperatures below freezing (0°C);
- hot conditions – daytime temperatures above 20°C; and
- high rainfall/flooding – where water-level rises could be sufficient to flood the traps (the use of floating platforms may allow trapping to continue during minor water level fluctuations, but not during major flooding events which would capsize the rafts).

1.6.4 The weather forecast would be monitored daily during the trapping exercise, and the traps would be securely closed or removed if adverse weather conditions arise or are forecast.

b) Traps

1.6.5 An ideal metal trap type for capturing water vole is constructed from 1cm × 1cm weld mesh with an aluminium or wooden shelter at one end. Its basic dimensions are 50cm long × 15cm wide × 15cm high. The aluminium shelter sits over the far end of the trap and is 215mm in length. The traps have a spring-loaded mechanism allowing a very light treadle weight and have a simple locking bar fitting in their doors which activates on closure. These traps are light and easy to handle.

1.6.6 Traps would be thoroughly cleaned, disinfected, rinsed in clean water and dried after use and between trapping sites. In areas with bovine tuberculosis (TB), care needs to be taken to ensure that the agent is effective against mycobacteria (e.g. Trigene © is an effective agent whereas Virkon is not).

1.6.7 If trapping is undertaken during inclement weather conditions, then wooden covers over the nesting areas of the trap would be used to insulate the bedding area. These can be additionally insulated with a covering of ‘bubble-wrap’ if poor weather conditions persist.

1.6.8 Traps would be checked prior to use to ensure that they are in complete working order. Any traps which break, or malfunction would be immediately replaced. Each trapping team would have enough traps to allow for a replaceable reserve.

c) Locating and securing traps

1.6.9 Traps would be placed at a density of at least one per 10m of bank and where possible would be located parallel to the bank edge and immediately adjacent to latrine sites or in areas where runs are obvious. The ground beneath the trap would be flattened as far as possible without damaging the bank, to allow the trap to sit securely, and where possible placed on a slight incline with the nest chamber highest, to prevent submersion in the event of minor fluctuations in water level. All traps would be secured with pegs, to prevent them being dislodged.

1.6.10 Traps would not be set in precarious positions where the movement of captured animals could lead them to fall into water, or in situations where human interference is likely to occur[1].

1.6.11 Each trap would be uniquely numbered with indelible pen and either clearly marked using flags (where interference by the public is unlikely, as in this location) or their locations mapped accurately to ensure they can be relocated. All trap locations should also be recorded using a hand-held Global Positioning System (GPS).

1.7 Provisioning traps

1.7.1 Traps would be provisioned with dry straw bedding and half a fresh, sweet apple. Additional food can also be provided (e.g. pieces of carrot). These materials would be checked daily and changed at least every second day.

a) Checking traps

1.7.2 Traps would be checked at least twice daily:

[1] Traps can also be set on floating platforms (such as mink rafts, or purpose-built structures). This approach is particularly helpful in capturing animals from wetland habitat where there is no bank; where the bank is too steep to allow traps to be set safely; where most of the latrines are located some distance from the bank on floating vegetation; or where water levels are likely to fluctuate, such as downstream of an outfall or in an artificially or tidally impounded reach. Floating platforms are also useful where the disturbance of traps by dogs or foxes is likely. They must be sufficiently buoyant and stable to ensure that they can support a water vole's weight (or that of any non-target species), and therefore must be of higher specification than those simply used for undertaking surveys. The traps must be secured to the platform, to ensure that they do not roll into the water, and the platforms must be secured using canes or similar, to prevent them floating away. They also need to be tethered in a way which allows them to rise and fall with changes in water level, and they should not be used in situations where there is significant water wash from boat traffic, which could cause them to capsize.

- early morning check, between 6am and 10am, with all traps checked by 10am; and
- late afternoon/evening check, before dusk.

1.7.3 During warm weather conditions a third check in the middle of the day would be undertaken.

b) Handling captured animals

1.7.4 Handling of water vole would only be undertaken by individuals holding an SNCO licence, or their accredited agents. Captured water vole to be released at the Aldhurst Farm receptor site would be examined upon release from the trap to determine their sex and approximate size. They would then be placed in a suitable container for transportation, such as a standard rodent laboratory cage.

1.7.5 When water vole are captured, traps would be replaced on the same spot, as it is likely that more than one animal would be present. Particular care would be taken to ensure that more than a single trap is placed side by side at any location where very small juveniles (30–50g in weight) have been captured. The chance of catching other sibling litter mates at the same point is high. These can be placed in holding cages together if they are captured at the same location but should not be mixed with any other adults.

1.7.6 All field staff would be made aware that water vole can carry leptospirosis, and be familiar with its symptoms, pathways for transmission to humans, and the precautions necessary when handling water voles to minimise the risk of infection.

c) Completion of trapping

1.7.7 Trapping would be considered to be complete once there has been a period of five days or more when overnight temperatures are above freezing, with no captured animals, and there are no new field signs within the capture site. Once completed, a destructive search of the area would be undertaken. Any animals found during the destructive search would be captured with nets or by hand and transported as described above.

1.7.8 For large trapping exercises, such as in this location in the Sizewell Marshes SSSI, it may be appropriate to consider completing trapping in some parts of the site before others, to prevent the chances of animals recolonising the cleared areas. Further consideration is to be given to this, particularly in light of the difficulties in accessing the area for all of the works described above.

d) Soft release

1.7.9 Section 6.8 is taken from Dean et al. (Ref 1.3).

1.7.10 Water vole that are relocated by trapping should be released into their receptor site using a soft-release technique. Although there is a lack of evidence of the additional benefits of soft-release versus hard-release (or indeed of the potential benefits of a longer-term soft-release than that described below) it is the professional opinion of the authors that the use of soft-release pens is likely to increase the number of animals surviving at release sites by providing animals with time to adjust to their new location. There are two basic methodologies for this process:

- The creation of pens with no base that are sunk into the ground to a depth of at least 25cm adjacent to the water's edge. These can be complete (fold-up) units or constructed from separate materials.

- Complete cages positioned in the riparian vegetation next to the water's edge from which animals cannot escape until a front section (with 6cm diameter holes in either side of a predator-proof baffle) is fitted.

1.7.11 Although both systems can work well each has its advantages and disadvantages discussed in the following sections.

i. Pens with no base

1.7.12 Using this release technique, the water vole burrows out of the holding pen. Studies of radio-collared individuals (P. Franklin, personal communication) demonstrated that they would remain under these structures, in the burrow systems they have established, for many days before moving out into the wider environment. Once in position, these cages are difficult to move and if water levels fluctuate, they can rapidly be submerged. In addition, if they are not designed as complete units and their construction materials leave gaps in the overall structure then the vole can readily escape before they have settled. Under certain ground conditions, such as stony soils, they can be hard to reliably install. They need to be covered at least partially from the weather and securing predator-proof lids can be difficult.

1.7.13 A successfully used design is constructed from aluminium, which folds down for transport, and has a hinged lid for feeding access. It is completely weather-proof, with a floor area of approximately 45cm × 45cm and a maximum height of 25cm. Once dug in, these pens are fitted with a cardboard sheet (5mm thick) in their base through which the water vole have to gnaw to access the soil beneath. The top lid functions as an access door for feeding and maintenance. These cages needed to be well shaded to avoid them heating up excessively, so they would be located to avoid direct or dappled sunlight.

ii. Complete cages

1.7.14 Using this technique, water vole are completely contained. Although they cannot establish burrow systems they would rapidly come and go from both their own and adjacent cages once the fronts are folded under the main cage and a baffle (to deter large predator access) is placed in position. These types of release cages are easier to install in some cases (such as stony soils) and are easier to move if this is needed during the release. The water vole are released from this structure by folding the front section under the main cage and then fitting a baffle with 6cm diameter holes at either side.

1.7.15 These cages can also be used as an on-site holding facility in situations where the release of water vole needs to be delayed, such as to allow vegetation within the receptor site to become better established. In such cases the cages must have a covered section on their top, back and sides to prevent the bedding getting damp. This can be achieved by partially covering the cage with a tarpaulin. The pens must be positioned in an entirely secure location where they cannot be removed or interfered with in any way by predators or people. Their position in a receptor habitat must be well above the level of any potential rises in water level.

iii. Release

1.7.16 If groups of siblings are being released together, up to seven individuals can be released using either technique. Family groups of a mother and young can also be released together. In other circumstances, water vole should be released as individuals rather than in groups. Individuals of the same sex should be separated by a minimum of 40m intervals along the waterway (two pens, one containing a male, one a female, per 40m length). The pens should be sited as close to the water as possible, in (or near) tall vegetation. Release pens should be situated away from public access. If this is impossible then a security fence may be required to prevent interference.

iv. Provisioning

1.7.17 Release pens must be checked daily during the relocation operation to ensure that the animals have enough food. They should be supplied with a straw-bale-section (one-sixth of a bale) to provide cover and bedding. In the experience of the authors, each water vole should be provided with quarter of a sweet apple, half a carrot and cut external vegetation daily; and the animals should be supported with food for eight days in the dug-in cage system before these are removed, leaving the old bedding in place. In the complete cage system, they should be supported with food for five days, released on the sixth day and then fed for another three days. Once again, all the old bedding from these pens should be left *in situ* on the bank. In situations where water vole are to be held in complete cages for longer than six days, as an on-site holding facility (see above), they should also be provided daily with a small bowl of dry alfalfa-rich rabbit feed and drinking water (clip-on water bottles should be attached to the side of the cage). Shallow metal trays, 60cm long × 30cm wide × 10cm deep can also be provided as swimming trays. The cages should need to be checked daily to ensure that they are intact, and food and water must be replenished daily.

e) Taking into captivity

1.7.18 Trapping out water vole from the Sizewell Marshes SSSI construction footprint is proposed to be undertaken over both spring and autumn periods. If trapping is required to be undertaken in autumn between 15 September to 30 November inclusive and the weather is cold (night-time temperature below freezing (0ºC)) in the autumn, there would be a contingency option for any water vole captured in the 15 September to 30 November window to be over-wintered in captivity and subsequently released into the Aldhurst Farm receptor area the following spring.

1.7.19 The following organisations are believed to have the facilities to hold water vole in captivity (should this be required if the weather turns cold (night-time temperature below freezing (0ºC)) during an autumn trapping programme):

- Chester Zoo (British and Irish Association of Zoos and Aquariums (BIAZA) registered).
- Derek Gow Consultancy.
- M&H Ecology.
- Wildwood Ecology (BIAZA registered).

1.7.20 All facilities and care regimes for water vole must be fully compliant with the legislative requirements present in the Welfare of Animals Act (Ref 1.4). Ideally animals would be held by organisations registered with the British and Irish Association of Zoos and Aquariums (BIAZA) or in similar facilities (such as those noted above) which can maintain a consistently high standard of captive care and maintenance.

1.7.21 All operatives handling water vole must be suitably experienced and use appropriate equipment.

f) Post trapping destructive search

1.7.22 The following steps (outlined in Table 1.5) would be undertaken after the completion of the trapping. This approached has been adapted from the guidance in the most recent water vole guidance (Ref 1.3).

Table 1.5: Post trapping destructive search protocol

Step	Action
1	Re-survey the site for fresh evidence of water vole. If there is no evidence that water vole are still present, undertake a destructive search of the burrows (under the supervision of a suitably experienced ecologist) as follows.
2	Excavate burrows to ensure that no animals are present. Hand tools would preferably be used, and excavation would extend as far as possible, bearing in mind practical health and safety constraints.
3	Using an excavator with a toothed bucket, rake through the turf and topsoil on the bank face and top on the side that the excavator is positioned. Then with a second or third sweep of the bucket, remove the turf and topsoil to a depth beyond which any burrows would be present.
4	Remove in-channel vegetation within 50cm of the toe of the bank to prevent regrowth.
5	Smooth the surface of the bank using an excavator with a ditching bucket (or the back of the toothed bucket). Ensure that any lumps of topsoil that might provide a refuge for water vole are removed.
6	Repeat the process for the opposite bank (if necessary).
7	Ensure that water vole do not return prior to the development works commencing by: • undertaking the works within five days of completing the destructive search; or • in-filling the channel immediately following the destructive search; or • maintaining the works area as bare ground until the works have taken place. This is likely to require a repeat scraping/smoothing of the banks; or • covering the ground with a suitable matting to ensure that vegetative regeneration cannot occur; or • installing suitable water vole resistant fencing to prevent water vole returning.

g) Timetable of trapping and translocation works

1.7.23 The timetable of the works described is dependent upon weather (i.e. extreme weather events such as high rainfall, daytime temperatures above 20^{o}C and night-time temperature below freezing 0^{o}C), trapping success and the completion of other ongoing protected species mitigation works being conducted within the application site. Trapping is expected to take a maximum of 21 days. The predicted timetable for the works can be seen in Table 5 below [to be completed].

Table 1.6: Proposed timetable and summary of key water vole mitigation works at the application site.

Activity and Key Points	Approximate Dates
Updated surveys	TBC
Licence submission	TBC
Licence granted This date assumes a 30 working day turnaround for the licence from submission to Natural England.	TBC
Site resurveyed to determine trap positioning This will allow the current status of water vole within the survey site to be assessed.	TBC
Installation of soft release pens Once a licence has been granted, soft release pens will be installed at the receptor site. The time between installation and the commencement of trapping will allow any damaged vegetation to recover prior to any animals being translocated to the release pens.	TBC
Baited traps opened.	TBC
Checking of open traps All open traps will be checked twice daily. Any captured animals will be moved to receptor site release pens and provisioned with adequate food resources.	TBC
Closing of traps Once a minimum of ten trapping days in suitable weather have been conducted with no animals being caught for 5 consecutive days, the destruction of habitat will be allowed. Should the destruction of habitat be postponed, the traps will remain active and in situ right up until the destruction of habitat occurs to ensure no window of opportunity exists for water vole to re-colonise.	TBC

Activity and Key Points	Approximate Dates
Destruction of habitat Once the site is determined to have been cleared of water vole and other protected species, the site will be destroyed under supervision of a suitably qualified ecologist, according to the methodology outlined in the Water Vole Conservation Handbook.	TBC
Soft release of captured water vole Once it is determined that all animals in the application site have been relocated and water vole habitat at the application site has been destroyed, or individual water vole have been held in release pens for 21 days, any captured animals present in release pens will be released through the removal of a small baffle. This will only occur if animals have been in the release pens for a minimum of four days. The pens will be left in-situ to provide shelter for the released animals and food supplies will continue to be provisioned.	TBC
Removal of soft release pens Five days after the animals are released from the soft release pens, these pens will be removed entirely. Any remaining bedding and food will be left in-situ.	TBC

1.8 Compensation

a) Release location

1.8.1 The proposed release location for trapped water vole is Aldhurst Farm receptor site where habitat enhancement and creation measures were implemented in 2014 to 2016, with ongoing management of the area.

1.8.2 The Aldhurst Farm area (bounded by Lovers Lane to the north and east, Valley Road to the south-east, and Leiston to the west and south-west) was in arable use up until 2014. It has the upper reaches of the Leiston Drain crossing the site from east to west and is immediately adjacent to the Sizewell Marshes SSSI to the east. Surveys found water vole present in the Leiston Drain.

1.8.3 Overall, the release site offers more extensive habitat than that being lost to the development, as presented in Table 1.6.

Table 1.7: Habitat loss and gain as a result of the development

Donor site		Receptor/habitat enhancement site	
Location	Habitat loss - Size (perimeter/ length in m, or area in ha)*	Location	Habitat Created/Enhanced - Size (perimeter/ length in m, or area in ha)
Leiston Drain	390m of permanent habitat loss (Inc. 70m of culvert and 20m stand-off either side) on two banks	Aldhurst Farm lagoons and reedbed habitat creation/enhancement (including the release site, Lagoon A which has been fenced to maintain it as water vole free)	The total area of wetland habitat created / enhanced within Aldhurst Farm is approximately 6.2ha which includes: Wet reedbed (excluding open water areas) 3.15ha Open water within wet reedbed (assume 25% from 20—30% stated in Ecology and Landscape Management Plan, Appendix A) 1.1ha Dry reedbed and reed-based tall herb fen 1.2ha Approximately 2km of ditch (0.8ha) Of which the release area (Lagoon A) is approximately 1.9ha with approximately 790m of ditch
Sizewell Drain	Within SSSI triangle: 1319m of permanent habitat loss on two banks	Ditch realignment of Sizewell and Leiston Drain	Ditch realignment of Sizewell and Leiston Drain will create 1.09km of ditch
East-west running drains west of Sizewell Drain	31m (one section)	New habitat in the north eastern extent of the site	New habitat to be created in the marsh harrier habitat improvement areas of the site will comprise of 1.2ha of reedbeds and 0.7ha of wet woodland
Lagoon and associated reedbed in SSSI	0.67ha of wet reedbed 3.55ha dry reedbed		

Donor site		Receptor/habitat enhancement site	
Location	Habitat loss - Size (perimeter/ length in m, or area in ha)*	Location	Habitat Created/Enhanced - Size (perimeter/ length in m, or area in ha)
Total Area Lost:	4.22ha of reedbed 1740m of ditches	**Total Area Available (in Aldhurst farm and new habitat to be created in the marsh harrier habitat improvement areas created areas):**	5.6ha Reedbed 1.1ha Open water 0.7ha Wet woodland Approximately 3km of ditches

1.8.4 Approximately 6.2ha of wetland and 2km of ditch and open water were created on this site in 2014 in the form of four lagoons either side of the Leiston Drain. These lagoons were designed to ensure that the reedbed and lowland ditch habitats could establish and develop a similar biodiversity value to those within the adjacent Sizewell Marshes SSSI. They were created through lowering the ground to expose the water table, securing water levels during low rainfall, with weirs to maximise water-level control.

1.8.5 The newly created lagoon banks and reedbed have established well and currently provide suitable habitat for water vole to burrow in; the reedbeds provide habitat for water vole to build nests in, and the diverse flora provides suitable foraging habitat.

1.8.6 The western-most lagoon (Lagoon A, see Appendix A **Figure 14C6B.8**) has an area of approximately 1.9ha and a ditch perimeter of approximately 790m. This lagoon has been designed to be the receptor site for water vole translocated from Sizewell C. A site visit on 6 October 2016 and subsequent visits in 2018 revealed that Lagoon A has establishing well as a potential water vole receptor site (see Table 1.7). Lagoon A was fenced with water vole-proof fencing in the spring of 2018. The outflows to the ditch system were covered in fine mesh to prevent ingress by water vole. Further site visits in 2018 (19 June and 7 August) confirmed the absence of water vole and the on-going development of the habitat as suitable for water vole.

1.8.7 A visit was undertaken in November 2019 to evaluate the ongoing management of the area and additional management prescriptions were recommended to ensure optimum quality.

Table 1.8: Photographs of Lagoon A, Aldhurst Farm in 2016 and 2018

	
From west, looking east (06/10/16).	From east, looking west (06/10/16).

 From west, looking east (22/06/18).	 From west, looking east (22/06/18).

1.8.8 Plants identified within the reedbed in 2018 include: Water-plantain (*Alisma plantago-aquatica*), Bulrush (*Typha latifolia*), Purple-loosestrife (*Lythrum salicaria*), Water-cress (*Nasturtium officinale*), Pendulous Sedge (*Carex pendula*) and Hoary Willowherb (*Epilobium parviflorum*). Patches of Bramble (*Rubus fruticosus agg.*) were also developing around edge of reedbed. Therefore, the reedbeds and banks have become optimal habitats for water vole.

1.8.9 The other created lagoons and reedbeds at Aldhurst Farm (Lagoons B, C and D, see Appendix A **Figure 14C6B.8**) have been created as compensatory habitats to offset the landtake impacts associated with Sizewell SSSI Marshes described above, including habitat loss to water vole. Lagoons B, C and D have not been fenced off to prevent the natural colonisation of water vole. In habitat area terms, these lagoons would provide a conservation benefit to water vole and offset the overall habitat loss and fragmentation effects from the Sizewell C project in relation to reedbeds and ditches.

1.8.10 A management plan for Aldhurst Farm has been prepared and approved by the Local Planning Authority, ensuring the maintenance of habitat suitable for water vole.

1.8.11 In addition to the Aldhurst Farm habitat areas, described above, a new area of reedbed and wet woodland would be created in the north-eastern extent of the site. The area will comprise a mosaic of reedbed (1.2ha) and wet woodland (0.7ha) adjacent to extensive areas of dry grassland and scrub created as habitat improvement areas for marsh harriers and surrounded by existing woodland to the north and east of the newly created habitat (see Appendix A **Figure 14C6B.9**). These wetland habitats would form an extension to the Minsmere South Levels to the north and east and when established would also be suitable for colonisation by water voles in due course.

1.9 Monitoring and management

1.9.1 A regular monitoring programme, both during and after construction, is required to:

- assess the effectiveness of the mitigation; and
- provide early warning of any adverse trends in the population so that appropriate action can be taken.

1.9.2 This approach will provide the best opportunity of ensuring no adverse impacts arise on water vole populations over the short- or long-term.

1.9.3 Monitoring would be undertaken at both the construction site (and several hundred metres either side of it) and at the receptor site at Aldhurst Farm.

1.9.4 Monitoring water voles will provide information on:

- the establishment and success of the translocated population at the Aldhurst Farm receptor site;
- colonisation of the realigned Sizewell Drain;
- re-colonisation of the Leiston Drain; and
- population interchange across the new SSSI Crossing.

1.9.5 Surveys will be carried out during the breeding season (March to October), and at a time of year when field sign survey results can be compared with pre-construction survey data. The monitoring would be undertaken for a five year period, in accordance with the guidelines set out in the Water Vole Mitigation Guidelines (Ref 1.3). Specific survey techniques are likely to be required to determine the extent of population interchange across the new SSSI Crossing.

1.9.6 Management of the receptor site will continue throughout the life cycle of the Sizewell C reactor and will be the responsibility of the site operator (SZC Co.). The management of the receptor site and of the existing ditches impacted by the works, realigned ditches and newly created habitats at Aldhurst Farm is designed to prevent incidental mortality and to achieve an optimum habitat as outlined in the Water Vole Conservation Handbook (Ref

1.5). An approved (by the Local Planning Authority) management plan is in place and is presented in Appendix B.

1.10 Development timetable

a) Timetable summary

1.10.1 Table 1.8 shows the proposed construction and operational phases of the SZC main development site works. Where applicable, inputs in relation to water vole mitigation are also included.

Table 1.9: Construction and Operational Phases in relation to water vole mitigation

Phase	Generic action	Specific action	Timing
Preliminary works	Activities proposed prior to a DCO being granted, to expedite the delivery of the works.	Fencing to exclude water vole from proposed Aldhurst Farm receptor site, and further habitat enhancement.	Completed 2018. Maintenance ongoing.
		Surveys to confirm absence of water vole at proposed Aldhurst Farm receptor site.	Completed 2018. To be updated in 2020
		Draft licence preparation as part of the DCO.	2020
		Pre-licence population surveys at Sizewell Marshes SSSI crossing construction footprint	2021
		Final licence preparation.	2021
		Licence submission.	Post DCO grant

Phase	Generic action	Specific action	Timing
Phase 1: Site establishment and preparation for earthworks	Establishment of the site and preparations for the main earthworks, focussing on securing and clearing the site and provision of early access routes. Ditch realignment.	Spring (ideally) or autumn trapping of water vole from Sizewell Marshes SSSI crossing construction footprint (and if required, over-wintering in captivity)	TBC
	Installation of Sizewell Marshes SSSI crossing	Release of water vole from captivity (if required) into Aldhurst Farm receptor site	TBC
		Displacement of water vole from 30m sections of Sizewell Drain	TBC
Phase 2: Earthworks	Main ground materials which overlay construction area transported to the stockpile areas within the temporary construction area. New reedbed and wet woodland habitats to be created in the north eastern extent of the site	On-going monitoring programme at receptor site and Sizewell Marshes SSSI crossing construction footprint.	TBC
Phase 3: Main civil works	Main civil engineering works.	On-going monitoring programme at receptor site and Sizewell Marshes SSSI crossing construction footprint.	TBC

Phase	Generic action	Specific action	Timing
Phase 4: Fit out, instrumentation and commissioning	Mechanical and electrical plant installation phase.	On-going monitoring programme at receptor site and Sizewell Marshes SSSI crossing construction footprint.	TBC
Phase 5: Removal of temporary facilities and restoration	As the main construction phases conclude, temporary facilities would start to be removed and the temporary construction site areas restored to an agreed state consistent with Landscape Strategy for the EDF Energy estate.	On-going monitoring programme at receptor site and Sizewell Marshes SSSI crossing construction footprint.	TBC
Operational phase	On-going monitoring programme at receptor site, realigned ditches, crossing culvert and Sizewell Marshes SSSI crossing footprint.		TBC

1.11 Project plan for conservation gain

a) Net conservation gain

1.11.1 Macpherson & Bright (Ref 1.6) considered the landscape approach to water vole conservation. They have shown, from population modelling, the importance of creating (through habitat creation/restoration of large reedbeds and grazing marsh sites) ‘patches’ of core water vole habitat which can sustain water vole metapopulations in the surrounding landscape where conditions are less favourable.

1.11.2 Although water vole were recorded in the Leiston Drain at Aldhurst Farm prior to the habitat creation programme, only a small number of signs were found, and the surrounding land was agricultural land, of negligible value for water vole. Habitat creation at Aldhurst Farm has created and would maintain a mosaic of habitat suitable for water vole including: approximately 5.4ha of wet and dry reedbed habitat (incorporating between 20-30% open water habitat) and approximately 2km of ditch habitat characteristic of lowland ditch habitat.

1.11.3 In addition, the new reedbed and wet woodland habitats in the north eastern extent of the site, it will be created during the construction phase and will likely to have established and available for use during the final stages of construction. These habitats represent a net gain for water vole.

Appendix A: Figures

Please note that the red line boundary used in the figures within this document was amended after this document was finalised, and therefore does not reflect the boundaries in respect of which development consent has been sought in this application. However, the amendment to the red line boundary does not have any impact on the findings set out in this document and all other information remains correct.

Appendix B: Approved Ecology and Landscape management Plan for Aldhurst Farm Water vole area

Appendix C: Review of likelihood of Significant fragmentation from SSSI Crossing

1.1 Introduction

1.1.1 This section of the report outlines the rationale behind the assessment that there will be no significant impact from fragmentation.

1.2 Culvert Design for Water Vole

1.2.1 There is limited evidence as to whether culverts act as a barrier to water vole movement along watercourses. The Water Vole Conservation Handbook (Ref 1.5) states that ‘culverting does not seem to provide a major problem to water vole movement or fragmentation’, although it also says that ‘length may present a problem to water vole daily movement and dispersal’.

1.2.2 A review of the literature regarding the use of crossing structures by water vole, carried out to assess the potential impacts for culverts and bridges to form a barrier, and to assess potential mitigation options. From this review:

- in terms of distance alone, a 68m culvert within the territory of a water vole would not be too great a distance for water vole to negotiate;
- in terms of distance alone, a dispersing water vole could readily move 68m through a culvert, if required;
- the Sizewell Marshes SSSI and Minsmere South Levels water vole colonies are likely to be large enough to be genetically viable in the long term. If a barrier effect were to occur as a result of the construction of the Sizewell Marshes SSSI crossing, i.e. assuming that neither territorial nor dispersing individuals are prepared to use a structure (whether bridge or culvert), then the link along the Leiston Drain between the two populations is unlikely to be critical to the maintenance of either the Sizewell Marshes SSSI or Minsmere South Levels populations in the long term; and
- the potential exists to design a culvert to increase the likelihood of the structure being used by water vole, so that it is less likely to represent a barrier that would critically impact on the long-term maintenance of the combined Sizewell Marshes SSSI and Minsmere South Levels populations.

1.2.3 As a result of the literature review it was assessed that there would be no significant fragmentation as a result of the new culvert across the SSSI.

1.2.4 The literature review below suggests the following design measures would increase the likelihood of a structure being used by water vole, although robust evidence that such measures work is lacking.

- Large box culverts allow maximum light to pass through.
- Ideally, the diameter of any culvert should be at least 2000mm with a berm included, and culverts should be straight with no bends, so light can be viewed at both ends.
- Box culverts are better for water vole than pipe culverts.
- Gabions installed within each culvert can be used to provide a shelf just above mean water level, to permit water vole to pass easily from one end of the culvert to the other; these should be fully integrated into the existing bank at either end. This may also allow water vole to leave the water to rest, if required.
- Disturbed banks and gabions should be hydro-seeded to encourage rapid regeneration of vegetation.

1.2.5 The culvert proposed as a component of the development has been designed with these parameters in mind.

1.3 Detailed literature review

1.3.1 The table below (Table 1.9) outlines the literature reviewed that informed the conclusion that the new culvert would not cause significant fragmentation of populations of water vole.

Table 1:1: Results of detailed literature review

Evidence of water vole using culverts	
Small mammal use of modified culverts on the Lolo South Project of Western Montana (Ref 1.7)	Several small mammal species were found using a culvert in Montana under a highway. A total of six culverts were monitored over a distance of three miles along a series of wetlands – three with 25inch shelves and three without as controls. Small and large mammals used the shelving.
An evaluation of corrugated steel culverts as transit corridors (Ref 1.8).	• In 1995, 12 dry corrugated steel pipe culverts (35 x 1m) with soil substrate were installed at 50 m intervals under a four-lane highway at one wetland. Eight of the culverts were monitored. At another wetland, two wet cross-drainage corrugated steel pipe culverts (31 x 0.6m) were monitored. Aluminium track-plates covered with soot were installed 1-2m inside each culvert and were monitored nine times in July-October 2000. • Small mammals used most of the eight dry culverts, particularly racoons (11% of plates), species from the weasel family (32%) and mice, vole and shrews (31%). Similar species, although in much lower numbers were recorded using wet culverts.
Water vole wander across 'fragmented' Scottish habitat (Ref 1.9)	"Those animals typically have a home range of a few hundred square meters, and we found them moving two to three kilometres, a few even moving 15km between [the site of] their birth and their first reproduction."
Water Vole Conservation Handbook (Ref 1.5)	Open – sized box culverts up to 30-35m in length have been shown to be used by water vole. Water vole were shown to colonise from an existing population isolated by culverts of this length. Radio-collared water vole in Northumberland were shown to move considerable distances in an upland environment with many small culverts and pipes.
Kevin O'Hara, Project Officer Northumberland Wildlife Trust, pers. comm.	Kevin has undertaken studies looking at water vole and culverts. In his professional opinion: • a 70m culvert would not be considered a major barrier to the movement of water vole. • culverts should be straight with no bends, so light can be viewed at both ends. • a minimum circumference of 600mm is recommended. • an option that allowed pockets of vegetation to establish may improve the suitability of any corridor for the passage of water vole.

References

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1.2 HMSO (1996) The NERC Act [Accessed online December 2019] http://www.legislation.gov.uk/ukpga/2006/16/contents

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VOLUME 2, CHAPTER 14 APPENDIX 14C7A: NATTERJACK TOAD MITIGATION STRATEGY

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1 Natterjack Toad Mitigation Strategy

1.1 Introduction

a) Purpose

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station.

1.1.2 This Natterjack Toad Mitigation Strategy outlines the key approaches to mitigating potential impacts to Natterjack Toad (*Epidalea calamita*) populations present within or adjacent to the construction site for Sizewell C main development site. It will be used by SZC Co. and any relevant subcontractors, in relation to the proposal to build the Sizewell C.

1.1.3 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.1.4 The requirements for mitigation are currently based on the impacts outlined in the ES chapter associated with the proposed main development site works. This document should be read alongside the following documents:

- ES Volume 2 Chapter 14 Amphibians;
- ES Volume 2 Appendix 14A5 Amphibians; and
- ES Volume 2 Appendix 14C9B Draft Natterjack Toad Protected Species Licence.

b) Background

1.1.5 To facilitate the construction of Sizewell C a series of Water Management Zones (WMZs) are required. One of these is required to the north of the Sizewell C construction site (hereafter referred to as the main development site), within a field known as 'Retsom's Field' (Approximate Centroid Grid Ref: TM 4713 6514). The field is owned in its entirety by EDF Energy but only partially situated within the main development site. It comprises approximately 14.9ha of grazed pasture that is managed on behalf of EDF Energy by Suffolk Wildlife Trust (SWT). It also forms part of a larger Environmental Stewardship Agreement with EDF Energy which has been live since November 2013 (Agreement Reference: AG00476432; CPH Number: 360730020) and is recognised Coastal and Floodplain Grazing Marsh on the priority habitat inventory.

1.1.6 Retsom's Field contains three ponds (named N1, N2 and N3), one of which (N1) supports a breeding population of natterjack toads (*Epidalea calamita*). All ponds are situated outside of the Sizewell C application boundary, but approximately 3.55ha of suitable terrestrial foraging habitat will be lost to the WMZ during the construction phase of Sizewell C (10 years). The habitat loss is a worst case estimate as detailed design may enable a reduction in the size of the WMZ in this area and so reduce the loss of the foraging habitats.

1.1.7 This report presents a strategy to mitigate potential impacts on natterjack toad within or adjacent to the construction site for the main development site. It will be used by Arcadis Consulting (UK) Limited (hereafter referred to as Arcadis), SZC Co. and any relevant subcontractors, in relation to the proposal to build Sizewell C. However, only the proposed works associated with the construction of the WMZ within Retsom's Field are of relevance, as illustrated on 14C7A.1.

1.1.8 Natterjack toads are found at about 60 sites in Britain, and populations have declined significantly in the last century, due to habitat loss [Ref. 9]. Eastern England has seen the greatest declines in the numbers of this species, and the last natterjack toad colonies in Suffolk became extinct during the 1950s and 1960s [Ref. 18]. Natterjack toads were reintroduced to ponds in Retsom's Field at the north-east of the main development site in 2005 and have bred there successfully since [Ref. 1.1].

c) Legal Status

1.1.9 Natterjack toads are legally protected under Schedule 5 of the Wildlife and Countryside Act [Ref. 1.2], Schedule 2 of the Conservation of Habitats and Species Regulations [Ref.1.3] and are a European Protected Species (EPS). They listed under Suffolk's Priority Species and Habitats list [Ref. 1.4], and Section 41 of the NERC Act [Ref. 1.5] as a species of principal importance for the purpose of conserving biodiversity. A licence from Natural England is required for any activity which would result in a breach of the legislative protection afforded to natterjack toads. **Appendix A** summarises the legal status and licensing requirements for natterjack toads.

1.1.10 The local population of natterjack toads have been evaluated as being of 'National' importance in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) [Ref. 1.6] guidelines.

1.1.11 This Mitigation Strategy has been designed with the aim of reducing any potential adverse impact arising from of the construction of Sizewell C and ultimately ensure the favourable conservation status of the local natterjack toad population is maintained. The main objectives of the strategy are to ensure compliance with all relevant legislation, policy and guidance, and provide a mitigation and compensation solution that is beneficial to the local natterjack toad population in the long term.

d) Document Structure

1.1.12 This Natterjack Toad Mitigation Strategy is structured as follows:

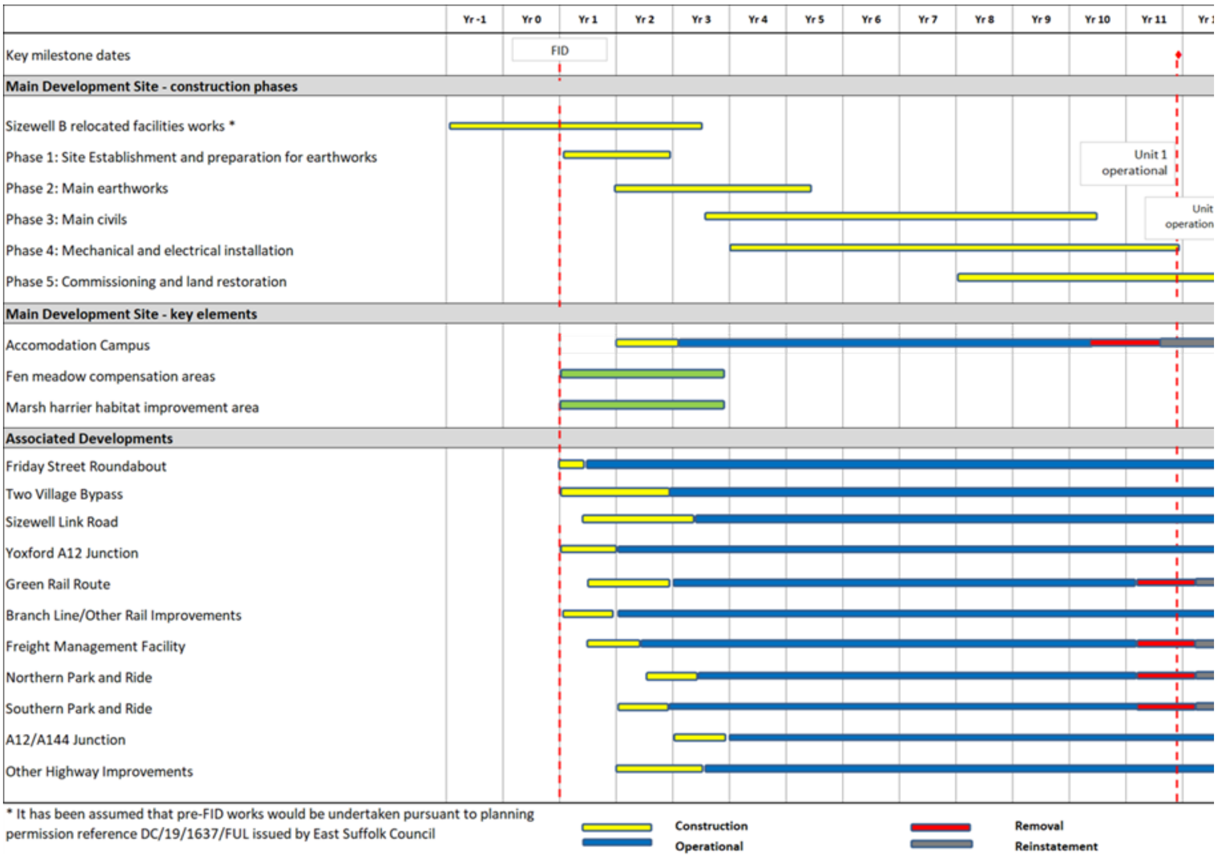
- Section 1: Introduction
- Section 2: Baseline Information
- Section 3: Impact Assessment
- Section 4: Mitigation Solution
- Section 5: Criteria for Success
- Section 6: Summary
- Appendices:
  - Appendix A: Legal status and licensing
  - Appendix B: Information underpinning this mitigation strategy
  - Appendix C: Natterjack toad baseline information
  - Appendix D: Figures
  - Appendix E: References

e) Development Programme Timeline

1.1.13 Construction would commence following a grant of a Sizewell C Draft Development Consent Order (Doc Ref. 3.1) (assumed 2022, Year 1), and is likely to be completed approximately nine to twelve years later (Years 9 to 12).

1.1.14 The programme requires that appropriate time is allowed for ecological mitigation and clearance works, in accordance with relevant seasonal constraints. The assumed construction programme is set out in Plate 1.1.

Plate 1.1: Assumed SZC Construction Programme



1.1.15 The following timeline describes key milestones in the delivery of this Mitigation Strategy:

- preconstruction: assessment of the impacts of construction based on current Construction Plan;
- updated preconstruction surveys to assess the natterjack toad population status to inform the Natural England derogation licence;
- at least one year before granting of a Development Consent Order (DCO) construction of additional refugia and other habitat improvements;
- inclusion of a draft Natural England derogation licence application as part of the DCO application. If approved, Natural England will issue a Letter of No Impediment to be included with the DCO submission;
- on granting of the DCO, submission of a final licence application to Natural England;

- prior to and during construction: implementation of any required mitigation strategies; and
- during and post-construction: monitoring of natterjack toad populations.

f) Roles and Responsibilities

1.1.16 The roles and responsibilities for implementation of this Mitigation Strategy are outlined below:

i. SZC Co.

- ensuring adequate land is available for the timely creation of any natterjack toad mitigation requirements;
- providing a named member of EDF staff to be the applicant for the licence, with the necessary authority and responsibility this requires;
- managing natterjack toad habitat areas to maximise their value for natterjack toad;
- ensure the Natterjack Toad Mitigation Strategy is implemented and evolved as required through the development process.

ii. Consultant ecologist

- developing and updating the Mitigation Strategy and the plan for its implementation;
- undertaking survey work on the status the Natterjack Toad populations required to inform a derogation licence;
- providing an ecologist to be the agent on behalf of the applicant, who will advise the applicant on how to fulfil any requirements of the NE licence;
- providing advice on any required natterjack toad populations mitigation and monitoring; and
- progress reporting.

iii. Contractors/sub-contractors

- adhering to agreed Method Statements, under a watching brief from an Ecological Clerk of Works (ECoW).

1.2 Natterjack Toad Baseline

a) Introduction

1.2.1 Below is a summary of the baseline information used to assess the impacts of the proposed development. It is supporting by the following information:

- **Appendix A** – provides the legal status of natterjack toads;
- **Appendix B** – lists all information underpinning this mitigation strategy; and,
- **Appendix C** – provides more information on natterjack toad ecology.

b) Natterjack toad ecology

1.2.2 The natterjack toad is a pioneer species, adapted for life in open habitats such as sand dunes, lowland heath or upper salt marshes [Ref. 1.7]. They require two elements of habitat structure, namely: open, unshaded terrestrial habitat with areas of un-vegetated (or minimally vegetated) ground with predominantly low-growing vegetation; and unshaded, ephemeral ponds for reproduction with shallow, shelving margins and few predators or competitors. Features such as rabbit burrows, logs and patches of open scrub provide cover [Ref. 8].

1.2.3 Natterjack toads are primarily nocturnal, spending much of the daytime in burrows or crevices under debris, and hibernating underground [Ref.1.8]. They emerge from hibernation in Spring, and have a long breeding season (April to July), with males calling to attract females to the ponds where spawning occurs. Metamorphosis to toadlets takes between six to eight weeks before toadlets then leave the pond. Hibernation starts in October.

1.2.4 Studies have shown that during the breeding season natterjack toads move up to 500m between breeding sites and can move substantially further outside of the breeding season [Ref. 20].

1.2.5 Current factors affecting the distribution of natterjack toads in Suffolk include significant reduction in formerly suitable habitat, loss of former breeding ponds, habitat fragmentation and predation by rising levels of corvids.

c) Site/habitat description

1.2.6 Retsom's Field comprises approximately 14.9ha of grazed pasture. It has light, sandy soils, relatively heavy sheep grazing pressure and several rabbit warrens, which provide hibernating opportunities (Suffolk Wildlife Trust, pers. comm.). Three ponds have been created for natterjack toad within the field as follows:

- N1 (Grid Ref: TM 47136 65112) – created in 2004 and only pond that has successfully supported breeding natterjack toad (to date).
- N2 (Grid Ref: TM 47148 65105) – also created in 2004 but clay lined pond that failed and is now defunct. May however provide terrestrial opportunities within an otherwise structurally poor field.
- N3 (Grid Ref: TM 47350 65191) – created in 2015, this pond is suitable for natterjack toad but as of 2019, none have been recorded within it.

1.2.7 Pond N1 is pumped dry in the winter to remove predators and allowed to refill naturally. The location of this field and the ponds are also shown in Figures 14C7A.2 and 14C7A.3 respectively.

1.2.8 In the wider area, the RSPB have recently (2018) created N4, a pond/scrape complex on Minsmere Levels, approximately 30m north of Retsom's Field and 265m north east of N1. Extensive areas of the Coastal and Floodplain Grazing Marsh and Coastal Sand Dunes priority habitats are situated to the north and east of Retsom's Field, providing a continuous corridor of suitable terrestrial habitat that connects the populations within N1 to those within Minsmere, to the north.

d) Desk Study, surveys conducted and previous information

1.2.9 Desk-study records (within the last 25 years) from the National Biodiversity Network (NBN) database:

- Westleton (TM 452 692) - relates to reintroductions carried out by the RSPB in 1985. Additional reintroductions were started at Mount Pleasant pools, Minsmere in 2005. Situated approximately 3.2km north of the main development site boundary and 4.5km from the Retsom's Field breeding pond (N1).
- Single desk-study record for natterjack toads at Vault Hill, RSPB Minsmere Reserve in 2005; however, this may be an erroneous location as this record is unknown to RSPB staff (RSPB, pers. comm.).

1.2.10 SWT have carried out monitoring surveys (counts of spawn strings, toadlets and adults) of the following:

- N1 (Grid Ref: TM 47136 65112) – annually since 2005. Subsequently, only this pond has remained as a successful breeding site. The number of tadpoles counted during SWT surveys and the adult population estimates for this pond are shown in **Table 1.1** (raw SWT data is provided in **Appendix C**)
- N2 (Grid Ref: TM 47148 65105) – annually between 2005 and 2007, after which the pond has not held water
- N3 (Grid Ref: TM 47350 65191) – annually since 2015; however, no natterjack toad sightings have been recorded at this pond to date (SWT, pers. comm., Jan 2019)

1.2.11 RSPB have carried out surveys of pond N4 (Grid Ref: TM 47438 65200), since its creation. As of August 2019, there were no signs of natterjack toad breeding within this pond (RSPB, pers. comm.).

1.2.12 Natterjack toads are also thought to hibernate in rabbit warrens within Retsom's Field (SWT, pers. comm.).

Table 1.1: Summary results from SWT Natterjack Toad Surveys – Pond N1

Year	Estimated natterjack tadpole peak counts	Spawn strings	Estimate of female numbers	Estimate of adult population size
2005	0	-	-	-
2006	0	-	-	-
2007	0	Large number	-	-
2008	3,000		-	-
2009	3,000	16	16	32
2010	2,500	-	-	-
2011	3,000	Present in April and second brood in July	-	-
2012	5,000	8 in April 4-6 strings in July (but no survival)	8[1]	16
2013	5,000	-	-	-
2014	8,000	11-13 in May	13	26

Year	Estimated natterjack tadpole peak counts	Spawn strings	Estimate of female numbers	Estimate of adult population size
2015	5,000+	Present in May and second brood in July	-	-
2016	3,000	2	2	4
2017	0	0	0	0
2018	15,000	8 in May 6 in June	14[2]	28
2019	10,000	7 in May 3 in July	10	20

[1] Assumed to be same females at start and end of breeding season.

[2] Assumed to be different females as breeding within one or two months.

e) Status of species at the local, county and regional levels

1.2.13 Rare. Since extinction in the 1950s and 60s, natterjack toad have been re-introduced in Suffolk at a small number of ponds, including the introduction of the population within Retsom's Field. Adults were recorded within N1 during 2006 and 2007 (despite only tadpoles being introduced in 2004 and natterjack toads taking 3-4 years to reach sexual maturity). It is therefore a possibility that the local/Minsmere population is increasing sufficiently to support local recruitment (i.e. the population at Minsmere is a source rather than a sink).

1.2.14 Since the creation of N1, it appears that tadpole peak counts have been steadily increasing but adult population size has remained relatively constant. It is thus assumed that N1 has reached its adult carrying capacity and/or juvenile survival rate is low, presumable due to a lack of suitable terrestrial refuge and overwintering opportunities. It can however be seen that, through the creation and maintenance of suitable aquatic and terrestrial habitat, EDF Energy has successfully managed the introduction of natterjack toads to Retsom's Field.

1.2.15 The indicative population size is estimated at around 30 adult natterjack toads and it is possible that the population within Retsom's Field has some genetic interchange with the population in Minsmere.

1.3 Potential Impacts upon Natterjack Toad

a) Impact Pathways

1.3.1 This section describes potential impacts of the Sizewell C proposals and the main development site on natterjack toads in the absence of mitigation.

b) Incidental mortality

1.3.2 Vegetation and ground clearance activities prior to construction of the WMZ have the potential to cause incidental injury or mortality to natterjack toads. This effect would occur during the Phase 1 site establishment and preparation of earthworks construction phase, as the WMZs are part of the temporary site infrastructure.

c) Noise and visual disturbance

1.3.3 Increases in light, noise and visual disturbance from construction activities (including increased vehicle movements, construction site lighting, and/or increased human presence) could affect the population of natterjack toads within Retsom's Field.

1.3.4 The noise disturbance could affect the mating calls of male natterjack toads, thus decreasing breeding efficiency. Although natterjack toads regularly experience years of total reproductive failure, the population would be at risk if there was an increased chance of this disturbance over the ten-year construction period.

1.3.5 Natterjack toads are primarily nocturnal and so may be subject to disruption to foraging or reproductive behaviour as a result of increased lighting levels, or subject to increased predation risk. They forage by actively hunting prey in short, grazed salt marsh or grassland habitat (such as that found in Retsom's Field). Despite toxins in their skin, natterjack toads are sometimes eaten by birds (especially corvids) and grass snakes, and so increased light levels have the potential to result in increased predation by these diurnal predators.

d) Habitat loss or modification

1.3.6 Development requires the temporary loss of approximately 3.55ha of suitable foraging habitat (c. 24% of the total area) within Retsom's Field. The habitat loss, though temporary, would last for up to ten years throughout construction. After this period, the field will be returned to its original state.

1.3.7 The following impacts have been discounted as follows:

- Aquatic habitat would not be affected. N1 is situated approximately 45m north of the WMZ development area.

- The general location of the WMZ has been located to avoid impacts on the few features that provide structural diversity (and thus resting and hibernation opportunities) within Retsom's Field. These include several rabbit warrens and the now-defunct N2.

- The large rabbit warren located at the edge of the proposed WMZ location (and shown on illustrative plans) would be avoided in detailed design to maintain what is regarded as a potentially important hibernation site.

1.3.8 N1 is a lined pond and the sandy nature of Retsom's Field means that impacts from construction related changes to hydrology can be discounted.

e) Fragmentation and isolation

1.3.9 None anticipated. The footprint of the main development site involves land take to the south and east of Retsom's Field, as there are no populations to the south and east, the works will not separate the population from other populations or suitable foraging resources.

f) Post-development interference impacts

1.3.10 None anticipated.

g) Predicted scale of impact on species status

14.1.1 Predicted low impact from temporary loss of foraging resource at a site (and thus local) level, in the absence of mitigation. No perceived impact at regional level.

1.4 Mitigation Proposals

a) Overview

1.4.1 To avoid killing or injuring any natterjack toad, the Water Management Zone (WMZ) will be ring fenced using amphibian fencing and a trapping and translocation exercise undertaken in advance of site clearance. Captured individuals will be released within a safe location adjacent to the breeding pond (N1). Ring fencing will remain in situ to prevent natterjack toads accessing the WMZ for the duration of its operation (10 years).

1.4.2 The WMZ would be constructed in daylight hours with no requirement for construction lighting. Similarly lighting is not likely to be required for the WMZ when it is in use and typical maintenance activities would involve a small number of personnel accessing the vicinity to monitor and maintain any equipment, filters and similar. To compensate for the temporary loss of foraging habitat, it is proposed that a new strategically placed natterjack toad pond is created and that refuge and overwintering opportunities within Retsom's Field are improved.

b) Capture and exclusion

1.4.3 Amphibian exclusion fencing (as per Figure 4 of the Great Crested Newt Mitigation Guidelines [Ref. 28]) will be installed around the perimeter of the working area of the WMZ, once the precise size and orientation of the WMZ is confirmed, within Retsom's Field to exclude and demarcate the trapping and translocation area. 'Permanent' type fencing is proposed as the fencing will remain in situ for between 9-12 years. The trapping and translocation area will then be compartmentalised with temporary amphibian proof fencing in order to increase capture effort. Pitfall traps will be installed on the inside of perimeter fencing and both sides of internal fencing to ensure a trapping density of 100 traps per hectare. Carpet tiles will also be placed between alternate pitfall traps (i.e. at a density of 50 per hectare) and adjacent to N1 to act as a receptor site.

1.4.4 Pitfall traps and carpet tiles will be checked daily before 11am and fencing will also be walked at night by torchlight to search for natterjack toads; any individuals encountered will be translocated to the receptor site adjacent to N1. This approach will continue for a minimum of 30 consecutive days/nights and until five consecutive nights of 'no capture' are observed. Following which, internal fencing will be removed, and the construction works for the WMZ would proceed within the exclusion zone. With the exception of an access track to the south, perimeter fencing will remain in situ for the duration of the WMZ (9-12 years). During this time, it will be maintained to ensure that it remains amphibian-proof.

1.4.5 Fence installation and removal will be overseen by an Ecological Clerk of Works (ECoW).

1.4.6 Figure 14C7A.4 illustrates the approximate location of perimeter fencing, temporary internal fencing, the receptor site and rabbit warrens (including 10m buffer zones).

c) Habitat Creation

1.4.7 Given the success and active management already in place at N1 it is not proposed that this pond or the adjacent defunct N2 (which may provide terrestrial opportunities) are enhanced as part of these works. Breeding and resting sites (i.e. rabbit warrens and N2) will be safeguarded from the proposed works by the installation of amphibian proof fencing.

1.4.8 Natterjack toad populations are usually limited by the number of suitable breeding ponds available rather than the extent of terrestrial habitat [Ref. 7]. Increasing the number of breeding ponds available is therefore likely to increase the size of the natterjack toad population in time. It is proposed that development is used as an opportunity to supplement natterjack toad conservation efforts by:

- Creating a new pond/scrape (N5). The proposed pond would be strategically placed centrally between N1 and N3 with the aim of providing a stepping stone to aid with colonisation of N3 and N4. It will have a surface area of approximately 150m^2 and will mimic N1 in terms of creation, comprising a butyl liner with very gently sloping sides (1:10) dug down to a maximum water depth of 50-70 cm. The slope of the pond basin will have a wide drawdown zone and an almost imperceptible edge. The scrape will be pumped dry in late summer and allowed to naturally fill in winter.

- Creating a c. 150m feature such as a linear mound comprising sand and stone adjacent to N5 that will, in the short term increase terrestrial opportunities (resting and overwintering) and increase connectivity between N1 and N3/N4. In the long term the wall should aid rabbit warren excavation and further increase overwintering opportunities.

1.4.9 Figure 14C7A.5 illustrates the approximate location of these features.

d) Mitigating against disturbance

1.4.10 The impacts of noise and light disturbance on breeding and foraging natterjack toads are sufficiently controlled by the primary and tertiary mitigation (see **SZC Volume 2 Chapter 14 – Terrestrial Ecology and Ornithology**) and no further measures are proposed.

e) Habitat/site management and maintenance

1.4.11 It is proposed that the management regime of the remainder of Retsom's Field (i.e. outside of the WMZ construction area) continues as present (i.e. with sheep grazing). N5 will be drained down annually in late summer and allowed to fill naturally over winter (as practiced with N1). After c. 10 years the WMZ will be decommissioned, infilled and this section of Retsom's Field would be reinstated to grazed pasture.

f) Monitoring

1.4.12 The new pond N5 would be monitored annually along with N1 and N3[1] for the duration of WMZ operation (9-12 years). Thereafter, monitoring will continue biannually for 6 years (i.e. 3 years of surveys).

1.5 Criteria for Success

a) Overview

1.5.1 Monitoring the natterjack toad populations and their habitat would provide evidence to assess the success of the Natterjack Toad Mitigation Strategy.

1.5.2 Success would be measured by maintaining and enhancing the favourable conservation status of natterjack toads, as determined by the following criteria:

- the continued existence of a breeding natterjack toad population, at or above pre-construction population levels (based on survey data collected to date for N1);
- the expansion of the Retsom's Field population into additional foraging habitat and breeding ponds (i.e. N5 but also supporting a pond complex with N3 and N4).

b) Roles and responsibilities

1.5.3 The roles and responsibilities for implementation of this Natterjack Toad Mitigation Strategy are outlined in **Table 1.2** below.

Table 1.2: Roles and Responsibilities

Role	Responsibilities
Licence Holder (SZC Co.)	• ensuring adequate land is available for the timely creation of any natterjack toad mitigation requirements; • providing a named member of SZC Co. staff to be the applicant for the licence, with the necessary authority and responsibility this requires; • organising meetings with stakeholders to review the Natterjack Toad Mitigation Strategy and its implementation, and assess its progress.
Named Ecologist / Ecological Clerk of Works	• developing and updating the Natterjack Toad Mitigation Strategy (as appropriate) and the plan for its implementation;

[1] It is assumed that the RSPB will continue to monitor N4; however, monitoring of this pond is not proposed as part of this mitigation solution)

Role	Responsibilities
	• undertaking any necessary surveys required to inform the final Natural England derogation licence application; • providing a named ecologist, who would advise the applicant on how to fulfil any requirements of the Natural England derogation licence; • providing advice on any required mitigation and monitoring; • providing regular progress reporting on the implementation of this Natterjack Toad Mitigation Strategy to SZC Co..
Contractors/sub-contractors (TBC)	• adhering to agreed Method Statements, under a watching brief from an Ecological Clerk of Works (ECoW).

c) Timetable of works

1.5.4 **Table 1.3** provides a list of pre, mid and post-development activities including timings of all capture, exclusion, mitigation and construction works. **Table 1.4** provides a post development timetable although it is not yet populated with dates

Table 1.3: Pre, mid and post-development activities

Activity	Timing	Comments
Receptor site pond creation	One year before construction commences	N5 to be created under non licenced method statement in winter 20XX/XX.
Receptor site terrestrial habitat works - general e.g. reseeding, hedge planting	One year before construction commences	Linear mound feature comprising sand and stone will be created under non-licenced method statement in winter 20XX/XX.
Receptor site terrestrial habitat works - features e.g. hibernacula, refuges	One year before construction commences	Carpet tiles to be placed adjacent to N1 a minimum of 21 days prior to translation.
Construction of permanent fences/walls	N/A	'Permanent' amphibian proof parameter/ring fencing, installed as part of translocation, to remain in situ for lifecycle of water management zone.
Amphibian fence installation (to include drift or ring fencing if applicable – specify which)	TBC – (Year x to Year x)	'Permanent' amphibian proof perimeter fencing, installed as part of translocation, to remain in situ for lifecycle of water management zone. Internal 'drift' fencing, to

Activity	Timing	Comments
		compartmentalise trapping area, to be removed on completion of trapping exercise.
Amphibian capture (pitfall trapping etc - outside hibernation/dormancy periods only)	TBC – (Year x to Year x)	30 day trapping period with 5 clear consecutive trapping nights to commence on installation of amphibian proof fencing mmm-yyyy to mmm-yyyy.
Hand searches	TBC – (Year x to Year x	Hand searched (as/if required) to be carried out by the named ecologist or accredited agent prior to fence installation and during above trapping period.
Destructive searches (following completion of all other capture efforts)	TBC – (Year x to Year x)	If required, on completion of the 30 day trapping period (with 5 clear consecutive trapping nights).
Construction period (start and end dates)	TBC – (Year x to Year x)	Construction with water management zone will not commence until completion of 30 day trapping period.
Site checks & maintenance during construction	TBC – (Year x to Year x)	Weekly (during March to September) or monthly (during October to February) visits to be undertaken by named ecologist or accredited agent throughout construction period, to check the amphibian fence is intact.
Drift fence removal (not to be undertaken during hibernation/dormancy periods)	TBC – (Year x to Year x)	To be removed upon completion of 3 days trapping (with 5 clear consecutive trapping nights), alongside destructive search, during active period.
Amphibian fence removal (not to be undertaken during hibernation/dormancy periods)	TBC – (Year x to Year x)	Perimeter fencing to be removed upon decommission of water management zone (estimated yyyy)
Habitat reinstatement (for temporary impact schemes only)	TBC – (Year x to Year x)	Sections of Retsom's Field affected by works to be reinstated upon decommission of water management zone (estimated yyyy)

Table 1.4: Post-development works timetable

[to be completed in due course]

Year:												
Population monitoring												
Habitat management												
Site maintenance												
Site maintenance												

1.6 Summary and Conclusions

1.6.1 SZC Co. is proposing to build a new nuclear power station at Sizewell which, together with a series of associated developments, is referred to as the Sizewell C Project. A series of Water Management Zones (WMZs) are required during construction of the Sizewell C Project and one of these, would be situated within a c. 14.9ha of grazed pasture field known as 'Retsom's Field'. The field is partially situated within the Development Consent Order (DCO) boundary but is wholly within EDF Energy's land ownership and is the subject of this mitigation strategy (and the only element which is considered to have the potential to impact natterjack toads).

1.6.2 Retsom's Field, into which natterjack toads were introduced in 2005, contains three ponds; they have bred successfully in one pond (N1) since, with a peak population estimate of 32 adults. EDF have therefore successfully managed the introduction of natterjack to the site over a 13-year period. Of the other two ponds, one no longer holds water (N2) and the other is yet to be found to support breeding (N3). A further pond (N4), was dug immediately to the north of Retsom's in 2018 by the RSPB. However, as of August 2019, no signs of breeding have been recorded in this pond. Since creation, all ponds have been monitored annually by Suffolk Wildlife Trust and the RSPB.

1.6.3 None of these ponds will be directly affected by the scheme, but temporary loss of foraging habitat within Retsom's Field is required during the 9-12 year construction phase. After this period, the field will be returned to its original state. Increased light and noise levels during the construction period has the potential to have a negative impact on natterjack foraging, breeding and predation avoidance, though these will be sufficiently controlled by the primary and tertiary mitigation. It is possible that vegetation and ground clearance activities will cause incidental injury or mortality without mitigation.

There are not anticipated to be any fragmentation or post-development interference impacts.

1.6.4 To avoid killing or injuring any natterjack toads, it is proposed that the Water Management Zone will be ring fenced and a trapping and translocation exercise undertaken. Captured individuals will be release within a safe location adjacent to the breeding pond (N1). Ring fencing will remain in situ for the duration of the Water Management Zone operation.

1.6.5 To compensate for the temporary loss of foraging habitat, it is proposed that a new strategically placed natterjack toad pond is created and that refuge and overwintering opportunities within Retsom's Field are improved.

Appendix 14C.7A.1: Legal Status And Licensing

1.1. Legislation

1.1.1. Natterjack toads are protected under Schedule 5 of the Wildlife and Countryside Act (W&CA) as ammended [Ref. 22], are a European Protected Species (EPS) under Schedule 2 of the Conservation of Habitats and Species Regulations [Ref. 3], are identified on the Section 41 list of the NERC Act [Ref. 5] as species of principal importance for the purpose of conserving biodiversity in England, and are a priority species for conservation action in the county [Ref. 4].

1.1.2. The W&CA [Ref. 2] makes it an offence (subject to exceptions) to intentionally kill, injure or take any wild animal listed on Schedule 5, and prohibits interference with places used for shelter or protection, or reclessly disturbing animals occupying such places. The Act also prohibits certain methods of killing, injuring, or taking wild animals.

1.1.3. Under the Conservation of Habitats and Species Regulations [Ref. 3], it is an offence to:

- deliberately capture, injure or kill any wild animal of an EPS;
- deliberately disturb wild animals of any such species;
- deliberately take or destroy the eggs of such an animal; and
- damage or destroy a breeding site or resting place of such an animal.

1.1.4. Disturbance is defined as that which is likely:

- to impair their ability to survive, breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; and
- to affect significantly the local distribution or abundance of the species to which they belong.

1.2. Licensing

1.2.1. A licence is required to permit actions that would otherwise be illegal. Natural England is the Statutory Nature Conservation Organisation responsible for issuing licences.

1.2.2. A survey licence is required for any survey work likely to disturb natterjack toads at any site where there is a reasonable likelihood that they are present. A survey licence is not required for non-intrusive surveying such as listening for natterjack toad calls or spawn string counts. If a natterjack toad is encountered, for example, when conducting a spawn string count, an unlicensed surveyor must cease work unless they are in the presence of a licensed surveyor.

Appendix 14C.7A.2: Information Underpinning This Mitigation Strategy

1.1.1. This Mitigation Strategy is underpinned by the following information:

- desk study records held by the Suffolk Biodiversity Information Service (SBIS);
- survey work carried out by Suffolk Wildlife Trust (SWT) at Retsom's pond;
- assessment of the natterjack toad population status and habitat quality within the main development site by Arcadis;
- **SZC ES Volume 2 Technical Appendix 14A5 – Amphibians** and **SZC ES Volume 2(c) Chapter 14 Terrestrial Ecology and Ornithology;**
- the **outline Landscape and Ecology Management Plan** (oLEMP) for the main development site and the surrounding area;
- Natterjack toad conservation handbook [Ref. 8];
- consultation with Natural England, and
- Natural England's Standing Advice [Ref. 17] for planning authorities who need to assess the impacts of development on natterjack toads.

Appendix 14C.7A.3: Natterjack Toad Baseline Information

1.1. Natterjack toad ecology and habitat requirements

1.1.1. The following information on natterjack toads comes from Beebee & Denton [Ref.8] and Beebee & Griffiths [Ref. 9] unless otherwise stated.

1.1.2. The natterjack toad is a pioneer species, adapted for life in open habitats (in Britain) such as sand dunes, lowland heath or upper salt marshes [Ref. 8 and Ref. 1.9]. They breed in shallow, freshwater pools which heat up quickly and allow the tadpoles to develop quickly to metamorphosis, unhindered by the presence of other species which may prey on tadpoles.

1.1.3. Of the three preferred habitat types (coastal dunes, upper saltmarshes and lowland heaths), the habitat around Retsom's pond is closest to lowland heath habitat. The Phase 1 Habitat Survey of Retsom's Field [Ref. 1.10] describes this as being a short grassland sward dominated by Sheep's-fescue (*Festuca ovina*) and Common Bent (*Agrostis capillaris*) with a small area of regenerating heathland (dominated by Heather (*Calluna vulgaris*)), with the occasional presence of *Cladonia* sp. lichen and localised patches of Bracken (*Pteridium aquilinum*). The close-cropped, sheep-grazed turf of Retsom's Field constitutes ideal terrestrial foraging habitat. Features such as rabbit burrows, logs and patches of open scrub provide cover for natterjack toads. The shallow pond used for breeding is pumped dry every winter to reduce the potential for predators to become established.

1.1.4. However, terrestrial habitat requirements for natterjack toads are best met by yellowdunes with extensiveareas of bare sand but with some vegetation cover (such as marram) to support invertebrate prey and also to provide cover for toads to burrow under.

1.1.5. Natterjack toads require two elements of habitat structure, namely: open, unshaded terrestrial habitat with areas of un-vegetated (or minimally vegetated) ground with predominantly low growing vegetation; and unshaded, ephemeral ponds for reproduction with shallow, shelving margins and few predators or competitors. These habitat features need to be close together as this species will not cross extensive areas of unsuitable terrain to move between summer/winter and breeding habitats.

1.1.6. They also require suitable substrate, such as sandy soils, to dig burrows to avoid extremes of temperature or dryness, and for hibernation. Fidelity to a home range and to a particular burrow can be surpriingly strong. Individuals may use the same location for two or three consecutive years, and can navigate back to their home even when they have been deliberately moved away from it.

1.1.7. Natterjack toads are primarily nocturnal, but may bask in vegetation in early morning sunshine shortly after hibernation and emerge from their burrows around dusk later in the year to feed; otherwise, they spend much of the day time in burrows or crevices under debris, and hibernate underground [Ref. 9]. They are also relatively slow-moving, although they are active predators at night, needing large areas of bare ground or very short vegetation for hunting invertebrate prey.

1.1.8. Natterjack toads emerge from hibernation in Spring. They have a long breeding season (April to July), with males calling to attract females to the ponds where spawning occurs. Natterjack females usually produce one spawn string a year, between April and July but may produce two – at the start and end of the season [Ref. 1.11]. Metamorphosis to toadlets is quick, taking between six to eight weeks, and toadlets then leave the pond. Hibernation starts in October.

1.1.9. Natterjack toad males call to attract females for mating, usually after dark, and males can be induced to start calling by incidental noises [Ref. 9].

1.1.10. Natterjack toads may face competition from common frogs (*Rana temporaria*) and common toads (*Bufo bufo*), as their tadpoles are competitively inferior. Their tadpoles are also vulnerable to predation by aquatic invertebrates.

1.1.11. Studies have shown that during the breeding season natterjack toads move up to 500m between breeding sites, and can move substantially further outside of the breeding season (maximum overall distances ranged from 567m to 4,411m) [Ref. 1.12]. Median home range sizes from radio-tracking studies in Spain are 0.5ha (breeding season) to 4.1ha post-breeding [Ref. 1.13].

1.1.12. Natterjack toads prefer to breed in small water bodies, but that does not mean they are poor swimmers [Fabrice Ottburg, pers. comm.]. In Dutch ditches and small waterbodies natterjack toads have no problem crossing these, including ditches between 2-5m wide [Fabrice Ottburg, pers. comm.].

1.2. Status and distribution

1.2.1. Natterjack toads are found at about 60 sites in Britain, and populations have declined significantly in the last century, due to habitat loss [Ref. 9].

1.2.2. The overall picture for natterjacks in the UK between 1990 and 2009 shows no overall decline, nor increase [Ref. 24] , from data collected across all UK populations. However, there are regional variations in the population trends, for the four regions south-central England; eastern England; south Irish Sea; north Irish Sea). Population trends in the eastern region (which ranges from Minsmere (Suffolk) in the south to Saltfleetby (Lincolnshire) in the north were negative (but not significantly so) in the period 1990-2009. N.B. the Sizewell population was not included in this analysis as the reintroduction only started in 2005.

1.2.3. In Suffolk, the natterjack toad was formerly found in at least ten colonies, at locations with a sandy substrate, scattered all down the east coast of the county, and in some inland locations. However, Eastern England has seen the greatest declines in the numbers of this species, and the last natterjack toad colonies in Suffolk became extinct during the 1950s and 1960s [Ref. 18].

1.2.4. The species has since been reintroduced in Suffolk, including to the EDF Energy estate in 2005.

1.2.5. According to the Suffolk Biodiversity Action Plan (BAP) [Ref. 1.14], current factors affecting the distribution of natterjack toads in Suffolk include:

- significant reduction in formerly suitable habitat due to the loss of heathland to agriculture, forestry, lack of grazing and to scrub encroachment;
- loss of former breeding ponds due to the lowering of the water table, changes in drainage patterns, infilling and, perhaps, acidification;
- habitat fragmentation preventing the dispersal of animals to new sites (with genetic isolation potentially becoming a problem for existing populations); and
- predation by rising levels of corvids (crows and magpies) due to the presence of outdoor pig units and waste disposal sites.

1.3. Surveys of the Main Development Site

1.3.1. Two ponds (N1 and N2) were created in Retsom's Field by SWT in 2004 (one with a butyl liner, one with a clay liner) on land then owned by British Energy (now the EDF Energy estate), at Retsom's Field (see Figure 14C7A.2 and 14C7A.3 and **Plate 2**). A three-year introduction programme commenced in 2005, with the introduction of toad tadpoles from existing populations at Holme, North Norfolk.

1.3.2. According to SWT, the natterjack population appears to be 'thriving' at least up to 2016, with the number of tadpoles counted during SWT surveys increasing steadily over the years (see **Table 1.1** Summary results for SWT natterjack toad surveys) [Ref. 1.15, Ref. 1.16, Ref. 1.17, Ref. 1.18, Ref. 1.19, Ref. 1.20, Ref. 1.21, Ref. 1.22, Ref. 1.23, Ref. 1.24, Ref. 1.25, Ref. 1.26, and pers. comm.). The numbers of emerging toadlets varies from year to year and is hard to quantify.

1.3.3. In 1996, Retsom's Field was entered into an Environmental Stewardship Agreement reverting the arable land to sheep-grazed coastal acid grassland. The breeding pond is pumped dry in the winter to remove predators and allowed to refill naturally.

Plate 1.1: Current breading pond and Retsom's Field


Current breeding pond


Retsom's Field

Table 1.1: Summary results for SWT Natterjack Toad Surveys

Year	Estimated natterjack tadpole peak counts	Adults seen	Spawn strings	Toadlets
2005	All the tadpoles disappeared from the pond with the butyl liner			
2006	The clay lined pond was damaged and all tadpoles killed.	1		
2007		Males seen and heard	Large number	Some
2008	3,000			
2009	3,000		16	A number
2010	2,500			None known to have emerged
2011	3,000		First strings in April. Second spawning in late July	Toadlets emerged

Year	Estimated natterjack tadpole peak counts	Adults seen	Spawn strings	Toadlets
2012	5,000		8 in April. 4-6 strings in July (but no survival)	
2013	5,000	Toads seen mating.		A good number
2014	6-8,000 (more likely 10,000+)		11-13 in May	200+ June/July
2015	5,000+		First strings seen in May. Second brood of strings in July	200+
2016	2,500-3,000	2 adult couplings seen	2	Minimum of 450
2017	0	Single juvenile / small adult	0	
2018	15,000 (conservative estimate)	Single	8 in May. 6 in June	300-500
2019	10,000 thousand in May	Four adults in pond 3 May Torch-surveys in mid-June found adults utilising the rabbit warren burrows up to 30+ metres SW of the pond	7 in May 3 in July	Several hundreds in May A few hundred in July

1.3.4. Total adult population size can be estimated by counting spawn strings in breeding ponds. Spawn string numbers indicate the number of females; the total adult population is around double the spawn string number, since the number of males is usually the same as the number of females. Natterjack females usually produce one spawn string a year, between April and July but may produce two – at the start and end of the season [Ref. 20], although spawn string counts may underestimated female numbers [Ref. 1.27]. Therefore it is reasonable to assume spawn string counts in consecutive months are from different females, whereas those from the start and end of the breeding season may be from the same female. Using these assumptions, the SWT data from **Table 1.1** can be looked at to estimate the Retsom's Field natterjack toad population size – see **Table 1.2**. This would suggest a population size of around 30 adult natterjack toads.

Table 1.2: Estimates of Natterjack Toad population size

Year	Spawn strings	Estimate of female numbers	Estimate of adult population size
2009	16	16	32
2012	8 in April. 4-6 strings in July (but no survival)	8[1]	16
2014	11-13 in May	13	26
2016	2	2	4
2017	0	0	0
2018	8 in May. 6 in June	14[2]	28
2019	7 in May 3 in July	10	20

[1] Assume could be same females at start and end of breeding season.

[2] Assume different females as breeding within one or two months.

1.3.5. Reptile surveys using artificial refugia along the woodland edge of Goose Hill/Retsom's Field [Ref. 11], and in Goose Hill and the SZC Co. Sizewell C Station Platform [Ref.11, Ref.11] were undertaken in 2015. The location of these surveys took place within potential suitable natterjack toad habitat, and natterjack toads are known to use reptile refugia; however, none were found.

1.4. Summary of RSPB Minsmere reintroduction data

1.4.1. There have been two reintroduction attempts within the RSPB Minsmere Reserve [RSPB, pers. comm.].

1.4.2. One, associated with ponds in RSPB compartments 3 and 4 at Westleton, involved toadlets introduced in 1985 and 1989. The maximum spawn string count (63) was recorded in 1999, but counts declined subsequently down to 2 in 2010 and none subsequently, for unknown reasons. There is still habitat available for foraging/hibernation [RSPB, pers. comm.].

1.4.3. The second was at ponds created in 2005 at Mount Pleasant in compartment 104, with toadlets introduced in 2006. There has been breeding ever since but it has been difficult to assess the population size [RSPB, pers. comm.]. Two adult males were heard in 2019.

Appendix 14C.7A.4: Figures

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VOLUME 2, CHAPTER 14 APPENDIX 14C7B: NATTERJACK TOAD METHOD STATEMENT

Contents

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Plates

None provided.

Figures

Appendices

Executive Summary

SZC Co. is proposing to build a new nuclear power station at Sizewell which, together with a series of associated developments, is referred to as the Sizewell C Project. To facilitate development a substantial amount of construction material will be transported to the site and a number of off-site associated developments are required during construction and long-term operation. A series of Water Management Zones (WMZs) are required during construction of the Sizewell C Project and one of these would be situated within a c. 14.9ha of grazed pasture field known as 'Retsom's Field'. This field is partially situated within the Development Consent Order (DCO) boundary but wholly within the EDF Energy estate. The works to establish the WMZ are the subject of this method statement and is the only element of the works which is considered to have the potential to impact natterjack toads.

Retsom's Field, into which natterjack toads were introduced in 2005, contains three ponds; they have bred successfully in one pond (N1) since, with a peak population estimate of 32 adults. EDF have therefore successfully managed the introduction of natterjack to the site over a 13-year period. Of the other two ponds, one no longer holds water (N2) and the other is yet to be found to support breeding (N3). A further pond (N4), was dug immediately to the north of Retsom's in 2018 by the RSPB. However, as of August 2019, no signs of breeding have been recorded in this pond. Since creation, all ponds have been monitored annually by Suffolk Wildlife Trust and the RSPB.

None of these ponds will be directly affected by the scheme, but temporary loss of foraging habitat within Retsom's Field is required during the approximate 10-year construction phase. After this period, the field will be returned to its original state. Increased light and noise levels during the construction period has the potential to have a negative impact on natterjack foraging, breeding and predation avoidance. It is possible that vegetation and ground clearance activities will cause incidental injury or mortality. There are not anticipated to be any fragmentation or post-development interference impacts.

To avoid killing or injuring any natterjack toads, it is proposed that the Water Management Zone will be ring fenced and a trapping and translocation exercise undertaken. Captured individuals will be release within a safe location adjacent to the breeding pond (N1). Ring fencing will remain *in situ* for the duration of the Water Management Zone operation (10 years).

To compensate for the temporary loss of foraging habitat, it is proposed that a new strategically placed natterjack toad pond is created and that refuge and overwintering opportunities within Retsom's Field are improved.

1 Natterjack Toad Method Statement

1.1 Introduction

1.1.1 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

a) Background to activity/development, include a brief summary of why the activity is necessary

1.1.2 SZC Co. is proposing to build a new nuclear power station at Sizewell in East Suffolk, known as Sizewell C. It would be located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north east of the town of Leiston. The power station, together with a series of proposed associated developments, is referred to as the Sizewell C Project. As part of the wider Sizewell C development, a new power station will be constructed at the main development site, adjacent to the existing Sizewell B power station.. The on-site area includes the main platform and associated power station infrastructure, water management zones and Sizewell B relocated facilities.

b) Full details of proposed works on site that are to be covered by the licence

i. e.g. barn/loft conversion to new dwelling, demolition of buildings, construction of factory, extraction of clay, landfilling. etc. Include current status of planning permission (if applicable)

1.1.3 To facilitate the construction of Sizewell C a series of Water Management Zones (WMZs) are required. One of these is required to the north of the scheme within a field known as ‘Retsom’s Field’ (Approximate Centroid Grid Ref: TM 4713 6514). The Field is owned in its entirety by EDF Energy but only partially situated within the Sizewell C DCO boundary. It comprises approximately 14.9ha of grazed pasture that is managed by Suffolk Wildlife Trust (SWT). It also forms part of a larger Environmental Stewardship Agreement with EDF Energy which has been live since November 2013 (Agreement Reference: AG00476432; CPH Number: 360730020) and is recognised Coastal and Floodplain Grazing Marsh on the priority habitat inventory.

1.1.4 Retsom's Field contains three ponds (named N1, N2 and N3), one of which (N1) supports a breeding population of natterjack toads. All ponds are situated outside of the Sizewell C application boundary, but suitable foraging habitat will be lost to the WMZ during the construction phase of Sizewell C.

1.1.5 Only the proposed works associated with the construction of the WMZ within Retsom's Field are of relevance to this licence application. Figure B.2 shows the construction areas relevant to this application.

1.2 Survey and Site Assessment

a) Pre-existing information on the species at the survey site

i. Provide records from local environmental records centres, local wildlife groups, previous survey work by the applicant or others

1.2.1 Desk-study records (within the last 25 years) from the National Biodiversity Network (NBN) database:

- Westleton (TM 452 692) - relates to reintroductions carried out by the RSPB in 1985. Additional reintroductions were started at Mount Pleasant pools, Minsmere in 2005. Situated approximately 3.2km north of the main development site boundary and 4.5km from the Retsom's Field breeding pond (N1).

- Single desk-study record for natterjack toads at Vault Hill, RSPB Minsmere Reserve in 2005; however, this may be an erroneous location as this record is unknown to RSPB staff (RSPB, pers. comm.).

1.2.2 Two ponds (N1 and N2) were created in 2004 at Retsom's Field (see Figures C.4a and C.4b) by SWT, and tadpoles from existing populations in Norfolk introduced in 2005. Subsequently, only N1 has remained as a successful breeding site. The number of tadpoles counted during SWT surveys and the adult population estimates are shown in Table 1.1 (*raw* SWT data is provided in F.2). A further pond (N3) was excavated in Retsom's Field in 2015; no natterjack toad sightings have been recorded at this pond to date (SWT, Pers. Comm., Jan 2019). Natterjack toads are also thought to hibernate in rabbit warrens within Retsom's Field (SWT, pers. comm.).

1.2.3 In 2018, the RSPB created a new pond/scrape (N4) complex on Minsmere Levels, immediately to the north of Retsom's Field (SWT, pers. comm.); however, there has been no signs of breeding in this pond to date.

Table 1.1: Summary results from SWT natterjack toad surveys – Pond N1

Year	Estimated Natterjack Tadpole Peak Counts	Spawn Strings	Estimate of Female Numbers	Estimate of Adult Population Size
2005	0	-	-	-
2006	0	-	-	-
2007	0	Large number	-	-
2008	3,000		-	-
2009	3,000	16	16	32
2010	2,500	-	-	-
2011	3,000	Present in April and second brood in July	-	-
2012	5,000	8 in April 4-6 strings in July (but no survival)	8[1]	16
2013	5,000	-	-	-
2014	8,000	11-13 in May	13	26
2015	5,000+	Present in May and second brood in July	-	-
2016	3,000	2	2	4
2017	0	0	0	0
2018	15,000	8 in May 6 in June	14[2]	28
2019	10,000	7 in May 3 in July	10	20

[1] *Assumed to be same females at start and end of breeding season.*

[2] *Assumed to be different females as breeding within one or two months.*

b) Status of species at the local, county and regional levels

1.2.4 Rare. Since extinction in the 1950s and 60s, natterjack toads have been re-introduced in Suffolk at a small number of ponds, including the introduction of the population within Retsom's Field. Adults were recorded within N1 during 2006 and 2007 (despite only tadpoles being introduced in 2004 and natterjack toads taking 3-4 years to reach sexual maturity). It is therefore a possibility that the local/Minsmere population is increasing sufficiently to support local recruitment (i.e. the population at Minsmere is a source rather than a sink).

1.2.5 Since the creation of N1, it appears that tadpole peak counts have been steadily increasing but adult population size has remained relatively constant.

It is thus assumed that N1 has reached its adult carrying capacity and/or juvenile survival rate is low, presumable due to a lack of suitable terrestrial refuge and overwintering opportunities. It can however be seen that, through the creation and maintenance of suitable aquatic and terrestrial habitat, EDF have successfully managed the introduction of natterjack toads to Retsom's Field.

c) Objectives of the survey

i. [e.g. to determine presence/absence of species, species usage of site]

1.2.6 The natterjack toad population within Retsom's Field is monitored annually by SWT and have been since introduction in 2005. The RSPB monitor N4 to the north.

d) Scaled plan/map of survey area of appropriate scale and orientation with integral or separate location map at 1:50,000 or 1:25,000 scale. Aerial photographs are also useful

1.2.7 See Figure C.4a (on OS mapping) and C4b (on aerial photography).

e) Site/habitat description (relevant to the species concerned), based on day-time visits. Include annotated photographs if helpful

1.2.8 Retsom's Field comprises approximately 14.9ha of grazed pasture. It has light, sandy soils, relatively heavy sheep grazing pressure and several rabbit warrens, which provide hibernating opportunities (Suffolk Wildlife Trust, pers. comm.). Three ponds have been created for natterjack toads within the field as follows:

- N1 (Grid Ref: TM 47136 65112) – created in 2004 and only pond that has successfully supported breeding natterjack toads (to date).
- N2 (Grid Ref: TM 47148 65105) – also created in 2004 but clay lined pond that failed and is now defunct. May however provide terrestrial opportunities within an otherwise structurally poor field.
- N3 (Grid Ref: TM 47350 65191) – created in 2015, this pond is suitable for natterjack toads but as of yet, none have been recorded within it.

1.2.9 Pond N1 is pumped dry in the winter to remove predators and allowed to refill naturally. Images of Retsom's field and the N1 breeding pond are shown in Table 1.2. The location of this field and the ponds are also shown in Figures C.4a and C3.4b.

1.2.10 In the wider area, the RSPB have recently (2018) created N4, a pond/scrape complex on Minsmere Levels, approximately 30m north of Retsom's Field and 265m north east of N1. Extensive areas of the Coastal and Floodplain Grazing Marsh and Coastal Sand Dunes priority habitats are situated to the north and east of Retsom's Field, providing a continuous corridor of suitable terrestrial habitat that connects the populations within N1 to those within Minsmere, to the north.

Table 1.2: Images of the site

	
View of N1, currently the only natterjack toad breeding pond with Retsom's Field	View of Retsom's Field

f) Field survey(s)

i. Include survey method, timings (day/evening), weather conditions (wind, rain, temperature – tabulated for multiple survey visits), personnel involved (provide individual licence numbers, if held), and equipment used

1.2.11 As presented above, SWT have carried out monitoring surveys (counts of spawn strings, toadlets and adults) of the following:

- N1 (Grid Ref: TM 47136 65112) – annually since 2005
- N2 (Grid Ref: TM 47148 65105) – annually between 2005 and 2007, after which the pond has not held water
- N3 (Grid Ref: TM 47350 65191) – annually since 2015

1.2.12 RSPB have carried out surveys of pond N4 (Grid Ref: TM 47438 65200), since its creation in 2018. As of August 2019, there were no signs of natterjack toads breeding within this pond (RSPB, pers. comm.).

g) Survey results

i. Summarise findings in table form (if appropriate); provide clear, annotated and cross-referenced maps/plans/photographs. Raw data to be appended

1.2.13 The headline results are presented in Section C.1. The raw data is presented in Section F.2, extracted from Suffolk Wildlife Trust (2006 – 2018) and personal communication with SWT for the 2019 data.

h) Interpretation/evaluation of survey results

i. Provide count/estimate of species numbers, status and significance of population, constraints on survey (e.g. time of year, cold weather, access problems – justify as necessary)

1.2.14 As discussed in C.2, tadpole counts within N1 have increased since the 2005 introduction. The indicative population size is estimated at around 30 adult natterjack toads and it is possible that the population within Retsom's Field has some genetic interchange with the population in Minsmere. It is assessed that the population is of national significance.

1.2.15 Given the thirteen years of survey data available, it is considered that there are no outlying constraints to the value of the data.

1.2.16 Retsom's Field forms part of the Sizewell Levels and Associated Areas County Wildlife Site (CWS); however, natterjack toad is not cited as an interest feature.

1.3 Impact assessment in absence of mitigation. Likely impacts of the development on natterjack toads

a) Short-term impacts: disturbance

1.3.1 Increases in light, noise and visual disturbance from construction activities could affect the population of natterjack toads within Retsom's Field by reducing patch quality for foraging and decreasing breeding efficiency by masking mating calls.

1.3.2 Vegetation and ground clearance activities prior to construction of the WMZ have the potential to cause incidental injury or mortality to natterjack toads. Note that the construction footprint of the WMZ has been specifically altered to avoid impacts to breeding habitat (i.e. N1) and hibernation sites (i.e. the rabbit warrens) within Retsom's Field.

b) Long-term impacts: habitat loss or modification

i. Impact on species population(s) to be taken into account at local, regional and national levels. Note that impacts can be positive or negative as this is in absence of mitigation

1.3.3 Development requires the temporary loss of approximately 3.55ha of suitable foraging habitat (c. 24% of the total area) within Retsom's Field. The habitat loss, though temporary, would last for up to ten years throughout construction. After this period, the field will be returned to its original state.

1.3.4 The following impacts have been discounted as follows:

1.3.5 Aquatic habitat would not be affected. N1 is situated approximately 45m north of the WMZ development area.

1.3.6 The WMZ has been located to avoid impacts on the few features that provide structural diversity (and thus resting and hibernation opportunities) within Retsom's Field. These include several rabbit warrens and the now-defunct N2.

1.3.7 N1 is a lined pond and the sandy nature of Retsom's Field means that impacts from construction related changes to hydrology can be discounted.

c) Long-term impacts: fragmentation and isolation

1.3.8 None anticipated. The works will not separate the population from other populations or suitable foraging resources.

d) Post-development interference impacts

1.3.9 None anticipated.

e) Predicted scale of impact on species status at the site, local county and regional levels

1.3.10 Predicted low impact from temporary loss of foraging resource at a site (and thus local) level, in the absence of mitigation. No perceived impact at regional level.

References

1.1 CIEEM. 2018. Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland. Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

1.2 Suffolk Wildlife Trust. 2006. Sizewell Land Management Annual Review 2005-2006. Ipswich: SWT.

1.3 Suffolk Wildlife Trust. 2007. Sizewell Land Management Annual Review 2006-2007. Ipswich: SWT.

1.4 Suffolk Wildlife Trust. 2008. Sizewell Land Management Annual Review 2007-2008. Ipswich: SWT.

1.5 Suffolk Wildlife Trust. 2009. Sizewell Land Management Annual Review 2008-2009. Ipswich: SWT.

1.6 Suffolk Wildlife Trust. 2010. Sizewell Land Management Annual Review 2010. Ipswich: SWT.

1.7 Suffolk Wildlife Trust. 2011. Sizewell Land Management Annual Review 2011. Ipswich: SWT.

1.8 Suffolk Wildlife Trust. 2011. Sizewell Land Management Annual Review 2012. Ipswich: SWT.

1.9 Suffolk Wildlife Trust. 2014. Sizewell Land Management Annual Review 2014. Ipswich: SWT.

1.10 Suffolk Wildlife Trust. 2015. Sizewell Land Management Annual Review 2015. Ipswich: SWT.

1.11 Suffolk Wildlife Trust. 2016. Sizewell Land Management Annual Review 2016. Ipswich: SWT.

1.12 Suffolk Wildlife Trust. 2017. Sizewell Land Management Annual Review 2017. Ipswich: SWT.

1.13 Suffolk Wildlife Trust. 2018. Sizewell Land Management Annual Review 2018. Ipswich: SWT.

Appendix 14C7B.1 – Pre-existing Survey Reports

1.1.1. SWT survey data is presented in Section C.1. The original survey reports are referenced in Section E.

1.1. Raw survey data

Table 1.1: Summary results for SWT natterjack toad surveys – Pond N1

Year	Estimated Natterjack Tadpole Peak Counts	Adults Seen	Spawn Strings	Toadlets
2005	All the tadpoles disappeared from the pond with the butyl liner			
2006	The clay lined pond was damaged and all tadpoles killed.	1		
2007		Males seen and heard	Large number	Some
2008	3,000			
2009	3,000		16	A number
2010	2,500			None known to have emerged
2011	3,000		First strings in April. Second spawning in late July	Toadlets emerged
2012	5,000		8 in April 4-6 strings in July (but no survival)	
2013	5,000	Toads seen mating		A good number
2014	6-8,000 (more likely 10,000+)		11-13 in May	200+ June/July
2015	5,000+		First strings seen in May. Second brood of strings in July	200+
2016	2,500-3,000	2 adult couplings seen	2	Minimum of 450

Year	Estimated Natterjack Tadpole Peak Counts	Adults Seen	Spawn Strings	Toadlets
2017	0	Single juvenile / small adult (2.5” long)	0	
2018	15,000 (conservative estimate)	Single	8 in May 6 in June	300-500
2019	10,000 in May	Four adults in pond on 3rd May Torch-surveys in mid-June found adults utilising the rabbit warren burrows up to 30+ metres SW of the pond	7 in May 3 in July	Several hundreds in May A few hundred in July

SIZEWELL C DEVELOPMENT – MAIN DEVELOPMENT SITE: VOLUME 2, CHAPTER 14: APPENDIX 14C9A – GREAT CRESTED NEWT NON-LICENSABLE METHOD STATEMENT

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1 Main Development Site Great Crested Newt Non-Licensable Method Statement

1.1 Introduction

a) Background and Scheme Overview

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station.

1.1.2 It is located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a Nationally Significant Infrastructure Project (NSIP) and if consented this would be via a Development Control Order (DCO).

1.1.3 This method statement outlines the key approaches to mitigating potential impacts to the great crested newt (*Triturus cristatus*) populations present within or adjacent to the construction site for the Sizewell C main development site. It will be used by SZC Co. and any relevant subcontractors, in relation to the proposal to build Sizewell C.

1.1.4 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.5 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction including an accommodation campus and a series of off-site associated development sites in the local area including:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the ‘northern park and ride’), and one to the south-west at Wickham Market (the ‘southern park and ride’) to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;
- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the ‘two village bypass’) to alleviate traffic on the A12 through the villages;
- A permanent road linking the A12 to the Sizewell C main development site (referred to as ‘Sizewell link road’) to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the ‘Yoxford roundabout’) and other road junctions to accommodate Sizewell C construction traffic;
- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site;
- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site (‘the green rail route’) and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network; and
- Green rail route extension and rail improvements to the Saxmundham to Leiston branch line.

1.1.6 The components of the Project listed above are referred to collectively as the ‘Sizewell C Project’.

1.2 Site location and setting

1.2.1 The main development site is located on the Suffolk coast, to the north of the existing Sizewell A and B power station complex. The total size of the proposed development is approximately 365ha, which encompasses five land parcel components, which are described below:

- Main platform: the area that would become the power station itself;

- Sizewell B relocated facilities and National Grid land: the area that certain Sizewell B facilities would be moved to in order to release Sizewell B land for the proposed development and the area required for the National Grid transmission network;
- Offshore works area: the area where offshore cooling water infrastructure and other marine works would be located;
- Temporary Construction Area (TCA): the area located primarily to the north and west of the proposed Sizewell Marshes Site of Special Scientific Interest (SSSI) crossing, which would be used to support construction activity on the main platform; and
- Land east of Eastlands Industrial Estate (LEEIE): the area including and directly to the north of Sizewell Halt, which would be used to support construction on the main platform and TCA.

1.2.2 The existing EDF Sizewell power station complex comprises a series of buildings associated with the power station, parking areas, access infrastructure and ancillary structures. The proposed development footprint is dominated by arable fields with field boundaries comprising native, species poor hedgerows or tree lines. Areas of woodland encompasses the EDF power station complex on the northern, western and southern boundaries, whilst several woodland blocks, comprising plantation, mixed plantation and broadleaved semi-natural woodland, are scattered across the site. The larger area present to the north east includes Hilltop Covert, Dunwich Forest, Goose Hill and the northern boundary of Kenton Hills. Numerous farm buildings and structures are also scattered to the north and west of the site. Portions of the site falls within the following designated sites:

- Sizewell Marshes SSSI – the site includes a small wetland area, including fen meadow habitat within this SSSI;
- Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB);
- Sizewell Levels and Associated Areas County Wildlife Site (CWS) – largely plantation woodland and acid grassland; and
- Suffolk Shingle Beaches CWS – dune grassland and vegetation shingle.

1.2.3 The area covered by this method statement is presented in Image 1 below.

Plate 1.1: Site location

1.2.4 The purpose of the works is to install a new nuclear power station at the Sizewell site. However, as a component of this, vegetation clearance and ground-breaking works (collectively referred to as “facilitating works” within this report) will be required in order to facilitate the proposed development. Accordingly, a number of potential ecological constraints are associated with the proposed facilitating works, as are set out below.

a) Key Ecological Constraints

1.2.5 The key potential legislative constraints associated with the facilitation works within the site include:

- Bats;
- Deptford Pink;
- Great Crested Newt;

- Natterjack Toad;
- Reptiles
- Water Vole; and
- Otter.

1.2.6 This method statement only covers guidance relating to great crested newts although method statements and / or draft protected species licences for the other species have also been prepared as relevant.

1.2.7 In order to enable the proposed development of main development site, as detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Given the presumed presence of great crested newts along the western edge of the site, the proposed facilitating works have the potential to cause injury/ mortality to this species should it be present within the site at the time of the works. Accordingly, the purpose of this document is to provide a reasonable avoidance measures (RAMs) method statement that can be used by SZC Co. and any relevant subcontractors, to ensure the safeguarding of great crested newts during the facilitation works to be undertaken within the site.

1.2.8 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.3 Site reasonable avoidance measures (RAMs) method statements for great crested newt

a) Introduction

1.3.1 This section provides a suite of dedicated RAMs Method Statements (MS) for the ecological constraints that may be encountered for great crested newts during the facilitation works.

1.3.2 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality of the protected species and avoid contravention of the relevant legislation. The ECoW will determine exactly when and where it is appropriate to apply the measures described in the RAMs MS. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.3.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) Toolbox Talk

1.3.4 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (Appendix 1) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to the legally protected species / other species of conservation concern present on within the site that may be encountered during the works.

1.3.5 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.

1.3.6 There is a declaration (Appendix 2) for those present to sign to confirm they have understood the constraints and actions presented.

1.4 Great crested newt

a) Site Status

1.4.1 Desk-study data received from the Suffolk Biodiversity Information Service (SBIS) returned no records of great crested newts within the boundaries of the site, given the presence of suitable aquatic and terrestrial habitat within the site, specific presence/ absence surveys were undertaken with respect to great crested newts within the site. Surveys of the site for great crested newts were carried out between 2007 and 2014 by Wood Group and Arcadis Consulting (UK) recorded an absence of great crested newts within the site. The eDNA surveys carried out in 2016 confirmed the continued absence of great crested newts from within the site.

1.4.2 Great crested newts were however recorded within four offsite ponds to the west of the site boundary and are therefore assumed to present, a least in low numbers, in terrestrial habitats at the western fringes of the site.

b) Legislation

1.4.3 Great crested newt is listed on Schedule 5 of the Wildlife and Countryside Act (WCA) 1981 (as amended) (HMSO, 1981) in respect of Section 9, which makes it an offence, inter alia, to:

- Intentionally or recklessly kill, injure or take (handle) a great crested newt;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place that a great crested newt uses for shelter or protection; or
- Intentionally or recklessly disturb a great crested newt while it is occupying a structure or place that it uses for shelter or protection.

1.4.4 The offence "recklessly" was added by the Countryside and Rights of Way Act 2000 (CRoW) (HMSO 2000).

1.4.5 Great crested newt receives further protection under Regulation 41 of The Conservation of Habitats and Species Regulations 2017. They are listed on Schedule 2 of the Regulations, which makes it an offence, inter alia, to:

- Deliberately capture, injure or kill a great crested newt;
- Deliberately disturb a great crested newt, in particular any disturbance which is likely:

Impair their ability to:

- Survive, to breed or reproduce, or to rear or nurture their young, or
- Hibernate or migrate
- Affect significantly the local distribution or abundance of great crested newt; or
- Damage or destroy a breeding site or resting place of a great crested newt.

1.4.6 Great crested newt is also included on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006). This Act places a duty upon public bodies to have regard to the purpose of conserving biodiversity within all of their actions. The species listed under Section 41 are 'Species of Principal Importance for the conservation of biodiversity in England' for which conservation steps should be taken or promoted.

1.4.7 When the RAMs described in this Method Statement are taken into account, the cumulative risks and effects on the local population(s) will be not significant. It is therefore considered that a great crested newt licence is not required for the facilitation works outlined in this Method Statement.

1.4.8 The Ecological Clerk of Works (ECoW), will oversee and quality-control the implementation of the ecological tasks undertaken.

c) Toolbox Talk

1.4.9 Prior to commencement of the works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to great crested newt.

1.4.10 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by great crested newts and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on great crested newts that could occur within or in the vicinity of the working area. The toolbox talk will stress that: potential great crested newt refugia / hibernation features should be left undisturbed; and great crested newt should not be handled by contractors.

d) Precautionary Working Methods

1.4.11 Differing precautionary working methods would be utilised dependent upon whether the relevant works within assumed great crested newt habitats are being undertaken in the great crested newt active or hibernation period. These periods are dependent upon weather conditions (temperature and rainfall) but are likely to be in the region of November to February inclusive (hibernation season) and March to October (active season). The ECoW will be responsible for determining the appropriate working methodology.

1.4.12 The prescriptions of this method statement should be followed during works in any areas with potential to support great crested newts in the western part of the site. These areas include but are not limited to: tree roots, hedgerow bases, rough grassland areas, arable field margins, earth banks, log piles, rock piles and woodlands.

1.4.13 If possible, all impacts to terrestrial areas which may offer hibernation potential (i.e. log piles, embankments etc.) will be removed outside of the hibernation period, as great crested newt are more likely to be active and associated with the ponds to the west of the site boundary during this period. However, there are restrictions on certain works due to the potential to impact upon nesting birds (during the bird nesting season, generally March to August inclusive), and all works timings will need to consider this.

1.4.14 No ponds supporting great crested newt are to be directly impacted by the works therefore an approach to pond removal is not required. For clarity, the precautionary working methodologies have been split down into three scenarios:

- Vegetation clearance in the active season
- Vegetation clearance in the hibernation season
- Ground-breaking works in the active and hibernation season.

1.5 Approach to vegetation clearance

a) Vegetation clearance in the active season

1.5.1 Any clearance within the active season must also consider the potential to impact upon nesting birds. Suitable measures to prevent impacts to nesting birds should be employed, which are likely to include pre-works checks for nests. These measures in relation to birds are not outlined in full within this document.

1.5.2 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working area.

1.5.3 The precautionary working methods to safeguard great crested newts during vegetation clearance in the active season are set out below.

- The ECoW will work with the contractor to determine a cutting regime whereby any animals present are able to move away from the cutting into retained habitats and not isolated in an unsuitable area. This area will be walked by the ECoW to identify any areas offering great crested newt sheltering opportunities prior to works commencing.
- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). Any removal of

sheltering habitats will be supervised by the ECoW. These will be dismantled by hand; this should be overseen by the ecologist.

- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.
- Vegetation is to be cleared at a minimum 150mm from the ground in the first pass.
- Subsequent to this, a suitable period of time as decided by the ECoW will be given to allow for any great crested newts present at the time of works to move away from the cut areas, this will also allow the ECoW to check the area for great crested newt, along with other species.
- The vegetation will then be cut to as close to ground level as possible;
- Vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to great crested newts within the site.

1.6 Vegetation clearance in the hibernation season

1.6.1 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working area.

1.6.2 The precautionary working methods to safeguard great crested newts during vegetation clearance in the hibernation season are set out below.

- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). If possible, this removal should be undertaken by hand or slowly under close supervision by the ECoW.
- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.

- The vegetation will then be cut to as close to ground level as possible.
- Vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to great crested newts within the site.

1.7 Approach to ground-breaking works including top-soil stripping (active season and hibernation period)

1.7.1 If possible, all impacts to terrestrial areas which may offer hibernation potential (i.e. log piles, embankments etc) will be removed outside of the hibernation period, as great crested newts are more likely to be active and associated with ponds during this period. However, there are restrictions on certain works due to the potential to impact upon nesting birds (during the bird nesting season, generally March to August inclusive), and all works timings will need to consider this.

1.7.2 Given that vegetation clearance works are to take place within the site prior to the commencement of any ground-breaking works, it is likely that the risk of encountering great crested newts will be reduced, due to the removal of suitable terrestrial habitat within the areas proposed for ground-breaking works. Ground-breaking works include any ground investigations, archaeology trenching, topsoil stripping etc.

1.7.3 Prior to commencement of the ground-breaking works, the ECoW will liaise with the contractor to clearly demarcate the required working area. The methodology outlined below assumes that all vegetation has previously been removed.

1.7.4 The precautionary working methods to safeguard great crested newts during ground-breaking works in the active season are set out below.

- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). If possible, this removal should be undertaken by hand or slowly under close supervision by the ECoW.
- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out

of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.

- The topsoil will then be carefully removed using a toothed bucket (if permitted under the contractors RAMS) under close ecological supervision by the ECoW.

b) Action to take if great crested newts are found

1.7.5 Should any great crested newts be found during the facilitation works the following must be observed due to the strict level of protection afforded to this species:

- The works will stop;
- The great crested newt will not be handled or moved from its resting place;
- The ECoW will assess the situation to determine whether a European Protected Species mitigation licence will be required before the works can continue; and if Natural England need to be informed.

References

1.1 HMSO (1981). The Wildlife and Countryside Act (as amended). HMSO, London.

1.2 HMSO (2000) The Countryside Rights of Way (CRoW) Act. HMSO, London.

1.3 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London.

Appendix 1: Toolbox Talk

Appendix 2: Declaration of Understanding

Toolbox talk title:	Ecology
Given by:	
Site:	
Date:	

Name	Company	Signature

Name	Company	Signature

VOLUME 2, CHAPTER 14 APPENDIX 14C9A: GREAT CRESTED NEWT METHOD STATEMENT

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a) Background and Scheme Overview

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1.1.2 It is located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a Nationally Significant Infrastructure Project (NSIP) and if consented this would be via a Development Control Order (DCO).

1.1.3 This method statement outlines the key approaches to mitigating potential impacts to the great crested newt (*Triturus cristatus*) populations present within or adjacent to the construction site for the Sizewell C main development site. It will be used by SZC Co. and any relevant subcontractors, in relation to the proposal to build Sizewell C.

1.1.4 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.5 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction including an accommodation campus and a series of off-site associated development sites in the local area including:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the 'northern park and ride'), and one to the south-west at Wickham Market (the 'southern park and ride') to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;
- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the 'two village bypass') to alleviate traffic on the A12 through the villages;
- A permanent road linking the A12 to the Sizewell C main development site (referred to as 'Sizewell link road') to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the 'Yoxford roundabout') and other road junctions to accommodate Sizewell C construction traffic;
- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site;
- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site ('the green rail route') and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network; and
- Green rail route extension and rail improvements to the Saxmundham to Leiston branch line.

1.1.6 The components of the Project listed above are referred to collectively as the 'Sizewell C Project'.

1.2 Site location and setting

1.2.1 The main development site is located on the Suffolk coast, to the north of the existing Sizewell A and B power station complex. The total size of the proposed development is approximately 365ha, which encompasses five land parcel components, which are described below:

- Main platform: the area that would become the power station itself;

- Sizewell B relocated facilities and National Grid land: the area that certain Sizewell B facilities would be moved to in order to release Sizewell B land for the proposed development and the area required for the National Grid transmission network;

- Offshore works area: the area where offshore cooling water infrastructure and other marine works would be located;

- Temporary Construction Area (TCA): the area located primarily to the north and west of the proposed Sizewell Marshes Site of Special Scientific Interest (SSSI) crossing, which would be used to support construction activity on the main platform; and

- Land east of Eastlands Industrial Estate (LEEIE): the area including and directly to the north of Sizewell Halt, which would be used to support construction on the main platform and TCA.

1.2.2 The existing EDF Sizewell power station complex comprises a series of buildings associated with the power station, parking areas, access infrastructure and ancillary structures. The proposed development footprint is dominated by arable fields with field boundaries comprising native, species poor hedgerows or tree lines. Areas of woodland encompasses the EDF power station complex on the northern, western and southern boundaries, whilst several woodland blocks, comprising plantation, mixed plantation and broadleaved semi-natural woodland, are scattered across the site. The larger area present to the north east includes Hilltop Covert, Dunwich Forest, Goose Hill and the northern boundary of Kenton Hills. Numerous farm buildings and structures are also scattered to the north and west of the site. Portions of the site falls within the following designated sites:

- Sizewell Marshes SSSI – the site includes a small wetland area, including fen meadow habitat within this SSSI;

- Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB);

- Sizewell Levels and Associated Areas County Wildlife Site (CWS) – largely plantation woodland and acid grassland; and

- Suffolk Shingle Beaches CWS – dune grassland and vegetation shingle.

1.2.3 The area covered by this method statement is presented in Image 1 below.

Plate 1.1: Site location

1.2.4 The purpose of the works is to install a new nuclear power station at the Sizewell site. However, as a component of this, vegetation clearance and ground-breaking works (collectively referred to as "facilitating works" within this report) will be required in order to facilitate the proposed development. Accordingly, a number of potential ecological constraints are associated with the proposed facilitating works, as are set out below.

a) Key Ecological Constraints

1.2.5 The key potential legislative constraints associated with the facilitation works within the site include:

- Bats;
- Deptford Pink;
- Great Crested Newt;

- Natterjack Toad;
- Reptiles
- Water Vole; and
- Otter.

1.2.6 This method statement only covers guidance relating to great crested newts although method statements and / or draft protected species licences for the other species have also been prepared as relevant.

1.2.7 In order to enable the proposed development of main development site, as detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Given the presumed presence of great crested newts along the western edge of the site, the proposed facilitating works have the potential to cause injury/ mortality to this species should it be present within the site at the time of the works. Accordingly, the purpose of this document is to provide a reasonable avoidance measures (RAMs) method statement that can be used by SZC Co. and any relevant subcontractors, to ensure the safeguarding of great crested newts during the facilitation works to be undertaken within the site.

1.2.8 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.3 Site reasonable avoidance measures (RAMs) method statements for great crested newt

a) Introduction

1.3.1 This section provides a suite of dedicated RAMs Method Statements (MS) for the ecological constraints that may be encountered for great crested newts during the facilitation works.

1.3.2 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality of the protected species and avoid contravention of the relevant legislation. The ECoW will determine exactly when and where it is appropriate to apply the measures described in the RAMs MS. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.3.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) Toolbox Talk

1.3.4 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (Appendix 1) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to the legally protected species / other species of conservation concern present on within the site that may be encountered during the works.

1.3.5 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.

1.3.6 There is a declaration (Appendix 2) for those present to sign to confirm they have understood the constraints and actions presented.

1.4 Great crested newt

a) Site Status

1.4.1 Desk-study data received from the Suffolk Biodiversity Information Service (SBIS) returned no records of great crested newts within the boundaries of the site, given the presence of suitable aquatic and terrestrial habitat within the site, specific presence/ absence surveys were undertaken with respect to great crested newts within the site. Surveys of the site for great crested newts were carried out between 2007 and 2014 by Wood Group and Arcadis Consulting (UK) recorded an absence of great crested newts within the site. The eDNA surveys carried out in 2016 confirmed the continued absence of great crested newts from within the site.

1.4.2 Great crested newts were however recorded within four offsite ponds to the west of the site boundary and are therefore assumed to present, a least in low numbers, in terrestrial habitats at the western fringes of the site.

b) Legislation

1.4.3 Great crested newt is listed on Schedule 5 of the Wildlife and Countryside Act (WCA) 1981 (as amended) (HMSO, 1981) in respect of Section 9, which makes it an offence, inter alia, to:

- Intentionally or recklessly kill, injure or take (handle) a great crested newt;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place that a great crested newt uses for shelter or protection; or
- Intentionally or recklessly disturb a great crested newt while it is occupying a structure or place that it uses for shelter or protection.

1.4.4 The offence "recklessly" was added by the Countryside and Rights of Way Act 2000 (CRoW) (HMSO 2000).

1.4.5 Great crested newt receives further protection under Regulation 41 of The Conservation of Habitats and Species Regulations 2017. They are listed on Schedule 2 of the Regulations, which makes it an offence, inter alia, to:

- Deliberately capture, injure or kill a great crested newt;
- Deliberately disturb a great crested newt, in particular any disturbance which is likely:

Impair their ability to:

- Survive, to breed or reproduce, or to rear or nurture their young, or
- Hibernate or migrate
- Affect significantly the local distribution or abundance of great crested newt; or
- Damage or destroy a breeding site or resting place of a great crested newt.

1.4.6 Great crested newt is also included on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006). This Act places a duty upon public bodies to have regard to the purpose of conserving biodiversity within all of their actions. The species listed under Section 41 are 'Species of Principal Importance for the conservation of biodiversity in England' for which conservation steps should be taken or promoted.

1.4.7 When the RAMs described in this Method Statement are taken into account, the cumulative risks and effects on the local population(s) will be not significant. It is therefore considered that a great crested newt licence is not required for the facilitation works outlined in this Method Statement.

1.4.8 The Ecological Clerk of Works (ECoW), will oversee and quality-control the implementation of the ecological tasks undertaken.

c) Toolbox Talk

1.4.9 Prior to commencement of the works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to great crested newt.

1.4.10 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by great crested newts and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on great crested newts that could occur within or in the vicinity of the working area. The toolbox talk will stress that: potential great crested newt refugia / hibernation features should be left undisturbed; and great crested newt should not be handled by contractors.

d) Precautionary Working Methods

1.4.11 Differing precautionary working methods would be utilised dependent upon whether the relevant works within assumed great crested newt habitats are being undertaken in the great crested newt active or hibernation period. These periods are dependent upon weather conditions (temperature and rainfall) but are likely to be in the region of November to February inclusive (hibernation season) and March to October (active season). The ECoW will be responsible for determining the appropriate working methodology.

1.4.12 The prescriptions of this method statement should be followed during works in any areas with potential to support great crested newts in the western part of the site. These areas include but are not limited to: tree roots, hedgerow bases, rough grassland areas, arable field margins, earth banks, log piles, rock piles and woodlands.

1.4.13 If possible, all impacts to terrestrial areas which may offer hibernation potential (i.e. log piles, embankments etc.) will be removed outside of the hibernation period, as great crested newt are more likely to be active and associated with the ponds to the west of the site boundary during this period. However, there are restrictions on certain works due to the potential to impact upon nesting birds (during the bird nesting season, generally March to August inclusive), and all works timings will need to consider this.

1.4.14 No ponds supporting great crested newt are to be directly impacted by the works therefore an approach to pond removal is not required. For clarity, the precautionary working methodologies have been split down into three scenarios:

- Vegetation clearance in the active season
- Vegetation clearance in the hibernation season
- Ground-breaking works in the active and hibernation season.

1.5 Approach to vegetation clearance

a) Vegetation clearance in the active season

1.5.1 Any clearance within the active season must also consider the potential to impact upon nesting birds. Suitable measures to prevent impacts to nesting birds should be employed, which are likely to include pre-works checks for nests. These measures in relation to birds are not outlined in full within this document.

1.5.2 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working area.

1.5.3 The precautionary working methods to safeguard great crested newts during vegetation clearance in the active season are set out below.

- The ECoW will work with the contractor to determine a cutting regime whereby any animals present are able to move away from the cutting into retained habitats and not isolated in an unsuitable area. This area will be walked by the ECoW to identify any areas offering great crested newt sheltering opportunities prior to works commencing.
- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). Any removal of

sheltering habitats will be supervised by the ECoW. These will be dismantled by hand; this should be overseen by the ecologist.

- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.
- Vegetation is to be cleared at a minimum 150mm from the ground in the first pass.
- Subsequent to this, a suitable period of time as decided by the ECoW will be given to allow for any great crested newts present at the time of works to move away from the cut areas, this will also allow the ECoW to check the area for great crested newt, along with other species.
- The vegetation will then be cut to as close to ground level as possible;
- Vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to great crested newts within the site.

1.6 Vegetation clearance in the hibernation season

1.6.1 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working area.

1.6.2 The precautionary working methods to safeguard great crested newts during vegetation clearance in the hibernation season are set out below.

- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). If possible, this removal should be undertaken by hand or slowly under close supervision by the ECoW.
- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.

- The vegetation will then be cut to as close to ground level as possible.
- Vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to great crested newts within the site.

1.7 Approach to ground-breaking works including top-soil stripping (active season and hibernation period)

1.7.1 If possible, all impacts to terrestrial areas which may offer hibernation potential (i.e. log piles, embankments etc) will be removed outside of the hibernation period, as great crested newts are more likely to be active and associated with ponds during this period. However, there are restrictions on certain works due to the potential to impact upon nesting birds (during the bird nesting season, generally March to August inclusive), and all works timings will need to consider this.

1.7.2 Given that vegetation clearance works are to take place within the site prior to the commencement of any ground-breaking works, it is likely that the risk of encountering great crested newts will be reduced, due to the removal of suitable terrestrial habitat within the areas proposed for ground-breaking works. Ground-breaking works include any ground investigations, archaeology trenching, topsoil stripping etc.

1.7.3 Prior to commencement of the ground-breaking works, the ECoW will liaise with the contractor to clearly demarcate the required working area. The methodology outlined below assumes that all vegetation has previously been removed.

1.7.4 The precautionary working methods to safeguard great crested newts during ground-breaking works in the active season are set out below.

- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). If possible, this removal should be undertaken by hand or slowly under close supervision by the ECoW.
- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out

of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.

- The topsoil will then be carefully removed using a toothed bucket (if permitted under the contractors RAMS) under close ecological supervision by the ECoW.

b) Action to take if great crested newts are found

1.7.5 Should any great crested newts be found during the facilitation works the following must be observed due to the strict level of protection afforded to this species:

- The works will stop;
- The great crested newt will not be handled or moved from its resting place;
- The ECoW will assess the situation to determine whether a European Protected Species mitigation licence will be required before the works can continue; and if Natural England need to be informed.

References

1.1 HMSO (1981). The Wildlife and Countryside Act (as amended). HMSO, London.

1.2 HMSO (2000) The Countryside Rights of Way (CRoW) Act. HMSO, London.

1.3 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London.

Appendix 1: Toolbox Talk

Appendix 2: Declaration of Understanding

Toolbox talk title:	Ecology
Given by:	
Site:	
Date:	

Name	Company	Signature

Name	Company	Signature

VOLUME 2, CHAPTER 14 APPENDIX 14C10: OTTER METHOD STATEMENT

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Plates

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Appendices

1 Otter Method Statement

1.1 Introduction

a) Background and Scheme Overview

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station.

1.1.2 It is located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is considered to be a Nationally Significant Infrastructure Project (NSIP) and if consented would be granted a Development Control Order (DCO).

1.1.3 This Otter Method Statement outlines the key approaches to mitigating potential impacts to the Otter (*Lutra lutra*) populations present within or adjacent to the construction site for Sizewell C main development site. It will be used by the consultant ecologist, SZC Co. and any relevant subcontractors, in relation to the proposal to build the Sizewell C.

1.1.4 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.5 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction including an accommodation campus and a series of off-site associated development sites in the local area. These are:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the 'northern park and ride'), and one to the south-west at Wickham Market (the 'southern park and ride') to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;

- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the 'two village bypass') to alleviate traffic on the A12 through the villages;

- A permanent road linking the A12 to the Sizewell C main development site (referred to as 'Sizewell link road') to alleviate traffic from the B1122 through Theberton and Middleton Moor;

- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the 'Yoxford roundabout') and other road junctions to accommodate Sizewell C construction traffic;

- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site;

- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site ('the green rail route') and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network; and

- Green rail route extension and rail improvements to the Saxmundham to Leiston branch line.

1.1.6 The components of the Project listed above are referred to collectively as the 'Sizewell C Project'.

b) Site Location and Setting

1.1.7 The main development site is located on the Suffolk coast, to the north of the existing Sizewell A and B power station complex. The proposed development encompasses five land parcel components, which are described below:

- Main platform: the area that would become the power station itself;

- Sizewell B relocated facilities and National Grid land: the area that certain Sizewell B facilities would be moved to in order to release Sizewell B land for the proposed development and the area required for the National Grid transmission network;
- Offshore works area: the area where offshore cooling water infrastructure and other marine works would be located;
- Temporary Construction Area (TCA): the area located primarily to the north and west of the proposed Sizewell Marshes Site of Special Scientific Interest (SSSI) crossing, which would be used to support construction activity on the main platform; and
- Land east of Eastlands Industrial Estate (LEEIE): the area including and directly to the north of Sizewell Halt, which would be used to support construction on the main platform and TCA.

1.1.8 The existing EDF Sizewell power station complex comprises a series of buildings associated with the power station, parking areas, access infrastructure and ancillary structures. The proposed development footprint is dominated by arable fields with field boundaries comprising native, species poor hedgerows or tree lines. Areas of woodland encompasses the EDF power station complex on the northern, western and southern boundaries, whilst several woodland blocks, comprising plantation, mixed plantation and broadleaved semi-natural woodland, are scattered across the site. The larger area present to the north east includes Hilltop Covert, Dunwich Forest, Goose Hill and the northern boundary of Kenton Hills. Numerous farm buildings and structures are also scattered to the north and west of the site. Portions of the site falls within the following designated sites:

- Sizewell Marshes SSSI – a small wetland area, including fen meadow habitat;
- Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB);
- Sizewell Levels and Associated Areas County Wildlife Site (CWS) – largely plantation woodland and acid grassland; and
- Suffolk Shingle Beaches CWS – dune grassland and vegetation shingle.

1.1.9 The area covered by this method statement is presented in Image 1 below.

Plate 1.1: Site location

1.1.10 The purpose of the works is to install a new nuclear power station at the Sizewell site. However, as a component of this, vegetation clearance and ground-breaking works (collectively referred to as "facilitating works" within this report) will be required in order to facilitate the proposed development. Accordingly, a number of potential ecological constraints are associated with the proposed facilitating works, as are set out below

c) Key Ecological Constraints (Protected Species)

1.1.11 The protected species present within the site and which the development of mitigation strategies associated with the development proposals include:

- Bats;
- Badgers;
- Natterjack toads;
- Reptiles;
- Nesting birds;
- Otters; and
- Water vole;

1.1.12 In order to enable the proposed development of main development site, as detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Given the habitats present within the site, the proposed facilitating works have the potential to cause injury/ mortality to otters should any be present within the site at the time of the works. Accordingly, the purpose of this document is to provide a reasonable avoidance measures (RAMs) method statement that can be used by the consultant ecologist, SZC Co. and any relevant subcontractors, to ensure the safeguarding of otters during the facilitation works to be undertaken within the site.

1.1.13 This method statement only covers guidance relating to otters. Method statements and protected species licences for the above species have also been prepared as relevant. This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.2 SITE Reasonable Avoidance Measures (RAMs) Method Statements for Otter

a) Introduction

1.2.1 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality of the protected species and avoid contravention of the relevant legislation. The Ecological Clerk of Works (ECoW) will determine exactly when and where it is appropriate to apply the measures described in the RAMs MS. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.2.2 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) Toolbox Talk

1.2.3 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (example in Appendix 1) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to otters present within the site and that may be encountered during the works.

1.2.4 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by otter and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.

1.2.5 There is a declaration (Appendix 2) for those present to sign to confirm they have understood the constraints and actions presented.

1.3 Otter

a) Site Status

1.3.1 Sizewell Marshes SSSI supports a locally important population of otter where there is an extensive area of suitable habitat linked, via the Leiston Drain to similar habitats on the Minsmere South Levels. The population is increasing in Suffolk, but is still considered to be vulnerable, threatened by: lack of safe and suitable habitat along rivers; poor water quality and pollution; and road traffic accidents. With the loss of a small part of Sizewell Marshes SSSI and with works planned adjacent to the Sizewell Marshes SSSI, this species would be directly and indirectly affected by the proposed development.

1.3.2 Construction of the main development site would result in either the temporary or permanent loss of suitable otter habitat along the Sizewell Drain, Leiston Drain and the Goodrum's Fen portion of the Sizewell Marshes SSSI, as a result of the Phase 1 site clearance works, diversion of the Sizewell Drain within Sizewell Marshes SSSI, installation of a barrier between Sizewell Marshes SSSI and the site, and construction of the SSSI Crossing to provide access to the main construction area.

1.3.3 In terms of proportion of an average range size, suitable habitat to be lost is likely to be a small proportion of the overall habitat in Sizewell and Minsmere, most of which would be retained and landtake would have a negative minor, non-significant effect at the local level on the otter population.

1.3.4 In the absence of mitigation, the works proposed have the potential to impact otters through:

- Habitat loss and fragmentation (including connectivity);
- Incidental mortality of species; and
- Disturbance effects on species population (comprising light, noise and visual effects).

1.3.5 It is reasonable to conclude that disturbance would have a limited effect on the otter population, given that the area of otter habitat likely to be disturbed is small compared to an average otter territory. Disturbance effects could potentially last for the duration of the construction phase although primarily during Phase 1, when the works around the SSSI to establish the platform, the diversion of the Leiston Drain and the SSSI Crossing are implemented.

1.3.6 Overall, it is considered that habitat loss and fragmentation would have a temporary negligible adverse effect on the species. The disturbance on otter would have short term, reversible, minor adverse effect. The habitat loss, fragmentation and potential disturbance to the species is considered not significant.

b) Legislation

1.3.7 Otter are protected under EC Directive (92/43/EEC). This is implemented in Britain under the Conservation of Habitats and Species Regulations (HMSO, 2017). Under this legislation it is an offence to damage or destroy an otter's place of shelter, whether intentionally or accidentally and to deliberately disturb an otter

1.3.8 Otter are also protected under the Wildlife and Countryside Act WCA (1981, as amended) which makes a criminal offence to 'intentionally' kill, injure or take an otter without a licence. It is also illegal to damage, destroy or obstruct access to a place used for shelter or protection.

c) Toolbox Talk

1.3.9 Prior to commencement of the vegetation clearance works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to otters. Site-specific toolbox talks (example in Appendix 1) will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on the species that could occur within or in the vicinity of the working area.

d) Precautionary Working Methods

1.3.10 Pre-construction surveys will be undertaken to provide up-to-date information on otter activity and as to whether any holts or other resting places are present within the construction footprint. Otter breeding and resting places ("holts") are typically tunnels under waterside trees, and are legally protected. Natal or breeding holds may be used at any time of the year. Although no natal holts have been found within the site boundary, there remains the possibility that otter may set up a new natal den site.

1.3.11 A European Protected Species Licence application and Method Statement would be required to permit works that would otherwise disturb, injure or kill otter, and/or damage or restrict access to their holts, should an active holt be identified. If required, a detailed mitigation strategy for otter would be provided in a method statement, based on Natural England's standing advice and guidance in relation to otter and mitigation for development projects (Natural England, 2014).

1.3.12 The locations of all holts and couches must be identified to contractors in confidence to ensure that they are not accidentally disturbed during the construction process. If an otter holt is located, a 30m exclusion zone would be clearly demarked and enforced.

1.3.13 Prior to works commencing the ECoW will undertake a toolbox talk to site staff covering the Precautionary Working Methods to be adhered to.

1.3.14 Where works are required in areas of otter activity (but not a place of shelter) the ECoW will demarcate and agree on site in which areas which activity is permitted. If night-time working is required, the works around the areas with suitable habitat for otters and particularly the Leiston and Sizewell drains, will comply with the measures and approaches defined in the Lighting Management Plan.

1.4 Facilitating Work Requirements

a) Vegetation Clearance Methods

1.4.1 Vegetation clearance works are required in order to facilitate the development of the site and these works have the potential to impact the local otter population. Should vegetation clearance work occur within the proximity of a watercourse (20m within Sizewell Marshes watercourses and within 10m of other watercourses) a qualified ECoW will carry out a pre-construction check for signs of otter and/or suitable otter habitat within the footprint of the works.

1.4.2 A European Protected Species Licence application and Method Statement would be required to permit works that would otherwise disturb, injure or kill otter, and/or damage or restrict access to their holts, should an active holt be identified.

1.4.3 Should otter signs be present the ECoW will demarcate and agree on site in which areas which activity is permitted.

b) Vegetation Clearance Equipment

1.4.4 The vegetation clearance contractors on site will utilise equipment specific to their clearance methods as per their RAMS. For example:

- John Deere 3 series compact with cut and collector flail;
- John Deere 4 series compact tractor with side arm flail; and
- Brushcutter, rakes, pitchforks and other hand tools.

Plate 1.2: John Deere 3 series compact tractor

Plate 1.3: John Deere 4 series tractor

Plate 1.4: Brushcutter

c) Ground-breaking Works Methods

1.4.5 Ground-breaking works are required in order to facilitate the development of the site and have the potential to impact the local otter population. Should ground-breaking works take occur (20m within Sizewell Marshes watercourses and within 10m of other watercourses) a qualified ECoW will carry out a pre-construction check for signs of otter and/or suitable otter habitat within the footprint of the works.

1.4.6 A European Protected Species Licence application and Method Statement would be required to permit works that would otherwise disturb, injure or kill otter, and/or damage or restrict access to their holts, should an active holt be identified.

1.4.7 Should otter signs be present the ECoW will demarcate and agree on site in which areas which activity is permitted. Demarcation and exclusion from holts within 30m of working areas, potentially with the use of Heras fencing.

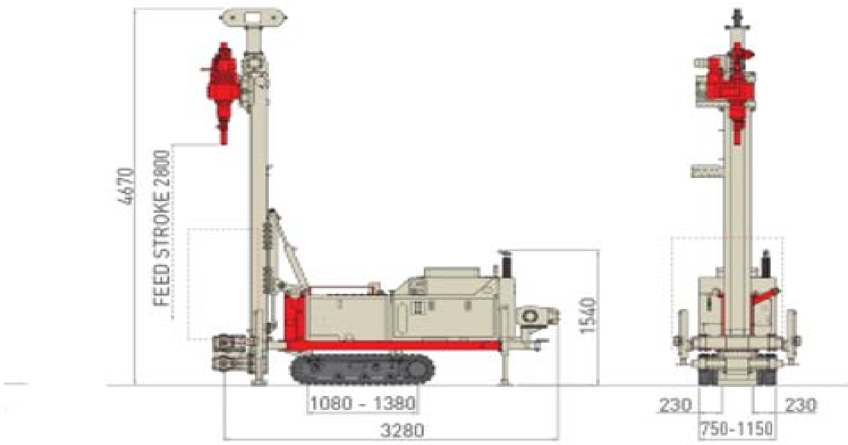
1.4.8 Any excavations made during construction activities would be closed at the end of the day to prevent access by otter and other terrestrial nocturnal animals. If it is not be possible for excavations to be closed at night, a means of egress (i.e. a wooden plank or soil ramp) would be provided to ensure that any animals that may access these excavations have a means of escape.

d) Ground-breaking Works Equipment

1.4.9 Contractors will utilise the equipment as per their RAMS. For example:

- Commacchio 205 drilling rig (Image 8) or Beretta T45 drilling rig;
- Spade;
- Spill kits; and
- Chapter 8 barrier/ Heras fencing.

Plate 1.5:



	m.s.	i.s.		
Potenza Motore *Engine Power*	kW	HP	33	44
Livello Emissioni *Emission Level*	-		Step 3A / Tier 4i	
Corsa Mast *Mast Feed Stroke*	mm	ft	1.030 - 2.800	3.4 - 9.2
Forza di Spinta *Feed Force*	daN	lbs	2.500	5,620
Forza di Tiro *Retract Force*	daN	lbs	2.500	5,620
Coppia Rotary *Rotary Torque Range*	daNm	lb*ft	200 - 480	1,475 - 3,540
Giri Rotary *Rotary Speed Range*	rpm		80 - 580	
Serraggio Morse *Clamp Range*	mm	in	45 - 220	1.8 - 8.6
Peso *Weight*	kg	lbs	2.400 - 2.800	5,300 -6,200

References

1.1 EDF Energy (2018). Lighting Strategy for Construction and Operational Sites. Sizewell C Project.

1.2 HMSO (1981). The Wildlife and Countryside Act (as amended). HMSO, London.

1.3 HMSO (2000) The Countryside Rights of Way (CRoW) Act. HMSO, London

1.4 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London

1.5 HMSO (2017). The Conservation of Habitats and Species Regulations. HMSO, London.

1.6 Natural England (2014). Otters: surveys and mitigation for development projects. Available from: https://www.gov.uk/guidance/otters-protection-surveys-and-licences#mitigation-compensation-methods-and-avoiding-impacts .

Appendix 14C.10.1: Ecological Toolbox Talk

1.1. Legislation

1.1.1. The Eurasian otter is the only native UK otter species. It's fully protected as a European protected species (EPS) and is also protected under sections 9 and 11 of the Wildlife and Countryside Act 1981.

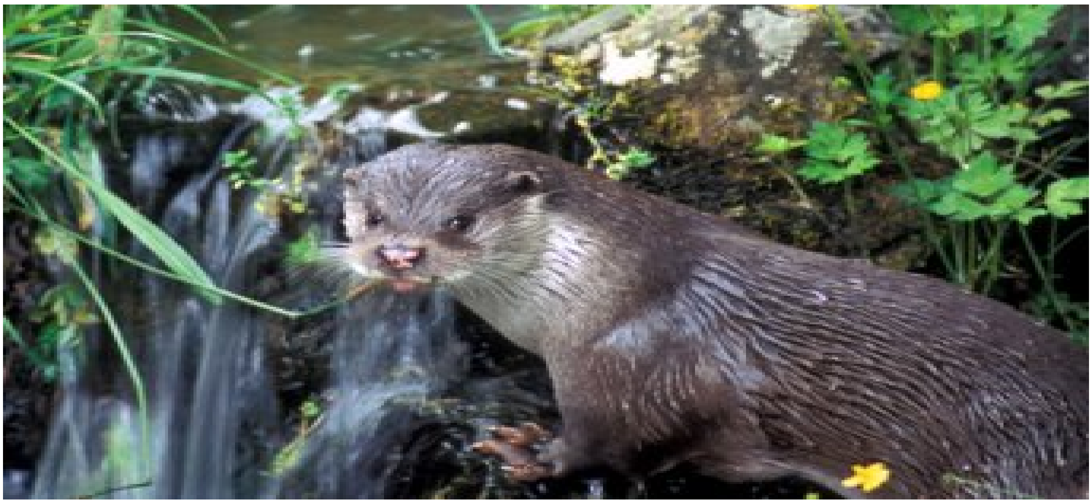
1.1.2. You're breaking the law if you:

- capture, kill, disturb or injure otters (on purpose or by not taking enough care)
- damage or destroy a breeding or resting place (deliberately or by not taking enough care)
- obstruct access to their resting or sheltering places (deliberately or by not taking enough care)
- possess, sell, control or transport live or dead otters, or parts of otters
- If you're found guilty of an offence you could get an unlimited fine and up to 6 months in prison.

1.2. Species Identification

1.2.1. Otter are associated with water courses. It is rare to see these animals but their holts and resting places are found in banks of ditches, streams and rivers and footprints can be easily seen.

Plate 1.1: Otter



1.2.2. Otter signs can be found:

- Under and near bridges
- On banksides
- On boulders or rocks either in river or near the river
- On old tree stumps or logs
- At either end of shortcut paths
- On gravel banks or sand and muddy areas
- Around ponds and lakes
- In marshes or reed beds
- At river junctions or intersections

Plate 1.2: Otter Habitat

1.2.3. Typically 2 – 7cm long, will contain fish bones and scales, be tarry and black but these will turn grey when old and naturally, they will smell very strongly of fish.

Plate 1.3: Otter spraint

1.2.4. The Otter prints can be found at the edge of river banks, in gravel, sand, mud and on tarmac if they have just left the river. They also have 5 toes which is a distinctive sign that it's an Otter print.

Plate 1.4: Otter print

1.3. Action

- If any species, or signs characteristic of protected species in the vicinity of the works are apparent, OR IF IN ANY DOUBT, stop the works immediately and contact the ECoW;
- The species involved may then be identified and appropriate action such as further surveys or mitigation taken; and
- Do not attempt to move any species found unless instructed to do so by an ecologist.

Appendix 14C.10.2: Declaration

By signing the register below you confirm that you have received the ECOLOGY TOOLBOX TALK (Appendix 1) AND METHOD STATEMENT briefing provided by the project ECoW.

Date	Name	Role on Site	Signature

The Conservation of Habitats and Species Regulations 2017
Wildlife & Countryside Act 1981

NATURAL ENGLAND

Licence Application Form

Application for a licence to take wild plants: Survey, science, education and conservation

Please Note – Applications can be completed online.
For more information please visit our website.

- Please complete this application form using **dark ink** and BLOCK CAPITALS.
- Return the completed form to the address shown.
- All questions should be answered as appropriate. Questions marked with '*' are mandatory and failing to complete these may result in delays to your application.
- If there is insufficient space for completing answers on this form, please attach a separate sheet.
- Natural England will aim to determine the outcome of a completed licence application within its published service standards.
- If you experience any problems completing this application or using the online Case Work Management (CWM) system – please see our website for guidance or contact Wildlife Licensing.
- Additional guidance is provided in Using CWM – Applicant Guidance Document. This can be downloaded from our website or you can ask Wildlife Licensing to send you a copy.

Wildlife Licensing
Natural England
Horizon House
Deanery Road
Bristol, BS1 5AH.
T. 020802 61089
wildlife.scicons@naturalengland.org.uk

For Office Use Only

CWM Ref No:

Charter Deadline:

1. Applicant Details

Please enter the details of the person who will become the licensee.

(For guidance please see attached annex)

- *If the applicant **is** already registered as a customer please complete Registered Customer Details (a)*
- *If the applicant **is not** already registered as a customer please complete the New Customer Registration (b)*

(a) Registered Customer Details

*Customer Number	*Surname	*Forename	*Postcode

(a) New Customer Registration

Please note: If you are the agent registering on behalf of the applicant you will need to provide their full authorisation with this application.

*Email Address

*Title
(please tick as appropriate) Mr ☐ Mrs ☐ Ms ☐ Other ☐ (Please Specify)

*Forename	Middle Name	*Surname

Professional Membership
(e.g. CIEEM, IEMA, etc)

If you represent an organisation please complete (i) (ii) and (iii)

(i) *Business Title | (ii) *Company | (iii) *Position

House Name / No.

*Address Line 1

*Address Line 2

Address Line 3

Town | *County

*Postcode | Country

Either 'Telephone No.' or 'Mobile No.' must be completed.

Telephone No. | Mobile No.

Fax no.

*Customer Type *(e.g. Farmer, Householder, Ecologist, etc.)*

*Are you VAT registered? Yes ☐ No ☐ If 'Yes' VAT Number:

*Are you registered with the Rural Payments Agency? Yes ☐ No ☐ If 'Yes' RPA SBI Number:

(b) Alternative Applicant Contact Details

In the event that the applicant is unavailable to discuss the application, it would be helpful if alternative contact details could be provided. By completing this section you are confirming that this contact is authorised to act on behalf of the applicant.

Name:

Tel Number:

Email Address:

2. Agent / Named Ecologist Details

(a) Will an agent / named ecologist be used in conjunction with this application? Yes ☐ No ☐
(For guidance please see attached annex)

- *If the agent **is** already registered as a customer please complete Registered Agent / Ecologist Details (b)*
- *If the agent **is not** already registered as a customer please complete the New Agent / Ecologist Registration (c)*
- *If there will not be an agent / ecologist used in conjunction with this application please go to the next section.*

(b) Registered Agent / Ecologist Details

*Customer Number	*Surname	*Forename	*Postcode

(c) New Agent / Named Ecologist Registration

Please note: If you are the applicant registering on behalf of the agent / named ecologist you will need to provide their full authorisation with this application.

*Email Address

*Title
(please tick as appropriate) Mr ☐ Mrs ☐ Ms ☐ Other ☐ (Please Specify

*Forename | Middle Name | *Surname

Professional Membership
(e.g. CIEEM, IEMA, etc)

If you represent an organisation please complete (i) (ii) and (iii)

(i) *Business Title | (ii) *Company | (iii) *Position

House Name / No.

*Address Line 1

*Address Line 2

Address Line 3

Town | *County

*Postcode | Country

Either 'Telephone No.' or 'Mobile No.' must be completed.

Telephone No. | Mobile No.

Fax no.

*Customer Type *(e.g. Farmer, Householder, Ecologist, etc.)*

*Are you VAT registered? Yes ☐ No ☐ If 'Yes' VAT Number:

*Are you registered with the Rural Payments Agency? Yes ☐ No ☐ If 'Yes' RPA SBI Number:

(d) Alternative Ecologist Contact Details

In the event that the named ecologist is unavailable to discuss the application, it would be helpful if alternative contact details could be provided. By completing this section you are confirming that this contact is authorised to act on behalf of the named ecologist and has a detailed knowledge of the application.

Name:

Tel Number:

Email Address:

3. Communication Preferences

Please indicate who should be contacted if we need to discuss this application:

Applicant ☐ Agent / Ecologist ☐

Please indicate to whom the outcome documentation for this application should be sent:

Applicant ☐ Agent / Ecologist ☐

Applicant preferences: Email ☐ Post ☐ Telephone ☐

If 'Yes' for telephone, please provide a contact no.

Agent / Ecologist preferences: Email ☐ Post ☐ Telephone ☐

If 'Yes' for telephone, please provide a contact no.

4. Previous Applications

(a) * To your knowledge, have there been any previous applications or licence decisions concerning this site? Yes ☐ No ☐

If 'No' please go to the next section. If 'Yes' to (a), please complete the following.

(b) *Date of most recent application:

(c) *What was the subject of the previous applications?

(d) *What is the application or licence reference number?

(e) *What was the outcome of the previous application? (Please select one of the following)

Granted ☐ Not Granted ☐ Advice Only ☐ Deferred ☐ Not Yet Known ☐

5. Purpose

(a) * Confirm the purpose of the application:

- ☐ Science or education, under section 55(2)(a) and/or section 16(3)(a)
- ☑ Conserving wild plants, under section 55(2)(c) and/or section 16(3)(c)
- ☐ Introducing wild plants to particular areas, under section 55(2)(c) and/or section 16(3)(c)
- ☐ Protecting any botanical collection, under section 55(2)(d) and/or section 16(3)(d)

(b) What are the main aims?

TO ENSURE THE LONG TERM SURVIVAL OF DEPTFORD PINK (DIANTHUS ARMERIA) AT SIZEWELL, SUFFOLK.

(c) * What publications have you produced or contributed to regarding this topic?	NONE. AN UNPUBLISHED METHOD STATEMENT IS APPENDED TO THIS APPLICATION.
(d) * Is data being collected? If yes, please describe what it will be used for.	THE SIZE OF THE DONOR POPULATION WILL BE RECORDED DURING THE YEAR OF TRANSLOCATION. THE SIZE OF THE TRANSLOCATED POPULATION WILL BE RECORDED AT THE TIME OF TRANSLOCATION AND YEARLY UP TO FIVE YEARS FROM THE TRANSLOCATION YEAR.

6. Justification

(a) * Please provide a summary of your need to apply:	THE CONSTRUCTION OF SEA DEFENCES AS PART OF THE SIZEWELL C NUCLEAR POWER STATION DEVELOPMENT WILL RESULT IN THE COMPLETE LOSS OF AN EXTANT POPULATION OF DEPTFORD PINK. THE SCALE AND REQUIREMENTS OF THE PROJECT ARE SUCH THAT THERE IS NO
(b) * If you are applying in relation to damage to land, crops, fisheries, or property, please provide the extent of damage and dates (including previous years if appropriate)	NOT RELEVANT

(c) * Have you taken any action to prevent the problems outlined above? Yes ☐ No ☐ N/A ☑

If 'Yes' to (c)... * Please provide details of the actions taken:

If 'No' to (c)... * Please explain why no actions have been taken?

7. Site Details

*Is the address for the site or premises to be licensed different to the applicant's address? Yes ☐ No ☐

If 'Yes' ... For each Site / Location to be licensed, please complete **all** of the following details:
If 'No' ... Please complete Site / Location Name and OS Grid Reference boxes only.
(For linear projects, please add the start and end points separately)

	Site 1	*Site 2*	*Site 3*
*Site / Location Name:	SIZEWELL NUCLEAR PC		
House No:			
Address Line 1:	SIZEWELL		
Address Line 2:	LEISTON		
Address Line 3:			
Town:			
*County:	SUFFOLK		
Postcode:	IP16 4UR		
*OS Grid Reference: *(In format XX123456)*	TM475638		

8. Conservation Considerations

(a) *Will any part of the proposed activity fall in and/or adjacent to a Designated Site? Yes ☑ No ☐ N/A ☐

If 'Yes' to (a) please complete the table below. If 'No', please go to the next section.

Please indicate whether the activity will fall on and/or adjacent to a designated site:	Designated Site Name:	Type of Designated Site *E.g. National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar Site, Ancient Monument, Marine Nature Reserve (MNR), Area of Outstanding Natural Beauty (AONB)*
On ☐ Adjacent to ☑	SOUTHERN NORTH SEA SPECIAL AREA OF CONSERVATION (SAC)	
On ☐ Adjacent to ☐		
On ☐ Adjacent to ☐		
On ☐ Adjacent to ☐		
On ☐ Adjacent to ☐		
On ☐ Adjacent to ☐		

(b) Have you received permission from all the designated site managers? Yes ☐ No ☐ Not Known ☐

(c) Have you consulted with Natural England for advice on the implications of the application on the designated sites? Yes ☐ No ☐ Not Known ☐

(d) Please give either the outcome of your consultations or the reason why you have not consulted us. Please provide any relevant correspondence and the name of the local Natural England adviser or reserve manager consulted.

(e) Will work extend into future years? *(If 'Yes' please state how many years it will extend for)* Yes ☑ 12 years No ☐

(f) Is work part of a wider project or contributing to local Biodiversity Action Plans? Yes ☐ No ☑ Not Known ☐

9.	Authorisation

(a) *Is the applicant the owner / occupier of the land? Yes ☑ No ☐ N/A ☐

If 'Yes' to (a) please go to the next section. If 'No' to (a) please answer (b).

(b) Have you received the owner occupier's permission to apply? Yes ☑ No ☐

Please note that it is your responsibility as the applicant to obtain the owner or occupier's permissions to act under licence on their property.

You may be asked to provide documentation which confirms that you have owner or occupier's permissions and we will contact you if this is necessary.

10.	Application Details

(a) Please add details for all licensable actions you wish to perform:

	Licensable Action 1	Licensable Action 2	Licensable Action 3
Application Subject	*Wild plants - survey, science, education and conservation*		
* Species			
* Activity	☑ Collect ☑ Cut ☐ Damage ☐ Destroy ☐ Kill ☐ Mark ☐ Pick ☑ Possess ☐ Sell ☐ Take ☐ Transport ☐ Uproot	☐ Collect ☐ Cut ☐ Damage ☐ Destroy ☐ Kill ☐ Mark ☐ Pick ☐ Possess ☐ Sell ☐ Take ☐ Transport ☑ Uproot	☐ Collect ☐ Cut ☐ Damage ☐ Destroy ☑ Kill ☐ Mark ☐ Pick ☐ Possess ☐ Sell ☐ Take ☐ Transport ☐ Uproot
* Method or Field Technique	☐ Alcohol ☐ Benthic sediment cores ☐ Clipping ☐ Core sampling by hand ☐ Digging ☐ Grappling ☑ Hand ☐ Hand held tools ☐ Leaf clip	☐ Alcohol ☐ Benthic sediment cores ☐ Clipping ☐ Core sampling by hand ☑ Digging ☐ Grappling ☐ Hand ☐ Hand held tools ☐ Leaf clip	☐ Alcohol ☐ Benthic sediment cores ☐ Clipping ☐ Core sampling by hand ☑ Digging ☐ Grappling ☐ Hand ☐ Hand held tools ☐ Leaf clip
Number	ALL SEED HEADS PRESENT ON SITE	UP TO 100 PLANTS FROM DONOR SITE	REMAINING PLANTS LEFT ON DONOR SITE
Plant Part	SEED HEADS CONTAINING SEEDS	WHOLE NON-FLOWERING PLANTS	WHOLE PLANTS
County	SUFFOLK	SUFFOLK	SUFFOLK

OS Grid Reference *(or 10km grid square)*	TM475638	TM475638	TM475638
Detailed Location	SAND DUNES LOCATED AT TM47576389	SAND DUNES LOCATED AT TM47576389	SAND DUNES LOCATED AT TM47576389
Proposed Date From	01.09.22	01.10.22	01.01.23
Proposed Date To	30.09.22	31.10.22	31.12.34

(b) * Does the work involve translocations (introductions, re-introductions or moving species)? Yes ☑ No ☐

If 'Yes' to (b)... * Have you evaluated the proposal against NE's translocation guidance on native plants?

YES, REVIEWED AGAINST THE IUCN

11. Authorised Individuals

* Will any additional authorised individuals / accredited agents be required to act under this license? Yes ☐ No ☐

If 'No' please go to the next section.

(EPS only) N/A ☐

If 'Yes', for each additional authorised individual / accredited agent, please complete the details below:

	Person 1	*Person 2*	*Person 3*
*Title:			
*Forename:			
Middle Name:			
*Surname:			
House No.:			
*Address Line 1:			
*Address Line 2:			
Address Line 3:			
Town:			
*County:			
*Postcode:			

Please note: The licensee and anyone acting under the licence are responsible for their actions and for complying with the licence conditions. In addition, no-one under the age of 18 may be authorised by the licensee without specific written permission from Natural England for licences that permit shooting.

12. Qualifications

If you have not held a similar type of licence within the last 3 years you will need to supply references to support your application. You must follow the guidance on our website with regard to the number and content of references required. If you submit the incorrect number of references or references with content which is not as described, it is likely your application will be refused.

(a) *Are you providing references? Yes ☐ No ☐

If 'Yes' to (a) ... Please provide details of referee(s)

(b) *Do you have qualifications and/or experience of the methods and procedures proposed? Yes ☐ No ☐

(c) *Please provide details of relevant experience and qualifications.

13. Supplementary Information

Please provide any additional information you may have to support your application.

PLEASE SEE APPENDED METHOD STATEMENT FOR DETAILS OF TRANSLOCATION APPROACH.

14. Data Protection

The data controller is the Natural England, Foss House, Kings Pool, 1-2 Peasholme Green, York, Y01 7PX. You can contact the Natural England Data Protection Manager at: Natural England, County Hall, Spetchley Road, Worcester, WR5 2NP; foi@naturalengland.org.uk

Any questions about how we are using your personal data and your associated rights should be sent to the above contact. The Data Protection Officer responsible for monitoring that Natural England is meeting the requirements of the legislation is: Defra group Data Protection Officer, Department for Environment, Food and Rural Affairs, SW Quarter, 2nd floor, Seacole Block, 2 Marsham Street, London SW1P 4DF. DefraGroupDataProtectionOfficer@defra.gsi.gov.uk

The information on the licence application form and any supporting material will be used by Natural England to undertake our licensing functions. This will include, but is not limited assessing your application, issuing a licence if applicable, monitoring compliance with licence conditions and collating licence returns and reports. The personal information we will process will include, but is not limited to your name and contact details, customer type and reasons for wanting a licence. Processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the data controller. That task is to conduct the licensing functions as delegated by Defra to Natural England under Part 8 Agreement under section 78 of the Natural Environment and Rural Communities Act 2006.

The processing by us of personal data relating to wildlife-related or animal welfare offences or related security measures is carried out only under official authority. This information is used in assessing an application as it is a material fact. Natural England will for particular licence applications and at specific stages of the licencing process discuss your application with third parties. The details of this sharing are set out here
https://www.gov.uk/government/publications/wildlife-licensing-privacy-notice

Your personal data will be kept by us for 7 years after the expiry of your licence or longer if stated in the licence conditions.
Failure to provide this information will mean that we will be unable to assess your application for a wildlife licence.
The information you provide is not connected with individual decision making (making a decision solely by automated means without any human involvement) or profiling (automated processing of personal data to evaluate certain things about an individual).

The data you provide will not be transferred outside the European Economic Area.
A list of your rights under the General Data Protection Regulation, the Data Protection Act 2018, is accessible at:
https://ico.org.uk/for-organisations/guide-to-the-general-data-protection-regulation-gdpr/individual-rights/
You have the right to lodge a complaint with the ICO (supervisory authority) at any time. Should you wish to exercise that right full details are available at:
https://ico.org.uk/for-organisations/guide-to-the-general-data-protection-regulation-gdpr/individual-rights/
Details of our Personal Information Charter can be found at:
https://www.gov.uk/government/organisations/natural-england/about/personal-information-charter.

Important Advice:

- **If your application is made under the Wildlife and Countryside Act 1981 (as amended) or the Conservation of Habitats and Species Regulations 2017, any person who in order to obtain a licence knowingly or recklessly makes a statement or representation, or furnishes a document or information which is false in a material particular, shall be guilty of an offence and may be liable to criminal prosecution. Any person found guilty of such an offence is liable, on summary conviction, to imprisonment for a term not exceeding six months or to a fine not exceeding level 5 on the standard scale, or to both. Regarding other wildlife legislation, we will look to provisions in the Fraud Act 2006 (as amended) in respect of applicants making any false representations.**

- **Natural England or the Secretary of State can modify or revoke at any time any licence that is issued, but this will not be done unless there is good reason for doing so. Any licence that is issued is likely to be revoked immediately if it discovered that false information has been provided that resulted in the issue of a licence.**

15. Declaration

15a. Convictions

* Have you or any person listed in the application been convicted of any wildlife-related or animal welfare offence? Yes ☐ No ☐

If 'Yes': Please provide details of the convictions: *(including dates)*

15b. Applicant Declaration.

☐ I have read and understood the privacy notice above.

- Where required, I undertake to obtain permission from landowners / occupiers of land to exercise any licence resulting from this application, and to allow any employee or representative of Natural England to monitor or inspect the work described in this application.
- I have read and understood the guidance provided in the application form and on the Wildlife Licensing Internet guidance pages. I declare the particulars given are correct to the best of my knowledge and belief.
- I declare the particulars given are correct to the best of my knowledge and belief, and I apply for a licence in accordance with the information I have provided.

☐ I agree to the declaration above.

Signature of Applicant:

For electronic applications, please insert an electronic signature above or tick this box to confirm with the declaration. ☐

Name: *(In BLOCK letters)*

Date:

15c. Ecologist Declaration

☐ I have read and understood the privacy notice above.

- I can confirm that I have visited the site.
- I have designed and inputted into the licence proposal.
- I declare the particulars given are correct to the best of my knowledge and belief.

☐ I agree to the declaration above.

Signature of Ecologist:

For electronic applications, please insert an electronic signature above or tick this box to confirm with the declaration. ☐

Name: *(In BLOCK letters)*

Date:

16. Annex - Application Notes

Applicant

The applicant is the person submitting the application (usually the landowner or occupier) who, if the licence was granted, would become the licensee. The applicant may appoint agents to produce the application pack and act on their behalf. A person with specific skills and knowledge of the species concerned, such as a consultant ecologist, must be appointed to assist in the preparation and the delivery of the proposals that ensure the species protection requirements can be met.

Licensee

The "Licensee" named on the licence is responsible for ensuring that all activities carried out on site in relation to the licence comply with the terms and conditions of the licence. However, all persons authorised to act under the licence must comply with the licence and its conditions (see Regulation 60(1) of the 2017 Regulations). This means that all authorised persons have a responsibility for ensuring that the licence terms and conditions, including any annex special conditions, are understood and complied with. Failure to do so could lead to prosecution.

Consultant/Named Ecologist

The "Named Ecologist" is a professional ecological consultant who has satisfied Natural England that they have the relevant skills, knowledge and experience of the species concerned and is responsible for undertaking and/or overseeing the work undertaken in respect of the licensed species. The 'Named Ecologist' has a responsibility for ensuring that the licence is complied with. They are responsible for advising the licensee on the suitability and competence of any Accredited Agents or Assistants employed on site to undertake the required duties and may include the direct supervision of Assistants where appropriate. More information about the experience required to become a name ecologist can be found here: *http://webarchive.nationalarchives.gov.uk/20140605090108/http:/www.naturalengland.org.uk/Images/bat-mitigation-guidance_tcm6-10534.pdf*

Accredited Agent

An “Accredited Agent” is a suitably trained and experienced person who is able to carry out work under a licence without the personal supervision of the Named Ecologist. Any Accredited Agent must be appointed by the Licensee and be in possession of a letter signed by the Licensee confirming their appointment. Agents shall carry a copy of the said letter when acting under the licence and shall produce it to any police or Natural England officer on request. .

Assistants

An “Assistant” is a person assisting a Named Ecologist or Accredited Agent. Assistants are only authorised to act under this licence whilst they are under the direct supervision of either the Named Ecologist or an Accredited Agent.

VOLUME 2, CHAPTER 14 APPENDIX 14C11: DEPTFORD PINK METHOD STATEMENT

Contents

Plates

Figures

None provided.

Appendices

1. Method Statement

1.1 Introduction

a) Background and scheme overview

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station.

1.1.2 The Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

1.1.3 This draft method statement outlines the key approaches to mitigating potential impacts to the Deptford Pink (*Dianthus armeria*) populations present within or adjacent to the construction site for Sizewell C main development site. It will be used by the consultant ecologist, SZC Co. and any relevant subcontractors, in relation to the proposal to build Sizewell C.

1.1.4 Sizewell C would comprise two United Kingdom European Pressurised Reactor (UK EPR™) units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The new nuclear power station would represent the Nationally Significant Infrastructure Project (NSIP) component of the proposed development

1.1.5 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction including an accommodation campus and a series of off-site associated development sites in the local area. These include:

- Two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the 'northern park and ride'), and one to the south-west at Wickham Market (the 'southern park and ride') to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;

- A permanent road to bypass Stratford St Andrew and Farnham (referred to as the 'two village bypass') to alleviate traffic on the A12 through the villages;
- A permanent road linking the A12 to the Sizewell C main development site (referred to as 'Sizewell link road') to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- Permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the 'Yoxford roundabout') and other road junctions to accommodate Sizewell C construction traffic;
- A temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site;
- A temporary extension of the existing Saxmundham to Leiston branch line into the main development site ('the green rail route') and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network; and
- Green rail route extension and rail improvements to the Saxmundham to Leiston branch line.

1.1.6 The components listed above are referred to collectively as the 'Sizewell C Project'.

1.1.7 In order to enable the proposed development of the main development site, as detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. These works cover an area on which Deptford Pink (*Dianthus armeria*) has recently been recorded. The proposed facilitating works therefore have the potential to cause the loss of Deptford Pink that may still be present. Accordingly, the purpose of this document is to provide a method statement that can be used by the consultant ecologist, SZC Co. and any relevant subcontractors, to ensure the conservation status of Deptford Pink is maintained during the facilitation works to be undertaken within the site.

b) Site location and setting

1.1.8 The main development site is located at Sizewell, East Suffolk. The Site are is presented in Image 1. The site largely is dominated by arable fields with field boundaries comprising native, species poor hedgerows or tree lines.

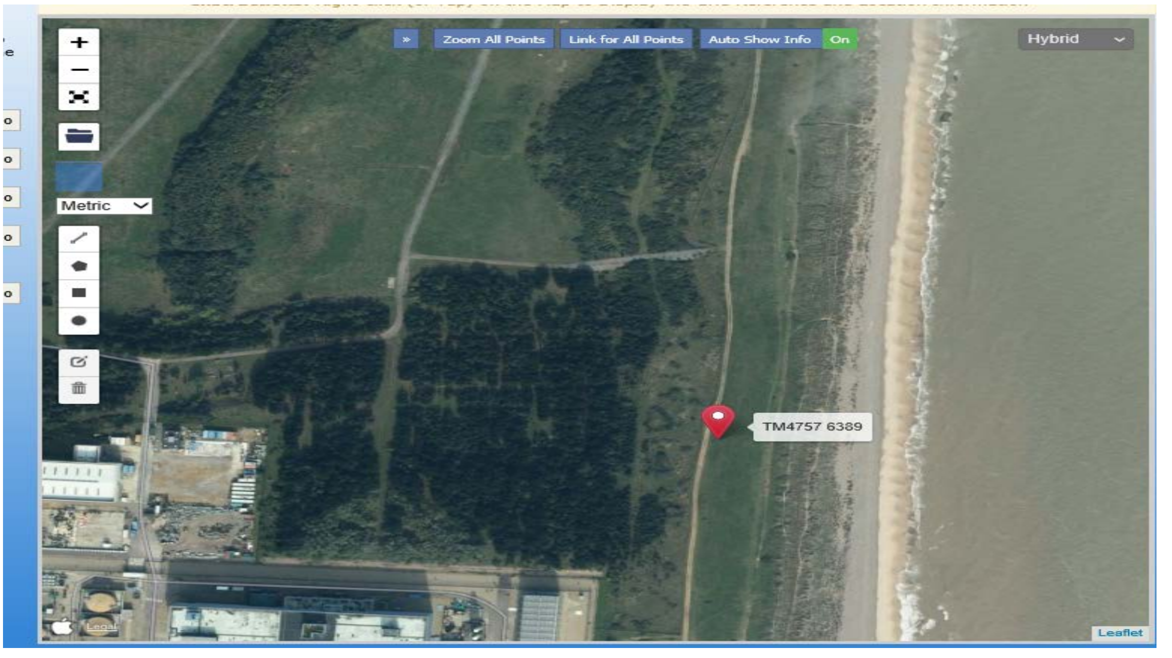
Several woodland blocks, comprising plantation, mixed plantation and broadleaved semi-natural woodland, are scattered across the site. The largest woodland area present to the north east includes Hilltop Covert, Dunwich Forest, Goose Hill and the northern boundary of Kenton Hills. Numerous farm buildings and structures are also scattered to the north and west of the site. Some of the application site falls within the following designated sites:

- Sizewell Marshes SSSI; the area subject to landtake includes an area of reedbed, ditches, wet woodland and fen meadow;
- Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB);
- Sizewell Levels and Associated Areas County Wildlife Site (CWS) – largely plantation woodland and acid grassland; and
- Suffolk Shingle Beaches CWS – dune grassland and vegetation shingle.

1.1.9 The eastern edge of the terrestrial part of the main development site includes vegetated shingle habitats backed to the west by a poorly developed dune system with Marram (Ammophila arenaria), Bracken (Pteridium aquilinum) and scattered Sea Buckthorn (Hippophae rhamnoides), Gorse (Ulex europaeus) and Broom (Cytisus scoparius) scrub. Scrub and rank grassland are dominant on land previously associated with the construction of Sizewell B power station located immediately west of the dune system. Habitats here include tussocky unmanaged grassland and planted native scrub species.

1.1.10 Habitats suitable for supporting Deptford Pink are thought to be restricted to the open areas of dune grassland and fringes of the vegetated shingle which enable germination without the competition and shading from vigorous perennial species. The area covered by this method statement is presented in Image 1 below.

Plate 1.1: Site location

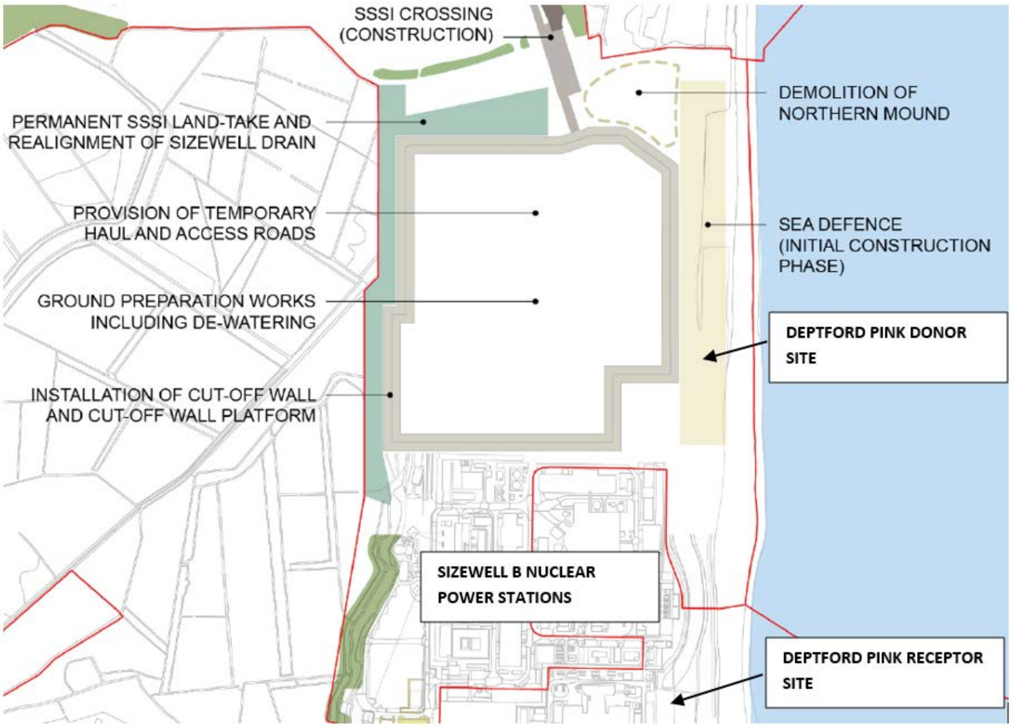


[pin refers to record for Deptford Pink]

c) Proposed works

1.1.11 Earthworks and construction of the proposed development sea defences are likely to remove or substantially disturb the area in which Deptford Pink is growing, leading to a loss of the habitat in which this plant is found (**Volume 2, Chapters 1** to **4).** The area of proposed sea defences in relation to the colony of Deptford Pink is shown in Image 2.

Plate 1.2: Proposed Sea Defences



d) Key ecological constraints

1.1.12 This draft method statement only covers Deptford Pink. There are draft method statements and draft protected species licences for other receptors as relevant.

1.1.13 This document is presented as a first draft. SZC Co. and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to Deptford Pink before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.2 Method statement for Deptford Pink

a) Introduction

1.2.1 This section provides a method statement for the relocation for Deptford Pink prior to the facilitation works.

1.2.2 The current location of the Deptford Pink cannot be avoided by construction as new sea defences in this area are needed to protect the new platform for Sizewell C.

1.2.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual method statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the Ecological Clerk of Works (ECoW).

1.3 Species description

1.3.1 Plantlife[1] (webpage resource) describe Deptford Pink as a biennial plant, flowering July to September. It occurs throughout Europe, but in the UK it is found only in scattered sites, predominately in southern England. It is considered as 'Nationally Scarce'.

1.3.2 Deptford Pink has been recorded on tracks, waysides, railway cuttings and hedge banks. It is associated with disturbed ground and open well-lit conditions.

1.3.3 It is classified as endangered in the UK (Ref. 1) and considered to be at high risk of extinction in the wild. The reasons for decline include habitat destruction, including agricultural improvement, afforestation, and urban development.

1.3.4 Deptford Pink overwinters as basal leave rosettes and dead flower stalks may persist for several months. It is most-often self-pollinated, produces abundant seeds and has a germination period of up to 5 months. Seed is shed in the late summer and autumn which germinates the following March.

1.3.5 Plantlife considers that to restore Deptford Pink sites, it is important to remove shade and competing vegetation.

1.4 Status on site

1.4.1 The following desk study records exist for Deptford Pink within the Main Development Site:

- "Sizewell Beach, TM4763, 20/06/2014, Dayne West. About 8 plants." (Transcripts of the Suffolk Naturalists Society 52 (2016)).

[1] https://www.plantlife.org.uk/uk/discover-wild-plants-nature/plant-fungi-species/deptford-pink

- "Between B & C sites. 6 Count of present 2014. TM474639. Longitude: 1.6222643007265. Latitude: 52.217253544491". (Suffolk Biodiversity Information Service (SBIS) (2018)).

1.4.2 The reference to Sizewell Beach indicates that the plants are located in the area of dunes or bordering the shingle. It is unknown if the records refer to the same or different colonies of plants.

1.4.3 It should be noted that of two other recent records in Suffolk, both were thought to be of casual or garden origin rather than representing native populations (Ref. 2) and this may also be the case for the Sizewell records.

1.4.4 Deptford Pink requires annual recruitment of new plants to sustain colonies. Habitats to the west of the dunes are unlikely to be suitable for Deptford Pink as these areas support planted scrub and unmanaged grassland which would compete with and shade Deptford Pink seedlings. If any seed were to germinate in this area it would not be expected to survive long enough to form a basal rosette.

1.5 Legislation

1.5.1 Deptford Pink is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) (Ref. 3). The Act provides protection as follows:

"1) Subject to the provisions of this Part, if any person—

(a) intentionally picks, uproots or destroys any wild plant included in Schedule 8; or

(b) not being an authorised person, intentionally uproots any wild plant not included in that Schedule, he shall be guilty of an offence.

(2) Subject to the provisions of this Part, if any person—

(a) sells, offers or exposes for sale, or has in his possession or transports for the purpose of sale, any live or dead wild plant included in Schedule 8, or any part of, or anything derived from, such a plant; or

(b) publishes or causes to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things, he shall be guilty of an offence.

(3) Notwithstanding anything in subsection (1), a person shall not be guilty of an offence by reason of any act made unlawful by that subsection if he shows that the act was an incidental result of a lawful operation and could not reasonably have been avoided.

(4) In any proceedings for an offence under subsection (2)(a), the plant in question shall be presumed to have been a wild plant unless the contrary is shown."

1.5.2 Removal of plants from the site would need to proceed under a licence granted by Natural England for the purposes of conservation (Application for a licence to take wild plants for science, research, education or conservation (A31)). This method statement has been developed to support such a licence application.

1.5.3 Deptford Pink is listed as a Species of Principal Importance under the Natural Environment and Rural Communities (NERC) Act 2006 (Ref. 4). As such it would need to be taken into consideration by a public body when performing any of its functions with a view to conservation.

1.6 Translocation methodology

1.6.1 The translocation of plants and seeds will include the steps outlined in the sections below. The precise approach is dependent on population size.:

- Identification of extant 'donor' plants.
- Confirmation and preparation of 'receptor' site (area on site to receive plants, seeds or seedlings).
- Seed collection and sowing (at the receptor site and in cultivation).
- Translocation (movement) of plants from donor to receptor site.
- Planting of plugs (basal rosettes) at the receptor site from plants grown from seed from the donor plants in cultivation.

a) Identification of donor plants

1.6.2 A targeted walkover survey will be undertaken during July/August in the year of potential grant of the Development Consent Order (DCO), to locate any flowering plants and non-flowering rosettes of Deptford Pink. The location of plants will be recorded as set out below. The precise method adopted will be dependent on the number of plants that are present. This methodology is based on the survey method used by the Species Recovery Trust (Ref. 5).

- 1-10 plants. The location of each plant will be recorded using GPS, a photographic record will be made and a numbered marker (tagged cane) will be inserted adjacent to the basal rosette. This will correspond with data on the plant collected digitally.

- 10-1000 plants. The location of each distinct group of plants will be recorded using GPS, a photographic record will be made and a numbered marker (tagged cane) will be inserted within the group of plants. This will correspond with data on the group collected digitally, which will include the number of flowering and non-flowering plants in the group. Should plants be widely scattered then the approach taken for 1-10 plants would be followed for up to 100 plants, above this number an estimate of the number of plants would be made. Any concentrations of plants would be recorded using GPS, photographed and marked with numbered canes.

- >1000 plants. The location of each distinct group of plants will be recorded using GPS, a photographic record will be made and a numbered marker (tagged cane) will be inserted adjacent within the group of plants. This will correspond with data on the group collected digitally, which will include an estimate of the number of flowering and non-flowering plants in the group. Should plants be widely scattered then an estimate will be made for the overall number of plants and any concentrations would then be recorded using GPS, photographed and marked with numbered canes.

b) Confirmation of receptor site

1.6.3 A proposed receptor site has been identified to the south of the known Deptford Pink colony. This comprises the dune system beyond that affected by the sea defence works for the Sizewell C power station and in front of the existing Sizewell B power station. The location of the proposed receptor site is shown in Image 3 below:

Plate 1.3: Location of Receptor Site

1.6.4 A detailed inspection of this area will be undertaken during July/August to correspond with the survey to identify Deptford Pink plants. The inspection will take into account the numbers of Deptford Pink plants found to be present and therefore the likely area required to receive plants and seeds.

1.6.5 The receptor habitat will be electronically mapped into compartments labelled using the following categories:

- Bare ground considered too trampled, exposed or unstable for successful establishment of Deptford Pink.
- Sparse ephemeral communities/thin grass with open areas of bare ground, suitable for the successful establishment of Deptford Pink.
- Coarse grass/herbs, unsuitable in current state for successful establishment of Deptford Pink.
- Scrub, unsuitable in current state for successful establishment of Deptford Pink.

- Areas supporting diverse flora or other notable plant species, which would need to be considered in the context of receiving Deptford Pink plants or seed.

c) Preparation of receptor site

1.6.6 Category 1 areas will not be used for receiving plants/seed and are not considered further.

1.6.7 Category 2 areas will be considered for receiving plants/seed but may require minor disturbance prior to sowing seeds or moving plants. This will involve the scarification of the soil surface using a metal rake to create a seedbed. This would be undertaken immediately prior to planting/sowing.

1.6.8 Category 3 areas will be considered for receiving plants/seed if insufficient Category 2 areas exist to support a viable and sustainable population of Deptford Pink, to at least mirror that lost. In this instance, coarse grass and herbs will be removed. A rotavator or similar may be used for this purpose, with extracted material removed from site. It is anticipated that such areas are likely to be more nutrient rich than those supporting ephemeral communities and therefore the success of long-term establishment of Deptford Pink in such areas may be compromised.

1.6.9 Category 4 areas are unsuitable for Deptford Pink establishment and will be avoided.

1.6.10 Category 5 areas will need to be reviewed on a case by case basis. Should it be possible to avoid notable plants or biodiverse areas, the ground will be scarified as for Category 1 in preparation for receiving plants/seed.

d) Seed collection, storage and cleaning

1.6.11 The data collected in July/August will be used to relocate flowering Deptford Pink plants in mid-September of the same year. As the colony is to be lost in its entirety, all seed heads will be collected. It is anticipated that under 50 plants are likely to be present based on the number of plants recorded by the desk study record for this species in 2014.

1.6.12 The collection date will be during dry weather. Seed heads will be placed in paper or muslin bags.

1.6.13 Seed heads will be stored in trays, kept cool and dry indoors until they dehisce. They will be regularly inspected to ensure they are not damp or infected with mould.

1.6.14 Once the seeds have dehisced, they will be 'cleaned' by removing the empty capsules, debris and any pests such as weevils or caterpillars.

1.6.15 The approximate number of seeds collected will be estimated.

e) Seed sowing

1.6.16 The following approach will be taken to seed sowing, based on the number collected:

- <100 seeds. Half to be grown on by a competent establishment as plug plants. Half to be sent for storage to the Millennium Seed Bank, Wakehurst Place (to be confirmed with Millennium Seed Bank).

- >100 seeds. Fifty seeds to be grown on by a competent establishment as plug plants. Fifty seeds to be sent for storage to the Millennium Seed Bank, Wakehurst Place (to be confirmed with Millennium Seed Bank). The remainder to be sown in the prepared receptor areas during mild, damp weather in October the year of the DCO (Year 1). Seed will be scattered by hand and gently raked in. The sown areas will be photographed, their GPS location recorded and marked using a numbered cane.

f) Translocation of plants

1.6.17 Up to 100 non-flowering rosettes will be carefully moved from the donor site to the prepared receptor areas.

1.6.18 The plants will be dug by hand using a trowel, attempting to keep the root ball intact.

1.6.19 They will then be wrapped in damp newspaper and placed in a plastic bag to prevent drying out before replanting in the prepared receptor areas on the same day.

1.6.20 The plants will be moved during cool damp weather in October the year of the DCO (Year 1). Plants will be watered into place.

g) Establishment of plug plants

1.6.21 Plug plants grown on from seed will be planted into the receptor areas during cool damp weather in October following the year of seed collection. Plants will be watered into place.

1.6.22 The success of establishing *Dianthus* species from pot grown plants has been confirmed for the related *Dianthus morisianus*. This is a species of fixed dunes in Sardinia. The survival rate of pot grown plants was >95% two years from planting and the fruit yield higher than that of the donor population (Ref. 1).

1.7 Monitoring

1.7.1 The receptor areas will be monitored the following July/August for successful establishment. Flowering plants and non-flowering rosettes will be counted up to 1000 basal rosettes, estimates will be made beyond this number. This monitoring will be extended for 5 years following translocation.

1.7.2 In the event that establishment has been poor or plants fail to persist, a proportion of seed stored in the Millennium Seed Bank may be grown on as plugs and transplanted to the site as previously described in an attempt to boost establishment.

1.7.3 A detailed monitoring plan will be prepared and this will be reported annually.

1.8 Conclusions

1.8.1 Assuming a Deptford Pink population is still present on site and can be located, providing that the recommendations outlined within this Method Statement are adhered to it is possible to secure the future of the Deptford Pink on the site.

References

1.1 JNCC (2019). Conservation Designations Spreadsheet. http://archive.jncc.gov.uk/default.aspx?page=3408 accessed 23.01.20

1.2 2 Sandford, M and Fisk, R (2010). A Flora of Suffolk. The Dorset Press.

1.3 HMSO (1981). The Wildlife and Countryside Act (as amended). HMSO, London.

1.4 Ref. 4 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London

1.5 Ref. 5 Species Recovery Trust (undated). Species Handbook. Deptford Pink (*Dianthus armeria*). (PDF) Available at: https://a7f0f8fb-8a2c-49bc-a703-7c4cbecc26d7.filesusr.com/ugd/59de27_c98344007ea44534b48942a48d509713.pdf [Accessed 23.01.20].

1.6 Ref. 6 Fauna & Flora International (2013). Oryx, 47(2), 203–206 The-effectiveness-of-plant-conservation-measures-The-Dianthus-morisianus-reintroduction

Appendix 1: A31: Application for a licence to take wild plants for science, research, education or conservation.

The Conservation of Habitats and Species Regulations 2017
Wildlife & Countryside Act 1981

NATURAL ENGLAND

Licence Application Form

Application for a licence to take wild plants: Survey, science, education and conservation

Please Note – Applications can be completed online.
For more information please visit our website.

- Please complete this application form using **dark ink** and BLOCK CAPITALS.
- Return the completed form to the address shown.
- All questions should be answered as appropriate. Questions marked with '*' are mandatory and failing to complete these may result in delays to your application.
- If there is insufficient space for completing answers on this form, please attach a separate sheet.
- Natural England will aim to determine the outcome of a completed licence application within its published service standards.
- If you experience any problems completing this application or using the online Case Work Management (CWM) system – please see our website for guidance or contact Wildlife Licensing.
- Additional guidance is provided in Using CWM – Applicant Guidance Document. This can be downloaded from our website or you can ask Wildlife Licensing to send you a copy.

Wildlife Licensing
Natural England
Horizon House
Deanery Road
Bristol, BS1 5AH.
T. 020802 61089
wildlife.scicons@naturalengland.org.uk

For Office Use Only

CWM Ref No:

Charter Deadline:

1. Applicant Details

Please enter the details of the person who will become the licensee.

(For guidance please see attached annex)

- *If the applicant **is** already registered as a customer please complete Registered Customer Details (a)*
- *If the applicant **is not** already registered as a customer please complete the New Customer Registration (b)*

(a) Registered Customer Details

*Customer Number	*Surname	*Forename	*Postcode

(a) New Customer Registration

Please note: If you are the agent registering on behalf of the applicant you will need to provide their full authorisation with this application.

*Email Address

*Title
(please tick as appropriate) Mr ☐ Mrs ☐ Ms ☐ Other ☐ (Please Specify)

*Forename	Middle Name	*Surname

Professional Membership
(e.g. CIEEM, IEMA, etc)

If you represent an organisation please complete (i) (ii) and (iii)

(i) *Business Title

(ii) *Company

(iii) *Position

House Name / No.

*Address Line 1

*Address Line 2

Address Line 3

Town

*County

*Postcode

Country

Either 'Telephone No.' or 'Mobile No.' must be completed.

Telephone No.

Mobile No.

Fax no.

*Customer Type *(e.g. Farmer, Householder, Ecologist, etc.)*

*Are you VAT registered? Yes ☐ No ☐ If 'Yes' VAT Number:

*Are you registered with the Rural Payments Agency? Yes ☐ No ☐ If 'Yes' RPA SBI Number:

(b) Alternative Applicant Contact Details

In the event that the applicant is unavailable to discuss the application, it would be helpful if alternative contact details could be provided. By completing this section you are confirming that this contact is authorised to act on behalf of the applicant.

Name:

Tel Number:

Email Address:

2. Agent / Named Ecologist Details

(a) Will an agent / named ecologist be used in conjunction with this application? Yes ☐ No ☐
(For guidance please see attached annex)

- *If the agent **is** already registered as a customer please complete Registered Agent / Ecologist Details (b)*
- *If the agent **is not** already registered as a customer please complete the New Agent / Ecologist Registration (c)*
- *If there will not be an agent / ecologist used in conjunction with this application please go to the next section.*

(b) Registered Agent / Ecologist Details

*Customer Number	*Surname	*Forename	*Postcode

(c) New Agent / Named Ecologist Registration

Please note: If you are the applicant registering on behalf of the agent / named ecologist you will need to provide their full authorisation with this application.

*Email Address

*Title
(please tick as appropriate) Mr ☐ Mrs ☐ Ms ☐ Other ☐ (Please Specify

*Forename | Middle Name | *Surname

Professional Membership
(e.g. CIEEM, IEMA, etc)

If you represent an organisation please complete (i) (ii) and (iii) | (i) *Business Title | (ii) *Company | (iii) *Position

House Name / No.

*Address Line 1

*Address Line 2

Address Line 3

Town | *County

*Postcode | Country

Either 'Telephone No.' or 'Mobile No.' must be completed.

Telephone No. | Mobile No.

Fax no.

*Customer Type *(e.g. Farmer, Householder, Ecologist, etc.)*

*Are you VAT registered? Yes ☐ No ☐ If 'Yes' VAT Number:

*Are you registered with the Rural Payments Agency? Yes ☐ No ☐ If 'Yes' RPA SBI Number:

(d) Alternative Ecologist Contact Details

In the event that the named ecologist is unavailable to discuss the application, it would be helpful if alternative contact details could be provided. By completing this section you are confirming that this contact is authorised to act on behalf of the named ecologist and has a detailed knowledge of the application.

Name:

Tel Number:

Email Address:

3. Communication Preferences

Please indicate who should be contacted if we need to discuss this application:

Applicant ☐ Agent / Ecologist ☐

Please indicate to whom the outcome documentation for this application should be sent:

Applicant ☐ Agent / Ecologist ☐

Applicant preferences: Email ☐ Post ☐ Telephone ☐

If 'Yes' for telephone, please provide a contact no.

Agent / Ecologist preferences: Email ☐ Post ☐ Telephone ☐

If 'Yes' for telephone, please provide a contact no.

4. Previous Applications

(a) * To your knowledge, have there been any previous applications or licence decisions concerning this site? Yes ☐ No ☐

If 'No' please go to the next section. If 'Yes' to (a), please complete the following.

(b) *Date of most recent application:

(c) *What was the subject of the previous applications?

(d) *What is the application or licence reference number?

(e) *What was the outcome of the previous application? (Please select one of the following)

Granted ☐ Not Granted ☐ Advice Only ☐ Deferred ☐ Not Yet Known ☐

5. Purpose

(a) * Confirm the purpose of the application:

- ☐ Science or education, under section 55(2)(a) and/or section 16(3)(a)
- ☐ Conserving wild plants, under section 55(2)(c) and/or section 16(3)(c)
- ☐ Introducing wild plants to particular areas, under section 55(2)(c) and/or section 16(3)(c)
- ☐ Protecting any botanical collection, under section 55(2)(d) and/or section 16(3)(d)

(b) What are the main aims?

TO ENSURE THE LONG TERM SURVIVAL OF DEPTFORD PINK (DIANTHUS ARMERIA) AT SIZEWELL, SUFFOLK.

(c) * What publications have you produced or contributed to regarding this topic?	NONE. AN UNPUBLISHED METHOD STATEMENT IS APPENDED TO THIS APPLICATION.
(d) * Is data being collected? If yes, please describe what it will be used for.	THE SIZE OF THE DONOR POPULATION WILL BE RECORDED DURING THE YEAR OF TRANSLOCATION. THE SIZE OF THE TRANSLOCATED POPULATION WILL BE RECORDED AT THE TIME OF TRANSLOCATION AND YEARLY UP TO FIVE YEARS FROM THE TRANSLOCATION YEAR.

6. Justification

(a) * Please provide a summary of your need to apply:	THE CONSTRUCTION OF SEA DEFENCES AS PART OF THE SIZEWELL C NUCLEAR POWER STATION DEVELOPMENT WILL RESULT IN THE COMPLETE LOSS OF AN EXTANT POPULATION OF DEPTFORD PINK. THE SCALE AND REQUIREMENTS OF THE PROJECT ARE SUCH THAT THERE IS NO
(b) * If you are applying in relation to damage to land, crops, fisheries, or property, please provide the extent of damage and dates (including previous years if appropriate)	NOT RELEVANT

(c) * Have you taken any action to prevent the problems outlined above? Yes ☐ No ☐ N/A ☐

If 'Yes' to (c)... * Please provide details of the actions taken:

If 'No' to (c)... * Please explain why no actions have been taken?

7. Site Details

*Is the address for the site or premises to be licensed different to the applicant's address? Yes ☐ No ☐

If 'Yes' ... For each Site / Location to be licensed, please complete **all** of the following details:
If 'No' ... Please complete Site / Location Name and OS Grid Reference boxes only.
(For linear projects, please add the start and end points separately)

	Site 1	*Site 2*	*Site 3*
*Site / Location Name:	SIZEWELL NUCLEAR PC		
House No:			
Address Line 1:	SIZEWELL		
Address Line 2:	LEISTON		
Address Line 3:			
Town:			
*County:	SUFFOLK		
Postcode:	IP16 4UR		
*OS Grid Reference: *(In format XX123456)*	TM475638		

8. Conservation Considerations

(a) *Will any part of the proposed activity fall in and/or adjacent to a Designated Site? Yes ☐ No ☐ N/A ☐

If 'Yes' to (a) please complete the table below. If 'No', please go to the next section.

Please indicate whether the activity will fall on and/or adjacent to a designated site:	Designated Site Name:	Type of Designated Site *E.g. National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar Site, Ancient Monument, Marine Nature Reserve (MNR), Area of Outstanding Natural Beauty (AONB)*
On ☐ Adjacent to ☑	SOUTHERN NORTH SEA SPECIAL AREA OF CONSERVATION (SAC)	
On ☐ Adjacent to ☐		
On ☐ Adjacent to ☐		
On ☐ Adjacent to ☐		
On ☐ Adjacent to ☐		
On ☐ Adjacent to ☐		

(b) Have you received permission from all the designated site managers? Yes ☐ No ☐ Not Known ☐

(c) Have you consulted with Natural England for advice on the implications of the application on the designated sites? Yes ☐ No ☐ Not Known ☐

(d) Please give either the outcome of your consultations or the reason why you have not consulted us. Please provide any relevant correspondence and the name of the local Natural England adviser or reserve manager consulted.

(e) Will work extend into future years? *(If 'Yes' please state how many years it will extend for)* Yes ☑ 12 years No ☐

(f) Is work part of a wider project or contributing to local Biodiversity Action Plans? Yes ☐ No ☐ Not Known ☐

9.	Authorisation

(a) *Is the applicant the owner / occupier of the land? Yes ☐ No ☐ N/A ☐

If 'Yes' to (a) please go to the next section. If 'No' to (a) please answer (b).

(b) Have you received the owner occupier's permission to apply? Yes ☐ No ☐

Please note that it is your responsibility as the applicant to obtain the owner or occupier's permissions to act under licence on their property.

You may be asked to provide documentation which confirms that you have owner or occupier's permissions and we will contact you if this is necessary.

10.	Application Details

(a) Please add details for all licensable actions you wish to perform:

	Licensable Action 1	Licensable Action 2	Licensable Action 3
Application Subject	*Wild plants - survey, science, education and conservation*		
* Species			
* Activity	☑ Collect ☑ Cut ☐ Damage ☐ Destroy ☐ Kill ☐ Mark ☐ Pick ☑ Possess ☐ Sell ☐ Take ☐ Transport ☐ Uproot	☐ Collect ☐ Cut ☐ Damage ☐ Destroy ☐ Kill ☐ Mark ☐ Pick ☐ Possess ☐ Sell ☐ Take ☐ Transport ☑ Uproot	☐ Collect ☐ Cut ☐ Damage ☐ Destroy ☑ Kill ☐ Mark ☐ Pick ☐ Possess ☐ Sell ☐ Take ☐ Transport ☐ Uproot
* Method or Field Technique	☐ Alcohol ☐ Benthic sediment cores ☐ Clipping ☐ Core sampling by hand ☐ Digging ☐ Grappling ☑ Hand ☐ Hand held tools ☐ Leaf clip	☐ Alcohol ☐ Benthic sediment cores ☐ Clipping ☐ Core sampling by hand ☑ Digging ☐ Grappling ☐ Hand ☐ Hand held tools ☐ Leaf clip	☐ Alcohol ☐ Benthic sediment cores ☐ Clipping ☐ Core sampling by hand ☑ Digging ☐ Grappling ☐ Hand ☐ Hand held tools ☐ Leaf clip
Number	ALL SEED HEADS PRESENT ON SITE	UP TO 100 PLANTS FROM DONOR SITE	REMAINING PLANTS LEFT ON DONOR SITE
Plant Part	SEED HEADS CONTAINING SEEDS	WHOLE NON-FLOWERING PLANTS	WHOLE PLANTS
County	SUFFOLK	SUFFOLK	SUFFOLK

OS Grid Reference *(or 10km grid square)*	TM475638	TM475638	TM475638
Detailed Location	SAND DUNES LOCATED AT TM47576389	SAND DUNES LOCATED AT TM47576389	SAND DUNES LOCATED AT TM47576389
Proposed Date From	01.09.22	01.10.22	01.01.23
Proposed Date To	30.09.22	31.10.22	31.12.34

(b) * Does the work involve translocations (introductions, re-introductions or moving species)? Yes ☐ No ☐

If 'Yes' to (b)... * Have you evaluated the proposal against NE's translocation guidance on native plants?

YES, REVIEWED AGAINST THE IUCN GUIDELINES FOR REINTRODUCTIONS

11. Authorised Individuals

* Will any additional authorised individuals / accredited agents be required to act under this license? Yes ☐ No ☐

If 'No' please go to the next section.

(EPS only) N/A ☐

If 'Yes', for each additional authorised individual / accredited agent, please complete the details below:

	Person 1	*Person 2*	*Person 3*
*Title:			
*Forename:			
Middle Name:			
*Surname:			
House No.:			
*Address Line 1:			
*Address Line 2:			
Address Line 3:			
Town:			
*County:			
*Postcode:			

Please note: The licensee and anyone acting under the licence are responsible for their actions and for complying with the licence conditions. In addition, no-one under the age of 18 may be authorised by the licensee without specific written permission from Natural England for licences that permit shooting.

12. Qualifications

If you have not held a similar type of licence within the last 3 years you will need to supply references to support your application. You must follow the guidance on our website with regard to the number and content of references required. If you submit the incorrect number of references or references with content which is not as described, it is likely your application will be refused.

(a) *Are you providing references? Yes ☐ No ☐

If 'Yes' to (a) ... Please provide details of referee(s)

(b) *Do you have qualifications and/or experience of the methods and procedures proposed? Yes ☐ No ☐

(c) *Please provide details of relevant experience and qualifications.

13. Supplementary Information

Please provide any additional information you may have to support your application.

PLEASE SEE APPENDED METHOD STATEMENT FOR DETAILS OF TRANSLOCATION APPROACH.

14. Data Protection

The data controller is the Natural England, Foss House, Kings Pool, 1-2 Peasholme Green, York, Y01 7PX. You can contact the Natural England Data Protection Manager at: Natural England, County Hall, Spetchley Road, Worcester, WR5 2NP; foi@naturalengland.org.uk

Any questions about how we are using your personal data and your associated rights should be sent to the above contact. The Data Protection Officer responsible for monitoring that Natural England is meeting the requirements of the legislation is: Defra group Data Protection Officer, Department for Environment, Food and Rural Affairs, SW Quarter, 2nd floor, Seacole Block, 2 Marsham Street, London SW1P 4DF. DefraGroupDataProtectionOfficer@defra.gsi.gov.uk

The information on the licence application form and any supporting material will be used by Natural England to undertake our licensing functions. This will include, but is not limited assessing your application, issuing a licence if applicable, monitoring compliance with licence conditions and collating licence returns and reports. The personal information we will process will include, but is not limited to your name and contact details, customer type and reasons for wanting a licence. Processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the data controller. That task is to conduct the licensing functions as delegated by Defra to Natural England under Part 8 Agreement under section 78 of the Natural Environment and Rural Communities Act 2006.

The processing by us of personal data relating to wildlife-related or animal welfare offences or related security measures is carried out only under official authority. This information is used in assessing an application as it is a material fact. Natural England will for particular licence applications and at specific stages of the licencing process discuss your application with third parties. The details of this sharing are set out here
https://www.gov.uk/government/publications/wildlife-licensing-privacy-notice

Your personal data will be kept by us for 7 years after the expiry of your licence or longer if stated in the licence conditions.
Failure to provide this information will mean that we will be unable to assess your application for a wildlife licence.
The information you provide is not connected with individual decision making (making a decision solely by automated means without any human involvement) or profiling (automated processing of personal data to evaluate certain things about an individual).

The data you provide will not be transferred outside the European Economic Area.
A list of your rights under the General Data Protection Regulation, the Data Protection Act 2018, is accessible at:
https://ico.org.uk/for-organisations/guide-to-the-general-data-protection-regulation-gdpr/individual-rights/
You have the right to lodge a complaint with the ICO (supervisory authority) at any time. Should you wish to exercise that right full details are available at:
https://ico.org.uk/for-organisations/guide-to-the-general-data-protection-regulation-gdpr/individual-rights/
Details of our Personal Information Charter can be found at:
https://www.gov.uk/government/organisations/natural-england/about/personal-information-charter.

Important Advice:

- **If your application is made under the Wildlife and Countryside Act 1981 (as amended) or the Conservation of Habitats and Species Regulations 2017, any person who in order to obtain a licence knowingly or recklessly makes a statement or representation, or furnishes a document or information which is false in a material particular, shall be guilty of an offence and may be liable to criminal prosecution. Any person found guilty of such an offence is liable, on summary conviction, to imprisonment for a term not exceeding six months or to a fine not exceeding level 5 on the standard scale, or to both. Regarding other wildlife legislation, we will look to provisions in the Fraud Act 2006 (as amended) in respect of applicants making any false representations.**

- **Natural England or the Secretary of State can modify or revoke at any time any licence that is issued, but this will not be done unless there is good reason for doing so. Any licence that is issued is likely to be revoked immediately if it discovered that false information has been provided that resulted in the issue of a licence.**

15. Declaration

15a. Convictions

* Have you or any person listed in the application been convicted of any wildlife-related or animal welfare offence? Yes ☐ No ☐

If 'Yes': Please provide details of the convictions: *(including dates)*

15b. Applicant Declaration.

☐ I have read and understood the privacy notice above.

- Where required, I undertake to obtain permission from landowners / occupiers of land to exercise any licence resulting from this application, and to allow any employee or representative of Natural England to monitor or inspect the work described in this application.
- I have read and understood the guidance provided in the application form and on the Wildlife Licensing Internet guidance pages. I declare the particulars given are correct to the best of my knowledge and belief.
- I declare the particulars given are correct to the best of my knowledge and belief, and I apply for a licence in accordance with the information I have provided.

☐ I agree to the declaration above.

Signature of Applicant:

For electronic applications, please insert an electronic signature above or tick this box to confirm with the declaration. ☐

Name: *(In BLOCK letters)*

Date:

15c. Ecologist Declaration

☐ I have read and understood the privacy notice above.

- I can confirm that I have visited the site.
- I have designed and inputted into the licence proposal.
- I declare the particulars given are correct to the best of my knowledge and belief.

☐ I agree to the declaration above.

Signature of Ecologist:

For electronic applications, please insert an electronic signature above or tick this box to confirm with the declaration. ☐

Name: *(In BLOCK letters)*

Date:

16. Annex - Application Notes

Applicant

The applicant is the person submitting the application (usually the landowner or occupier) who, if the licence was granted, would become the licensee. The applicant may appoint agents to produce the application pack and act on their behalf. A person with specific skills and knowledge of the species concerned, such as a consultant ecologist, must be appointed to assist in the preparation and the delivery of the proposals that ensure the species protection requirements can be met.

Licensee

The “Licensee” named on the licence is responsible for ensuring that all activities carried out on site in relation to the licence comply with the terms and conditions of the licence. However, all persons authorised to act under the licence must comply with the licence and its conditions (see Regulation 60(1) of the 2017 Regulations). This means that all authorised persons have a responsibility for ensuring that the licence terms and conditions, including any annex special conditions, are understood and complied with. Failure to do so could lead to prosecution.

Consultant/Named Ecologist

The “Named Ecologist” is a professional ecological consultant who has satisfied Natural England that they have the relevant skills, knowledge and experience of the species concerned and is responsible for undertaking and/or overseeing the work undertaken in respect of the licensed species. The ‘Named Ecologist’ has a responsibility for ensuring that the licence is complied with. They are responsible for advising the licensee on the suitability and competence of any Accredited Agents or Assistants employed on site to undertake the required duties and may include the direct supervision of Assistants where appropriate. More information about the experience required to become a name ecologist can be found here: *http://webarchive.nationalarchives.gov.uk/20140605090108/http:/www.naturalengland.org.uk/Images/bat-mitigation-guidance_tcm6-10534.pdf*

Accredited Agent

An “Accredited Agent” is a suitably trained and experienced person who is able to carry out work under a licence without the personal supervision of the Named Ecologist. Any Accredited Agent must be appointed by the Licensee and be in possession of a letter signed by the Licensee confirming their appointment. Agents shall carry a copy of the said letter when acting under the licence and shall produce it to any police or Natural England officer on request. .

Assistants

An “Assistant” is a person assisting a Named Ecologist or Accredited Agent. Assistants are only authorised to act under this licence whilst they are under the direct supervision of either the Named Ecologist or an Accredited Agent.