The Sizewell C Project

6.1 Environmental Statement - Non-Technical Summary

May 2020

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Revision: 1.0
Applicable Regulation: Regulation 5(2)(a)
PINS Reference Number: EN010012

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1. Introduction

SZC Co.[1] 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 (see **Figure 1.1**). The power station, together with the proposed associated developments, is referred to as the "Sizewell C Project".

This document is the non-technical summary (NTS) of the Environmental Statement (ES) submitted with the Development Consent Order application for Sizewell C. It provides a summary of the likely significant environmental effects predicted to arise from the Sizewell C Project, and broadly follows the same structure as the ES to enable the reader to locate additional detail, if required.

1.1 Overview of the project

The proposed Sizewell C nuclear power station would comprise two UK European Pressurised Reactor (EPR)™ units, as shown on **Plate 1.1**, 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™ unit 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 the Office for Nuclear Regulation and Environment Agency, and has been licensed and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes.

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, as shown in **Figure 1.1**.

The main development site comprises land required for the Sizewell C nuclear power station, offshore works and land used temporarily to support construction, including a temporary accommodation campus and caravan site for the construction workforce. To off-set effects associated with the main development site, the enhancement of sports facilities in Leiston, fen meadow compensation habitats at Benhall and Halesworth and (if required) a marsh harrier habitat improvement area west of Westleton are also proposed.

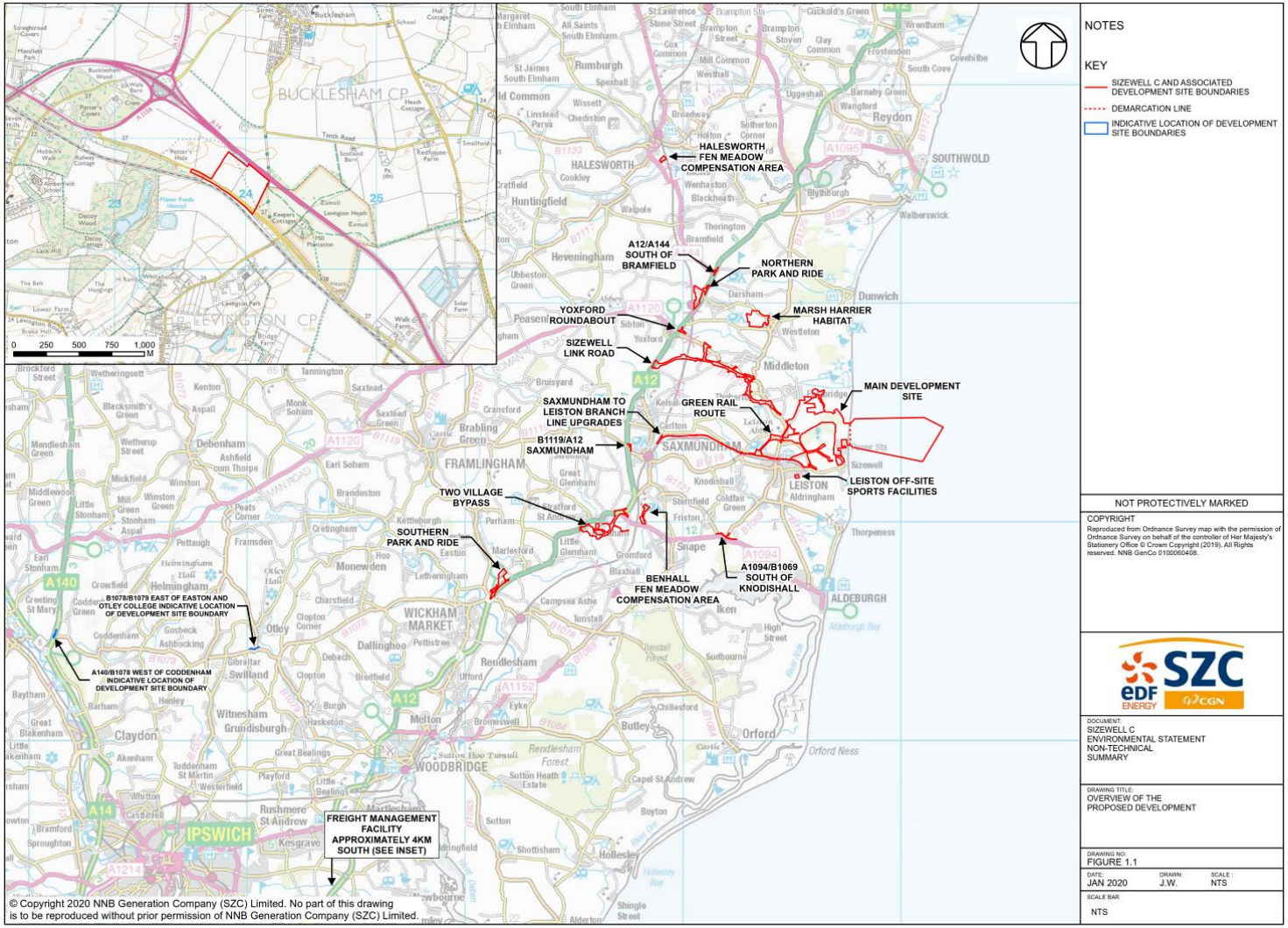
[1] NNB Generation Company (SZC) Limited, referred to in this document as 'SZC Co.'.

Other off-site associated developments include:

- two temporary park and ride sites; one at Darsham (the 'northern park and ride'), and one 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 and mitigate road safety effects on the A12 through the two villages;
- a permanent road linking the A12 to west of the Sizewell C main development site (referred to as the '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 and mitigate road safety effects;
- 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; and
- a temporary extension of the existing Saxmundham to Leiston branch line into the main development site (referred to as '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 lorries from the regional and local road network.

Plate 1.1 Illustrative view of proposed Sizewell C nuclear power station

Figure 1.1 Location of the proposed Sizewell C Project



2. Planning context

2.1 The need for nuclear power

Government policy acknowledges that there is a clear and urgent need for significant new electricity generating capacity in the UK. This need arises from:

- a forecast increase in demand for electricity;
- the closure of existing power stations which are at or near their operational lifetimes;
- the need to shift the UK's energy supply mix toward low-carbon sources; and
- the need for energy security.

The Government has identified that, in order to meet its energy and climate change objectives, there is an urgent need for new electricity generating stations and that new nuclear power should contribute to that mix. This is identified in the Overarching National Policy Statement for Energy (Ref. 1) and the National Policy Statement for Nuclear Power Generation (Ref. 2). The latter lists eight potentially suitable sites for the deployment of new nuclear power stations in England and Wales by the end of 2025, including the site for Sizewell C.

In December 2017, the Government issued a Ministerial Statement (Ref. 3) confirming that the assessments of need for new electricity generation carried out for the National Policy Statement remain valuable and relevant and that new nuclear power remains key to meeting the Government's 2050 climate change obligations. The Statement confirmed that the Government continues to give its strong in principle support to proposals at those sites currently listed in the National Policy Statement for Nuclear Power Generation, which are due to deploy after 2025.

2.2 Consenting process

The Sizewell C Project meets the criteria of a Nationally Significant Infrastructure Project under the Planning Act 2008 (Ref. 4), as it would bring forward a new onshore generating station in England with a capacity of over 50 megawatts (MW).

Therefore, the Planning Act 2008 is the primary legislation that establishes the legal framework for applying, examining and determining the application for the Sizewell C Project. The application for development consent is submitted to the Planning Inspectorate. Consent for the Sizewell C Project would take the form of a Development Consent Order and would be granted by the Secretary of State for Business, Energy and Industrial Strategy, following a public examination of the application.

2.3 What is an Environmental Impact Assessment?

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (Ref. 5) and the Marine Works (Environmental Impact Assessment) 2007 Regulations (Ref. 6) (collectively referred to in this document as 'the EIA Regulations')

require that an Environmental Impact Assessment (EIA) is carried out for the Sizewell C Project.

An EIA is an environmental assessment process to ensure that planning decisions are made with knowledge of the likely significant environmental effects of a future development. It is a systematic process that examines the potential effects on the environment resulting from the construction, operation and decommissioning of a development, and allows for the identification of measures to prevent, reduce or offset any adverse effects and to enhance any beneficial effects.

During the EIA process, opportunities and management measures are identified and incorporated within the development proposals to prevent or reduce any adverse effects and to enable sustainable design and construction principles to be embedded within the proposals.

The EIA is documented in the Environmental Statement (ES), which has been prepared in accordance with all relevant legislation and guidance.

The structure of the ES for the Sizewell C Project is summarised in **Table 2.1**.

Table 2.1 Structure of the Environmental Statement

Environmental Statement	Content
Non-technical summary (this document)	A stand-alone summary of the ES volumes listed below in non-technical language.
Volume 1 Introduction	Introduces the Sizewell C Project and the ES.
Volume 2 Main development site	Presents an environmental assessment of the proposed development on the respective project sites
Volume 3 Northern park and ride	
Volume 4 Southern park and ride	
Volume 5: Two village bypass	
Volume 6: Sizewell link road	
Volume 7: Yoxford roundabout and other highway improvements	
Volume 8: Freight management facility	
Volume 9: Rail	
Volume 10 Cumulative and transboundary effects	Presents an assessment of cumulative effects (within the project and with other projects) and transboundary effects which may be experienced outside the UK.

2.4 Other related applications

Two separate early works applications that are related to the Sizewell C Project have already been approved – these include the Aldhurst Farm habitat creation scheme and the Sizewell B relocated facilities works.

a) Aldhurst Farm habitat creation scheme

The Aldhurst Farm habitat creation scheme[2] was designed to compensate for any future land-take from the Sizewell Marshes Site of Special Scientific Interest (SSSI) should the Sizewell C nuclear power station be granted consent and built. Notably the scheme was designed to compensate for the loss of reedbed and lowland ditch habitat, and their associated invertebrate and rare vascular plant assemblages. Permission for this application was granted in March 2015 and most of the works were completed in 2015 and 2016. In addition to compensating for habitat loss, the habitats established as part of the scheme now also form part of the existing baseline environment.

b) Sizewell B relocated facilities

The Sizewell B relocated facilities works[3] include the relocation, demolition and replacement of several existing Sizewell B facilities. These facilities are ancillary to the process of electricity generation at Sizewell B and have a broad range of functions, including industrial, workplace, education, cultural and infrastructure. Some of the facilities to be relocated are within the area of land that is nominated for Sizewell C, whilst the other facilities, or areas of land, would be impacted because of relocating the facilities from the north to the Sizewell B site.

Consent for the Sizewell B relocated facilities works was granted by East Suffolk Council in November 2019. Progressing these works under the separate planning permission would facilitate earlier delivery of the Sizewell C Project, than if the relocation proposals were only included as part of SZC Co.'s application for development consent. Nevertheless, as these works facilitate the construction of Sizewell C, they have also been included in the application for development consent for the Sizewell C Project.

Plate 2.1 Reedbed habitat at Aldhurst Farm

[2] East Suffolk Council planning application reference: DC/14/4224/FUL

[3] East Suffolk Council planning application reference: DC/19/1637/FUL

3. Consultation and Alternatives

3.1 Overview of consultation

The **Consultation Report** (Doc Ref. 5.1) provides an overview of engagement undertaken to inform the Sizewell C Project. Engagement with the local community and other stakeholders about a new nuclear power station at Sizewell has been ongoing since 2008. However, four principal stages of statutory consultation under the Planning Act 2008 have been undertaken between 2012 and 2019, as illustrated in **Plate 3.1**. Minor changes were made to the site boundary following the close of Stage 4 consultation, and therefore, additional targeted consultation was completed subsequently. The **Consultation Report** (Doc Ref. 5.1) explains the issues raised at various stages of consultation and how feedback from consultees has influenced the options and choices made in the development of Sizewell C proposals.

Through the formal stages of consultation and development of design, SZC Co. has developed various strategies for how the power station should be constructed, in particular with regards to the transport and accommodation strategies. Each strategy would require different associated development to support the construction of Sizewell C. Taking account of feedback from the consultation, as well as design development, and technical and environmental studies, SZC Co. has identified the strategies that are most suitable for the development. It is on the basis of these strategies that SZC Co. is making its application for development consent.

Outside of the formal consultation stages, SZC Co. has also conducted separate consultation and engagement with relevant statutory and non-statutory consultees throughout the EIA process and the development of the proposals. Commentary on the technical environmental consultation undertaken is provided within **Volumes 1** to **9** of the **ES**.

Plate 3.1 Sizewell C consultation timeline

3.2 Alternative strategies and designs

a) Introduction

The EIA Regulations require that the ES includes an outline of the main alternatives studied by the applicant and an indication of the main reasons for the choice made, taking into account the environmental effects. This section of the NTS provides a summary of the main alternative designs and strategies considered.

b) Strategic site location and reactor design

The location of the Sizewell C power station, to the north of the existing Sizewell B power station, and the approximate location of the temporary construction area are indicated on plans appended to the National Policy Statement for Nuclear Power Generation (Ref. 2). Albeit, it is recognised that the site boundary proposed in the application for development consent varies from that shown in the National Policy Statement, as specific proposals are developed.

In addition, the UK EPR™ nuclear reactor (shown on **Plate 3.2**) is proposed for Sizewell C. This reactor design has been assessed and approved by the Office for Nuclear Regulation and the Environment Agency through the UK Generic Design Assessment process. The UK EPR™ reactor is the same reactor design as is being constructed at Hinkley Point C.

Therefore, no alternative locations for the Sizewell C power station and reactor design have been considered.

Plate 3.2 Generic UK EPR™ design

c) Strategic alternatives

A number of strategic alternatives for the construction of Sizewell C nuclear power station have been considered, which have guided the evolution of the proposed development and the need for associated development. The strategic alternatives have been led by the need to support the estimated peak on-site construction workforce and freight movements.

A summary of the main strategic alternatives is provided below, with further detail provided in **Volume 1, Chapter 4** of the **ES**.

i. Construction workforce accommodation

While SZC Co. would look to recruit as many local people as possible, due to the size and scale of construction, a number of workers would need to be recruited from outside the local area and would seek temporary accommodation. SZC Co. would aim to strike a balance between the economic benefits of workers using existing local accommodation, with the need to provide sufficient project accommodation to ensure that any disturbance to local communities is minimised, as far as possible. A new campus and caravan site are therefore proposed to accommodate some of the construction workforce.

SZC Co. has considered the principle of providing a single or multiple campus sites, and whether the campus(es) should be within the main development site boundary or remote from it. At Stage 1 consultation, SZC Co. identified three possible sites within the area for the proposed campus, one adjacent to the main development site and two alternative near-site options. At Stage 2 consultation, the former was confirmed as the preferred location and various site layout options were explored.

It was concluded that an on-site accommodation campus to the east of Eastbridge road was the preferred option as:

- it would greatly reduce the number of journeys on local roads, as well as time associated with travelling to and from the construction site;
- it would increase productivity and reduce potential health and safety risks associated with long travel to work;
- it would allow for flexible hours of work, which may be necessary to respond to emerging site needs; and
- a multiple-campus option would spread the workforce across a wider area and increase the difficulty in managing effects on impacted communities, as well as increasing traffic due to additional (and longer) bus journeys across multiple shifts.

EDF Energy Group experience of the construction of new nuclear power stations has highlighted that caravan accommodation would also be popular with some non-home-based construction workers, especially in the early years of construction. Accordingly, the strategic decision was taken to provide some caravan accommodation adjacent to the main development site.

Further details on the site-specific alternatives considered and the evolution of its design, can be found in **Volume 2, Chapter 6** of the **ES**. The **Accommodation Strategy** (Doc Ref. 8.10) sets out further details on accommodation infrastructure and the approach proposed by SZC Co.

ii. Transport strategy

Movement of people

Due to the construction workforce volumes that would need to be transported to the Sizewell C Project sites on a daily basis, SZC Co. considered different proposals to manage and reduce daily traffic during peak years of construction.

In addition to the provision of an on-site accommodation campus and caravan park, a range of further measures were considered

which would help manage and reduce traffic levels. These included:

- provision of park and ride facilities;
- direct bus services;
- walking and cycle improvements;
- rail infrastructure; and
- management of car parking.

At Stage 1 consultation, two park and ride facilities were proposed on the A12 to intercept traffic movements to the main development site and reduce traffic through the towns and villages; one to the north of the main development site and one to the south.

Potential sites for both park and ride locations were identified from a combination of desk-based studies and field surveys, and through consultation with Suffolk Coastal District Council (now East Suffolk Council) and Suffolk County Council. Further details on the site selection approach, the final location of each of these park and ride sites (i.e. at Darsham and Wickham Market), and the evolution of their design, can be found in **Chapter 3** of **Volumes 3** and **4** of the **ES**.

In addition, SZC Co. has identified a range of direct bus services to the main development site from key locations, where there are concentrations of workers. Opportunities for walking and cycling infrastructure improvements have been identified, including (but not limited to) a new footpath linking the proposed caravan site to the main construction area.

In the early stages of consultation, the movement of the construction workforce by dedicated rail services was also considered. However, this option was discounted as only a limited proportion of the construction workforce is likely to live sufficiently close to a rail station and any benefit would be limited by the low frequency of services. The start and finish times of the workforce would also be unlikely to coincide with available rail services, whereas park and ride facilities and direct bus services can be more easily timed and flexibly adapted to meet the required demand.

The need for car parking on the main development site has also been identified, in order to allow workers living in the local area to drive directly to the construction site. Only workers living locally would be issued a parking permit. Workers without a parking permit (including those benefiting from a direct bus service) would need to use one of the park and ride sites, a direct bus service or walk or cycle to the main development site.

Movement of freight

SZC Co. considered a range of alternatives for transporting large volumes of construction materials and freight required at the main development site. SZC Co.'s overall strategy was to:

- first, reduce the volume of materials that require movement off-site through re-use of excavated material as fill or landscaping, where appropriate;

- secondly, where materials must be imported or exported, the strategy was for rail or sea to play a role, wherever practical and cost-effective; and
- thirdly, where movement of materials by road remains necessary, this activity would be managed to reduce the local impacts, as far as reasonably practicable, through the use of defined routes and systems to monitor, manage and control the number and timing of vehicle movements.

SZC Co. evaluated the possibility of moving material by sea, road and rail.

A 'marine led strategy' was discounted early in the design process as the scale of the required jetty would have resulted in severe underwater noise during construction due to piling, loss of habitat associated with the footprint of the jetty and its piles, changes to the alignment of the shore line, and the length of time it would require to construct the jetty. However, a smaller beach landing facility could be provided, which would facilitate the delivery of abnormal indivisible loads[4] to remove heavy and oversized loads from the road network.

This evaluation concluded in the generation of three freight delivery scenarios; initially, a 'rail led' scenario and a 'road led' scenario, and later an 'integrated strategy' at Stage 4 consultation, as summarised in **Plate 3.3**.

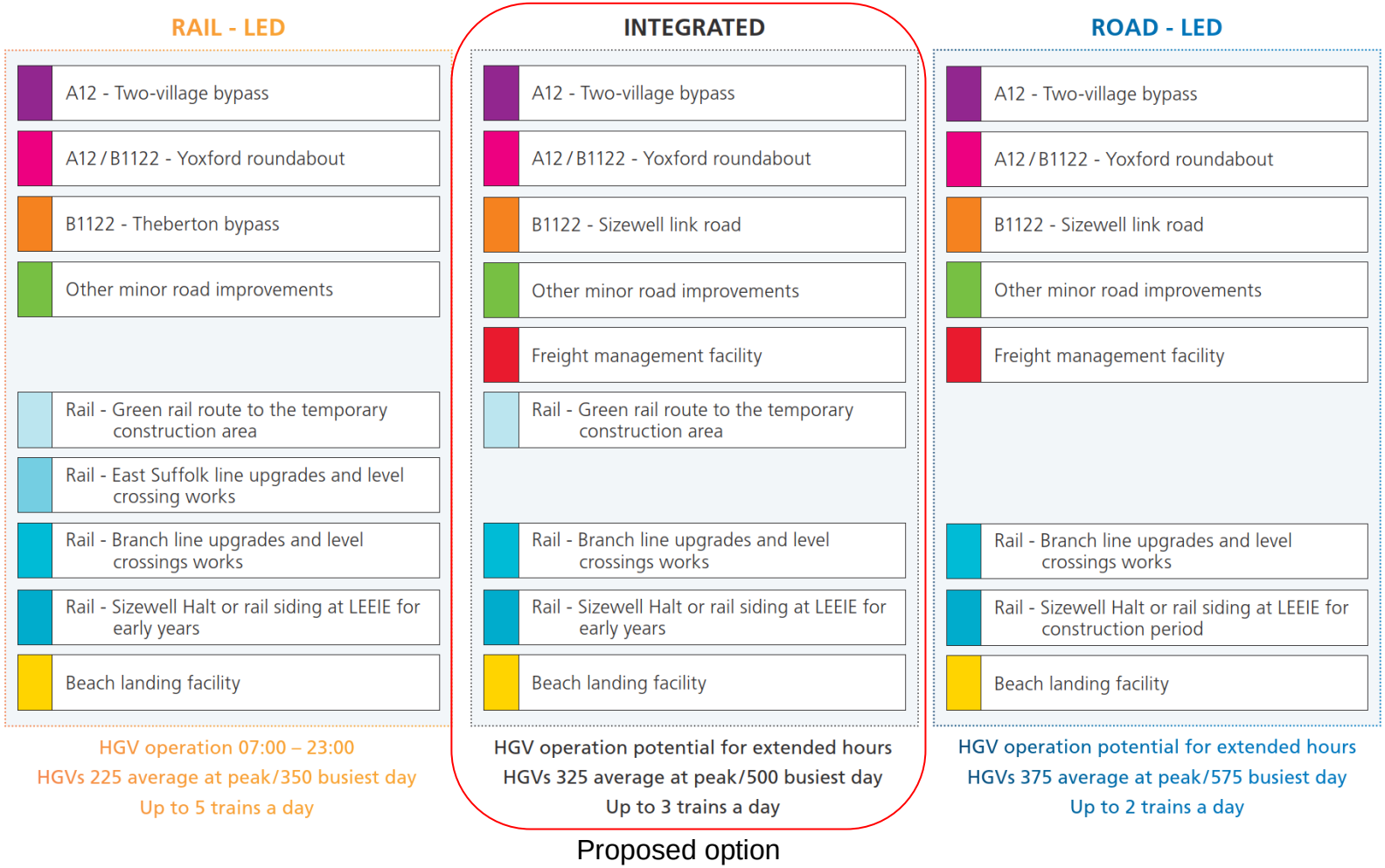
Local authorities advocated for both the rail and marine led scenarios in their response to consultation Stages 1 to 3, with a preference for rail-based transport, and were concerned that a road-led approach would lead to a significant increase in construction traffic on local roads. However, in Network Rail's response to consultation, a number of risks to the rail-led option were identified that could potentially impact the Sizewell C programme.

Therefore, the integrated strategy was developed that would maximise the use of rail by committing to those rail works, where there was sufficient programme certainty that the works could be undertaken in time. The integrated strategy would allow for up to three trains per day (six movements) on a new temporary green rail route that extends into the temporary construction area and includes upgrades and level crossing works on the Saxmundham to Leiston branch line.

There is a clear preference in National Policy Statements for Energy and Nuclear Power Generation for the use of rail infrastructure over road transport for the movement of freight during construction. SZC Co. has decided, therefore, to promote the integrated strategy as part of this application for development consent.

[4] Abnormal indivisible loads are large loads to be delivered to the site which by their nature cannot be broken into smaller multiple deliveries.

Plate 3.3 Freight management strategy options



Proposed option

d) Site-specific alternative designs

In addition to the strategic alternatives summarised above, further alternative designs for each of the Sizewell C Project sites have been considered and consulted on as part of the formal consultation process and informal engagement with stakeholders. The main site-specific alternative design options considered are listed in **Table 3.1**.

The proposals have evolved through:

- consideration of the sites' context and environmental constraints;
- an understanding of the operational requirements of the Sizewell C Project, including where relevant, nuclear safety; and
- consideration of the likely environmental effects and consultation feedback. For instance, care has been taken to locate construction activities away from existing properties and sensitive ecological sites, where possible, limit construction disturbance, minimise land take, avoid the most sensitive landscapes, have regard to heritage assets and, where practicable, maintain access to recreation and amenity areas.

Further details of the main local alternatives considered for the Sizewell C Project sites and how the designs have been developed with due regard to environmental effects are provided in **Chapter 6** of **Volume 2** and **Chapter 3** of **Volumes 3** to **9** of the **ES**.

Table 3.1 Site-specific alternatives

Site	List of main site-specific alternatives considered
Main development site	• finish of the reactor building domes; • method of spent fuel storage; • shape of the forebay structures for the reactor units; • main platform height; • height of the emergency diesel generator stacks and nuclear auxiliary stacks; • type of cooling system; • form of sea defences; • landscape strategy for the operational site; • alternative means of access to the main platform when crossing the Sizewell Marshes SSSI; • electrical connection to National Grid substation; • locations and consolidation of Sizewell B relocated facilities; • location and design of cooling water intake and outfall structures, Fish Recovery and Return system and the combined drainage outfall used during construction; • siting and layout of the accommodation campus, the temporary construction area and main site access; • use of on-site borrow pits; and • use and layout of the land east of Eastlands Industrial Estate.
Park and rides	• provision of facilities as set out under the integrated freight management strategy (see **Plate 3.3**); • site locations, layouts and route alignments; • localised highway or pedestrian improvements, speed limit reductions; and • improvements to existing rail infrastructure.
Freight management facility	
Road infrastructure	
Rail infrastructure	

4. Environmental Impact Assessment Methodology

4.1 EIA Scoping

The Environmental Impact Assessment (EIA) considers the potential for likely significant effects to occur on resources (such as the water environment and archaeology) and receptors (such as human beings and flora and fauna), as a result of a proposed development. The scope and methodology of the EIA has been discussed with the Planning Inspectorate through a process called EIA scoping.

EIA scoping forms one of the early stages of the EIA process and sets out the potential environmental aspects that may be significantly impacted by the proposed development, which, therefore, would need to be assessed as part of the EIA. It also outlines the proposed methodologies for the environmental assessments.

In accordance with the EIA Regulations, SZC Co. submitted an EIA Scoping Report to the Planning Inspectorate in 2014 and an updated EIA Scoping Report in 2019 (see **Volume 1, Appendix 6A** of the **ES**), alongside a request for a Scoping Opinion. The 2019 Scoping Opinion received from the Planning Inspectorate is provided in **Volume 1, Appendix 6B** of the **ES**.

This ES has been prepared in accordance with the 2019 EIA Scoping Report and Scoping Opinion.

4.2 Environmental Impact Assessment Approach

The main stages of the EIA process for the Sizewell Project are illustrated in **Plate 4.1**. In summary, the stages include:

- establishing characteristics of the baseline environment by identifying the existing resources and receptors (e.g. designated areas, bird species, residential properties) that exist at the site and in the surrounding area;
- assessing the impacts and likely significant environmental effects predicted to occur as a result of the proposed development;
- identifying measures to avoid, reduce or manage any adverse environmental effects (referred to as ‘mitigation measures’), including making changes to design proposals, and identifying opportunities for enhancement;
- assessing cumulative effects which may occur due to a combination of Sizewell C Project effects or together with other projects and plans; and
- identifying effects that remain after the introduction of all mitigation (referred to as ‘residual effects’).

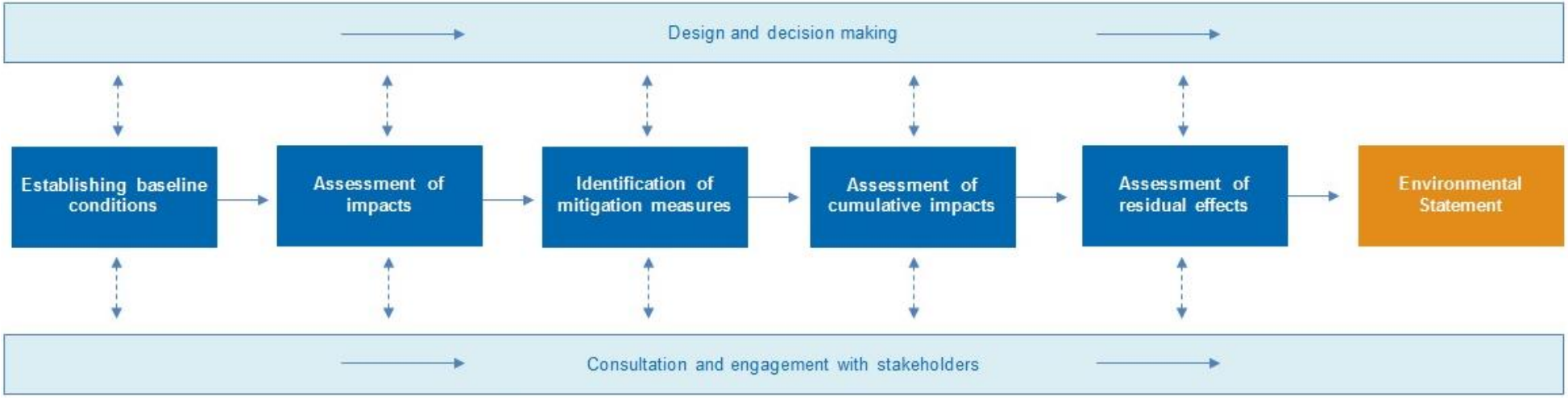
The results of the EIA are reported in the **ES** (Doc Ref. 6.2 to 6.11).

A generic EIA methodology has been applied across technical environmental assessments within the ES, where appropriate, to provide consistency and allow comparison between the results of each of the topic assessments.

The general approach is to consider the sensitivity, importance or value of an affected resource or receptor and the predicted change to the environment as a result of the proposed development (referred to as the magnitude or severity of an impact). The resulting effect is then determined and identified as either adverse, beneficial or neutral. The duration and geographic scale of the effects is also considered. The significance of environmental effects is then assessed, typically by judging the value and susceptibility of a resource or receptor to change and the predicted magnitude of change resulting from the proposed development. All effects are classified as '**significant**' or '**not significant**'. Where appropriate, industry-specific assessment criteria are used.

The concept of 'significance' is central to the EIA process; it aids the identification of the principal effects of the proposed development and, accordingly, where mitigation is required. Following the consideration of the proposed mitigation, the anticipated effects that remain are known as residual effects.

Plate 4.1 EIA assessment approach



5. Main development site

5.1 Introduction

The main development site for the construction and operation of the Sizewell C nuclear power station is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston and within the administrative boundary of East Suffolk Council (see **Figure 5.1**). Once constructed, the Sizewell C nuclear power station would be located directly to the north of the existing Sizewell A and B power station complex.

Volume 2 of the **ES** provides a detailed description of how the proposed Sizewell C nuclear power station would be constructed, operated and decommissioned, and the likely significant environmental effects that are anticipated to arise as a result of these activities.

5.2 Description of development

The main development site encompasses the area required for the construction and operation of the Sizewell C nuclear power station and has been split into five components (see **Figure 5.2**):

- power station platform (main platform): the area that would become the Sizewell C nuclear power station itself;
- Sizewell B relocated facilities land and National Grid land: the area that certain Sizewell B facilities would be moved to in order to release existing Sizewell B land for the construction of Sizewell C, and land required for National Grid infrastructure;
- offshore works area: the area where offshore cooling water infrastructure and other marine works would be located;
- temporary construction area: the area located primarily to the north and west of the proposed SSSI crossing, which would be used to support construction activity on the main platform;
- land east of Eastlands Industrial Estate (LEEIE): the area that would be used to support construction on the main platform and temporary construction area.

A description of the permanent and temporary development in the above areas is provided in **Volume 2, Chapters 2** and **3** of the **ES**. A summary of the proposals for each component area is provided below, with **Figure 5.3** showing the illustrative operational masterplan and **Figure 5.4** showing the illustrative construction masterplan.

Figure 5.1 Location of the main development site

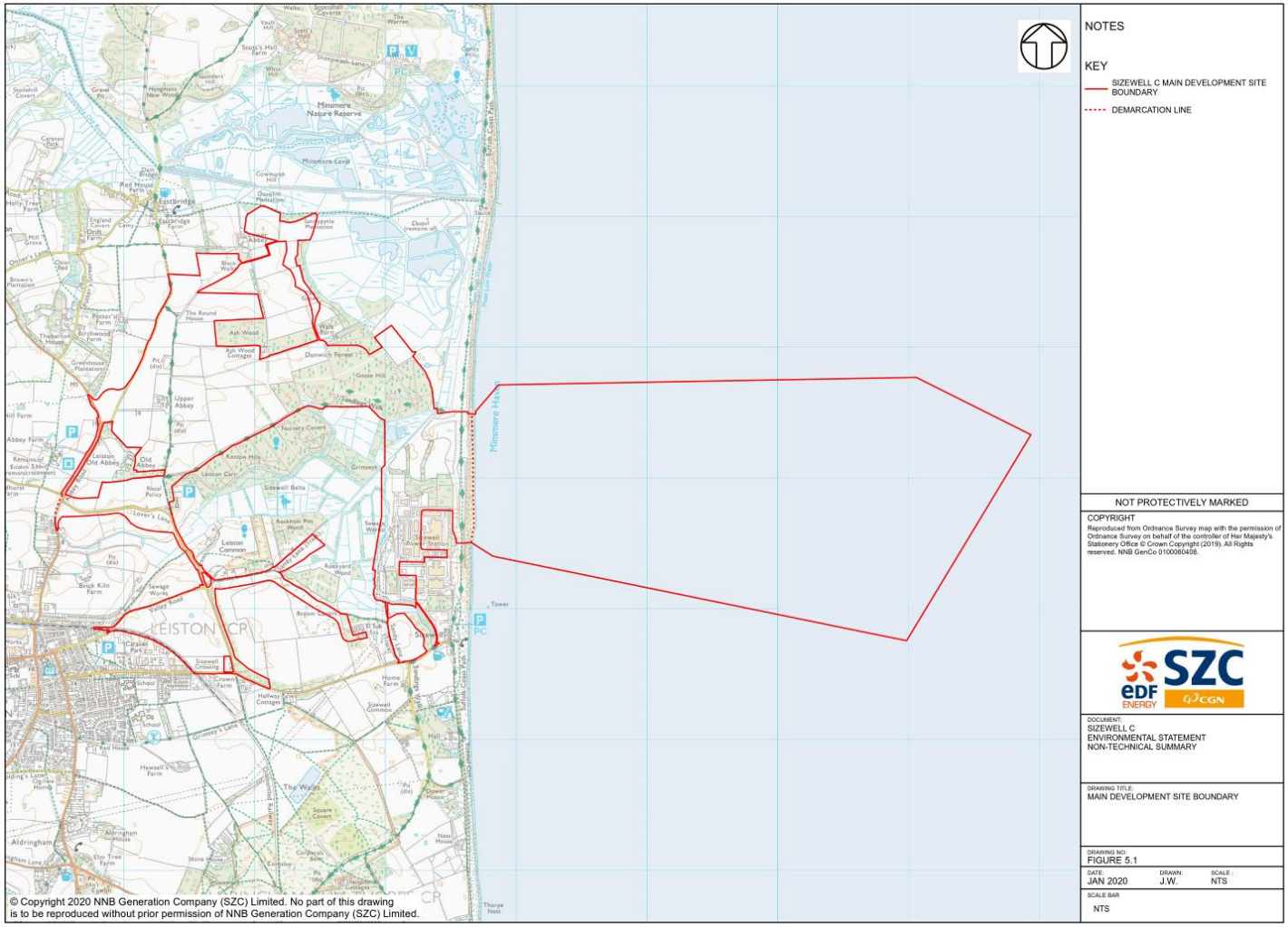
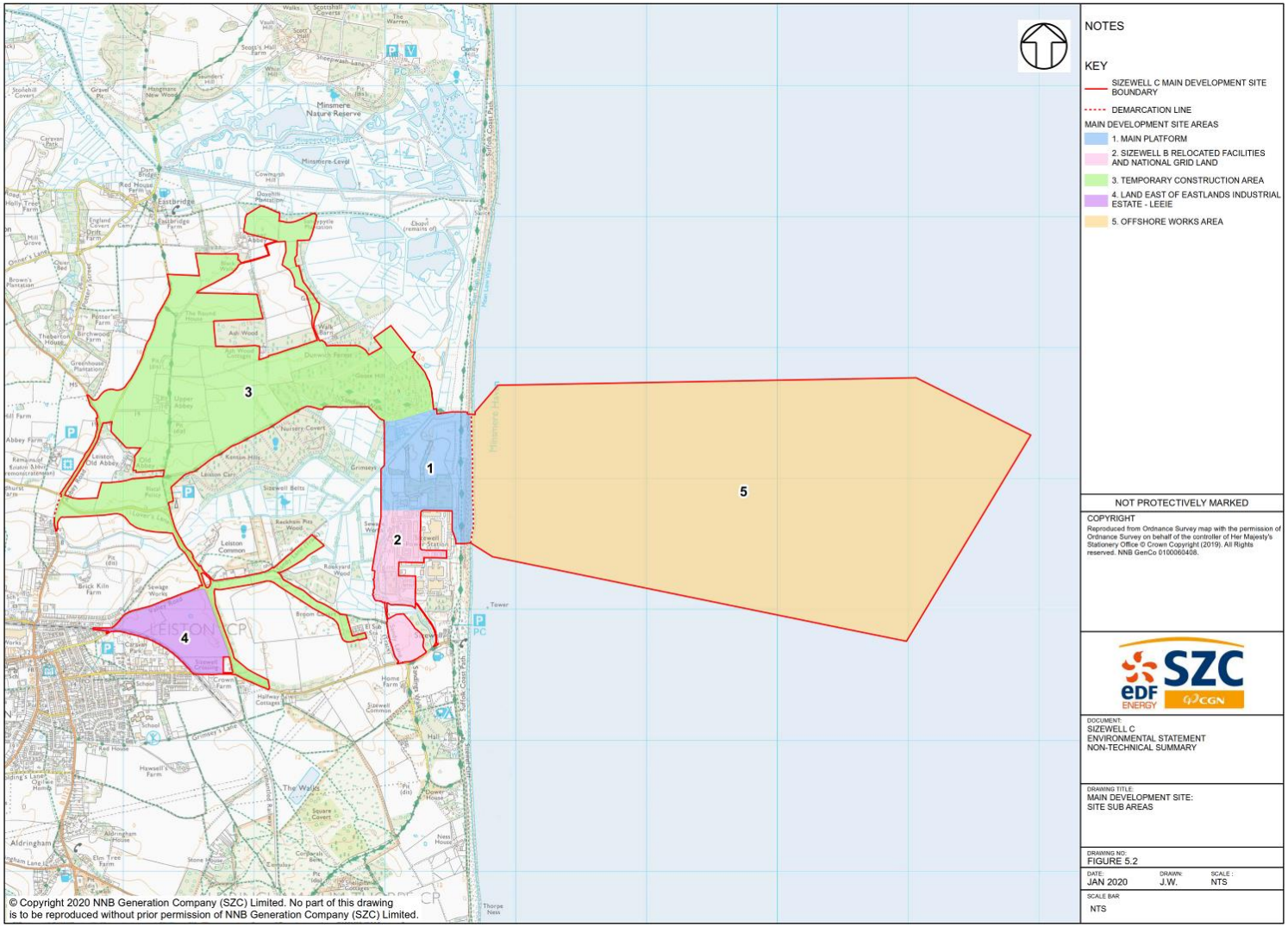


Figure 5.2 Main development site sub-areas



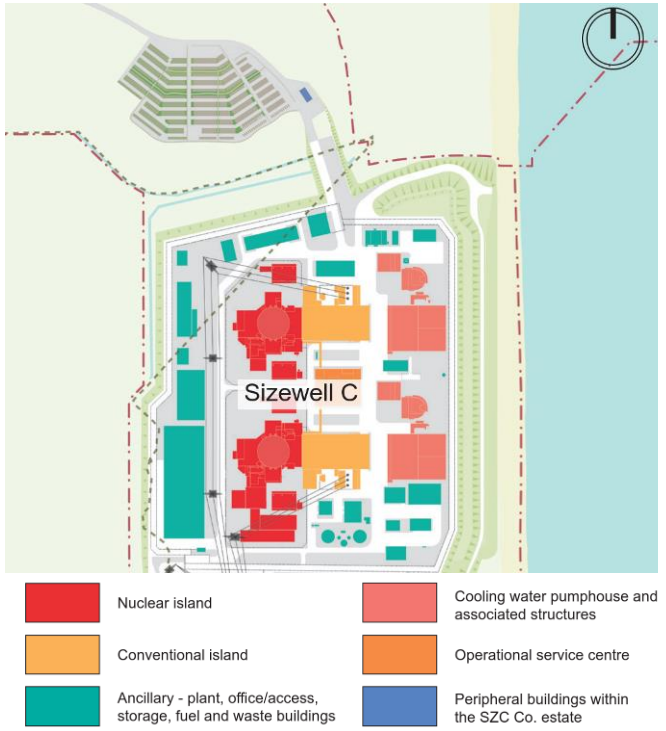
a) Main platform

The main power station platform would include the following (as shown on **Plate 5.1**):

- two reactor buildings for the UK EPR™ reactor units and associated annexed buildings containing the safety systems, fuel handling systems and access facilities, together with the adjacent emergency diesel generator buildings (known as the 'nuclear islands');
- two sets of turbine halls and electrical buildings for the export and distribution of electrical power (the 'conventional islands');
- an operational service centre;
- cooling water pump houses and associated buildings and plant;
- waste storage buildings, including an intermediate level waste store and an interim spent fuel store;
- sea defences, comprising a new landscaped hard coastal defence feature, an existing landscape feature, which would be reconstructed to tie into the Sizewell C hard coastal defence feature and would be known as the Northern Mound, and a new artificial linear dune, known as the soft coastal defence feature;
- a beach landing facility used for the delivery of abnormal indivisible loads by the sea;
- overhead power lines and pylons; and
- ancillary buildings required to facilitate the operation of Sizewell C, including buildings for security, office use, storage and other purposes.

Access to the main platform would be provided by a new crossing to the north constructed across an area of land that forms part of the Sizewell Marshes SSSI and the Leiston Drain.

Plate 5.1 Proposed Sizewell C buildings and structures on main platform



b) Sizewell B relocated facilities land and National Grid land

A number of existing Sizewell B facilities would need to be either relocated from the main platform area or relocated within the Sizewell B station because of works on the main platform. These facilities have a broad range of functions including industrial, workplace, education, cultural uses and associated infrastructure; some of which would need to be upgraded to comply with current standards and regulations.

Land is also required for the National Grid 400 Kilovolts (kV) substation and the associated relocation of an existing National Grid pylon and overhead lines.

c) Offshore works area

This includes cooling water infrastructure with two intakes, one outfall and two fish recovery and return tunnels for the operation of the Sizewell C power station and one combined drainage outfall for use during construction and early stages of commissioning.

d) Temporary construction area

The temporary construction area refers to the main area of land that would be required largely on a temporary basis to facilitate the construction of the Sizewell C power station. During construction, the temporary construction area would be used to provide:

- temporary facilities, including contractors' compound areas, batching plants, access and storage areas, logistical facilities, water treatment plants, water pumping stations and water storage facilities, fabrication and pre-cast concrete production areas, etc.;
- material management, including borrow pits and stockpiles;
- temporary railway track with terminal facility for offloading goods, railway sidings and a passing loop for locomotives;
- temporary water resource storage area, for the storage of non-potable water for use in construction activities;
- temporary car park with approximately 1,000 spaces, plus additional parking for buses;
- temporary construction worker accommodation campus providing up to 2,400 bed spaces, supported either by a combined heat and power facility or air source heat pumps, and associated infrastructure, including 300 surface car parking spaces and a multi-storey car park with approximately 1,300 car parking spaces, plus blue badge and cycle parking space; and
- Associated temporary construction infrastructure, activities and machinery, including drainage, utilities, access and haul roads, excavations, cranes and other specialist machinery.

Furthermore, during the construction period, the following permanent infrastructure would be established within this area:

- power station access road, linking the SSSI crossing with a new roundabout onto Abbey Road (B1122);

- permanent car park with up to 1,370 spaces at the eastern end of the access road to support the operation of the Sizewell C power station;
- off-site delivery checkpoint;
- vehicular and pedestrian causeway crossing the Sizewell Marshes SSSI;
- emergency equipment store and back-up generator at Upper Abbey Farm;
- electrical substation south of Upper Abbey Farm;
- improvements to the car park and access of Kenton Hills woodland, with the provision of up to 15 additional car parking spaces;
- highway works including the realignment of Lover's Lane, the provision of a combined bridleway, cycleway and footpath from Sizewell Gap and King George's Avenue to Eastbridge Road and other public rights of way diversions.

Once construction at the main platform has finished, temporary facilities would be removed and the area would be used for habitat creation, as described within the **Outline Landscape and Ecology Management Plan** (Doc Ref. 8.2).

e) Land east of Eastlands Industrial Estate (LEEIE)

This area would be used to support construction on the main platform and the temporary construction area. The area would comprise:

- new vehicle access points onto Valley Road, Lover's Lane and King George's Avenue;
- a 400-pitch caravan park for the accommodation of construction workers, with associated facilities for staff welfare and amenity;
- a temporary single railway track with railway sidings and a passing loop for the locomotive;
- a temporary park and ride facility comprising approximately 600 car parking spaces, 20 bus parking spaces and an associated terminal area;
- a freight management facility comprising approximately 80 parking spaces for heavy goods vehicles and associated infrastructure, including a new vehicle access onto Lover's Lane;
- temporary material management areas, including stockpiles and a material transfer laydown area; and
- a logistics compound to accommodate temporary buildings, facilities, machinery and materials.

At the end of the construction period, all facilities at the LEEIE would be removed and the area reinstated to agriculture as described within the **Outline Landscape and Ecology Management Plan** (Doc Ref. 8.2).

Figure 5.3 Illustrative operational masterplan

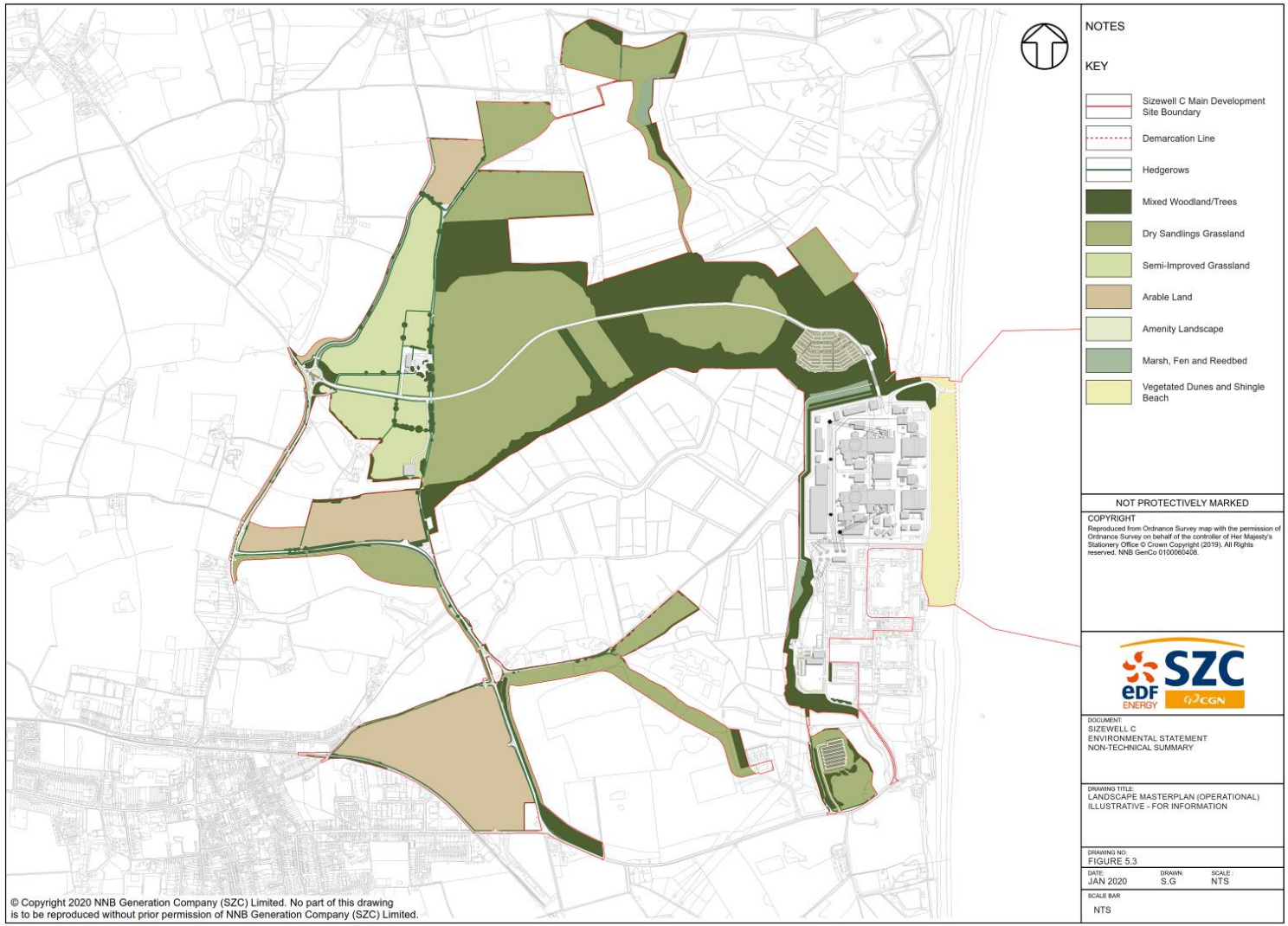
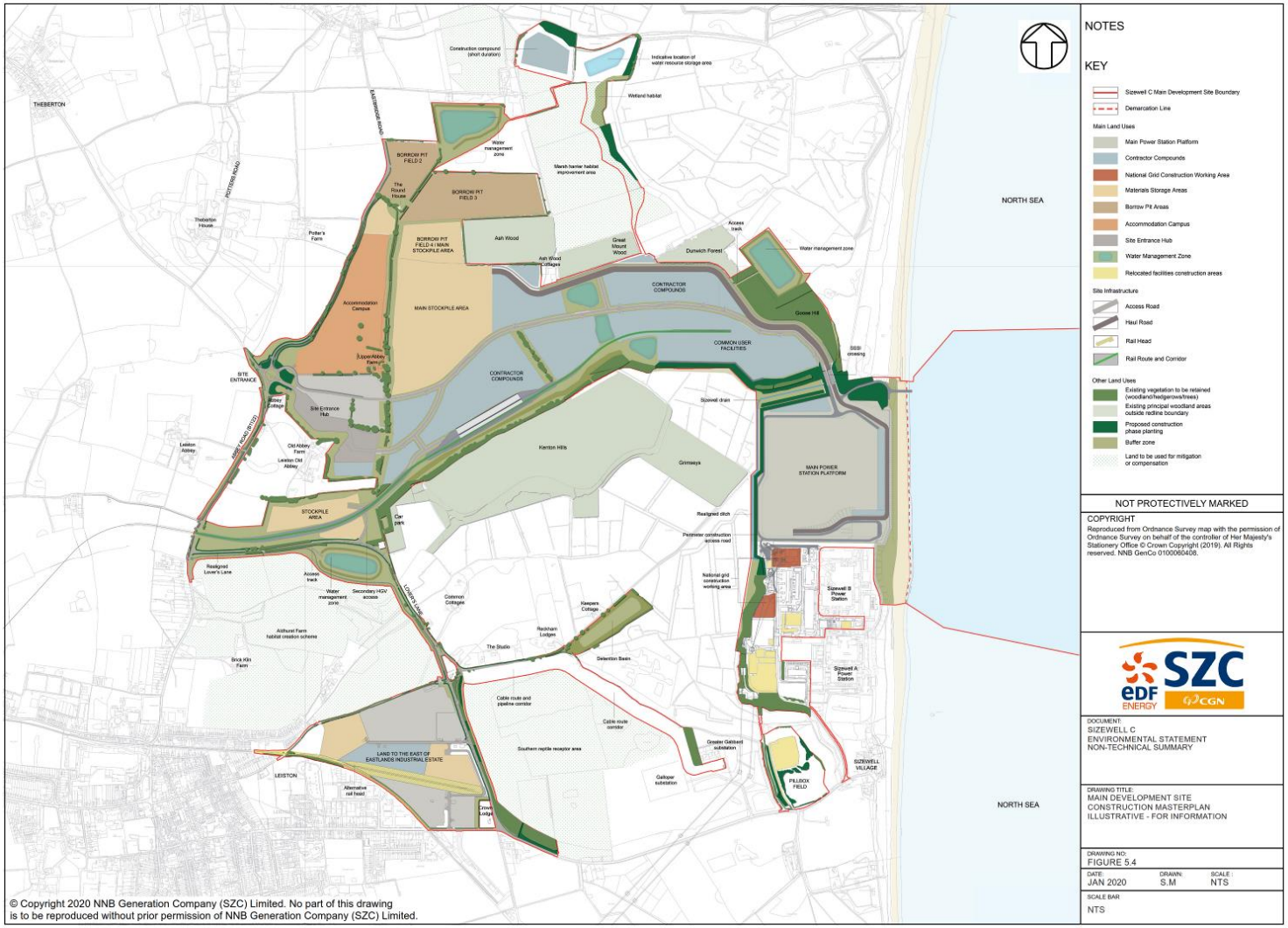


Figure 5.4 Illustrative construction masterplan



5.3 Off-site developments

To mitigate the effects of activity on the main development site, the following off-site developments are also proposed (refer to **Figure 1.1** for a location of these sites):

- Two areas of fen meadow compensation land, one to the south of Benhall and one to the east of Halesworth, to create permanent fen meadow habitats to compensate for the loss of approximately 0.7 hectares of fen meadow habitat from the Sizewell Marshes SSSI;
- off-site sports facilities at Leiston comprising a full-sized 3G artificial football pitch and two multi-use games areas, for shared use between construction workers, Alde Valley School and the local community during the construction phase and left as a legacy for the school and community thereafter; and
- a temporary marsh harrier habitat improvement area to the west of Westleton, if required[5]. If used, at the end of construction, this land would be returned to arable use.

[5] A permanent marsh harrier habitat improvement area has been established at the northern edge of the EDF Energy estate. The Shadow Habitats Regulation Assessment Report (Doc Ref. 5.10) concludes that this is appropriate compensation for the predicted 'loss of foraging' habitat for marsh harriers over the Sizewell Marshes SSSI. However, if it is determined by the Secretary of State that additional marsh harrier habitats are required then the Westleton site would be temporarily used to provide this.

Volume 2 of the **ES** identifies no significant environmental effects as result of the construction and operation of the off-site developments.

5.4 Construction

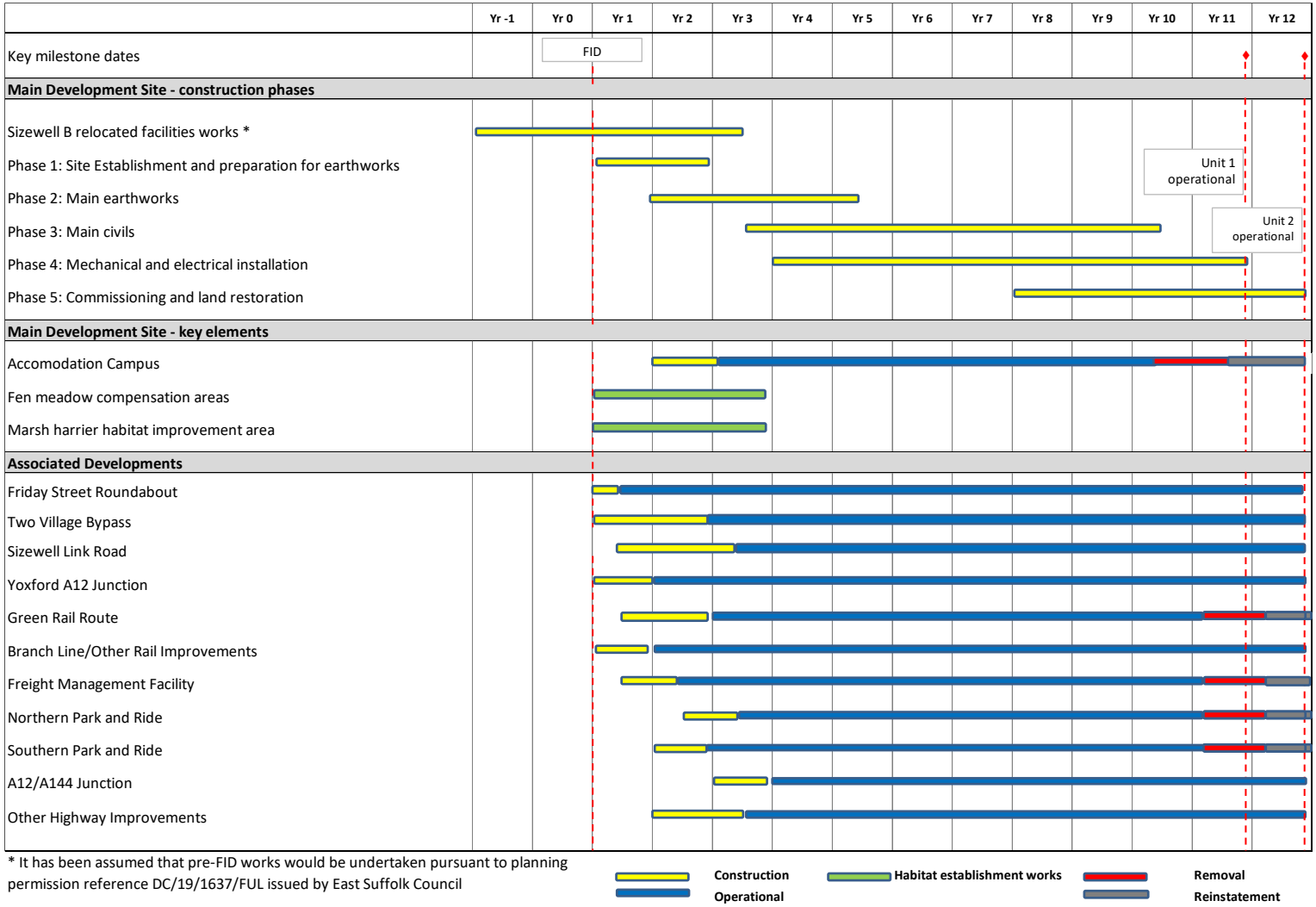
Construction of the Sizewell C power station is anticipated to take 9-12 years. Construction would be undertaken in the following phases, which may overlap as work is undertaken simultaneously in different areas across the main development site:

- Phase 1: site establishment and preparation of earthworks;
- Phase 2: main site earthworks and completion of temporary infrastructure
- Phase 3: main civil engineering works;
- Phase 4: mechanical and electrical installation; and
- Phase 5: commissioning and land restoration.

Works for Sizewell B relocated facilities may start prior to Phase 1 of construction under its existing planning permission granted by East Suffolk Council. **Plate 5.2** provides a summary of the indicative construction programme.

All construction works would be managed in accordance with construction environmental management measures set out within the **Code of Construction Practice** (**CoCP**) (Doc Ref. 8.11).

Plate 5.2 Indicative construction programme



* It has been assumed that pre-FID works would be undertaken pursuant to planning permission reference DC/19/1637/FUL issued by East Suffolk Council

For the purposes of the EIA, during the peak of construction, a total of 7,900 workers are assumed to work on construction activity at the main development site and 580 staff are assumed to be working at the accommodation campus and caravan park. A further 20 staff are assumed to be working at the freight management facility. Construction workers would work in shifts over the course of the day and night throughout the week. The night shift would generally include maintenance and logistics support activities. However, where continuity of work is needed (e.g. for fixing concrete formwork, large concrete pours, erection of steelwork and marine tunnelling activities etc.), night shift activities would differ accordingly.

During the construction of the main development site, an estimated 10.1 million tonnes of material would be brought to the site. Of the material to be imported, at least 3.5 million tonnes are expected to be transported by rail. The remaining 6.6 million tonnes would be transported by road. This excludes abnormal indivisible loads to be delivered to the beach landing facility via the sea.

During the early years of construction, there would be less traffic associated with the construction works, but the off-site associated developments and other mitigation measures would not yet be in place. On a typical day during the early years, a total of 600 two-way lorry movements are expected (i.e. 300 lorries in each direction).

Once the rail work on the Saxmundham to Leiston branch line and at LEEIE has been completed, up to two return freight trains per day would operate in each direction during the early years of construction. No freight trains would pass through Leiston overnight.

Once construction of the green rail route into the temporary construction area is complete, this would provide capacity for three return freight trains to operate in each direction. These trains would predominantly operate overnight to make use of available rail capacity at these times.

During peak construction, up to 650 two-way lorry movements (i.e. 325 lorries in each direction) are anticipated on a typical day, with 1,000 two-way lorry movements on the busiest day (i.e. 500 lorries in each direction).

Further details on the construction of Sizewell C nuclear power station are provided in **Volume 2, Chapter 3** of the **ES.**

5.5 Operation

The Sizewell C nuclear power station would have an expected net electrical output of approximately 1,670 megawatt (MW) per unit, giving a total site capacity of 3,340MW.

The Sizewell C nuclear power station would have an operational life of 60 years. Sizewell C is designed to operate continuously 24 hours a day, save for routine maintenance outages. Therefore, access would be required to the site and facilities at all times.

During operation, it is expected that the Sizewell C nuclear power station would provide 900 jobs. Around 1,000 extra workers would be needed during planned refuelling and maintenance outages

which would take place approximately every 18 months for each UK EPR™ reactor unit.

Further details on the operation of Sizewell C nuclear power station are provided in **Volume 2, Chapter 4** of the **ES.**

5.6 Decommissioning

At the end of electricity generation, Sizewell C nuclear power station would be decommissioned. The process of decommissioning would be divided into a number of activities leading to the clearance and de-licensing of the site and ultimately its release for re-use. The decommissioning strategy to be employed for Sizewell C would be 'early site clearance' and would begin as soon as practicable after the end of electricity generation at the site. The UK EPR™ reactor units have been designed with decommissioning in mind, to minimise the amount of radioactive waste when the site is cleared and de-licensed.

The decommissioning of Sizewell C, with the exception of the Interim Spent Fuel Store (ISFS), could be achieved within approximately 25 years of the end of generation. The ISFS would continue to operate until a UK Geological Disposal Facility is available and the spent fuel is ready for disposal. The hard coastal defence feature would remain in place.

Before decommissioning can take place, SZC Co. would be required to undertake an EIA and prepare an ES under the relevant EIA regulations, in order to obtain consent for the works from the Office for Nuclear Regulation. Whilst an EIA of decommissioning would need to be undertaken at a later stage, a high-level assessment of the types of environmental effects that may occur during decommissioning is presented within **Volume 2, Chapter 5** of the **ES**.

5.7 Spent fuel and radiological waste

Operation and decommissioning of the Sizewell C nuclear power station would result in the unavoidable generation of quantities of radioactive waste and spent fuel. This is a known and justifiable consequence of nuclear power generation and there are precise regulatory requirements in place for the management of this waste which are monitored by the Office for Nuclear Regulation and the Environment Agency.

SZC Co.'s strategy would be to minimise, manage and process radioactive wastes as they arise, where this is reasonably practicable. For example, wherever reasonably practicable, measures would be taken to prevent materials becoming radioactively contaminated, due to the placement of inert material adjacent to radioactive material. Waste processing systems have been specified to treat radioactive liquid and gaseous discharges, and solid wastes, in order to reduce the environmental impact to as low as reasonably achievable prior to disposal.

Further details of spent fuel and radioactive waste management are provided in **Volume 2, Chapter 7** of the **ES**.

5.8 Summary of likely environmental effects

This section provides a summary of the likely environmental effects predicted to occur as a result of the construction and operation of the Sizewell C nuclear power station. The proposed mitigation measures are also summarised.

a) Conventional waste and material resources

i. Context

Chapter 8 of **Volume 2** of the **ES** presents the project-wide assessment of material resource use and conventional waste generation effects arising from the Sizewell C Project, considering the main development site as well as associated developments.

The assessment considered the potential for likely significant effects to arise on regional and national resource markets due the use of material resources by the Sizewell C Project. In addition, the assessment considered potential effects on the capacity of regional waste management infrastructure. To establish the baseline characteristics for resource markets and regional waste management infrastructure, the latest published data relating to material use and waste facilities' capacities were reviewed and used to assess the level of impact from the Sizewell C Project.

Environmental design and mitigation measures across the Sizewell C Project would seek to minimise waste disposal and maximise reuse and recycling. These measures include the management of waste in accordance with the **Conventional Waste Management Strategy** (refer to **Volume 2, Appendix 8A** of the **ES**) which sets out good practice measures for minimising waste, including the requirement for a site waste management plan during construction. Additionally, a number of measures to minimise waste by design have been identified, such as use of modular, pre-fabricated units to minimise off-cuts, appropriate ordering of materials and use of best practice. Any surplus excavated material would be retained on-site for re-use in landscaping. A slurry treatment plant would be provided within the temporary construction area to enable the treatment and re-use of tunnel boring arisings on-site. Contractors would be required to continue to identify opportunities to design out waste, for example recycling material by crushing, blending and subsequent re-use as an aggregate.

ii. Construction phase

Key materials to be used during the construction of the Sizewell C Project include concrete, steel, bitumen and gravel. The material resource use assessment concluded that the effects arising from the use of concrete, steel and bitumen would be **significant** (over 5% of total resource availability either regionally and/ or nationally). The effects from the use of gravel would be **not significant** (less than 5% of capacity)**,** due to sufficient availability both regionally and nationally. A summary of the identified effects is provided in **Table 5.1**.

Table 5.1 Summary of material resource use on regional and national capacity*

Material	Percentage of regional capacity	Percentage of national capacity
Concrete	**Over 10%**	Less than 5%
Steel	**Over 10%**	**Over 10%**
Bitumen	**Over 5%**	Less than 1%
Gravel	Less than 5%	Less than 1%

* Material resource use of over 5% of capacity is considered as significant.

Waste arising during the construction phase would predominantly comprise inert[6] and non-hazardous waste[7], with small amounts of hazardous waste[8] generated. It is estimated that for both, inert and non-hazardous waste that would need to be exported off-site, the waste quantities generated would constitute between 1 and 5% of the remaining waste infrastructure capacity in Suffolk. Whilst there are a smaller number of facilities regionally which have the capability of receiving hazardous waste, hazardous waste arisings during the construction phase would constitute less than 1% of the total annual hazardous waste arisings in Suffolk throughout the construction programme. Overall, the effect on waste infrastructure in Suffolk during the construction phase is, therefore, considered to be **not significant**.

iii. Operational phase

There is not expected to be substantial requirement of materials during the operational phase. Whilst small volumes of materials would be required for the maintenance of any permanent development, such as localised repairs to buildings, infrastructure and highways, larger maintenance activities would be infrequent and would be expected to require limited quantities of primary raw materials or manufactured construction products. Therefore, the effects on material resources during this phase have been identified as **not significant**.

Commercial and industrial waste generated by the Sizewell C power station during operation would be less than 1% of available waste management infrastructure capacity in Suffolk, with the average annual waste arisings estimated as 1,140 tonnes. During outages, a higher quantity of wastes compared to periods of normal operation may be generated, albeit for a limited period. Overall, the effect of operational waste arisings on the waste management infrastructure in Suffolk would be **not significant**.

[6] Inert waste is waste that does not undergo any significant physical, chemical or biological transformation upon disposal. Examples include sand, concrete and bricks.

[7] Non-hazardous wastes include all waste materials that are not specifically deemed as hazardous, such as office waste and food waste.

[8] Waste is considered 'hazardous' when it contains substances or has properties that might make it harmful to human health or the environment, for example batteries, paint cans, electrical wastes or contaminated soils.

b) Socio-economics

i. Context

Chapter 9 of **Volume 2** of the **ES** presents the socio-economic assessment for the Sizewell C Project. The assessment is project-wide and considers the overall socio-economic effects of the Sizewell C Project on the labour market, local and regional economy, housing market, tourism sector and public services.

The largest settlements in the immediate districts are Ipswich and Felixstowe to the south, and Lowestoft and Great Yarmouth to the north. Of the six immediate districts (East Suffolk, Great Yarmouth, Ipswich, Babergh, Mid Suffolk and South Suffolk), four are predominantly rural, and the area as a whole has a low population density (2.1 residents per ha). In the five wards surrounding the main development site, there are 19,470 residents living at a low density of 1.2 people per ha.

ii. Construction phase

The Sizewell C Project would impact the local population and economy, due to an influx of construction workers. Up to 7,900 workers are predicted to be working on the main development site at peak, plus a further 600 workers on the associated development sites, including the accommodation campus. Of this total, it is expected that over 2,000 of the 7,900 main development site workers and all of the 600 associated development workers would be home-based[9]. SZC Co. would aim to maximise home-based recruitment through an **Employment, Skills and Education Strategy** (included within the **Economic Statement**, (Doc Ref. 8.9)) which would include measures, such as a Sizewell Jobs Service, a skills fund and educational interventions focused on aspiration raising, encouraging take-up of Science, Technology, Engineering and Mathematics (STEM) topics and careers advice.

Local people may also be recruited through the local and regional supply chain. SZC Co.'s **Supply Chain Strategy** (included within the **Economic Statement**, (Doc Ref. 8.9)) sets out how the Sizewell C Project intends to work with Suffolk Chamber of Commerce and other stakeholders to enable local and regional businesses to win work on the power station.

As a result, during construction, the labour market for the local population would experience a **significant benefit** in terms of productivity, new jobs, skills and training, as would the local economy due to use of the local supply chain, additional wages and worker spend.

The remainder of workers at peak (around 5,880) would be non-home-based. That is, people who move to the area to work on the Sizewell C Project and take accommodation within 60-minutes of the main development site. Some of these people would move to the area on a long-term basis and may buy properties but many

[9] Workers are considered to be home-based, if they live within a maximum 90-minute commuting distance from the main development site.

would take temporary accommodation, staying either in the Sizewell C Project accommodation campus and caravan site, in local private-rented or tourist accommodation, or in spare rooms. Some non-home-based workers would bring families, but most would go back to their permanent homes at weekends or the end of their shift periods.

The non-home-based workforce is considered to lead to a short-term, temporary change in population dynamics, which is considered as a **significant** effect on the local community. This change has the potential to result in effects on the provision of public and emergency services (such as education, social services or police services), community safety and cohesion, and housing need. There is also potential for the local tourist and private rented accommodation sectors to experience some effects on capacity and operation.

A number of plans and strategies are proposed to mitigate any adverse effects, supported by financial contributions through legal agreements, where required. The proposed mitigation includes:

- **Accommodation Strategy** (Doc Ref. 8.10), including a Housing Fund;
- **Community Safety Management Plan** (Doc Ref. 8.16);
- Public Services Contingency Fund;
- Support for emergency services; and
- Provision of off-site sports facilities at Leiston, for shared community and worker use during the construction phase and left as a legacy thereafter (see **section 5.3** of this document).

The Sizewell C Project also proposes to offer a Community Fund to mitigate any potential effects on local communities. The Community Fund would be used for schemes, measures and projects which promote the economic, social or environmental well-being of local communities and enhance quality of life.

There is also the potential for localised effects on the tourism economy. To mitigate this, a Tourism Fund would be provided. This would be used to deliver initiatives such as the promotion of activities for the Suffolk coast, supporting local projects, undertaking future visitor surveys, and responding to effects on particularly sensitive attractions / locations within the Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB).

With mitigation in place, as summarised above, the effects on the housing market, tourism sector, public services and community cohesion are assessed as **not significant**. Furthermore, the provision of off-site sports facilities at Leiston is considered to result in a **significant benefit** to the local community.

iii. Operational phase

Sizewell C would have an operational workforce of 900, comprising 700 staff and 200 contractors. Of the 700 staff, just over half (370) are predicted to be drawn from the population living in the local area. The remaining 330 are expected to be recruited from outside the area but are likely to move to the area permanently. 200

contract staff are expected to be recruited from outside the area and may continue to be non-home based (i.e. stay in temporary accommodation during the working week). Contractor support would increase by approximately 1,000 workers during each outage (every 18 months).

No significant adverse socio-economic effects are predicted during the operational phase because:

- The anticipated additional demand for housing would be low and is likely to be spread over a number of years, coinciding with the rundown of construction (and the release of some accommodation previously used by construction workers).
- Workers moving permanently to the area would take either existing private-rented accommodation or buy properties and, therefore, not represent additional demand for public services. They would also pay for local services through their Council Tax.
- Sizewell C outage workers would be accommodated within the existing local housing market without significant difficulties.

Significant beneficial effects have been identified on the labour market at the regional and county scale from operation of the Sizewell C power station. **Significant benefits** are also identified for the local and regional economy due to local indirect employment / economic effects and effects on business and supply chain through procurement of goods and services.

c) Transport

i. Context

Chapter 10 of **Volume 2** of the **ES** presents an assessment of transport effects arising from the construction and operation of the main development site and the construction, operation and reinstatement (where relevant) of the associated development sites.

The baseline study of existing transport conditions identified a network of public rights of way, footways and cycle routes within the study area. The public rights of way are generally across agricultural land, unpaved and unlit. No existing bus services serve the Sizewell A and B stations. The closest bus stops to the main development site are in Leiston.

The closest rail line to the Sizewell C main development site is the East Suffolk line. This is a 79km rural branch line that runs in a south-west to north-east direction between Ipswich and Lowestoft. The highway network in the vicinity of the main development is comprised of local authority roads. Nearly all the roads in the area are single carriageways.

Sizewell Gap is the main access to the existing Sizewell power station complex. It connects with Lover's Lane at the priority junction with King George's Avenue, east of Leiston. King George's Avenue connects Sizewell Gap and Lover's Lane with the centre of Leiston. It provides access to Eastlands industrial estate to the east of Leiston.

The B1122 is an approximately 15 kilometre (km) long rural B-road that connects the A12 in Yoxford to the north with the A1094 in Aldeburgh to the south via Middleton Moor, Theberton, Leiston, and Aldringham.

The A12 is the main route between Ipswich and Lowestoft. It is principally single carriageway with a short section of dual carriageway between the A14 south-east of Ipswich and Woodbridge. The A12 south of the A14 is a trunk road managed by Highways England. The A14 is a dual carriageway road which connects the M6 and M1 in Leicestershire with the Port of Felixstowe.

ii. Construction phase

The assessment of potential effects on transport during the construction phase considered pedestrian severance, pedestrian delay, amenity, fear and intimidation, driver delay, and accidents and road safety. All effects from construction traffic would be managed by implementing a series of management plans: **Construction Traffic Management Plan** (Doc Ref. 8.7)**, Construction Worker Travel Plan** (Doc Ref. 8.8) and **Traffic Incident Management Plan** (Doc Ref. 8.6).

The following significant effects in the early years of the construction phase, prior to the completion of associated developments and the main development site access road, were identified:

- Short-term **significant adverse** effect on cycle amenity on B1122, prior to the completion of the Sizewell link road. In order to mitigate the effect, SZC Co. would carry out a pre-condition highway survey and also provide funding for the maintenance of the road during the early years of construction, when it is to be used by Sizewell C construction traffic. The maintenance of the road surface during the early years would mitigate to some extent the adverse effects.
- Short-term **significant adverse** effect on pedestrian amenity on the B1122 through Theberton village. The speed limit on the B1122 through Theberton is already 30mph and driver education is proposed to further enforce driver behaviour and adherence to speed limits along the construction traffic routes. Once the Sizewell link road is operational, traffic flows through Theberton are forecast to decrease substantially and the amenity effects would be removed.

Following the completion of the two village bypass, traffic flows through Farnham and Stratford St Andrew would reduce substantially during peak construction. This would result in **significant beneficial** effects on severance, pedestrian delay and amenity within these villages during peak construction. Likewise, the completion of the Sizewell link road would result in a substantial reduction in traffic flows along the B1122 through Middleton Moor and Theberton. This would result in **significant beneficial** effects on severance and amenity within these villages during peak construction.

However, the introduction of the two village bypass and Sizewell link road are also expected to result in **significant adverse** effects during peak construction on some of the public rights of way that intersect the new roads. **No significant** effects associated with

fear and intimidation, driver delay, and accidents and safety are expected during the early and peak construction phases.

iii. Operational phase

The effects identified for peak construction are considered to be permanent and would remain during the operational phase. These include **significant beneficial** effects from the reduction of traffic flows through Farnham, Stratford St Andrew, Middleton Moor and Theberton, following the completion of the two village bypass and Sizewell link road. As a result, the effects of traffic on severance, pedestrian delay and amenity within these villages would be significantly reduced.

However, the two village bypass and Sizewell link road are also expected to result in **significant adverse** effects on severance and pedestrian delay due to permanent crossings with public rights of way.

d) Noise and vibration

i. Context

Chapter 11 of **Volume 2** of the **ES** presents the assessment of potential noise and vibration effects arising from the construction and operation of the main development site.

To inform the assessment, baseline sound surveys were undertaken between 2010 and 2019 around the main development site to characterise the sound levels currently experienced by receptors, such as residential properties, over a 24-hour period.

Receptors were selected that were considered representative of a group or groups of receptors adjacent to the main development site, as they would be likely to experience the highest levels of noise and vibration from the activity assessed. The noise and vibration levels likely to occur at the 'representative' receptors close to the main development site have been estimated for the construction works, road traffic and plant noise during operation, as applicable.

ii. Construction phase

Noise is likely to be generated throughout the construction phase through works such as initial site preparation, earthworks and excavation, construction of buildings and infrastructure, operation of temporary facilities, land restoration and removal of temporary facilities, as well as from construction traffic.

A range of control measures are proposed to mitigate noise and vibration effects from construction works, including the provision of noise barriers in the form of landscape bunds and/ or acoustic screens. Furthermore, contractors would be required to implement good practice measures to minimise noise and vibration impacts, as set out in the **CoCP** (Doc Ref. 8.11), a programme of monitoring and a system for investigating any noise and vibration complaints.

During the initial phases of construction (during the day) and/ or during the removal and reinstatement of temporary development, **significant** noise effects are predicted for a number of properties (including Abbey Cottages, Abbey Farm, Abbey Road, Ash Wood Cottages, Keepers Cottage, properties on Lover's Lane / Sandy Lane Junction, Old Abbey Farm / Care Home, Plantation Cottages,

Potters Farm, Round House, and The Studio). Works at land east of Eastlands industrial estate are predicted to result in **significant** noise effects at properties on King George's Avenue, Sizewell Sports and Social Club and Heath View. Overnight average and maximum noise levels from material unloading from the green rail route, hauling to stockpiles, and continuous excavation and tunnelling are predicted to lead to **significant** effects at Ash Wood Cottages, Old Abbey Farm / Care Home, and Round House. SZC Co. and its contractors would be required to provide additional noise mitigation, for example additional temporary acoustic screening. In addition, SZC Co. would offer a **Noise Mitigation Scheme**, which would provide options for noise insulation or temporary rehousing, where specified noise criteria are exceeded (refer to **Volume 2, Appendix 11H** of the **ES** for further details).

In addition, low impacts are predicted at the residential elements of Leiston Abbey, which would be **not significant**. SZC Co. would liaise further with the occupants, who include Pro Corda, to take account of the potentially more sensitive activities that involve, amongst other things, indoor and outdoor music performance. As a high sensitivity receptor, a higher category of effect is possible, which would be considered **significant**. SZC Co. would undertake further assessment and liaise with Pro Corda on the timing of the construction works relative to the activities at the Abbey to reduce this effect.

Construction traffic would be reduced as much as possible through the provision of park and ride facilities, rail infrastructure, freight management facility and beach landing facility, as part of the Sizewell C Project. Impacts of construction traffic would be managed in accordance with the **Construction Traffic Management Plan** (Doc Ref. 8.7) and **Construction Worker Travel Plan** (Doc Ref. 8.8). However, in the early years of construction (modelled 2023 scenario) prior to the associated developments being complete and operational, there would be **significant adverse** effects from construction traffic at a small number of properties on the road network, including properties within 50 metres of the B1122 between Yoxford and the B1125 junction, and on Lover's Lane. Once the proposed main site access road and associated developments have been constructed and are operational **significant adverse** noise effects are only predicted at properties along Kings Road in Leiston during the peak of construction (modelled 2028 scenario). This is the assumed route for Sizewell C buses. Where these effects are confirmed as part of a further assessment under the **Noise Mitigation Scheme** (**Volume 2, Appendix 11H** of the **ES**), the provisions of that scheme would apply.

In addition, during the construction phase, **no significant** effects have been identified from the combined heat and power plant or air source heat pumps of the accommodation campus, with measures embedded within design to attenuate noise to specified limits.

No significant adverse effects have been identified from vibration during construction.

iii. Operational phase

During operation of Sizewell C, **no significant** effects are expected from the operation of power station plant, including during periods where back-up generators are tested. Operational traffic would be

greatly reduced when compared to the construction phase and **no significant** effects have been identified due to operational traffic noise.

e) Air quality

i. Context

Chapter 12 of **Volume 2** of the **ES** presents the assessment of potential air quality effects on human health arising from the construction and operation of the main development site. Air quality effects on ecology are considered in **section 5.8g)**.

To inform the assessment, a desk study of available air quality monitoring data and baseline air quality surveys were undertaken in 2016-2017 and 2019-2020. The baseline assessment established that the existing concentrations of air pollutants across the study area are generally well below air quality objective standards set out in legislation for the protection of human health. However, in Stratford St Andrew and Woodbridge, there are two Air Quality Management Areas, which have been declared by East Suffolk Council due to elevated concentrations of nitrogen dioxide (a pollutant which is emitted by road traffic).

The scope of the air quality assessment considers emissions arising from the construction works, construction road and rail traffic, and the combined heat and power plant associated with the accommodation campus. During operation, key emission sources include the back-up diesel generators on the main platform, which would be regularly tested for maintenance, as well as road traffic and the combined heat and power plant, which would be retained to provide back-up power for the emergency equipment store.

Plate 5.3 Baseline dust monitoring survey

ii. Construction phase

During construction, there is a risk of proposed construction activities giving rise to emissions of dust and particulate matter. Specifically, the long-term earthworks and movement of materials can create dust, in addition to emissions from construction plant exhausts. A risk assessment was undertaken for particulate

emissions arising from construction dust generating activities and plant exhaust emissions. On the basis of the risk assessment, an **Outline Dust Management Plan** has been developed (refer to **Volume 2, Appendix 12A** of the **ES**), which sets out measures to manage construction activities, so that dust emissions are minimised, including effective dust suppression measures and monitoring. If batching cement plant or mobile crushing plant of a sufficient scale is needed, these operations would be regulated by the local authority and controlled in accordance with an environmental permit to be issued for such operation. With the implementation of these measures, **no significant** effects associated with emissions from construction works are considered likely.

Furthermore, the combined heat and power plant of the accommodation campus would be designed, maintained and operated in accordance with regulatory requirements for combustion plants. The stack height of the plant has been optimised to minimise ground-level air quality impacts, whilst limiting the visual impact of a taller stack. Air quality modelling demonstrates that **no significant** air quality effects as a result of emissions from the combined heat and power plant would occur.

Measures to minimise and manage the effects of construction traffic, such as the **Construction Traffic Management Plan** (Doc Ref. 8.7) and **Construction Worker Travel Plan** (Doc Ref. 8.8), also help to reduce traffic emissions to air. Construction road and rail traffic modelling of key pollutants, including nitrogen dioxide (NO_2), and particulate matter (PM_{10} and $PM_{2.5}$), indicates that in all assessment years (2023 and 2028) there would be **no significant** **adverse** effects on residential properties. A limited number of receptors would experience an improvement in air quality, as the proposed two-village bypass and Sizewell link road would divert traffic away from populated areas.

iii. Operational phase

Emergency diesel generators that would provide back-up power for the Sizewell C power station would be designed, maintained and operated in accordance with an environmental permit granted by the Environment Agency. The stacks of emergency diesel generators have been set as high as could be achieved under the design envelope for the power station, whilst limiting their visual impact. Emissions from three scenarios were modelled to determine the effect of the emergency diesel generators on air quality. The scenarios modelled included commissioning, routine testing and the loss of off-site power. **No significant** long-term effects on human health were identified in any of the three scenarios. However, in the event of loss of off-site power, the assessment identified the potential for a short-term **significant** effect as a result of nitrogen dioxide (NO_2) emissions, which would exceed the air quality standard objectives. This effect would only occur in emergency situations and would be for a short duration while all practicable measures are employed to restore the normal power supply to the operational station. **No significant** short-term effects from commissioning and routine testing were identified.

The volume of operational traffic is substantially less than during construction. Therefore, **no significant** effects on residential properties were predicted due to emissions from operational traffic in all of the study area.

f) Landscape and visual

i. Context

Chapter 13 of **Volume 2** of the **ES** presents the assessment of potential landscape and visual effects arising from the construction and operation of the main development site. The assessment of the baseline comprised a desk study, including a review of landscape character studies and aerial photography, as well as site visits and photography from key viewpoints.

The surrounding landscape comprises arable farmland and pastures, areas of heathland, open water and ditches, marshland, reed beds and belts of woodland. Along the coast, low cliffs, dunes and sand and shingle beaches mark the boundary between land and sea. Immediately adjacent to the main development site are the existing Sizewell A and B nuclear power stations. The main reactor buildings form relatively prominent features in the local landscape and are surrounded by ancillary buildings, car parks, and other forms of infrastructure which are largely screened from locations in the surrounding landscape. South of the site are the Galloper and Greater Gabbard onshore substations and high voltage transmission lines that extend westwards. The Sizewell B intake and outfall structures are prominent features in local views, for example in locations along Sizewell Beach.

Much of the study area is within the Suffolk Coast and Heaths national character area. At a local level, the site includes the Estate Sandlands and Coastal Levels local landscape character types and the Nearshore Water seascape character type. Ancient Estate Claylands and Coastal Dunes and Shingle Ridges local landscape character types are located adjacent to the site. The full extent of the main platform and majority of the temporary construction area are also located within the Suffolk Coast and Heaths AONB. The coastline along the site forms part of the designated Suffolk Heritage Coast.

Settlements within the study area include the market towns of Aldeburgh, Leiston, Saxmundham, Southwold, Reydon, Halesworth and Holton. Recreational routes within the study area include long-distance pedestrian routes (such as the Suffolk Coast Path and Sandlings Walk) and national and regional cycle routes.

Plate 5.4 Landscape character types within the local area

ii. Construction phase

The proposed development would lead to changes to the existing landscape character and visual amenity during construction through the removal of elements of the existing landscape, alterations to landform, and views of construction activities.

The design of the main development site has been carefully planned to reduce landscape and visual effects, as much as reasonably practicable. For example, where possible, the physical extent of the site has been restricted to retain and protect existing woodland and belts of vegetation, and temporary earth bunds and hoarding would be used to screen views of construction activities. Some advance planting has already been completed with more to be undertaken at an early stage of construction to strengthen hedgerows and woodland blocks along site boundaries. The heights of stockpiles and accommodation campus buildings would be limited to minimise their visual prominence within the surrounding area. Lighting during construction would be managed to minimise upward glow and light spill into neighbouring areas, with dark zones and corridors retained along bat flight corridors, as described within the **Outline Lighting Management Plan** (**Volume 2, Appendix 2B** of the **ES**).

Despite mitigation embedded within design, construction works are considered likely to result in **significant adverse** effects on the local landscape character types within and adjacent to the site during the construction period. **Significant adverse** effects have been identified on the Estate Sandlands, Coastal Levels, Ancient Estate Claylands, Coastal Dunes and Shingle Ridges and Nearshore Waters character types due to the removal of existing landscape features and views of construction activities.

Significant adverse effects on visual amenity have also been identified from views at:

- Westleton Walks and Dunwich Heath,
- the Royal Society for the Protection of Birds (RSPB) Minsmere nature reserve,
- the coastal strip between Dunwich,
- Minsmere Sluice and the Beach View Holiday Park,
- Eastbridge and Leiston Abbey,
- areas within the north-western section of the main development site which remain accessible to the public,
- Sizewell Belts, and
- views from offshore.

These include **significant adverse** effects on the visual amenity of the Suffolk Coast Path and Sandlings Walk.

The landscape and visual effects would only occur over localised sections of the Suffolk Coast and Heaths AONB and the Suffolk Heritage Coast. Overall the effects during construction on these designations are, therefore, assessed as **not significant**.

iii. Operational phase

To minimise effects during operation, the design of the permanent development has been developed to limit the visual prominence of the operational power station buildings, structures, and infrastructure. For example, the new sea defences and the re-instated Northern Mound would be at a height that screens views of activity and lower lying buildings at the main platform from locations along Sizewell Beach and offshore. The design and specification of façade materials and colours would be in keeping with the existing buildings and structures and respond to the local landscape and built context. Building height and locational parameters have been established to control the visibility of permanent structures.

Areas used during construction would be reinstated in accordance with the operational phase masterplan (refer to **Figure 5.3**) and using the approaches set out in the **Outline Landscape and Ecological Management Plan** with the objective to enhance both the site's ecological value and its landscape character. Newly planted areas of vegetation would be managed to maintain a long-term screening function and to integrate the area affected during construction into the EDF Energy estate and the wider landscape.

Lighting would be minimised, as far as practicable with reference to minimum safety requirements, to reduce the effects of the proposed development at night. Further details of the lighting strategy are presented in the **Outline Lighting Management Plan (Volume 2, Appendix 2B** of the **ES**).

Despite mitigation, **significant adverse** effects on the existing landscape character of the area (Estate Sandlands and Coastal Levels landscape character types) are considered to remain.

Furthermore, views of the permanent development are considered to result in **significant adverse** effects on the visual amenity at:

- Westleton Walks and Dunwich Heath,
- the RSPB Minsmere nature reserve,
- the coastal strip between Dunwich,
- Minsmere Sluice and the Beach View Holiday Park,
- Eastbridge and Leiston Abbey,
- Sizewell Belts,
- views from the National Trust Dunwich Coastguard Cottages (see **Plate 5.5** for an example), and
- views from offshore.

These include **significant adverse** effects on the visual amenity of the Suffolk Coast Path and Sandlings Walk.

The landscape and visual effects would only occur over localised sections of the Suffolk Coast and Heaths AONB and the Suffolk Heritage Coast. The effects during operation on these designations as a whole are, therefore, assessed as **not significant**.

Plate 5.5 Representative view from National Trust Dunwich Coastguard Cottages car park (before and after)

g) Terrestrial ecology and ornithology

i. Context

Chapter 14 of **Volume 2** of the **ES** presents the assessment of potential effects of the main development site on terrestrial ecology and ornithology. The assessment considers effects on designated sites, habitats and protected species. In addition, a **Shadow Habitats Regulations Assessment Report** (Doc. Ref 5.10) is submitted with the application for development consent to identify potential effects on European designated sites (Natura 2000 sites). **Table 5.2** lists sites designated for nature conservation that have been identified for consideration within the terrestrial ecology and ornithology assessment of the main development site.

A detailed suite of ecological survey work has been undertaken within the main development site and the surrounding area between 2007 and 2019 to characterise the existing ecological baseline.

Survey work has confirmed that the majority of the site comprises arable farmland which is of little intrinsic ecological value. However, away from the arable fields, a diverse range of habitats is present, including broadleaved woodland, conifer plantation, acid grassland, dune grassland, vegetated shingle and wetland (including fen meadow, wet woodland, ditches and reedbed). Several of these habitats form part of sites designated for nature conservation. Specifically, the main development site includes areas of Sizewell Marshes SSSI, Sizewell Levels and Associated Areas County Wildlife Site (CWS) and Suffolk Shingle Beaches CWS.

Table 5.2 Sites designated for nature conservation identified for further assessment within the ES

European sites	National designations	Local designations
Four Special Protection Areas (SPA): Outer Thames Estuary; Alde-Ore Estuary; Minsmere to Walberswick; and the Sandlings. **Three Special Areas of Conservation (SAC)**: Minsmere to Walberswick Heaths and Marshes; Alde-Ore and Butley Estuaries; and Orfordness to Shingle Street. **Two Ramsar sites**: Minsmere to Walberswick; and Alde-Ore Estuary.	**Eight Sites of Special Scientific Interest (SSSI):** The Alde-Ore Estuary; Blaxhall Heath; Leiston to Aldeburgh; Minsmere to Walberswick Heaths and Marshes; Sandlings Forest; Sizewell Marshes; Snape Warren; and Tunstall Common.	**Five County Wildlife Sites (CWS):** Sizewell Levels and Associated Areas; Southern Minsmere Levels; Suffolk Shingle Beaches; Sizewell Rigs; and Leiston Common.

The location and extent of Sizewell Marshes SSSI is shown on **Figure 5.5**.

On the basis of the baseline assessment and survey work, the following species were considered further within the ES:

- Deptford Pink (a nationally scarce plant species);
- invertebrate species and assemblages supported by habitats within the Sizewell Marshes SSSI and Suffolk Shingle Beaches CWS;
- fish, including eels;
- amphibians, including natterjack toads;
- reptiles, including adders, slow-worm, common lizard and grass snake;
- breeding and wintering bird assemblages associated with designated sites within the study area and other birds of nature conservation importance;
- bat species; and
- terrestrial mammals, including badgers, otters and water voles.

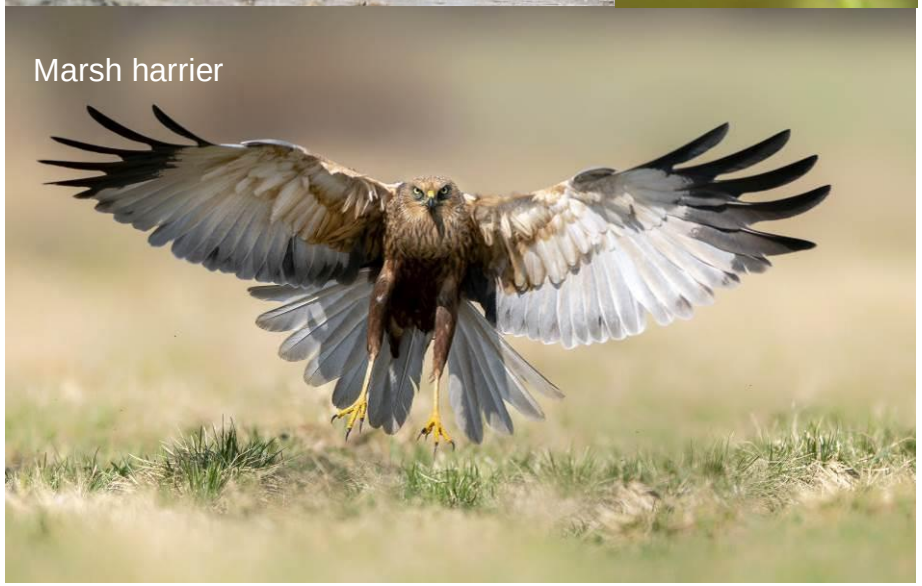
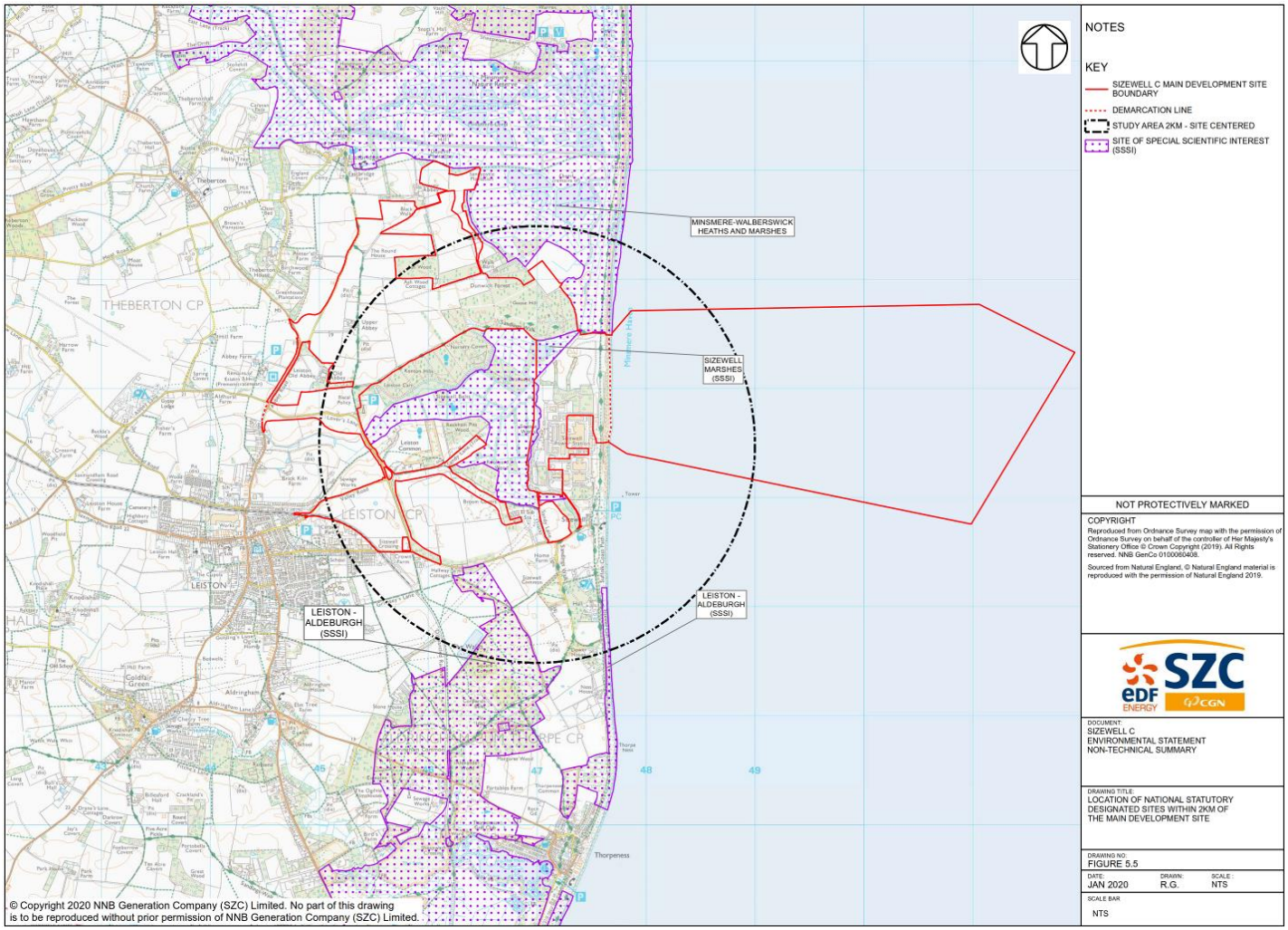


Figure 5.5 Location of Sizewell Marshes Site of Special Scientific Interest



ii. Construction phase

The potential for construction works to impact on ecology as a result of the following activities was considered:

- direct land take resulting in habitat loss, degradation and fragmentation;
- physical interaction between species and project infrastructure, including incidental loss of plant and mortality of species;
- alteration of coastal processes;
- disturbance effects, e.g. due to trampling, light pollution, noise and visual effects and other effects from the displacement of recreational users;
- alteration of local hydrology (including water chemistry) and hydrogeology; and
- changes in air quality.

The design of the main development site has been carefully planned to reduce effects on ecology, as much as reasonably practicable. The amount of habitat lost has been minimised, where possible, and replacement habitats are proposed on-site and off-site. Measures have been embedded within the design to minimise construction disturbance, effects on groundwater, surface water and air quality, and to maintain the coastal frontage of Sizewell C.

Table 5.3 summarises the amount of habitat lost from Sizewell Marshes SSSI (which has a total area of habitat of 104.33 ha) on a temporary and permanent basis and the replacement habitats provided elsewhere to compensate for this loss. The direct land take resulting in habitat loss and fragmentation is considered to result in a **significant adverse** effect on the Sizewell Marshes SSSI. This would reduce to an effect which is considered **not significant** on the successful establishment of replacement habitats. The permanent land take forms approximately 6.7% of the total area of the Sizewell Marshes SSSI with a further 2.8% being used temporarily during construction only.

In addition, construction would result in the loss of approximately 51ha of land from Sizewell Levels and Associated Areas CWS and Southern Minsmere Levels CWS, which is considered to constitute a **significant adverse** effect due to the loss of woodland, acid grassland and heath habitats. These habitats would be re-provided as part of the landscape-scale restoration across the wider EDF Energy estate following construction, as described in the **Outline Landscape and Ecology Management Plan** (Doc Ref. 8.2).

Construction of the main platform and sea defences along the Sizewell Beach would result in the temporary loss of approximately 7ha of land from the Suffolk Shingle Beaches CWS, which is considered to constitute a **significant adverse** effect. The existing surface layers of the frontage would be stockpiled to preserve the seedbank of the coastal vegetation and would be incorporated into the final landscaping of the new sea defence and foreshore to enable reinstatement of the coastal vegetation. The sea defence provided would mitigate the effects of coastal erosion and a monitoring and mitigation plan would be implemented to maintain the sea defences.

Table 5.3 Summary of habitat lost within Sizewell Marshes SSSI and replacement habitat provided

Habitats	Extent of temporary land take (ha)	Extent of permanent land take (ha)	Replacement habitat
Dry reedbed	0	3.55	Aldhurst Farm (completed in 2016) – approximately 6ha of new wetland (comprising 5ha of reedbeds and 1ha of ditches and lagoons). These areas would also provide nesting and foraging habitat for bird and bat species as well as suitable habitat for water vole. A further 1.2 ha of wet reedbed planting would be created west of The Grove.
Wet reedbed	0.67	0	
Ditches	0.20	0.07	
Fen meadow	0.9*	0.7	Off-site fen meadow compensation areas at Halesworth (4.3ha) and Benhall (12.3ha); in which the most favourable areas for habitat creation comprise 1.7ha, although the potential extent of fen meadow which is likely to be created would be defined following further site surveys.
Wet woodland	1.13*	2.63	0.7 ha of wet woodland planting west of the Grove. Further opportunities for additional wet woodland at Aldhurst Farm and the fen meadow site at Benhall.
Tall ruderal	0	0.08-	Small areas of tall ruderals are expected to develop naturally at Aldhurst Farm.
Total (ha)	**2.9ha**	**7.03ha**	
% loss out of total Sizewell Marshes SSSI area	**2.8%**	**6.7%**	

* These areas include 0.9ha of fen meadow and 0.43ha of the 1.13 ha wet woodland shown here which would be temporarily impacted to erect the overhead powerlines.

Replacement habitats have also already been established for marsh harriers and reptiles, and bat boxes have been provided within the wider EDF Energy estate. If the area improved for marsh harriers within the wider EDF Energy estate is judged insufficient, a further 54.3ha of land to the west of Westleton would be improved to provide additional foraging habitat for this species.

Other mitigation embedded within the design to minimise effects on ecology includes (but is not limited to): boundary treatments to reduce disturbance from construction activities, specification of stack heights for combined heat and power plant to enable maximum dispersion of air pollutants, the provision of pollution prevention measures within the **Outline Drainage Strategy** (refer to **Volume 2, Appendix 2A** of the **ES**) and measures to minimise light spill, as set out within the **Outline Lighting Management Plan** (refer to **Volume 2, Appendix 2B** of the **ES**). The **Rights of Way and Access Strategy** (**Volume 2, Appendix 15I** of the **ES**) would be implemented to limit the displacement of people to areas nearby designated sites.

The SSSI crossing has been designed to retain the natural bed and banks of the Leiston Drain to facilitate the passage of fish, bats, otter and water vole through the culvert. A ledge would be installed to enable passage by otter and lighting minimised to enable bats to use the culvert. A water control structure with a fish pass would be installed on the realigned Sizewell Drain which would enable water levels within the Sizewell Marshes SSSI to be managed in order to help ensure that any changes to the hydrological regime caused by construction activities can be maintained within the expected natural variations to safeguard retained habitats.

The **CoCP** (Doc Ref 8.11) sets out general measures to minimise effects from construction activities. Species-specific mitigation measures are set out within the documents listed in **Plate 5.6**.

Plate 5.6 Species-specific ecology mitigation

- Bat Mitigation Strategy and Method Statement (Volume 2, Appendices 14C1A and 14C1B);
- Reptile Mitigation Strategy and Method Statement (Volume 2, Appendices 14C2A and 14C2B);
- Badger Mitigation Strategy and draft licence (Volume 2, Appendices 14C3A and 14C3B);
- Fen Meadow Phase 2 Report (Volume 2, Appendix 14C4);
- Marsh Harrier Strategy Habitat Report (Volume 2, Appendix 14C5);
- Water Vole Mitigation Strategy and draft licence (Volume 2, Appendices 14C6A and 14C6B);
- Natterjack Toad Mitigation Strategy and draft licence (Volume 2, Appendix 14C7A and 14C7B);
- Great Crested Newt Method Statement (Volume 2, Appendix 14C9A);
- Otter Method Statement **(**Volume 2, Appendix 14C10); and
- Deptford Pink draft licence (Volume 2, Appendix 14C11).

Despite the mitigation set out above, a **significant adverse** effect has been identified on Deptford Pink due to direct land take. In addition, **significant adverse** effects on barbastelle and Natterer's bats have been identified due to habitat fragmentation during construction.

The potential impacts of construction noise and habitat severance on the population of marsh harriers nesting at Minsmere, which currently forage over the Sizewell Marshes SSSI, would be addressed through providing compensatory habitats at the north of the EDF Energy estate. As a result, **no significant adverse** effects on this species are expected. The **Shadow Habitats Regulations Assessment Report** (Doc Ref. 5.10) concludes that this is sufficient compensation for the predicted loss of foraging habitat for marsh harriers. However, if it is determined by the Secretary of State that additional marsh harrier habitats are required, then a site at Westleton has been identified to temporarily provide this.

No significant adverse effects on other protected species (invertebrate assemblages, eel, natterjack toad, birds, other bat species and terrestrial mammals) have been identified.

iii. Operational phase

The potential for the following impacts on ecology as a result of the operation of Sizewell C nuclear power station were considered:

- any long-term alterations of coastal processes;
- any long-term changes in air quality;
- any long-term changes in water quality;
- long-term changes to habitat types due to the landscape scale restoration of the Sizewell estate;
- alteration of local hydrology (including water chemistry) and hydrogeology;
- disturbance (noise, lighting and visual effects) from the completed development.

Following construction, areas temporarily used would be reinstated in accordance with the **Outline Landscape and Ecology Management Plan** (Doc Ref. 8.2). Existing arable land on the EDF Energy estate would be converted to Suffolk Sandlings acid grassland habitats with additional areas of scrub and woodland plantings. This landscape-scale habitat creation would replace existing intensively managed arable farmland with habitats of greater biodiversity value and would increase habitat connectivity particularly for bats. The **Outline Landscape and Ecology Management Plan** also includes long-term management prescriptions and a monitoring programme for habitats created ensuring that these areas are successfully delivered. This restoration would deliver biodiversity net gain and is considered to provide a long-term **significant beneficial** effect, specifically for invertebrate assemblages of sandy habitats and reptiles due to the additional habitat provided.

Measures have also been embedded within the design to minimise operational air quality emissions (see **section 5.8e)**), maintain coastal frontage, minimise disturbance from lighting and potential effects on groundwater and surface water quality (refer to the operational lighting and drainage strategies within **Volume 2, Appendices 2A** and **2B** of the ES). As a result, **no significant**

adverse effects on ecology during the operation of Sizewell C are considered likely to occur.

h) Amenity and recreation

i. Context

Chapter 15 of **Volume 2** of the **ES** presents the assessment of potential amenity and recreation effects of the proposed main development site.

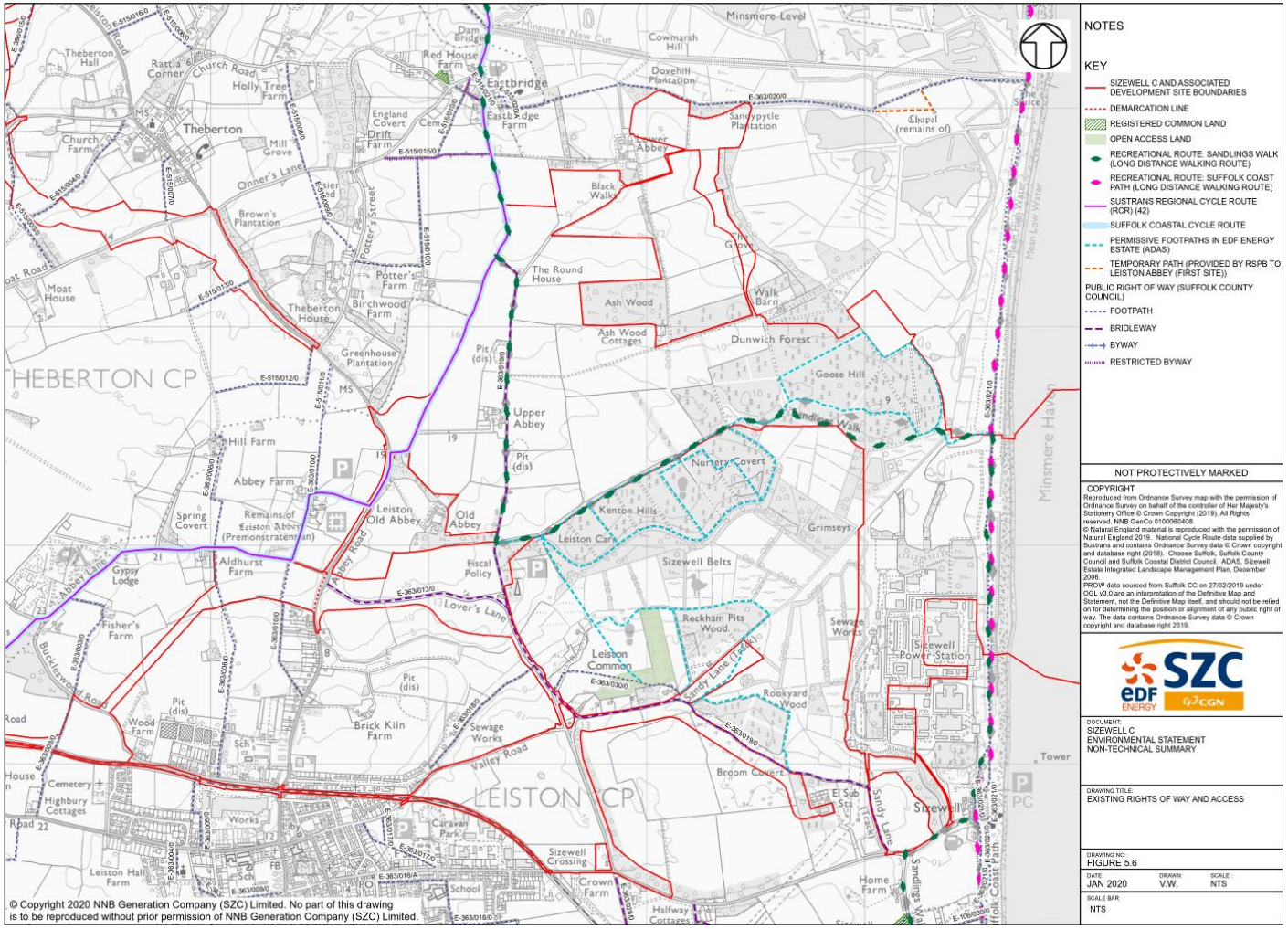
Onshore, a network of linear and area access resources (referred to as 'recreational resources') exist within the study area, which are used for a range of recreational activities including walking, dog walking, cycling, horse riding, fishing and watching wildlife.

Offshore, the sea is used for recreational activities including sailing and fishing. The assessment of amenity and recreation effects includes consideration of visual, noise, air quality and transport impacts which have the potential to affect amenity and use of recreational resources, including an assessment of effects on the tranquillity of the area.

The Suffolk coast and the Suffolk Coast and Heaths AONB is a popular destination for holiday makers, many of whom come to the area to undertake recreational activities using the network of recreational resources. The main recreational resources within the surrounding area include: RSPB Minsmere nature reserve, National Trust Dunwich Heath and Coastguard Cottages, Sizewell beach, Leiston Abbey, woodland at Kenton Hills, open access land at Westleton Heath, Westleton Walks and Dunwich Heath, Aldringham Common and The Walks, and Leiston Common. Furthermore, there are a number of recreational routes within the surrounding area, such as promoted long-distance walking routes, national and regional cycle routes, public rights of way, bridleways, tracks and local roads (see **Figure 5.6**). Suffolk Coast Path and Sandlings Walk pass through the site boundary along Sizewell beach. This section of the coastline also forms part of the proposed England Coast Path, which is a proposed National Trail around all of England's coast. Effects on Dark Sky Discovery Sites (i.e. locations where light pollution is limited and therefore provide a great opportunity for stargazing) have also been considered.

To inform the amenity and recreation assessment, a profile of the users of recreational resources was established on the basis of a review of existing visitor surveys. Furthermore, SZC Co. completed visitor surveys within the surrounding area and at RSPB Minsmere in 2014 and 2015 respectively to better understand the frequency, seasonality and duration of visits, mode of travel, reasons for visiting, visitor activities etc.

Figure 5.6 Existing rights of way and access



ii. Construction phase

Proposals for the main development site have been developed to minimise effects on linear recreational routes from physical diversions and temporary or permanent closures of existing routes, where possible, as shown on **Figure 5.7**. For example, the long distance walking routes along the coast (the Suffolk Coast Path, Sandlings Walk, and the future route of the England Coast Path) would remain open during construction and operation of Sizewell C, although may need to be closed for short periods to ensure public safety during the construction of the sea defences and the operation of the beach landing facility. An inland diversion would be provided for periods of temporary closure to ensure that people can continue to walk the Suffolk Coast Path, Sandlings Walk and the England Coast Path at all times, albeit along a longer inland route. The period of these closures and diversions would be minimised, as far as possible.

In addition, approximately 1.4km of the Sustrans Regional Cycle Route 42/Suffolk Coastal Cycle Route on the B1122 and Eastbridge Road would be permanently diverted in order to ensure that the route stays open and that a safe route is provided whilst the new roundabout on the B1122 is being constructed. Temporary diversions would also be provided for sections of Sandlings Walk and Bridleway 19 (E-363/019/0). All temporary and permanent diversions of public rights of way are set out within the **Rights of Way and Access Strategy** (**Volume 2, Appendix 15I** of the **ES**).

As part of the proposed development, a new 4.5km long off-road combined bridleway, cycleway and footpath would be created from Sizewell Gap and King George's Avenue to the accommodation campus, which would be retained following construction. A further section of the route would be constructed from Valley Road and the LEEIE, which would also provide a new off-road connection to Leiston. This route would provide safe pedestrian, cycle and equestrian access for the public and for construction workers, taking people off roads and providing new and enhanced routes.

Other mitigation measures include the permanent improvement of Kenton Hills car park, provision of public access to specific areas within Aldhurst Farm habitat creation area for informal recreation and the construction of the shared outdoor sports facility in Leiston. Furthermore, mitigation proposed to reduce effects on transport, noise, air quality and visual amenity (refer to **sections 5.8c)ii)**, **5.8d)ii)**, **5.8e)ii)** and **5.8f)ii)**) would also reduce disturbance of recreational users.

Significant adverse effects on the users of recreational resources are expected due to views of construction, impacts on tranquillity, and additional visitors at:

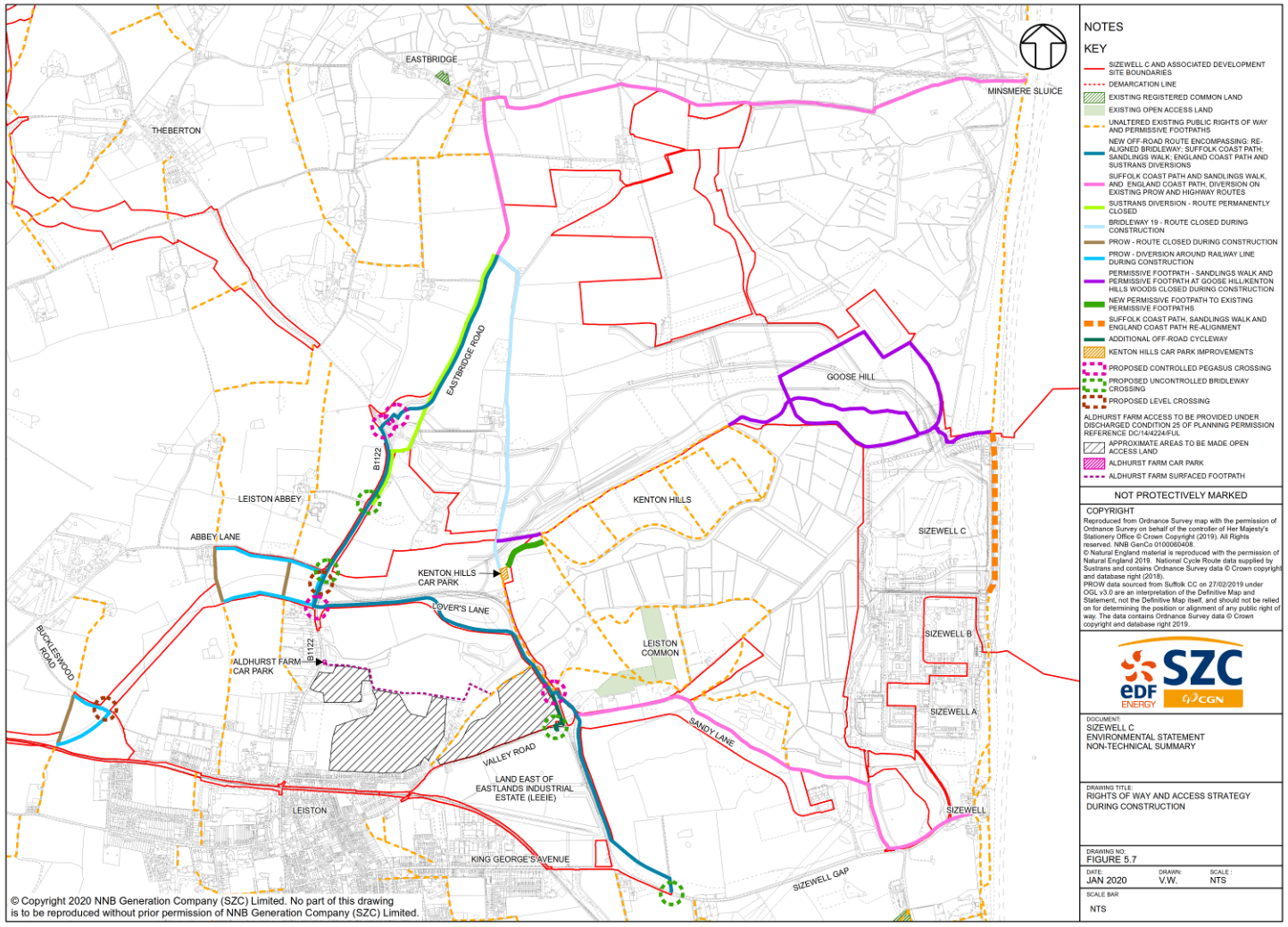
- Westleton Walks and Dunwich Heath;
- RSPB Minsmere;
- Dunwich to Minsmere Coast;
- Eastbridge and Leiston Abbey;
- Minsmere South;
- Minsmere to Sizewell Coast;
- Sizewell Belts;

- public rights of way within the site boundary;
- public rights of way north of Leiston;
- Aldringham Common; and
- The Walks.

Similarly, **significant adverse** effects are expected on the users of Suffolk Coast Path, the future England Coast Path, and Sandlings Walk.

No significant effects on other recreational resources have been identified.

Figure 5.7 Rights of way and access strategy during construction



iii. Operational phase

Once Sizewell C is operational, the diverted public rights of way would be reinstated, as shown on **Figure 5.9** and described within the **Rights of Way and Access Strategy** (**Volume 2, Appendix 15I** of the **ES**). The Suffolk Coast Path and Sandlings Walk through Goose Hill would be reinstated on a realigned route to ensure that the long-distance walking route remains open permanently. Sandlings Walk and Bridleway 19 routes would cross the main site access road and run through a restored and enhanced landscape. During operation, the beach landing facility would be used very rarely, approximately once every 5-10 years, during which the coast path might be temporarily closed for short periods of time and an inland diversion provided.

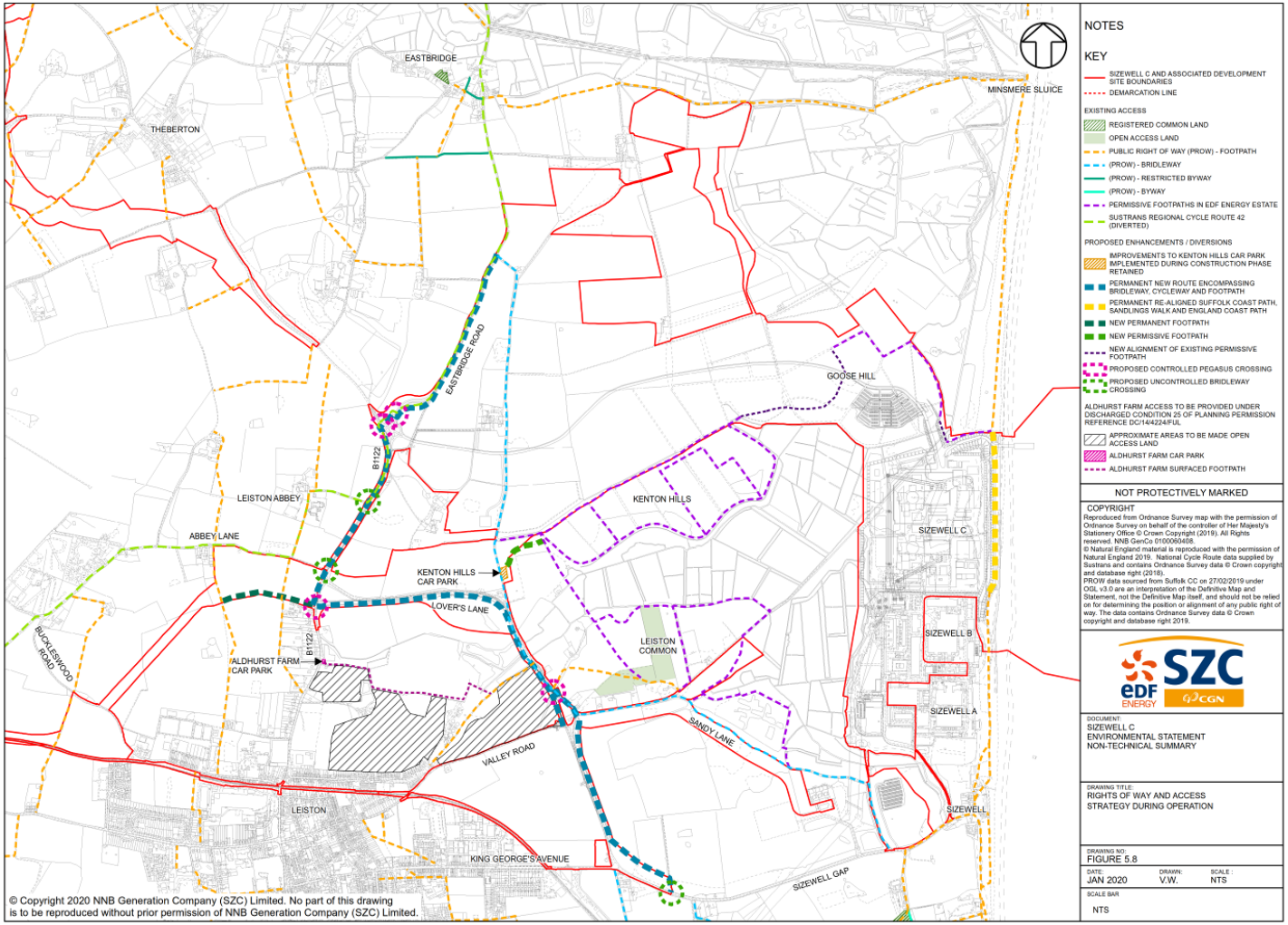
Permanent **significant adverse** effects would remain on the Minsmere to Sizewell Coast and on recreational resources to the north-east of the site due to views of the operational station, change to the tranquillity of the area, the permanent change to permissive paths due to realignment of Sandlings Walk and potential temporary diversions of the coast path.

However, **significant beneficial** effects have also been identified due to the provision of new recreational resources and the improved landscape setting within the north-western section of the site and at Sizewell Belts.

No significant effects on other recreational resources have been identified.

Figure 5.8 Illustrative view north towards the Sizewell C site from the Suffolk Coast Path and Sandlings Walk east of Hill Wood

Figure 5.9 Rights of way and access strategy during operation



i) Terrestrial historic environment

i. Context

Chapter 16 of **Volume 2** of the **ES** presents an assessment of potential effects of the main development site on the terrestrial historic environment. The baseline for the assessment was established through a combination of desk-based research and fieldwork including geophysical survey, evaluation trenching and a heritage assessment of Upper Abbey Farm.

There are two Grade II Listed Buildings within the site boundary – the Upper Abbey Farmhouse, and the Barn, 40m north of Upper Abbey Farmhouse. Within the study area outside the site boundary, there are also two Scheduled Monuments associated with Leiston Abbey (named as 'Leiston Abbey (first site) with later chapel and pillbox' and 'Leiston Abbey (second site) and moated site') and a further 11 Listed Buildings. One of these is Grade I Listed (St Mary's Abbey), with the remainder being Grade II Listed and comprising mainly farmhouses and associated buildings, cottages, and a coastal watch house.

Previous archaeological investigations within the site boundary and the surrounding area have identified prehistoric field systems, possible funerary monuments, and settlement features; medieval settlement and agricultural features; post-medieval pits and earthworks; extensive features relating to World War II defences and training; and many undated artefact scatters. Pre-historic peat deposits have also been identified in an infilled former river channel, which runs to the west and north of the existing Sizewell A and B sites and crosses the area of the main platform. It is possible that these peat deposits may contain archaeological material, although none have been recovered from these contexts to date.

The majority of the landscape character area within the site is considered to be of low historic value, as it comprises significantly modified wetlands, and substantial areas where historic landscape elements have either been erased or have been obscured by modern planting schemes or hedgerow loss. However, hedgerows within the site could be considered to be of potential historic importance, as the majority of these follow field boundaries shown on pre-1845 mapping, and other hedgerows not shown on historic mapping are likely to be of similar age. The seascape of the site is dominated and defined by the presence of the existing Sizewell A and B power stations and is therefore considered to be of low historic value.


Upper Abbey Farmhouse


The Barn

ii. Construction phase

During construction, intrusive groundworks could disturb or destroy archaeological remains, if present on the site. Therefore, prior to the commencement of construction in areas where there is a potential for archaeology, a scheme of archaeological investigation would be undertaken, comprising, where relevant, evaluation, excavation and recording to ensure that the archaeological interest of any significant deposits and features within the site would be appropriately investigated, recorded and disseminated (refer to **Volume 2, Appendix 16H** of the **ES** for further details).

In addition, a **Peat Strategy** (**Volume 2, Appendix 16G** of the **ES**) has been agreed with Suffolk County Council Archaeology Service and Historic England, setting out appropriate investigative techniques to allow loss of archaeological interest in the peats on the main platform site to be mitigated. Therefore, the overall effect resulting from the potential disturbance of buried heritage assets is considered to be **not significant**.

Impacts on the setting[10] of heritage assets as a result of the visibility and noise from construction works have also been considered throughout the development of the project proposals. Mitigation identified to reduce noise and visual effects during construction, as described in **sections 5.8d)ii)** and **5.8f)ii)**, would also limit impacts on the setting of heritage assets.

To mitigate impacts on the setting of the two Grade II Listed Buildings within the site boundary (Upper Abbey Farmhouse and the adjacent Barn), the Barn would be repaired during the construction period. These repairs would allow the Barn to be enhanced and retain its contribution to the setting of the Grade II listed Upper Abbey Farmhouse. In addition, works would be undertaken within the wider farmyard to stabilise, or remove, unstable structures, and to remove intrusive vegetation. As a result, the overall effect of construction works on the setting of these assets is assessed as **not significant**.

Despite measures proposed to minimise visibility and noise from construction works, a **significant adverse** effect on the Leiston Abbey Scheduled Monument (first site) and a Grade II Listed Cottage 450m west of Upper Abbey Farmhouse has been identified. This is due to the potential loss of heritage significance of these assets with the change to their settings during construction. Additional mitigation for Leiston Abbey Scheduled Monument is proposed to provide enhancements to the visitor experience of the two Leiston Abbey sites. An off-road link between the two Leiston Abbey sites would also be provided during the construction period of the proposed development and retained permanently, therefore, providing a lasting benefit.

A **significant adverse** effect on the historic landscape character of the main development site has also been identified due to the change to the use of the site, removal of potentially important historic hedgerows and the realignment of historic routeways. It is proposed that the historic landscape features would be recorded in

[10] Setting of a heritage asset is defined as the surroundings in which a heritage asset is experienced.

accordance with an agreed written scheme of investigation prior to the start of construction.

No significant effects on other heritage assets have been identified.

iii. Operational phase

Any disturbance of archaeological heritage assets within the site would have occurred during construction and, therefore, **no effects** on archaeology are anticipated during operation.

With the removal of temporary development and large-scale landscape restoration following construction, including reinstatement of hedgerows on field boundaries, **no significant** adverse effects on heritage assets and historic landscape as a result of changes to the setting have been identified. Furthermore, the repair of the Grade II Listed Barn is considered to provide a **significant beneficial** effect in the long term.

Effects on Leiston Abbey Scheduled Monument (first site) resulting from the change to its setting would be mitigated through the agreement to enhance visitor experience to the two Leiston Abbey sites and, therefore, the overall effect on this asset is assessed as **not significant**.

Leiston Abbey Scheduled Monument (first site)

j) Soils and agriculture

i. Context

Chapter 17 of **Volume 2** of the ES presents the assessment of potential effects of the main development site on soils and agriculture. The baseline conditions were characterised through a combination of desk study, soil and agricultural land classification surveys and interviews with the landowners.

The soil type and its suitability for agricultural use varies across the site, with a summary provided below:

- the coastal strip of the main platform area is characterised by coastal beach deposits in a series of sand dunes, which is not suitable for agricultural use;
- the main types of soils associated with Sizewell B relocated facilities, National Grid land, the majority of the temporary construction area and to the east of the LEEIE are freely draining brown sandy soils which are often slightly acidic; liming is required to enable a range of crops to be grown on these soils;
- across the western extent of the site and the majority of LEEIE soils comprise freely draining loamy and clayey soils, which are of poor quality for agricultural use; and
- the soils west and north of Sizewell B power station comprise deep peat and clay deposits which can become very acidic; these soils would require drainage for any kind of agricultural use.

Of the total on-shore area on the main development site, approximately 213.9ha of land is estimated to be in agricultural use, with the majority of this land being used for crops, such as cereals, potatoes, onions, parsnips and turnips. Approximately 22.2ha of this agricultural land is considered to fall within the classification of 'best and most versatile'[11] agricultural land. In addition, land is registered under agri-environment schemes[12] across the site at LEEIE and within the temporary construction area. Woodland at Goose Hill, Broom Covert, adjacent to Sizewell Gap and immediately south of Sizewell A, and at Black Walks is registered under woodland grant schemes.

Agricultural land holdings on the site are owned by seven separate entities, with most of the land being within the ownership of EDF Energy Group companies.

ii. Construction phase

Construction on the main development site would use approximately 213.9ha of agricultural land. However, following construction, approximately 205.4ha of this land would be

[11] Agricultural land in England and Wales is graded between 1 and 5, depending on the extent to which physical or chemical characteristics impose long-term limitations on agricultural use. Grades 1, 2 and 3a are defined as 'best and most versatile' agricultural land in England and Wales.

[12] Agri-environment schemes are land management practices which protect and enhance the environment, for example planting field margins with food sources for insects and reduced management of hedgerows to provide more habitat for farmland birds.

reinstated in accordance with the **Outline Landscape and Ecology Management Plan** (Doc Ref. 8.2) as pasture, arable farmland, woodland or acid grassland and heath. In addition, existing soil resource would be retained on site throughout the construction period and re-used during landscape restoration (further details are set out in the **Outline Soil Management Plan, Volume 2, Appendix 17C** of the **ES**).

The temporary use of best and most versatile agricultural land during the construction period is considered to constitute a **significant adverse** effect**.** However, following reinstatement, **no permanent significant** effects due to the loss of agricultural land have been identified. In addition, SZC Co. would continue to liaise with the affected landowners to reduce the effects on their holdings, as far as practicable. In the long term, **no permanent significant** effects on agricultural businesses have been identified.

iii. Operational phase

During operation, no additional land would be required beyond that reported for the construction phase, and **no further effects** on agricultural land or businesses due to loss of land are therefore anticipated.

There is the potential for invasive weed species to grow within the site. However, this would be controlled through an appropriate management regime to remove weed growth that might threaten adjoining agricultural land, as described within the **Outline Landscape and Ecology Management Plan** (Doc Ref. 8.2). Therefore, **no significant** effects are expected.

k) Geology and land quality

i. Context

Chapter 18 of **Volume 2** of the ES presents the assessment of potential effects of the proposed main development site on ground conditions, including an assessment of physical effects on soil erosion, soil compaction, waste soils and mineral resources, as well as contamination of the site and surrounding area.

The site is largely underlain by a mix of consolidated sand, gravel, silt and clay. Peat is also present in the main platform and temporary construction areas. The main platform comprises an area of made ground[13] associated with the construction of the adjacent Sizewell B power station. Made ground is also likely to be present within the LEEIE, as a result of the railway line constructed along its western boundary and within the temporary construction area associated with sand and clay pits located in this area. The bedrock geology beneath the site comprises three different types of rock - crag, clay and chalk of various geological ages. There are no areas used for mineral extraction with the main development site.

Areas of peat within the site are associated with ground stability hazards. In addition, ground along the coastal strip is at risk of running sand. The site is also considered to have a moderate risk

[13] Made ground is land where natural and undisturbed soils have largely been replaced by man-made or artificial materials.

of unexploded ordnance, due to air raids in several areas around Leiston and Sizewell during World War II.

Contamination testing has demonstrated that soils within the site boundary are suitable for either commercial or public open space use, albeit small amounts of contaminants have been detected. In addition, elevated concentrations of contaminants have been detected in groundwater and surface water samples (see **section 5.8l)** below). Existing levels of ground gas and radiation levels within soils, groundwater and surface water are unlikely to pose a significant risk to human health.

ii. Construction phase

The construction phase may introduce new sources of contamination due to leaks and spillages and could disturb and mobilise existing contamination within soils. However, as set out within the **CoCP** (Doc Ref 8.11), best practice measures would be adopted to minimise pollution risks from construction in line with appropriate risk assessments. These include the adoption of working methods to manage contamination risk to soils, groundwater and surface water, implementation of appropriate pollution incident control plans and procedures and the safe storage of fuel, oils and equipment. Furthermore, the drainage strategy includes measures to prevent the pollution of groundwater and surface water due to runoff from the construction site (refer to **Volume 2, Appendix 2A** of the ES for further details).

Additional ground investigation, risk assessments and assessment of unexploded ordnance would be undertaken to specify measures within design to mitigate against ground stability, soil erosion and ground contamination hazards. For example, ground gas protection measures would be provided in the buildings on site and other relevant structures, where required. With these measures in place, **no significant** effects on human health, groundwater and surface water and properties due to the risk of contamination, ground stability and soil erosion are considered likely.

The **Materials Management Strategy** (**Volume 2, Appendix 3B** of the **ES**) and **Outline Soil Management Plan** (**Volume 2, Appendix 17C** of the **ES**) seek, as far as reasonably practicable, to reuse and recycle soils on site, and to actively reduce the amount of hazardous soils generated from the development. Therefore, **no significant** effects due to waste soils being generated during construction have been identified.

iii. Operational phase

During operation, there would be limited impacts on soil erosion, ground stability and compaction, and due to waste soils during maintenance operations, with the majority of these hazards having been mitigated during construction. Therefore, **no significant** effects due to these impacts are likely to occur.

The operation of the Sizewell C power station could also introduce new sources of contamination due to leaks and spillages, as well as new pathways for the migration of contamination. Storage and disposal of wastes and hazardous substances at the Sizewell C power station would be managed in accordance with guidance, legislative requirements and appropriate environmental permits, consents and licences. With these measures in place, **no**

significant effects due to the risk of contamination are considered likely.

l) Groundwater and surface water

i. Context

Chapter 19 of **Volume 2** of the **ES** presents the assessment of potential effects on groundwater and surface water resources arising from the main development site. This assessment is also supported by the **Main Development Site Flood Risk Assessment** (Doc. Ref 5.2) and project-wide **Water Framework Directive Compliance Assessment** (Doc. Ref 8.14). To inform the understanding of the groundwater and surface water regime at the site, a numerical groundwater model was produced. This has been informed by monitoring data collected since 2013 from over 90 monitoring wells.

Several aquifers[14] lie beneath the site. The superficial deposits of sand and gravel located to the east of the site and in higher ground to the west of the site are classified as Secondary A Aquifers[15]. In addition, the deeper bedrock of crag and chalk are classified as Principal Aquifers[16]. Whilst the peat deposits are not classified as an aquifer, they store and transmit water originating from groundwater, surface water and rainfall, which is important for sustaining habitats within the Sizewell Marshes SSSI, particularly the reedbeds, fen meadow and rush pastures.

Surface water drainage in the study area comprises two, low energy, lowland river systems - the Leiston Drain and the Minsmere River, both of which discharge to the sea via the Minsmere Sluice. When river levels exceed sea levels, water flows from Minsmere Sluice to the sea. When sea levels exceed river levels, flow will cease, and water is stored upstream of the sluice.

Water levels in the Sizewell Marshes SSSI are controlled by a series of interconnecting drains, which ultimately discharge to the Leiston Drain. The Sizewell Drain, which runs through the western section of the main platform area, is a tributary of the Leiston Drain and is the primary watercourse that drains the Sizewell Marshes SSSI. Surface waters within the study area are strongly influenced by the water levels and flows within the groundwater systems.

[14] An aquifer is a body of saturated rock through which water can easily move.

[15] Secondary A Aquifers are permeable layers of rock capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

[16] Principal Aquifers are layers of rock that usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.


Leiston Drain


Typical drainage channel in Sizewell Marshes SSSI

The groundwater underlying the majority of the main platform area and parts of the temporary construction area is subject to saline intrusion; this is with the exception of groundwater levels within peat deposits, for which there is no evidence of tidal influence. The general direction of groundwater flow is towards the coast. The quality of groundwater and surface water is moderate to poor, which is attributed to marine influences, discharges from the Leiston Sewage Treatment Works and farming activities in the surrounding areas.

There are multiple licensed groundwater abstraction sites within 1km of the site. The majority of these are associated with general farming and domestic use and for water management at the Aldhurst Farm, except for one site for public water supply approximately 280m to the south. There are also two licensed surface water abstraction sites within the study area associated with Leiston Drain and lower Minsmere River systems, which are being used for the irrigation of agricultural land.

A summary of flood risk at the main development site during construction and operation is shown in **Table 5.4**.

Table 5.4 Summary of flood risk at the main development site*

Site Summary		Flood Risk						
Site	Phase	Coastal	Breach	Fluvial	Surface Water	Ground Water	Reservoir	Sewer
Main Platform	Construction	M	M	L	L	L	L	L
	Operation	L	L	L	L	L	L	L
SSSI Crossing	Construction	L	M	L	L	L	L	L
	Operation	L	L	L	L	L	L	L
Temporary construction area	Construction	L	L	L	L	L	L	L
	Operation	L	L	L	L	L	L	L
LEEIE	Construction	L	L	L	L	L	L	L
	Operation	L	L	L	L	L	L	L

* L = low, M= medium, H= high

ii. Construction phase

Construction activities could impact upon groundwater and surface water resources due to runoff from the construction site and changes to groundwater and surface water flows. Specifically, potential impacts arising from the following activities were assessed:

- construction of the SSSI crossing;
- Sizewell Drain realignment along the western boundary of the main platform area;
- construction of sheet pile walls and a hydraulic cut off wall within the main platform area;
- use of borrow pits, water management zones and other works within the temporary construction area; and
- works within the LEEIE.

The proposed development would encroach into the Sizewell Drain and Sizewell Marshes SSSI to accommodate the new Sizewell C platform. The Leiston Drain and Sizewell Marshes SSSI would be further impacted upon by the SSSI crossing from the platform to Goose Hill. Measures to minimise impacts from works within the watercourses are set out in the **CoCP** (Doc Ref. 8.11). In addition, works would be further managed through the permitting process with the Environment Agency. With mitigation in place, the effects are assessed as **not significant**.

The realignment of the Sizewell Drain has the potential to alter groundwater flow and potentially affect the associated Sizewell Marshes SSSI. However, control structures would be installed along the realigned Sizewell Drain to manage water levels within the drain and hence manage groundwater flow in the area. The effect on groundwater from the realignment activity would therefore be **not significant**.

Dewatering is required in the footprint of the main platform, in order to reduce groundwater levels to facilitate construction. A low permeability cut-off wall would be installed to stop groundwater flow into the deep excavation on the main platform. As a result, the effect on groundwater levels is assessed as **not significant**. Groundwater monitoring would be undertaken throughout the dewatering operation and action taken in the event that groundwater levels outside the cut-off wall fall below agreed thresholds.

The implementation of the proposed surface water drainage (see **Volume 2, Appendix 2A** of the **ES**) would act to manage and control discharge of surface water to the ground at an acceptable rate. The proposed water management zones would intercept surface water run-off prior to discharge into a surface watercourse or to ground. As a result, **no significant** effects on groundwater flows and quality would occur.

The excavation and backfilling of borrow pits are likely to have a temporary effect on the groundwater flow and quality in this area. However, this would be limited and **not significant**.

Furthermore, impacts on groundwater quality could occur due to leaks and spillages during construction and the leaching/migration

of contaminants through the soil. The **CoCP** (Doc Ref. 8.11) includes proposed mitigation and controls, including appropriate pollution incident controls. In addition, various construction areas would be isolated from the wider environment with appropriate drainage mechanisms. As a result, this effect is assessed as **not significant**.

All foul water generated during construction from the main and temporary construction areas would be pumped to a construction sewage treatment plant, prior to discharge to sea. This would ensure segregation of surface waters and sewage effluent during construction. Temporary arrangements would be made until the construction sewage treatment plant is operational.

The embedded design approach provides suitable mitigation to maintain a low flood risk across the main development site during the construction phase. There is a short period of time during construction when the existing sea defences are to be lowered prior to the construction of the new hard coastal defence feature. During this period the construction area is at increased risk from coastal flooding. The **CoCP** (Doc Ref 8.11) sets out measures to alert and protect the workforce in case of flooding. The arrangements would be further developed in a flood risk emergency plan. Once the main sea defences are built, the coastal breach flood risk to the main platform and SSSI crossing area would be reduced. The risk of flooding to and from the main development site during construction is assessed as **not significant**.

iii. Operational phase

During operation, the following potential impacts were considered:

- reduction in the rate/volume of water discharging to ground;
- leaching/migration of contaminants through the soil to groundwater and surface water and contamination from operational wastewater and sewage; and
- changes to the surface water flows and flood risk.

The completed development site would increase the impermeable surface area compared to baseline conditions. Engineered drainage that is incorporated into the proposed development would act to channel water falling on impermeable surfaces into sustainable drainage infrastructure. The hydraulic cut-off wall and sheet piled support wall would be left in-situ for the operational phase of the development. Whilst this has the potential to alter the groundwater flow regime below the operational site, modelling has shown it would have no discernible effect on groundwater flows. Therefore, **no significant** effects on groundwater recharge and flows during operation have been identified.

For operational areas of the Sizewell C power station site, an operational phase drainage system would be implemented to intercept water, sediment and contaminants. Forecourt separators would be provided at all locations where fuel handling takes place. At the western perimeter of the main platform, a filter drain would be installed to capture surface water run-off and prevent direct discharge to Sizewell Drain. The operational phase sewage treatment plant would be used to treat domestic sewage generated

during the operation of the Sizewell C power station. Treated effluent would be discharged to sea via the main cooling water system. On this basis, **no significant** effects on groundwater and surface water quality have been identified.

The presence of the Sizewell Drain control structures would act to manage water levels within Sizewell Drain and adjacent groundwater level. The operation of these would be agreed with stakeholders as part of a formal plan. The enhanced controls also have the potential to provide greater control over water levels in the Sizewell Marshes SSSI and, therefore, provide greater resilience to future climatic variation. As a result, the effect on surface water flows is considered **not significant**.

The design of the main platform, including the sea defence, would reduce the risk to the proposed development from coastal, breach, fluvial, surface water, sewer and groundwater flooding until the end of the operation. There would be a residual risk of flooding were the main sea defences to fail, although management approaches would be in place to reduce the likelihood of this and the associated impact. The SSSI crossing and the sea defences have been designed, so that they could be raised at an appropriate point in time, if required, to reduce the risk of coastal flooding. Due to the scale of the existing risk and the relatively small additional risk, the effect on flood risk is **not significant**.

m) Coastal geomorphology and hydrodynamics;

i. Context

Chapter 20 of **Volume 2** of the **ES** presents the assessment of potential effects of the proposed development on coastal geomorphology and hydrodynamics.

The current shoreline of the Greater Sizewell Bay (and most of the Suffolk coastline) is a result of substantive coastal erosion and accretion events caused by storm conditions during the 19th century. Severe erosion of the Dunwich Cliffs supplied large volumes of sand and shingle to the sediment transport system along the shore. In addition, the presence of natural and man-made hard points affects sediment transport and shoreline position within an otherwise soft and erodible coast. These hard points are the Coralline Crag, Minsmere outfall, and Blyth River mouth jetties.

The shoreline management approach along the frontage of existing Sizewell power stations is to ‘hold the line’ (Ref. 8). Although, in the future, the shoreline is expected to retreat.

ii. Construction phase

The effects of construction activities required to build the hard and soft coastal defence features (see **Plate 5.7**), beach landing facility, nearshore outfalls and the offshore cooling water infrastructure on coastal hydrodynamics and geomorphology have been considered. The effects on hydrodynamics and sedimentation, sediment disturbance and scour are considered **not significant** due to the limited extent of works required. Furthermore, the soft coastal

defence feature would provide additional beach sediment to the system which would reduce the rate of coastal erosion and, thereby, have a beneficial effect to supporting the 'hold the line' management approach.

Heavy plant and machinery operating on the beach would cause some sediment compaction, however the resistance of the beach to compaction is expected to be high as the sediment would be mobilised and re-worked during storms. Additionally, heavy plant movements on the active beach face would be restricted to minimise disturbance of beach sediments. The effects due to compaction are therefore **not significant**.

In addition, the effects from dredging and piling activities required to install the beach landing facility, nearshore outfall and the offshore cooling water infrastructure have been assessed. All activities would be limited in duration and spatial extent. Impacts from dredging would be mitigated where possible by use of plough dredging. Where extraction dredging is necessary sediment would be released to the sea nearby to minimise the volume of sediment removed from the system. The effects have been assessed to be **not significant**.

iii. Operational phase

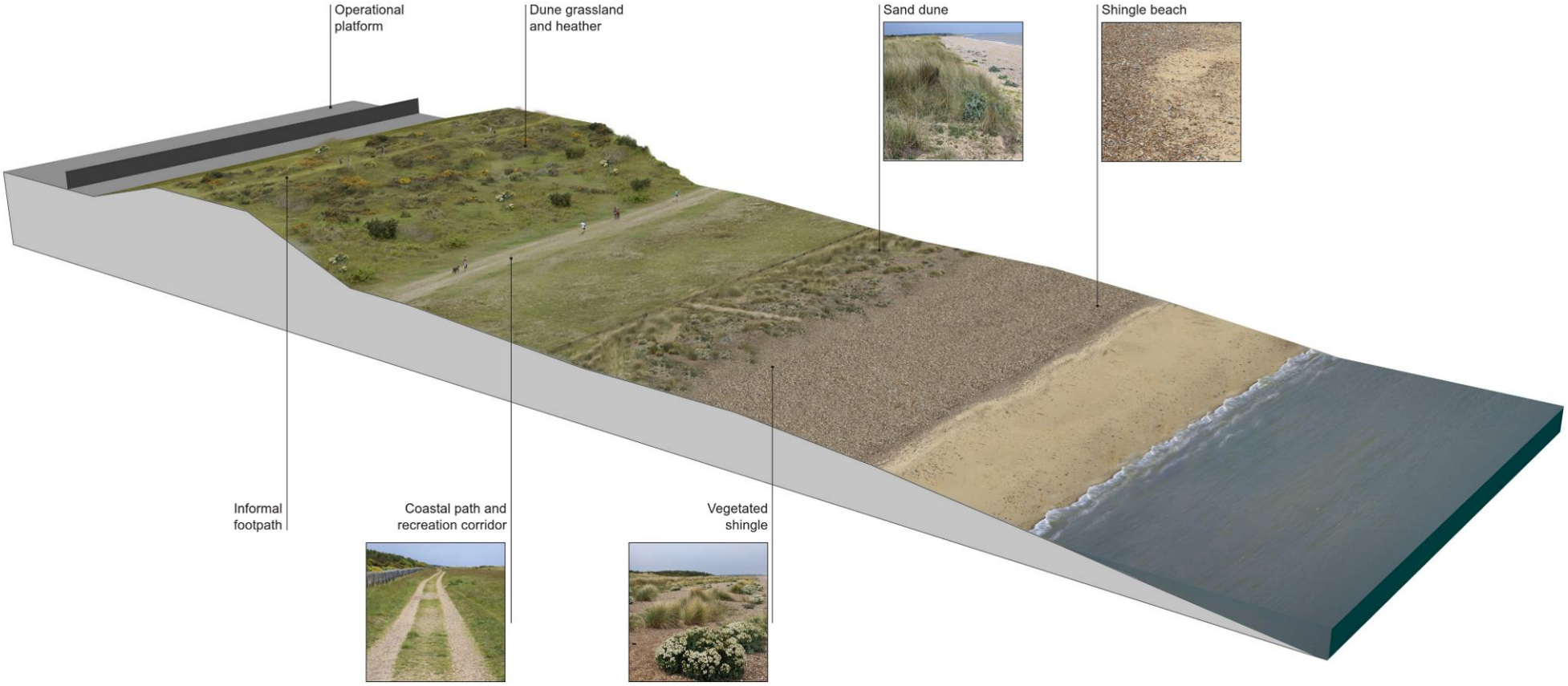
During operation, effects from the presence of the proposed coastal and marine infrastructure on geomorphology and hydrodynamics have been considered. Effects on hydrodynamics, sedimentation and scour have all been assessed as **not significant** due to the limited extent of the infrastructure.

The soft coastal defence feature would provide relatively small quantities of sediment during storms over several decades to prevent shoreline retreat, until the feature is completely depleted. A coastal processes monitoring and mitigation plan is proposed to monitor the erosion of the coast and confirm when replenishment of the soft coastal defence is required. The potential for changes in sediment regime due to the presence of the soft coastal defence feature has been assessed as **not significant**.

The soft coastal defence feature would require some maintenance, so some heavy plant would need to work on the beach during the operational phase. As with the machinery working on the beach during construction, this may cause some compaction of surface sediment. This effect would be no worse than during the construction phase and, therefore, the effect is classified as **not significant**.

Dredging close to the shore would be required for the maintenance of the navigational channel leading up to the beach landing facility. This effect would be the same as during the construction phase and has therefore been assessed as **not significant**.

Plate 5.7 Visualisation of the sea defence



n) Marine water quality and sediments

i. Context

Chapter 21 of **Volume 2** of the **ES** presents the assessment of potential effects of the proposed development on marine water quality and sediments. Monitoring data at Sizewell has shown that the levels of dissolved oxygen are high and sea water at Sizewell is classed as 'intermediate turbidity'. Seawater temperature trends follow a seasonal cycle, ranging from approximately 4ºC in winter to 20ºC in summer. Sediment samples collected at Sizewell were analysed and are considered uncontaminated. The dominant substrate is sandy material with a low organic carbon content.

ii. Construction phase

The assessment considered the following potential effects:

- changes in suspended sediment concentration from dredging;
- pollution from construction machinery and activities; and
- impacts on marine water quality and sediments from the combined drainage outfall discharges.

Under the deemed marine licence, sediment contamination levels would be monitored to ensure material is deemed acceptable for the proposed disposal route. Measures to prevent pollution from the construction activities in the marine environment are also set out within the **CoCP** (Doc Ref 8.11). Discharges from the combined drainage outfall would be treated to agreed water quality standards and monitored thereafter under an Environmental Permit by the Environment Agency. With these measures in place, the effects on marine water quality and sediments are assessed as **not significant**.

iii. Operational phase

The assessment considered the following potential effects:

- changes in suspended sediment concentration from dredging the beach landing facility navigational channel;
- impacts on marine water quality and sediments from the offshore cooling water and the fish recovery and return tunnel outfalls;
- localised temperature changes and deoxygenation[17] due to discharges from the offshore cooling water outfall.

As during construction, sediment contamination levels would be monitored during dredging activities prior to disposal. Operational discharges would be treated to agreed water quality standards and monitored thereafter under an Environmental Permit. With these measures in place, the effects on marine water quality and sediments during operation are assessed as **not significant**.

The effect of thermal uplift from the cooling water discharge is assessed as **not significant**, as the heated water would quickly cool and mix with sea water. As a result, the change in deoxygenation levels is also assessed as **not significant**.

[17] Removal of oxygen from sea water.

o) Marine ecology and fisheries

i. Context

Chapter 22 of **Volume 2** of the ES presents the assessment of potential effects of the proposed development on marine ecology and fisheries. Marine ecology receptors have been assessed in the following groups: plankton, benthic communities[18], fish, marine mammals, and commercial and recreational fisheries. Surveys have been undertaken over the last decade to characterise these receptor groups.

The marine ecology surveys identified the presence of reef forming Ross worm, which is considered of conservation importance. In addition, 24 key fish species were identified as representative of the local assemblage. The most commonly occurring fish included Dover sole, whiting, gobies, dab, flounder, thornback ray, Atlantic herring, European sprat, anchovy, mackerel, horse mackerel (scad) and pilchard, with sprat being the most abundant. Spawning grounds for Dover sole and plaice and nursery grounds for Dover sole, plaice, whiting, cod, seabass, thornback ray, herring, sprat and mackerel were also identified within the Greater Sizewell Bay.

Harbour porpoise, harbour seal, and grey seal are known to regularly occur in the Greater Sizewell Bay. The proposed marine infrastructure associated with the Sizewell C Project is situated within the Southern North Sea SAC. The SAC is designated solely for the purpose of aiding the management of harbour porpoise.

Commercial fisheries and recreational angling activities have been considered in the assessment. Commercial fisheries primarily use potting, netting, long-liners, and otter trawling methods. Shore anglers and boat anglers tend to operate year-round, although the catch composition varies seasonally. Key commercially and recreationally important species considered in this assessment are: Dover sole, European plaice, whiting, Atlantic cod, European seabass, Atlantic herring, thornback ray, common whelk, European lobster, and brown crab.


Harbour porpoise


Ross worm

ii. Construction phase

The ecology of marine systems is dependent on a number of environmental factors, including water quality, hydrodynamics, geomorphology, substrate composition and quality. Therefore, the assessment of coastal geomorphology and hydrodynamics and marine water quality and sediments have informed the assessment of effects on marine ecology and fisheries. Impacts from dredging,

[18] Benthic communities include organisms that live on, in or near the seabed.

discharges and other construction activities have been considered. All effects have been assessed as **not significant**. These are summarised below.

Dredging activities for the installation of the offshore cooling water infrastructure and beach landing facility would cause a direct removal of sediments, short-term increased suspended sediments in sea water and an increased sedimentation rate. The effect of these activities on plankton, benthic communities (including the Ross worm), fish and marine mammal populations has been assessed as short-term and **not significant**.

Dredging, piling, and unexploded ordnance clearance would also cause underwater noise which may disturb marine mammals, fish with swim bladders, and eggs and larvae present within the vicinity. Best practice protocols would be followed to reduce underwater noise, for example avoiding piling during high tide and use of soft-start procedures for ramping-up piling. Should an unexploded ordnance device be found on site, a full assessment would be completed considering the exact specifications and location, to determine a disposal method that is least disruptive. In addition, a **Marine Mammal Mitigation Protocol** (see **Volume 2, Appendix 22N** of the **ES**) would be implemented. With these measures in place, the effect from underwater noise is assessed as **not significant**.

Discharges from the combined drainage outfall could influence plankton, benthic invertebrate and fish populations. Discharges would be treated to water quality standards agreed with the Environment Agency to prevent sediment and associated contaminants from being discharged. With these measures in place, these effects have been assessed as **not significant**.

Marine mammals may also experience some visual and physical disturbance from vessel activity during the construction of the proposed marine infrastructure. A Vessel Management Plan would be implemented, which would include measures to minimise disturbance, such as site-wide speed restrictions. In addition, a lighting strategy with the aim to minimise light spill into the marine environment would be implemented. This effect has therefore been assessed as **not significant**.

The effects on fisheries due to restricted access during construction are assessed as **not significant** due to the limited fishing activity within the impacted area and alternative fishing grounds available.

iii. Operational phase

The assessment has investigated all potential effects to the marine ecosystem during operation. Factors that may disturb marine ecology include entrainment and impingement[19] within the cooling

[19] Entrainment occurs when marine organisms are small enough to go through the cooling water filtration screens, through the power station cooling water circuit and then discharged to sea.

Impingement is the term used to refer to fish and other marine organisms that become trapped on cooling water filtrations screens and are returned to the sea via the fish recovery and return system.

water infrastructure, discharges from the offshore cooling water outfall and the fish recovery and return system, dredging of the beach landing facility navigation channel, and the presence and maintenance of this infrastructure.

The cooling water system would result in some entrainment and impingement of marine ecology. Measures have been embedded within the design to minimise these effects, including through the design of a low-velocity side-entry intake head and the provision a fish recovery and return system, which would discharge impinged organisms back into the sea. Modelling demonstrates that the effect due to entrainment and impingement would be **not significant**. A Comprehensive Impingement Monitoring Programme is proposed to monitor the effectiveness of mitigation incorporated within the design.

Although the system would be designed to return fish as safely as possible, there is a potential for the fish return and recovery system to cause some injury and / or mortality to fish. This could result in a minor change to the spatial foodweb dynamics, as predators and scavengers are likely to take advantage of a greater density of available prey close to the fish return and recovery outfall. The overall effect is, however, likely to be limited and is considered **not significant**.

Plough dredging for the beach landing facility navigation channel maintenance would temporarily increase suspended sediments in sea water, noise and vibration, and wave exposure to all marine ecology groups considered in the assessment. Given the small spatial influence, infrequent occurrence and temporary nature of the activity, this effect has been assessed as **not significant**.

The presence of the beach landing facility, and offshore cooling water infrastructure would cause some localised geomorphological changes to the shoreline and seabed. This may cause a small-scale shift in the distribution of benthic invertebrate and fish habitat. This effect has been assessed as **not significant**.

The cooling water outfall would discharge chlorinated water, hydrazine, nutrients and ammonia to the sea. All discharges would be treated to water quality standards agreed and monitored by the Environment Agency through an Environmental Permit. With these measures in place, these effects have been assessed as **not significant**.

A thermal plume would be permanently present at the cooling water outfall. Acute effects of thermal discharges are predicted to occur over a very limited spatial area due to rapid mixing with cooler water. Furthermore, the outfall would be located 3km from the shore in deep water to ensure the plume becomes buoyant and loses heat quickly. Effects at the population level and on the Greater Sizewell Bay foodweb have been assessed as **not significant**.

Commercial and recreational fishing vessels may experience some disturbance during operation due to restricted access during maintenance activities or the use of the beach landing facility. Additionally, the density of target fish species may be altered

slightly by the thermal plume. Both effects would be limited and are considered to be **not significant**.

p) Marine historic environment

i. Context

Chapter 23 of **Volume 2** of the **ES** presents the assessment of potential effects of the proposed development on the marine historic environment (i.e. all heritage assets below the mean high-water mark and offshore).

Offshore geophysical and borehole surveys have identified a series of deposits, consisting of peats and intertidal clays and silts, which coincide with the beach landing facility and cooling water intake/outfall head locations. These deposits relate to a time when the area offshore would have been either fully terrestrial or part of a former river system and are of interest to archaeologists for the information they can provide on past environments and sea level change.

No designated heritage assets are present in the vicinity of the proposed marine infrastructure. There are a number of wreck sites within the surrounding area and several World War II defences along the beach. In terms of historic landscape, the coastal frontage predominantly comprises the current industrial landscape (Sizewell power station) and unimproved land along the coastal marshes. The site is currently considered to be of low historic significance.

ii. Construction phase

There is a potential for the disturbance of previously unrecorded archaeological material on the seabed and / or deposits of paleoenvironmental and geoarchaeological interest during the installation of the beach landing facility and the offshore cooling water infrastructure. This disturbance would be mitigated for through geological analysis and academic dissemination of information on the deposits. A protocol for reporting finds during dredging would also be put in place. Therefore, the potential effects have been assessed as **not significant**.

iii. Operational phase

Any disturbance of archaeological heritage assets within the site would have occurred during the construction phase and **no further effects** are anticipated during the operation of the proposed development. Any dredging during the operational phase would remove sediment that has infilled the originally dredged areas during construction. However, dredging protocols would remain in place.

q) Marine navigation

i. Context

Chapter 24 of **Volume 2** of the **ES** presents the assessment of potential effects of the proposed development on marine navigation.

The closest major port to the main development site is the port of Lowestoft, a commercial fishing port which also acts as a base for

vessels servicing offshore oil and gas and offshore windfarm industries. Felixstowe and Ipswich are located to the south. Great Yarmouth, Harwich and Rotterdam are the three ports being considered as the transhipment port for the Sizewell C project. An oil transhipment area is located approximately 11 nautical miles north-east of the main development site, where tankers may transfer oil from one vessel to another. The closest working offshore windfarms to the main development site are the Greater Gabbard and Galloper offshore windfarms. Commercial, recreational and fishing vessels also use the area.

Marine traffic data shows that, during the summer months, the proposed cooling water intake/outfall positions would be located within an area of higher vessel density due to the abundance of small craft activity close to shore. In contrast, lower vessel density is recorded in the same location during the winter months due to the significantly reduced level of small craft activity. Other high-density areas can be attributed to the north/south route, approximately 4 nautical miles east of the proposed development, for transient traffic identified in the study area. This main route is utilised by commercial vessels transiting to various ports within the Humber Estuary and Thames Estuary.

Marine navigation incident data between 2005 and 2014 was reviewed as part of the assessment process. Machinery failure was the most frequently recorded incident type within the data sets.

ii. Construction phase

A **Navigational Risk Assessment** was undertaken to determine the navigational risks from the proposed development and the mitigation required (refer to **Volume 2, Appendix 24A** of the **ES**). During construction, there is a risk that installation vessels and dredgers could collide with passing vessels and cause disruption to any ongoing activities, such as the maintenance of offshore windfarm cables, as well as fishing and recreational activities. Information on vessel movements would be circulated with the relevant bodies and a buoyed construction zone would be sectioned off as additional mitigation to reduce the risk. A temporary Harbour Area would be designated and managed by a Harbour Master to ensure safe vessel movements during offshore construction and delivery of construction materials to the beach landing facility. These risks are, therefore, considered as **not significant**.

There is also an increased risk of vessel grounding during construction. This would be mitigated by the production of a delivery and logistics plan, temporary safety zones, and patrol launches. This risk has, therefore, been assessed as **not significant**.

iii. Operational phase

During operation, similar risks of collisions and disruption from maintenance vessels are expected as would occur during construction. These risks would be mitigated by the same measures as during construction and, therefore, are considered **not significant**.

In addition, during operation there is a risk of vessel grounding and / or fishing gear and anchors snagging on the intake and outfall structures. This would be mitigated for by marking structures with

buoys and beacons on site in addition to charts. Therefore, this risk has been assessed as **not significant**.

r) Radiological considerations

i. Context

Chapter 25 of **Volume 2** of the **ES** presents the radiological impact assessment for the main development site. Radioactivity occurs naturally, including in foods we eat, and can be artificial/produced by human activities. Any radioactivity found within the soils or groundwater will contain naturally occurring levels of radiation, and in areas of industrial activity there may be low levels of artificial radiation present. Surveys and monitoring programmes have been undertaken in order to obtain a more detailed understanding of the background radioactivity levels around the Sizewell C main development site. The existing surveys have not detected any levels of artificial radiation that would present a risk to human health.

ii. Construction phase

The assessment has considered the potential for the Sizewell C Project to affect human health from doses during construction due to the demolition of the existing Sizewell B outage store, existing contamination within soils, use and transport of radiography sources during construction and sea disposal of dredge sediment.

The demolition of the existing outage store would be undertaken in compliance with the existing procedures at Sizewell B power station which would prevent effects from radiation to workers and members of the public from these activities. Furthermore, the transport and use of radiography sources would be undertaken in compliance with the contractors' mobile permits and existing legislative requirements. No levels of radiation in soils and dredge sediments that would present a risk to human health have been detected. Therefore, overall effects during construction are considered **not significant**.

iii. Operational phase

The operational assessment has considered the potential for effects due to doses to human and ecological receptors from direct radiation and the discharge of low levels of radioactive gaseous emissions and aqueous effluents. In addition, doses associated with the transport of radioactive materials and wastes and any maintenance dredging have also been considered.

The UK has a strict regulatory framework to control radioactive discharges and direct radiation exposures to workers and the general public from nuclear power stations. Any new nuclear power station needs an Environmental Permit from the Environment Agency before making any discharges of radioactivity into the environment or disposals of radioactive waste. In order to grant the permit, SZC Co. needs to demonstrate to the Environment Agency the application of Best Available Techniques to minimise radioactive waste generated and that the gaseous and liquid effluent discharges are kept as low as reasonably achievable. There are also supplementary provisions regulated by the Office for Nuclear Regulation under the Nuclear Installations Act 1965 and the associated Nuclear Site Licence, to control the accumulation of radioactive waste on a licensed site, including

storage and transportation. With these measures in place, the operational effects are assessed as **not significant**.

s) Climate change

i. Context

Chapter 26 of **Volume 2** of the **ES** presents the assessment of climate related impacts associated with the Sizewell C Project. The assessment considered three aspects:

- lifecycle greenhouse gas impact assessment;
- climate change resilience assessment; and
- in-combination climate change impact assessment.

ii. Greenhouse gas impact assessment

The greenhouse gas impact assessment quantifies the volume of greenhouse gas emissions arising from the Sizewell C Project and considers how it would affect the ability of the Government to meet its carbon reduction plan targets.

The construction assessment has demonstrated that construction emissions for the Sizewell C Project would not exceed 1% of the total five-year UK carbon budget period in which they arise. Therefore, the construction of Sizewell C would have **no significant** effect on the UK meeting its carbon budgets through to 2032.

Embedded carbon[20] in materials used to construct the main development site and associated developments accounts for over 80% of total construction emissions of the Sizewell C Project. Where feasible, materials with lower embedded carbon, for example with a higher recycled/ reused content would be specified. However, there are still expected to be **significant** residual emissions, as would be the case with any large-scale construction project.

Emissions during operation of the power station would not exceed 1% of the total UK carbon budget period in which they arise. As such, the operation of the Sizewell C power station would have **no significant** effect on the UK meeting its electricity sectoral carbon budgets through to 2034.

In the context of the wider electricity generation sector, there are **significant benefits** in the long term, as nuclear power stations produce no greenhouse gas emissions while generating electricity. The lifecycle greenhouse gas emissions from Sizewell C are estimated to equate to 4.5 grams of carbon dioxide equivalent per kilowatt hour (gCO_2e/kWh). This is considerably lower than natural gas electricity generation and is better than or comparable with other low carbon energy sources:

- Natural gas 340 gCO_2e/kWh

[20] Embedded carbon refers to carbon dioxide emitted during the manufacture, transport and construction of building materials, together with end of life emissions.

- Solar photovoltaic 40-85 gCO_2e/kWh
- Offshore wind 7-24 gCO_2e/kWh
- Onshore wind 7-20 gCO_2e/kWh.

The low carbon energy generation of Sizewell C would displace approximately 1 million tonnes of carbon dioxide equivalent ($MtCO_2e$) in 2035 reducing to approximately 0.5$MtCO_2e$ by 2050. On this basis, it is conservatively estimated that emissions from the construction of Sizewell C would be offset within the first six years of operation by emissions displaced, assuming the equivalent energy were otherwise generated by the anticipated mix of grid electricity generation sources. Therefore, the Sizewell C Project would achieve substantial greenhouse gas emissions savings compared with likely alternative forms of energy generation and make a significant contribution to meeting UK climate change targets.

iii. Climate change resilience assessment

The climate change resilience assessment considers how resilient the Sizewell C Project sites are to the changing climate. A number of measures have been embedded into the design of the Sizewell C Project to minimise risks from climate change. These include (but are not limited to):

- specification of a minimum platform and SSSI crossing height, which would reduce the risk of the main platform and access to it from being flooded;
- provision of continuous coastal sea defence structures to protect the main platform from coastal flooding;
- the new coastal sea defence would have a set minimum height to protect against the risk of wave overtopping, with an adaptive design to potentially raise the defence in the future, if required;
- the drainage strategy accounts for the projected increases in future rainfall, and provides sufficient attenuation to prevent flooding; and
- surfacing of roads to specific standards to withstand projected increases in temperatures.

A number of management measures would also be implemented across the Sizewell C Project which include:

- the **CoCP** (Doc Ref. 8.11) requires for contractors to monitor and plan for severe weathers events and to register on the Environment Agency's flood warning service in areas of flood risk;
- the **Traffic Incident Management Plan** (Doc Ref. 8.6) sets out procedures for the management of construction traffic during severe weather events;
- the **Outline Landscape and Ecology Management Plan** (Doc Ref. 8.2) sets out the approach for the selection of plants within landscaping tolerant to existing and future site conditions, and the strategy for the establishment, maintenance, long-term management and monitoring of newly created landscapes/ habitats and existing features/habitats.

Under the regulatory and legal requirements for obtaining a Nuclear Site License, SZC Co. is required to demonstrate that the

design of the nuclear power station has accounted for the potential impacts of climate change and that the necessary measures have been adopted. These measures would be reviewed regularly.

With these measures in place, the assessment identified **no significant** effects associated with climate change resilience.

iv. In-combination climate change impact assessment

The in-combination climate change impact assessment considered whether with potential climate change, the effects of the Sizewell C Project identified within other topic assessments could become worse.

In addition to the measures set out above for the climate change resilience assessment, mitigation described for other topic assessments also accounts for the effects of climate change, specifically mitigation set out in the relevant chapters for geology and land quality, groundwater and surface water, landscape and visual, soils and agriculture, terrestrial ecology, and major accidents and disasters.

With mitigation in place that takes account of the likely changes to climate variables, **no significant** effects were identified.

t) Major accidents and disasters

i. Context

Chapter 27 of **Volume 2** of the **ES** presents the assessment of major accidents and disasters which considers the vulnerability of the Sizewell C Project to existing hazards and assesses the potential for the Sizewell C Project to cause significant environmental effects as a result of a major accident.

The assessment identifies both hazards and threats from natural sources, sources within the site and sources off-site. This includes consideration of natural hazards (such as extreme weather events), existing hazard sources (such as existing utilities within the site and neighboring industrial sites) and new hazard sources (such as the presence of construction vehicles and equipment).

The assessment identifies the potential environmental consequences of each hazard and threat and considers the significance of the risk of a major accident and / or disaster occurring. The assessment sets out all relevant mitigation to ensure that risks are reduced to be as low are reasonably practicable.

In the context of the Sizewell C Project, mitigation is proposed in various forms, through design, construction and operation. An overview of the mitigation proposed is provided below.

ii. Design

Sizewell C would comprise two UK EPR™ reactors. These reactors have been subject to a generic design assessment within which nuclear regulators (Office for Nuclear Regulation and Environment Agency) review the design and safety, security and environmental submissions.

As part of the EIA process, a number of site-specific measures have been developed for the main development sites and associated development sites to reduce the risk of a major accident or disaster occurring. These measures included the consideration of the site drainage, ground conditions, coastal flood defences, security and lighting.

In addition to the site-specific measures, new roads to be provided by the Sizewell C Project have been designed in accordance with the Design Manual for Roads and Bridges and the rail proposals have been designed in accordance with Network Rail Standards to ensure that relevant safety standards are met.

iii. Construction phase

During the construction of the Sizewell C Project, a series of management controls would be put in place to reduce the likelihood of a major accident or disaster occurring. These include, but are not limited to, the following documents:

- **CoCP** (Doc Ref 8.11) details how construction activities would be managed and controlled, including measures for emergency preparedness and incident response.
- Health and safety management plans would be prepared by the contractors and 24/7 emergency response would be provided on-site.
- **Traffic Incident Management Plan** (Doc Ref. 8.6) sets out Sizewell C arrangements in the event of an incident on the routes between park and rides and the main development site.
- **Construction Traffic Management Plan** (Doc Ref. 8.7) details the management of all freight traffic during the construction of the Sizewell C Project.
- **Construction Worker Travel Plan** (Doc Ref. 8.8) details arrangements relating to the movement of the Sizewell C Project construction workforce.

iv. Operational phase

Nuclear safety is paramount to all decisions and activities that SZC Co. undertakes. All risks related to nuclear safety are strictly regulated under the Nuclear Site Licence by the Office for Nuclear Regulation. The Nuclear Site Licencing process must demonstrate that the plant is safe in normal operation and that any non-standard operations do not immediately lead to nuclear emergencies. In addition, the Office for Nuclear Regulation's Civil Nuclear Security and Safeguards division would need to approve the Sizewell C site security plan, for construction and operation, before the Sizewell C power station is brought into use.

Prior to the start of operation, SZC Co. is required to identify all events that have the potential to cause an emergency, and then evaluate the range of possible on and off-site consequences for the range of events identified. This would identify recommended emergency planning zones to enable the local authority to alter existing or develop and implement effective and proportionate emergency response plans.

Emergency preparedness and incident response would also be set out within other relevant environmental permits, consents and

licences, including for the storage and use of hazardous substances.

v. Assessment

The assessment concludes that following consideration of the identified mitigation, the Sizewell C Project is not likely to result in any significant environmental effects associated with major accidents and disasters. All risks are considered **not significant.**

u) Health and wellbeing

i. Context

Chapter 28 of **Volume 2** of the **ES** presents the health and wellbeing assessment for the Sizewell C Project. The assessment is project-wide (comprising both the main development site and associated developments) and considers the overall health and wellbeing effects of the Sizewell C Project.

Due to the multidisciplinary nature of the assessment, and the overlap with other technical disciplines, the assessment of health and wellbeing draws from data and outputs from several supporting assessments in **Volumes 2** to **9** of the **ES** (i.e. socio-economics, transport, noise and vibration, air quality, and radiological assessments).

ii. Construction phase

Construction of the Sizewell C Project has the potential to cause health and wellbeing effects associated with changes in emissions to air, additional transport movements, noise exposure, socio-economic factors and general stress and anxiety impacting on quality of life and wellbeing.

Following the implementation of appropriate mitigation measures, predicted background concentrations for all air pollutants would be well below air quality objectives set for the protection of human health, and the change in exposure would be orders of magnitude lower than is required to quantify any measurable health outcome. The resultant effect is **not significant**.

Changes to road traffic movements have the potential to influence the risk of accident and injury. However, these effects are mitigated through design, including proposed off-site highway improvements and non-design construction traffic management measures. Consequently, the overall effect on health and wellbeing is **not significant**.

Although some significant residual noise effects are predicted during construction, these effects would only persist for a short period of time at a limited number of receptors. Additionally, these receptors would qualify for the **Noise Mitigation Scheme** (refer to **Volume 2, Appendix 11H** of the **ES**) and would be subject to further bespoke assessment to identify and manage any short-term significant noise effects. Where properties do not qualify for the **Noise Mitigation Scheme**, there is a potential for **significant adverse** effects on health and wellbeing to occur. In addition, **significant beneficial** effects would occur following the construction of the two village bypass and Sizewell link road due to a reduction in noise along the A12, where it passes through the

villages of Stratford St Andrew and Farnham, and along a section of the B1122 from Middleton Moor to Theberton.

Socio-economic factors that can impact on health and wellbeing during the construction phase include significant benefits in terms of employment and income opportunities distributed locally, regionally and nationally. Employment and income are important to achieve good social, mental and physical health. Therefore, this represents a **significant beneficial** effect on health and wellbeing.

The introduction of a temporary non-home-based construction workforce has the potential to impact health and wellbeing through increased demand on healthcare and other community services. However, this would be managed through the implementation of an occupational health service open to both home and non-home-based staff, complementing local public health provision. Therefore, the overall effect on health and wellbeing is **not significant**.

Factors influencing an individual's quality of life include emotions such as stress and anxiety. Tangible impacts have been investigated and addressed within the health and wellbeing assessment. Intangible subjects, which are often difficult to quantify, have been addressed through consultation and community engagement, which would be maintained throughout construction. On this basis, the effect on quality of life and wellbeing is **not significant**.

iii. Operational phase

Operation of the Sizewell C Project has the potential to cause health and wellbeing effects through changes in radiological exposure, electromagnetic field exposure, emissions to air, additional transport movements, noise exposure, socio-economic factors and general stress and anxiety impacting on quality of life and wellbeing.

The radiological impact assessment shows that any radiological emissions and discharges from the Sizewell C nuclear power station would be significantly below thresholds set to protect public health. The impact on health and wellbeing is therefore considered **not significant**.

Based on the fact that existing power distribution lines would be utilised and that the effect from the proposed development would fall well within the relevant electromagnetic field exposure guidelines protective of public health, the overal effect on health and wellbeing is considered **not significant**.

All operational air quality predictions are well below air quality objectives set to be protective of health, and the change in exposure would be orders of magnitude lower than is required to quantify any measurable health outcome. The resultant effect on health and wellbeing is considered **not significant**.

Operational traffic volumes would be much lower than during construction, with legacy benefits of highway improvements remaining. Therefore, the overall effect on health and wellbeing from changes in road safety is **not significant**.

No significant residual noise effects are predicted from the operation of Sizewell C nuclear power station, associated traffic or other sources during operation. However, the operation of the two village bypass and Sizewell link road would give rise to significant adverse noise effects at a limited number of receptors, albeit would also give rise to significant beneficial noise effects at other locations. Receptors experiencing significant effects would qualify for the Noise Mitigation Scheme and would be subject to further assessment to identify and avoid significant changes in noise. Where properties do not qualify for the Noise Mitigation Scheme, there is a potential for **significant adverse** effects on health and wellbeing to occur.

Operational employment opportunities provided by the Sizewell C Project would provide a long-term continuation of a substantial number of skilled and secure jobs for local people. This is considered to comprise a **significant beneficial** effect on health and wellbeing.

Once operational, tangible environmental and social changes diminish, and local communities are familiar with operational activities and systems in place to protect the environment and health. On this basis, potential effects from stress and anxiety during operation are likely to be limited, therefore the effect on health and wellbeing is **not significant.**

6. Northern and southern park and rides

6.1 Introduction

Volumes 3 and **4** of the **ES** provide a summary description of the construction, operation, and removal and reinstatement phases of the northern park and ride at Darsham and southern park and ride at Wickham Market respectively, together with an assessment of the likely significant environmental effects that are predicted to arise as a result of these proposals.

6.2 Description of development

The northern park and ride facility would intercept construction workers travelling on the A12 to the main development site from the north, whilst the southern park and ride would intercept workforce travelling from the south. The park and rides would reduce the amount of additional traffic on local roads and through local villages.

The northern park and ride would be situated to the west of the A12, to the east of the East Suffolk line and to the north of Darsham rail station (refer to **Figure 6.1**). The approximately 27.9 hectare site lies within a predominantly arable farmland landscape with scattered woodland cover. Access to the site would be via a new temporary three arm roundabout, with works to Willow Marsh Lane and the temporary realignment of the A12 via the roundabout.

The southern park and ride would be located to the north-east of Wickham Market. Access to the site would be off the slip road from the B1078 which leads to the northbound A12 (refer to **Figure 6.2**). The approximately 26.4 ha site lies within a predominantly arable farmland landscape with scattered woodland cover, it also extends to include a section of the A12.

Both of the park and ride facilities would comprise:

- car parking areas for up to 1,250 car parking spaces (of which up to 40 would be accessible spaces) and up to 12 pick up only spaces;
- up to 10 spaces for minibuses/vans/buses;
- up to 80 motorcycle parking spaces;
- cycle shelters for up to 20 bicycles;
- bus terminus area, including shelters;
- security fencing and lighting;
- an amenity and welfare building comprising toilets and staff room;
- a security building including an administration office;
- a security booth adjacent to an exit loop for errant vehicles;
- other ancillary development, including road markings, signage, lighting, closed circuit television and utilities; and

- external areas including roadways, footways, landscaping (including bunds) and drainage infrastructure.

The southern park and ride facility would also comprise:

- a traffic incident management area; and
- a postal consolidation building;

If there is an incident within the main development site or external to the main development site on the local road network, which requires construction-related vehicles to be held or diverted, the traffic incident management area at the southern park and ride could be utilised to manage vehicles and remove them from the public road network while the incident is being resolved.

6.3 Construction

Construction of the park and ride facilities is anticipated to take approximately 12 to 18 months to complete. The construction programme comprises five separate phases:

- Phase 1: Preparation works;
- Phase 2: Earthworks and excavation;
- Phase 3: Laying of materials for parking areas and internal circulation routes and, for the northern park and ride, construction of roundabout and A12 realignment;
- Phase 4: Construction and fit out of buildings, and installation of utilities;
- Phase 5: Final surfacing.

The anticipated route of construction traffic to the park and rides would be from the A12 and follow the proposed access road alignment into the facility. At peak it is estimated that 42 lorry movements would access each site per day during construction.

It is estimated that the peak construction workforce would be approximately 60 persons on each construction site at any one time.

At the southern park and ride, the use of the bridleway (E-288-008/0) would not be stopped or curtailed during operation, but would be temporarily extinguished to the south of the proposed access road during the construction phase.

All construction works would be managed in accordance with construction environmental management measures set out within the **CoCP** (Doc Ref. 8.11).

6.4 Operation

The park and ride facilities would operate seven days a week during construction of the main development site. Bus services between the park and ride sites and the main development site would travel on the A12 and the B1122, and there would be a maximum of 100 daily bus arrivals and 100 daily bus departures.

The peak use of the park and ride facilities is anticipated to be in 2028, when the construction workforce for the Sizewell C project is at its peak. Buses would operate to accommodate the main development site construction shift pattern. The park and ride facilities would be operational between 05:00 and 01:00. When not

in use, the parking facilities would be closed but security staff would remain on site.

6.5 Removal and reinstatement

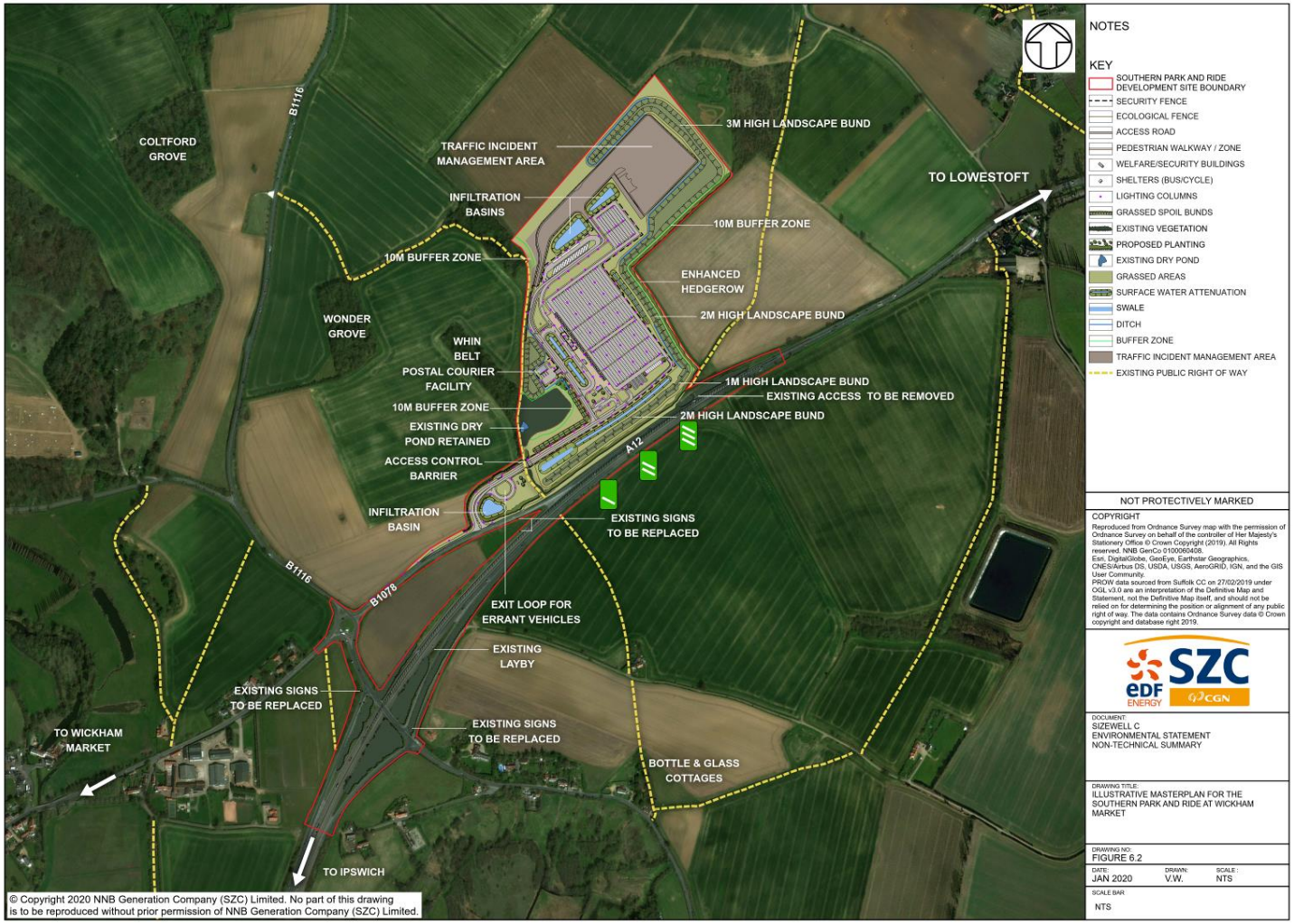
Once the need for the facility has ceased, the buildings and associated infrastructure, would be removed in accordance with a removal and reinstatement plan, which would maximise the potential for re-use of building, modules and materials. When the site has been cleared, the area would be returned to agricultural use and, at the northern park and ride, the A12 reinstated back to its original alignment.

It is anticipated that dismantling, removal and site reinstatement would follow a programme broadly the reverse of construction. Key activities would include but are not limited to:

- formation of demolition site compound;
- demolition plant mobilisation and ceasing of operational traffic movements and closure of facilities;
- removal of buildings, structures, and services;
- breaking up of concrete and surfacing;
- restoration of land; and
- management of waste and other materials.

Figure 6.1 Illustrative masterplan of the proposed northern park and ride

Figure 6.2 Illustrative masterplan of the proposed southern park and ride



6.6 Summary of likely environmental effects

This section provides a summary of the likely environmental effects predicted to occur as a result of the construction, operation and removal and reinstatement phases of the northern and southern park and rides. The proposed mitigation measures are also summarised.

a) Noise and vibration

i. Context

Chapter 4 of **Volumes 3** and **4** of the **ES** present the assessment of potential noise and vibration effects on the surrounding area as a result of the construction, operation, and removal and reinstatement of the park and rides. To inform the assessment, baseline sound surveys were undertaken at a number of monitoring locations in the vicinity of the proposed and ride sites to characterise the sound levels currently experienced by receptors such as residential properties.

ii. Construction phase

Noise is likely to be generated throughout the construction phase through works such as site preparation, earthworks and excavation, construction of parking areas, circulation routes, and buildings, and final surfacing, as well as from construction traffic.

A range of mitigation measures are proposed to mitigate the effects of the proposed park and ride development, including the provision of landscape bunds in the first phase of construction that provide acoustic screening and adoption of good practice measures to minimise noise and vibration impacts, as set out in the **CoCP** (Doc Ref. 8.11). Further acoustic screening and working methods would be considered by the contractor, such as limiting noisy construction activities on Saturday afternoons. As a result, all construction noise levels are predicted to be **not significant**. In addition, **no significant** effects from vibration during construction have been identified. Notwithstanding these outcomes, a programme of monitoring and a system for the receipt and recording of any noise and vibration complaints from occupiers of noise sensitive receptors would be put in place.

iii. Operational phase

During operation, noise is likely to be generated by the operation of the proposed development as a result of vehicle movements and mechanical plant. The mechanical plant would be selected so that the target noise levels are below the significant noise effect level. Overall, **no significant** effects are predicted.

iv. Removal and reinstatement phase

The same mitigation measures that applied during construction would also apply during the removal and reinstatement phase. With these measures in place, **no significant** effects are predicted.

b) Air quality

i. Context

Chapter 5 of **Volumes 3** and **4** of the **ES** present the assessment of potential effects relating to air quality arising from the

construction, operation, and removal and reinstatement of the park and rides.

To inform the assessment, the current and future year baseline pollutant levels were established through a review of existing published data from Defra and East Suffolk Council, and modelling of predicted traffic emissions for a baseline year of 2018, and future baseline years of 2023 and 2028. The assessment then considered how the predicted emissions arising from dust and construction traffic during the construction and removal and reinstatement phases, and traffic during operational phase at 'representative' receptors close to the park and ride sites compared to the established baseline conditions.

ii. Construction phase

During construction, the proposed construction activities could give rise to changes in dust deposition rates and to changes in concentrations of particulate matter (PM_{10}) in air. However, with the application of measures to manage dust, such as siting the construction access at least 10m from residential receptors and use of surface covering to minimise the extent of exposed soils and potential resuspension of dust, **no significant** construction dust effects are anticipated.

Further modelling and assessment of predicted concentrations for air pollutants (NO_2, PM_{10} and $PM_{2.5}$) was undertaken to consider the effects of construction traffic in 2023 on air quality at receptors in proximity to the park and ride sites. The assessment concluded that there would be **no significant** effects at representative receptor locations.

iii. Operational phase

The assessment of road traffic emissions from operational traffic associated with the park and ride site, considered both an average day and busiest day in 2028 during the operational phase. **No significant** effects are predicted to occur at representative receptor locations.

iv. Removal and reinstatement phase

As for the construction phases, the proposed activities associated with the removal and reinstatement phase of the park and ride sites could give rise to changes in dust deposition rates and to changes in concentrations of particulate matter (PM_{10}) in air. However, with the application of measures to manage dust generation **no significant** construction dust effects are anticipated.

Additionally, as construction traffic associated with the removal and reinstatement phase is not expected to be greater than the construction traffic, **no significant** effects are predicted.

c) Landscape and visual

i. Context

Chapter 6 of **Volumes 3** and **4** of the **ES** present the assessment of potential effects of the proposed park and ride sites on landscape character and visual amenity.

Northern park and ride

The review of baseline information identified two landscape character types, which were assessed in further detail due to the potential impacts on their character, the Ancient Estate Claylands (which include the site), and the adjacent Rolling Estate Claylands.

In addition, the following groups of visual receptors were considered:

- **Group 1** – Users of the cycle way along Willow Marsh Lane and Main Road, minor roads and local residents to the north and east of the site and immediately adjacent to it;
- **Group 2** – Users of the public footpath to the north of the site, south of the A144, and local residents in the vicinity of the route;
- **Group 3** – Users of public footpaths located to the east of the A12 and within the zone of visual influence, as well as local residents to the east and south-east of the site within 350m; and
- **Group 4** – Users of the public footpath between Martin's Farm and Cockfield Hall, to the west of the site, within approximately 600m.

Southern park and ride

The review of baseline information identified one landscape character types, which was assessed in further detail due to the potential impacts on its character, the Plateau Estate Farmlands.

In addition, the following groups of visual receptors were considered:

- **Group 1** - users of footpaths and bridleways within 400m of the site and to the north of the A12;
- **Group 2** - users of footpaths and bridleways within 700m of the site, local residents of Bottle and Glass cottages, Lower Hacheston and houses around Ivy House Farm and motorists to the south of the A12 on the B1078 and Station Road; and
- **Group 3** - local road users using the B1116 and Marlesford Road.

ii. Construction phase

The proposed park and ride facilities would lead to changes to the existing landscape and visual amenity during construction through the removal of elements of the existing landscape and alterations to landform, and views of construction activity. However, the design has sought to minimise loss of existing woodland and hedgerow where possible. Measures set out in the **CoCP** (Doc Ref. 8.11) would also reduce construction disturbance, such as the use of site hoardings and limits to light spill. Once constructed, the landscape bunds would also screen the sites.

It is anticipated that there would be **no significant** effects on the landscape character during construction of the park and ride facilities.

However, there would be a **significant adverse** visual effect on receptors within Group 1 of the northern park and ride facility, due

to the views of construction activity and elements seen above planting and the landscape bund.

The effects on the visual amenity for all other receptor groups are considered to be **not significant**.

iii. Operational phase

During the operation of the proposed park and ride sites, the effects arising from the presence and operation of the facilities on the landscape would be more perceptible within the site and in adjacent fields. However, **no significant** effects are anticipated on the landscape character.

Views of northern park and ride perimeter fencing, lighting and taller vehicles may be seen from receptors within Group 1, which are anticipated to experience **significant adverse** effects during both the day and at night (due to the visibility of proposed lighting).

The effects on the visual amenity of all other receptor groups are considered to be **not significant**.

iv. Removal and reinstatement phase

During the removal and reinstatement phase, the anticipated impacts on the landscape and visual amenity would be similar to the construction phase, and works would clear the site and replace the soil previously stored within the landscape bunds.

As with the construction phase, it is anticipated that there would be **no significant** effects on the landscape character during construction. However, there would be a **significant**, albeit temporary, adverse effect on receptors adjacent to the northern park and ride within Group 1, due to the view of construction activity and elements seen above planting and landscape bund.

The effects on the visual amenity for all other receptor groups are considered to be **not significant**.

d) Terrestrial ecology and ornithology

i. Context

Chapter 7 of **Volumes 3** and **4** of the **ES** present the assessment of potential effects of the proposed park and ride sites on ecology. The assessment considers effects on designated sites, habitats and protected species. In addition, a **Shadow Habitats Regulations Assessment Report** (Doc. Ref 5.10) is submitted with the application of development consent to identify potential effects on European designated sites (Natura 2000 sites).

The baseline assessment comprised a desk study, and a suite of ecological surveys, including extended Phase 1 habitat, amphibian, bat, and ornithological surveys.

Based on a combination of survey data collected to date and a precautionary approach, the following receptors were taken forward for a detailed assessment:

- northern park and ride:
  - great crested newt;
  - bat assemblage;

- southern park and ride:
  - bat assemblage.

ii. Construction phase

During the construction of the northern park and ride, great crested newts have the potential to be impacted due to loss and fragmentation of habitat. The only pond within the site would be retained and protected from construction works through the provision of a 10m buffer zone, where construction works would not be undertaken. Whilst there would be some loss of hedgerow within the site, the extent of habitat loss has been minimised, as far as practicable, by the retention of the woodland blocks and the majority of hedgerows within the site boundary. With mitigation in place, the effects on this species are considered to be **not significant**.

During the construction of both northern and southern park and rides, bats have the potential to be impacted by loss of habitat and disturbance from noise and light. The construction of the park and rides would result in the loss of foraging habitat and landscaping features suitable for use by commuting and roosting bats. However, this effect has been minimised, as far as practicable, through the retention of most of the hedgerows on site. Disturbance from noise and light would be minimised, as far as practicable, by the provision of closed boarded fencing along existing woodland blocks and minimising construction activity at night (where lighting would only be provided for safety and security). Overall, with these measures in place, the effects on bats are considered to be **not significant**.

Brown long-eared bat

iii. Operational phase

During the operation of the proposed northern park and ride, **no further effects** on great crested newts have been identified.

Impacts on the bat assemblage would be associated with disturbance from noise and light as the park and ride facilities would operate overnight. However, the extent of noise is likely to be restricted to the site and habitats on the immediate boundary. Lighting would be designed to minimise light spill beyond site boundaries, and therefore, light spillage to Nursery woodland adjacent to the northern park and ride and Whin Belt woodland block adjacent to the southern park and ride would be minimal. Whilst lighting levels would be higher along the new access roads, which could act as a deterrent to bats, only a relatively small

number of bats have been recorded within the sites. Overall, the effects on bats are considered to be **not significant**.

iv. Removal and reinstatement phase

During the removal and reinstatement phase, activities would be similar to that during construction and the land would be restored to agricultural use. Through the reinstatement of the site, the connectivity of habitats would be re-established. Overall, **no significant** effects on great crested newt or bats are anticipated.

e) Amenity and recreation

i. Context

Chapter 8 of **Volumes 3** and **4** of the **ES** present the assessment of potential effects of the proposed park and ride sites on amenity and recreation receptors. The assessment of amenity and recreation effects includes consideration of visual, noise and transport impacts which have the potential to affect amenity and use of recreational resources. The following resources have been scoped into the assessment:

- Northern park and ride:
  - A Sustrans link to National Cycle Route 1 runs along Willow Marsh Lane and passes through the northern part of the site.
- Southern park and ride:
  - There are four public rights of way which run close to the boundaries of or are within the southern park and ride site.

ii. Construction phase

Northern park and ride

Users of the Sustrans link would experience greatest changes between the A12, and the new access road into the site, where Willow Marsh Lane and the A12 would be altered to connect to the park and ride site. The route would not be closed during construction, however, a temporary diversion would be provided while construction work is being undertaken, to ensure that it remains open to cyclists and pedestrians. Construction would alter the visual amenity of users who would have views of construction activities and traffic. Users would also experience changes in noise environment, however, this is not considered to be substantial. Additionally, whilst there may be impacts on air quality from dust generated during construction. All construction disturbance would be minimised and managed in accordance with the **CoCP** (Doc Ref. 8.11). Overall, the effect on the users of the Sustrans link is **not significant**.

Southern park and ride

During construction of the proposed southern park and ride, users of the public rights of way scoped into the assessment may have views of construction works and landscape bunds. Users may also experience an increase in noise and impacts on air quality due to the generation of dust by the construction works and the increase in construction traffic along the A12. The existing bridleway to the west of the site would be temporarily diverted during the construction of the proposed access road. All construction disturbance would be minimised and managed in accordance with

the **CoCP** (Doc Ref. 8.11). Overall, the effect on the users of public rights of way is **not significant**.

iii. Operational phase

Northern park and ride

During the operation of the northern park and ride site, users of the Sustrans link would experience disruption due to the introduction of the new access road across Willow Marsh Lane. This would require cyclists to slow their speed on the approach and potentially stop at the junction, introducing a potential delay at this location on the route. Additionally, there would be visual changes along the route due to views of the site, and potential changes to air quality and noise from the operation of the site. However, these effects would be limited and, overall, are considered to be **not significant**.

Southern park and ride

During operation of the proposed southern park and ride, users of the public rights of way within or adjacent to the site may have limited views of the operational facility. Users may also experience potential changes to air quality and noise due the increase in traffic along the A12 and would encounter vehicle traffic at the crossing of the access road where there was no traffic previously. However, these effects would be limited, and **no significant** effects are predicted.

iv. Removal and reinstatement phase

Once the need for the facility has ceased, each site would be restored in accordance with a removal and reinstatement plan. Activities would be broadly similar to those undertaken during the construction phase and likely to result in similar impacts. Overall the effects on users of public rights of way are **not significant**.

f) Terrestrial historic environment

i. Context

Chapter 9 of **Volumes 3** and **4** of the **ES** present the assessment of potential effects of the proposed park and rides on above and below ground heritage assets.

Northern park and ride

There are no designated heritage assets within the site. The closest listed buildings include the Grade II listed Oak Hall and Old Hall within 500m of the site boundary.

Similarly, there are no records of archaeology within the site, although remains associated with Romano-British and medieval activity have been identified within the surrounding area.

The landscape character area within the site is of low historic value. However, several hedgerows within the site could be considered of potential historic importance, as they follow field boundaries shown on pre-1845 mapping.

Southern park and ride

There are no designated heritage assets within the site, although there are 31 listed buildings (located at Hacheston and Lower Hacheston), and two conservation areas (Wickham Market

Conservation Area and Marlesford Conservation Area) within the study area.

Previous archaeological investigations have found remains associated with Romano-British and Iron Age activity within the site.

As for the northern park and ride, the landscape character area within the site is of low historic value. However, several hedgerows within the site could be considered of potential historic importance, as they follow field boundaries shown on pre-1845 mapping.

ii. Construction phase

During construction of the park and ride sites, there would be intrusive groundworks that would disturb any surviving and unrecorded archaeological remains. Prior to the commencement of construction, an agreed scheme of archaeological investigation would be undertaken to ensure that the archaeological interest of any significant deposits and features within the site could be appropriately investigated, recorded and disseminated, preserving the archaeological interest of these remains. **No significant** effects are anticipated on archaeology at the northern park and ride site. However, a **significant adverse** effect has been identified at the southern park and ride site due to the confirmed presence of Romano-British remains.

Construction activities would introduce new visible and audible elements which may impact on the setting of built heritage assets identified within the study areas of park and ride facilities. Visibility of construction activities would be limited from the identified heritage assets due to the presence of existing hedgerows and topography which would partially screen the works. Similarly, whilst noise may increase at certain times of day or at certain times within the construction programme, with appropriate noise mitigation in place, as set out within the **CoCP** (Doc Ref. 8.11), this is unlikely to impact the ability to understand or appreciate the heritage value of the assets. Overall, **no significant** effects have been identified on built heritage assets.

Construction works are anticipated to have impacts on the historic landscape character. However, the construction works would be contained within specific fields and any loss of historic routeways or boundaries would be minimised, where practicable. The introduction of landscape bunds would screen the development and any hedgerows lost would be replanted subsequently. As a result, **no significant** effects are anticipated.

Archaeological investigation works

iii. Operational phase

Any disturbance of archaeological heritage assets within the sites would have occurred during construction and, therefore, **no further effects** are anticipated during operation.

The northern park and ride facility would be largely screened from Oak Hall and Old Hall during operation, due to the intervening hedgerows, planting and topography and, therefore, **no significant** effects are anticipated on built heritage assets.

Similarly, the southern park and ride would be largely screened by hedgerows and planting from the Wickham Market Conservation Area, Marlesford Conservation Area and the listed buildings at Hacheston and Lower Hacheston. Any visibility would be glimpsed, and the site would appear as a distant element in longer views across the landscape. **No effect** on built heritage assets would arise.

Whilst the operation of the park and ride facilities would represent a temporary change to the use of the site, there would be minimal loss of historic land divisions or routeways, and therefore **no significant** effects on the historic landscape character are anticipated.

iv. Removal and reinstatement phase

Any disturbance and/ or removal of archaeology within the site would have occurred during the construction and, therefore, **no further effects** are anticipated during removal and reinstatement.

While construction-related activity may be visible or audible at times during removal and reinstatement, works would be screened by the landscape bunds and mature planting, with progressive removal of the landscape bunds during the reinstatement of the site to agricultural use. Works would be more perceptible following the removal of the bunds, presenting a short-term and temporary change in setting. However, the site would be returned to agricultural use and include the restoration of sections of hedgerows, which would reverse any perceptual change to the setting of heritage assets or historic landscape character. Therefore, **no significant** effects would arise.

g) Soils and agriculture

i. Context

Chapter 10 of **Volumes 3** and **4** of the **ES** present the assessment of potential effects of the proposed park and ride facilities on soils and agriculture.

Northern park and ride

The site comprises slowly permeable, seasonally wet, slightly acid but base-rich loamy and clayey soils. Approximately 26.3ha of the site comprises agricultural land, out of which 21.8ha is best and most versatile agricultural land. The agricultural land on the site is owned by one agricultural business and forms part of a wider holding. The land also forms part of an entry level agri-environment scheme.

Southern park and ride

The site comprises predominantly sandy soils with some clay loam topsoil and clayey material at depth. Approximately 17.5ha of site is agricultural land, out of which 5.4ha is classified as best and most versatile agricultural land. All agricultural land on the site falls within the ownership of one land holding and forms part of a wider estate.

ii. Construction phase

Northern park and ride

Construction of the northern park and ride site would result in the temporary, long term loss of the 26.3ha of agricultural land from primary agricultural productivity, out of which 21.8ha is best and most versatile land. This is considered to be a long-term temporary **significant** effect on best and most versatile agricultural resources.

The temporary land take by the northern park and ride represents approximately 11.4% of the total area of the landholding affected. SZC Co. would continue to liaise with the landowner to reduce the effects the holding, as far as practicable. On this basis, it is considered that the effects would be **not significant**.

The temporary loss of land under an entry level agri-environment scheme would be very small in terms of the regional resource of approximately 70,000ha. This loss is considered **not significant**.

Southern park and ride

Construction of the southern park and ride site would result in the temporary, long term loss of 17.5ha of land from primary agricultural productivity. Approximately 5.4ha of this land is best and most versatile land. The temporary loss of this land is considered to result in **no significant** effects, due to the limited area.

The temporary land take represents approximately 4.6% of the total area of the landholding affected. SZC Co. would continue to liaise with the landowner to reduce the effects on this holding, as far as practicable. On this basis, it is considered the effects would be **not significant**.

iii. Operational phase

During operation of the park and ride facilities, no additional land would be required beyond that reported for the construction phase, and **no further effects** on best and most versatile agricultural resources or land holdings would occur.

There is the potential for invasive weed species to grow within the site. However, this would be controlled using an appropriate management regime that would remove weed growth that might threaten adjoining agricultural land. Therefore, **no significant effects** are anticipated.

iv. Removal and reinstatement phase

Once the need for the park and ride facilities has ceased, the buildings and associated infrastructure would be removed and the land returned to agricultural use. This would be undertaken in accordance with a soil management plan, produced for the site and specific to site conditions. Overall, **no significant effects** are anticipated.

h) Geology and land quality

i. Context

Chapter 11 of **Volumes 3** and **4** of the **ES** present the assessment of potential effects of the proposed park and ride facilities on ground conditions.

Northern park and ride

The geology at the northern park and ride site comprises chalky till as well as outwash sands and gravels, silts and clays. There is also a thin strip of windblown deposits, comprising clay, silt, sand and gravel deposits on the western side of the site. The bedrock of geology comprises sandstone, beneath which lies clay and chalk.

Whilst no contamination has been identified on site to date, there is potential for historical contamination from the construction of roads adjacent to the site, agricultural use on site, Darsham service station, Darsham railway station and the East Suffolk line, as well as other land uses located near to the site.

The site is not at risk or is at very low to low risk of hazards associated with ground conditions, such as landslides, ground stability hazards and ground dissolution, shrinking or swelling clay. There are also no geological faults located within the study area. A low unexploded ordnance risk has been identified, associated with air raids in several areas around Leiston and Sizewell during World War II.

Southern park and ride

The site is largely underlain by a mix of consolidated sand and gravels, and poorly sorted sediments. The bedrock geology beneath the southern park and ride site comprises sands.

Whilst no contamination has been identified on site to date, there is potential for historical contamination due to areas of made ground within the site, a disused sand pit (which is likely to have been infilled), roads surrounding the site as well as other land uses located near to the site.

The site is not at risk or is at very low risk of hazards associated with ground stability. There are no geological faults within the study area. A low unexploded ordnance risk has been identified.

ii. Construction phase

The construction phase may introduce new sources of contamination and disturb and mobilise existing contamination within soils. However, as set out within the **CoCP** (Doc Ref. 8.11), appropriate pollution incident control measures and the safe storage of fuel, oils and equipment would be implemented.

Additional ground investigation, risk assessments and assessment of unexploded ordnance would be undertaken to specify measures within design to mitigate against ground stability, soil erosion and ground contamination hazards. With these measures in place and following further ground investigation (and remediation if necessary), the effects on human health, water and property receptors during construction phase are considered as **not significant**.

Waste soils would be generated during construction through excavations and during the installation of services. There is the potential that waste soil generated would be classified as unsuitable for reuse on site, requiring removal from the site. The design and a materials management plan would seek, as far as reasonably practicable, to reuse and recycle soils on site and to actively reduce the amount of hazardous soils generated. On this basis, **no significant effects** have been identified.

iii. Operational phase

During operation, there would be limited impacts of soil erosion, on mineral resources, and on waste soils through maintenance operations, with the majority of these hazards having been mitigated during construction. Therefore, **no significant** effects due to these impacts are likely to occur.

The operation of the site could introduce new sources of contamination, due to leaks and spillages. The **Outline Drainage Strategy** (included within **Volume 2, Appendix 2A** of the **ES**) incorporates measures to prevent pollution from the operation of the park and ride facilities. In addition, the park and rides would be operated in accordance with relevant regulations, best practice and pollution prevention guidance. Therefore, **no significant** effects associated with the risk of contamination have been identified.

iv. Removal and reinstatement phase

The removal and reinstatement phase may result in effects on soil erosion, waste soils and mineral resources through the removal of structures, foundations, pavements, drainage and earthworks and reinstatement of subsoil/topsoil. The works would be undertaken in accordance with the **CoCP** (Doc Ref. 8.11) to minimise soil exposure, as far as practicable, and would be managed to reduce soil erosion and dust production. In addition, soils would be managed through a materials management plan to allow the re-use of suitable soils during the reinstatement works. Effects on soil erosion, mineral resources and waste soils are therefore assessed as **not significant**.

The assessment of contamination effects during this phase considered any new sources and pollution pathways which may be introduced by removal and reinstatement activities. With mitigation implemented during the removal and reinstatement phase in accordance with the **CoCP** (Doc Ref. 8.11), risks identified to human health, water, property and ecological receptors are assessed as **not significant**.

i) Groundwater and surface water

i. Context

Chapter 12 of **Volumes 3** and **4** of the **ES** present an assessment of potential effects on groundwater and surface water resources arising from the park and ride facilities. The assessment is also supported by the **Northern Park and Ride Flood Risk Assessment** (Doc. Ref 5.3), the **Southern Park and Ride Flood Risk Assessment** (Doc. Ref 5.4) and project-wide **Water Framework Directive Compliance Assessment** (Doc. Ref 8.15).

Northern park and ride

Several aquifers lie beneath the site; the windblown deposits and chalky till which are classified as Secondary Aquifers, and the sandstone bedrock is classified as a Principal Aquifer (see **section 5.8l)** for definitions). The chalky till at the site is expected to be of relatively low permeability, and therefore has a limited connectivity to groundwater within the underlying bedrock.

The northern park and ride site is located within the River Yox catchment area and within the reach of the Minsmere Old River water body. The River Yox is located approximately 900m to the south of the site, however a smaller, unnamed watercourse flows along the western boundary of the site before joining the Minsmere Old River approximately 1.2km south-east of the site.

There are no known water abstractions within 500m of the site.

The site is located in Flood Zone 1, meaning it has less than 1 in 1,000 annual probability of river or sea flooding. The majority of the site is also at low risk of flooding from surface water during heavy rainfall events, except for a small area in the south-western side of the site.

Southern park and ride

Two Secondary Aquifers lie beneath the site of the southern park and ride (the Lowestoft Formation Secondary A Aquifer and the Lowestoft Formation diamiction Secondary Aquifer (undifferentiated)). The site is also located within the catchment of the River Deben to the south-west and the River Ore to the north-east (the site does not drain directly into either of these water bodies), and within the reach of the Deben (Brandeston Bridge - Melton) water body. The River Deben is located approximately 800m to the south-west of the southern park and ride site, however, the River Deben floodplain includes a network of drainage ditches and small storage reservoirs which are located approximately 250m to the south of the southern park and ride site.

There are two known water abstractions within 500m of the site (one groundwater and one surface water). A further three groundwater abstractions and one surface water abstraction are located within 1km of the southern park and ride site.

The site is located in Flood Zone 1, meaning it has a very low risk (less than 1 in 1,000 annual probability) of flooding from rivers or the sea. The majority of the site is also at very low risk of flooding from surface water, except for four small isolated areas within the site.

ii. Construction phase

Construction activities could impact upon groundwater and surface water receptors through reduction in discharge to ground, changes to surface water flows and hydromorphology. The increase in the supply of fine sediment, or release of fuels, oils and lubricants through leaks and spills, could have adverse impacts on both groundwater and surface water hydrology, geomorphology and water quality. The **CoCP** (Doc Ref. 8.11) sets out proposed measures to be implemented by the construction contractors to protect groundwater and surface water. In addition, ground investigation and relevant risk assessments would be undertaken prior to commencement of construction works, with remediation completed, if necessary. With these measures in place, **no significant** effects on groundwater and surface water resources during the construction phase have been identified.

iii. Operational phase

An **Outline Drainage Strategy** (refer to **Volume 2, Appendix 2A** of the **ES**) has been developed for the park and ride sites to manage and control surface water run off rates through infiltration to ground. Pollution prevention techniques would be implemented through standard good practice and good design, including the use of sustainable drainage systems, such as swales and infiltration basins. The drainage strategy incorporates measures to minimise effects on groundwater and surface water flows and to prevent contamination from accidental spills and leaks during the operation of the park and ride. As a result, the effect from the operation of the proposed park and ride facilities on groundwater and surface water levels and quality is considered to be **not significant**.

The park and ride sites are located in Flood Zone 1, so there would be no loss in functional floodplain storage or displacement of river flood water. However, the proposed park and ride sites would increase impermeable areas within greenfield land. Surface water run-off would be managed through sustainable drainage measures, as set out in the **Outline Drainage Strategy** (**Volume 2, Appendix 2A** of the **ES**), to ensure **no significant** effects from surface water flood risk occur.

iv. Removal and reinstatement phase

During the removal and reinstatement phase the site would be reinstated to existing conditions as far as reasonably practicable. The removal and reinstatement activities would result in similar impacts as during the construction phase. In addition, intrusive activities from the removal of infrastructure could create new pathways for contamination. However, as during the construction phase, works would be undertaken in accordance with the **CoCP** (Doc Ref. 8.11). Further ground investigation and risk assessment post operation would confirm the risks at the time of removal and reinstatement and identify if there are areas requiring further remediation. With these measures in place, **no significant** effects are anticipated on groundwater and surface water resources during removal and reinstatement phase.

7. Two village bypass

7.1 Introduction

Volume 5 of the **ES** provides a detailed description of how the the two village bypass would be constructed and operated, and the likely significant environmental effects that are anticipated to arise as a result of these activities.

7.2 Description of development

The two village bypass would comprise a new, permanent, 2.4 kilometre (km) single carriageway road, with a design speed of 60 miles per hour (mph), that would depart from the A12 to the south-west of Stratford St. Andrew before re-joining the A12 to the east of Farnham (see **Figure 7.1**).

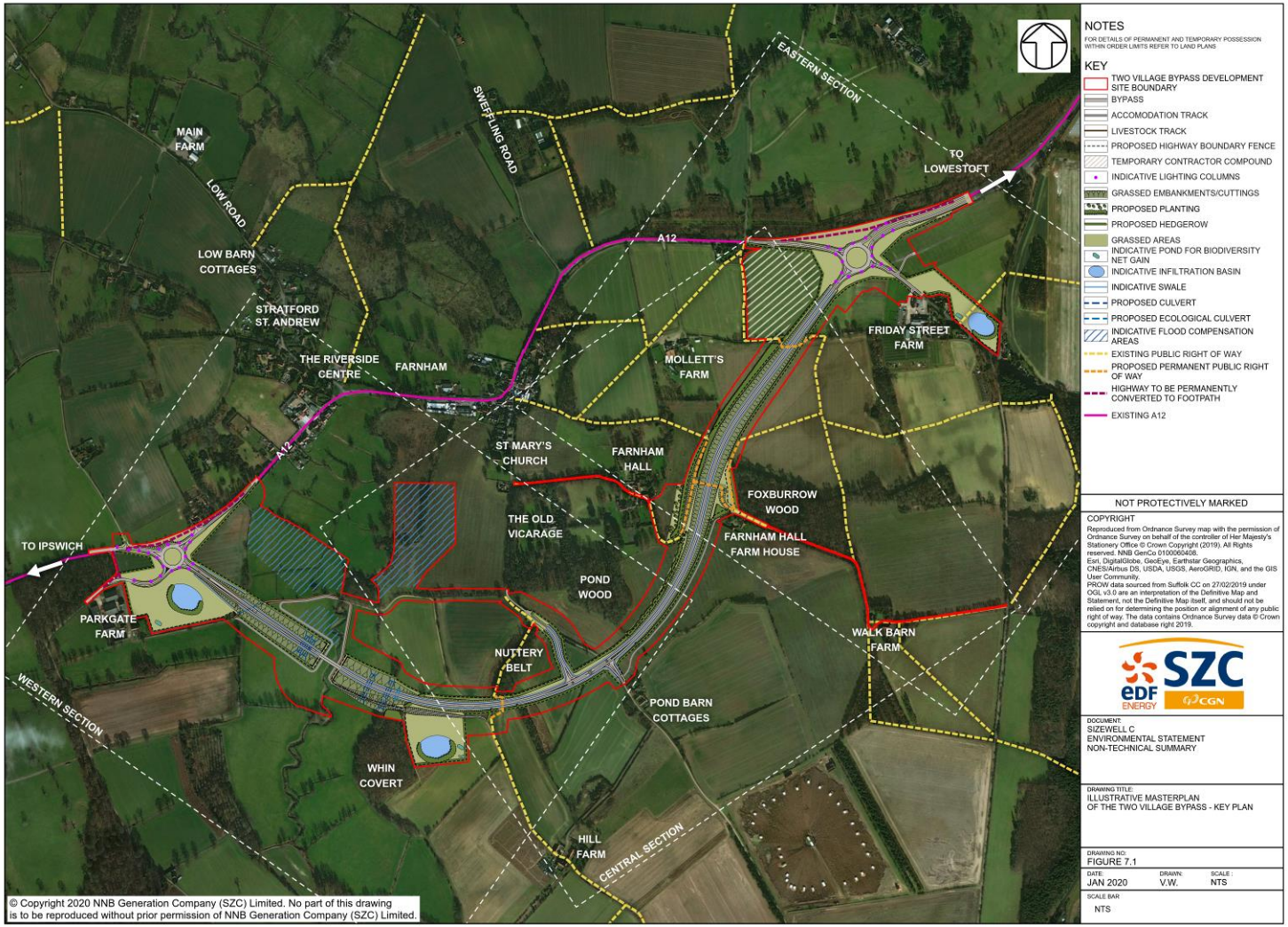
The two village bypass would effectively create a new route to the south of Stratford St. Andrew and Farnham, thus bypassing the two villages. Once operational, the two village bypass would form a new section of the A12, though the existing section of the A12 through the villages would be retained.

The two village bypass would include:

- provision of a four arm roundabout at the western end of the road, east of Parkgate Farm and Stratford Plantation to connect the road to the A12 and Tinker Brook;
- a multi-span overbridge for all traffic to allow a crossing over the River Alde;
- provision of flood compensation areas to the north of the bypass, largely to the west of the River Alde;
- provision of a staggered junction between Nuttery Belt and Pond Wood to maintain access on both sides of the route of the proposed two village bypass
- a cutting as the route of the bypass passes to the east of Farnham Hall. A non-motorised user overbridge, over the two village bypass road, would be provided and two public rights of way diverted to maintain connectivity across the route; and
- provision of a four arm roundabout at the eastern end of the road, to replace the existing junction of the A12, with the A1094 (Friday Street).

Where possible, public rights of way would be retained on their existing alignments. However, several public rights of way would require a diversion to ensure connectivity across the route of the bypass. The route of the proposed two village bypass would be mostly unlit, with lighting only proposed at the A12 western roundabout and the A12/A1094 eastern roundabout.

Figure 7.1 Illustrative masterplan of the proposed two village bypass



7.3 Construction

It is expected that the proposed two village bypass would be constructed during the early years of construction of the Sizewell C Project and would take approximately 24 months to construct. Construction would be largely undertaken in a west to east direction off-line, with the exception of junction tie-ins. Construction works would take place during Monday to Saturday 07:00 to 19:00 hours, with no working on Sundays or bank holidays. However, some activities may require 24 hour working and East Suffolk Council would be notified in advance.

The anticipated construction sequence would follow the below stages:

- Preparatory works: site set-up and clearance of vegetation, erection of temporary fencing, and creation of alternative access arrangements and rights of way, setting up of temporary contractor compounds, welfare facilities and temporary utilities;
- Construction works: earthworks, road construction and surfacing, construction of bridges and civil structures, installation of utilities and drainage, pavements, kerbs, footways and paved areas, permanent fencing, road signs and markings, road lighting, permanent connections to existing road networks, and landscaping.

It is envisaged that a temporary contractor compound would be requried during construction, located at the eastern end of the bypass, west of the A12 / A1094 (Friday Street) roundabout. It is assumed that all contractor vehicles would enter the temporary contractor compound from the A12 or A1094, and construction is expected to generate up to 60 lorry (each way) movements per day during the construction period (120 movements in total).

All construction works would be managed in accordance with construction environmental management measures set out within the **CoCP** (Doc Ref. 8.11).

7.4 Operation

The route of the proposed two village bypass would be open for public use alongside construction traffic associated with the Sizewell C Project. Routine maintenance would be undertaken, as required, such as periodic inspection and maintenace of drainage systems and vegetation clearance.

During the peak construction period at the Sizewell C main development site, the daily number of vehicles using the proposed route of the two village bypass, on a typical day, is forecast to be 22,200; of which 1,550 vehicle movements would be from all Sizewell C-related traffic. This would reduce flows along the existing A12 to 250 vehicle movements.

Once construction of the Sizewell C main development site is complete, the two village bypass would remain open and the daily number of vehicles using the proposed route of the two village bypass, on a typical day, is forecast to be 22,450.

7.5 Summary of likely environmental effects

This section provides a summary of the likely environmental effects predicted to occur as a result of the construction and operation of the proposed two village bypass. The proposed mitigation measures are also summarised.

a) Noise and vibration

i. Context

Chapter 4 of **Volume 5** of the **ES** presents the assessment of potential noise and vibration effects as a result of the construction and operation of the two village bypass.

To inform the assessment, baseline sound surveys were undertaken at monitoring locations in the vicinity of the two village bypass site and along the existing A12 to characterise the sound levels currently experienced by receptors such as residential properties. Baseline road traffic noise modelling has also been undertaken.

The assessment considered the anticipated noise and vibration levels during construction activity and the combined impact with construction traffic and operational traffic at representative receptor groups within the vicinity of the site and along the existing A12.

ii. Construction phase

The assessment considered noise and vibration generated through construction activities such as site clearance, construction of the temporary contractor compound, earthworks, surfacing of the road and construction of the bridges. A range of measures are proposed to mitigate the effects during construction including good practice measures to minimise noise and vibration impacts as set out in the **CoCP** (Doc Ref 8.11). Further acoustic screening and working methods would be considered by SZC Co. and its contractors, such as limiting noisy construction activities on Saturday afternoons. As a result, all construction noise levels are predicted to be **not significant**. In addition, **no significant** effects from vibration during construction have been identified. Notwithstanding these outcomes, a programme of monitoring and a system for the receipt and recording of any noise and vibration complaints from occupiers of noise sensitive receptors would be put in place.

iii. Operational phase

The assessment of road traffic noise from the two village bypass considered three operational scenarios:

- During the typical day of the peak construction period (in 2028) when the road would be used by Sizewell C construction traffic as well as be open to the public;
- During the busiest day of the peak construction period (in 2028) when the road would be used by Sizewell C construction traffic as well as be open to the public; and
- When construction of the power station is complete and Sizewell C is operational (in 2034).

During the peak construction year for the main development site (2028) when the two village bypass is used for Sizewell C

construction traffic, **significant adverse** noise effects have been identified on residential properties at: Parkgate Farm, Hill Farm, The Old Vicarage, Pond Barn Cottages, Farnham Hall, Farnham Hall Farmhouse, Mollet's Farm, Friday Street Farm, 51 Friday Street, Church Bungalow and Walk Barn Farm. During the busiest day **significant adverse** effects would also occur on properties at: Chapel Cottages, Rosehill Cottages and Mill Lane West.

Noise levels at properties along the bypass are expected to reduce following the completion of the Sizewell C power station, as the bypass would no longer be used for Sizewell C construction traffic. However, **significant adverse** noise effects are anticipated to remain at the following residential properties: Hill Farm, Pond Barn Cottages, Farnham Hall, Farnham Hall Farmhouse, and Walk Barn Farm.

Significant beneficial effects are anticipated during all three scenarios at the majority of receptors along the A12, where it passes through the villages of Stratford St Andrew and Farnham. This is due to the reduction of traffic travelling through the villages along the existing section of the A12, with the majority of vehicles using the new bypass instead.

SZC Co. would continue to seek measures to avoid or reduce these significant adverse effects. The **Noise Mitigation Scheme** would be made available for all properties, where the specified noise criteria are exceeded (see **Volume 2, Appendix 11H** of the **ES**). In doing so SZC Co. would engage with stakeholders to further understand the affected receptors, their use and the benefit of the measures.

b) Air quality

i. Context

Chapter 5 of **Volume 5** of the **ES** presents the assessment of potential effects relating to air quality arising from the construction and operation of the two village bypass on the surrounding area.

There is one air quality management area (AQMA) in the study area. This AQMA is located along the A12, within Stratford St Andrew, approximately 150m from the site boundary. This AQMA was declared in 2014 for exceedances of nitrogen dioxide (NO_2) annual mean objectives, which is a common air pollutant associated with road traffic.

To inform the assessment, the current and future year baseline pollutant levels were established through a review of existing published data from Defra and East Suffolk Council, and modelling of predicted traffic emissions for a baseline year of 2018, and future baseline years of 2023, 2028 and 2034. The baseline assessment demonstrated that the existing concentrations of air pollutants are well below air quality standards set out in legislation for the protection of human health across the study area.

The assessment considered the predicted emissions arising from dust and construction traffic during the construction phase, and traffic during operational phase at 'representative' receptors close to the two village bypass site and along the existing A12.

ii. Construction phase

During construction, the proposed construction activities could give rise to changes in dust deposition rates and to changes in concentrations of particulate matter (PM_{10}) in air. An **Outline Dust Management Plan** has been developed (refer to **Volume 2, Appendix 12A** of the **ES**) which sets out measures to manage activities to minimise impacts of dust, including effective dust suppression measures and monitoring. With the implementation of these measures, **no significant** effects on air quality from construction dust emissions are anticipated.

Due to the volume of construction traffic expected during construction of the proposed two village bypass, and the number of developments undergoing construction during the early years of the Sizewell C Project in the wider study area (Lowestoft to Ipswich), a detailed assessment of transport emissions for the construction phase scenario has been undertaken. Concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the nearby sensitive receptors show imperceptible to low increases, the greatest of which would be at properties located on The Street in Farnham. However, the overall concentrations would be well below the air quality objective values, and therefore the effects are considered to be **not significant**.

iii. Operational phase

The assessment considers the effects on air quality in two operational scenarios:

- during peak construction of the main development site when the proposed two village bypass would also be used for Sizewell C construction traffic as well as be open to the public (2028); and
- once the Sizewell C power station is complete and operational (2034).

The assessment considers emissions from operational traffic using the two village bypass at receptors along the new road and existing road network. In both operational scenarios, the assessment concludes that the effects on representative receptors along the proposed two village bypass would be **not significant**.

Receptors along the existing A12 through the villages of Stratford St Andrew and Farnham would experience a reduction in emissions from a reduction in traffic movement, leading to improvements in air quality. However, due to the overall low concentrations, the effects on air quality are considered to be **not significant**.

c) Landscape and visual

i. Context

Chapter 6 of **Volume 5** of the **ES** presents assessment of potential effects of the proposed two village bypass on the landscape character and visual amenity during construction and operation.

The review of baseline information identified three landscape character types to be assessed in further detail due to the potential impacts on their character, Rolling Estate Sandlands, Valley Meadowlands and Rolling Estate Claylands.

Five receptor groups were also identified which may experience effects on visual amenity and were, therefore, considered further in the assessment:

- **Group 1** - Users of local footpaths, local roads (the A1094 and unnamed roads off it) and residents and visitors around Friday Street Farm shop, to the western extent of the site.
- **Group 2** - Users of footpaths, local access roads and residents around the south-east of Farnham and Farnham Hall.
- **Group 3** - Users of footpaths and local roads (unnamed) south of Farnham, as well as local residents along them, within approximately 350m.
- **Group 4** - Pedestrians using the footways along the A12 and local residents along the A12 at Stratford St. Andrew, to the north of the site; and
- **Group 5** - Users of Tinker Brook to the west of the site, within approximately 250m, and residents along it.

The assessment also considered long distance routes as well as the effects on the special landscape area (which covers parts of the three landscape character types identified above), relating predominantly to the valley of the River Alde and the parklands at Glemham Park and Benhall Lodge.

The design has sought to retain existing woodland and hedgerow where possible, except where the proposed two village bypass crosses existing field boundaries or tree belts. Hedgerow planting is proposed along the route to replace that lost as well as woodland planting along at the top of the cutting where the route of the two village bypass passes Farnham Hall and Foxburrow Wood.

ii. Construction phase

The proposed two village bypass would lead to changes to the existing landscape character and visual amenity during construction through the removal of elements of the existing landscape and alterations to landform, as well as views of construction activity. However, the design has sought to minimise loss of existing woodland and hedgerow, where possible, and measures set out in the **CoCP** (Doc Ref. 8.11) would help reduce construction disturbance, for example by limiting light spill.

No significant effects on the landscape character during construction are anticipated. However, there would be **significant** adverse effects on three of the receptor groups identified (Groups 1, 2, and 4) during construction due to the views of construction activity and plant seen above existing vegetation.

The effects on the visual amenity for the other receptor groups and users of long-distance route are considered to be **not significant**, as is the effect on the special landscape area.

iii. Operational phase

The proposed two village bypass would become a permanent feature within the landscape. During operation, the scale of effects on the landscape character would remain similar to those as in construction except with the removal of the contractor compounds. Overall, **no significant** effects are anticipated on the landscape character.

During the first year of operation, visual amenity effects would reduce from the removal of construction activity and contractor compounds in views, however, where the road rises on embankments or on bridges, it would be a prominent feature. By year 15, the planting proposed within the landscape strategy would mature and would become more effective at screening, such that the visual effects would reduce to **not significant** at all receptor groups beside Groups 1 and 4. For these two groups, **significant adverse** effects would remain due to visibility of the proposed lighting at night.

The effects on the visual amenity for the other receptor groups and users of long-distance route are considered to be **not significant**, as is the effect on the special landscape area.

d) Terrestrial ecology and ornithology

i. Context

Chapter 7 of **Volume 5** of the **ES** presents the assessment of potential effects of the proposed two village bypass on terrestrial ecology and ornithology within the site and surrounding area. The assessment considers the effects on designated sites, habitats and protected species. In addition, a **Shadow Habitats Regulations Assessment Report** (Doc Ref. 5.10) is submitted with the application of development consent to identify potential effects on European designated sites (Natura 2000 sites).

Based on a combination of survey data collected to date and a precautionary approach, the following receptors were taken forward for a detailed assessment:

- Alde-Ore Estuary SPA, SAC, Ramsar site and SSSI;
- Foxburrow Wood CWS;
- habitats, including lowland mixed deciduous woodland, hedgerows, River Alde, floodplain grassland and associated invertebrate assemblage;
- breeding bird assemblage;
- bat assemblage;
- otter; and
- water vole.

ii. Construction phase

The route of the proposed two village bypass has been designed to avoid direct land take from designated sites. The design has also sought to retain existing woodland and hedgerows where possible, except where the proposed bypass crosses existing field boundaries or tree belts. The crossing of the River Alde would be via a 60m bridge which would preserve the integrity of the banks, bed and bank side. The site boundary has also been amended to avoid Foxburrow Wood CWS (which has been scoped out of construction assessment).

The Alde-Ore Estuary SPA, SAC, Ramsar site and SSSI is 3.4km from the site and is linked to the site via to River Alde. However, all construction works would be conducted in compliance with **CoCP** (Doc Ref. 8.11) and no equipment or materials would be stored within 10m of watercourse or in high flood risk areas. **No significant** effects are therefore anticipated**.**

Table 7.1 provides a summary of habitats of ecological importance that would be lost and re-provided by the proposed two-village bypass. Whilst there would a loss of woodland and hedgerow due to the construction of the proposed two village bypass, new planting would be provided in strategic locations along the route to integrate these areas into the surrounding landscape and reduce impacts on habitat fragmentation. The landscape planting would be undertaken towards the end of the construction phase and it is anticipated that it would take a number of years to mature and be of maximum benefit to ecological receptors. The overall effect on these habitats is considered to be **not significant**.

Furthermore, the loss of species-poor floodplain grassland is considered **not significant**. If flood compensation areas are required, these areas could be enhanced and could include additional surface water features to maximise the ecological benefits. By managing construction activities in accordance with the **CoCP** (Doc Ref. 8.11), **no significant** effects on the water quality of hydrology and hydrogeology of the floodplain grassland is anticipated.

The invertebrate assemblage within the site would be affected by the loss of floodplain grassland. However, given the floodplain habitat is linked to the wider River Alde floodplain there are extensive areas of adjacent habitat within the wider area available, **no significant** effects are therefore anticipated on the invertebrate assemblage.

Table 7.1 Habitat lost and re-provided at two village bypass

Habitats	Extent of temporary land take	Extent of permanent land take	Replacement habitat
Lowland mixed deciduous woodland	0.1ha	0.38ha	1.59ha new planting 0.1ha replanted woodland
Hedgerows	506m	1,189m	4,830m new hedgerow and 506m replanted hedgerow
Floodplain grassland	3.91ha	2.91ha	3.91ha reinstated

Construction of the proposed two village bypass would result in loss of habitat used suitable for foraging and breeding by farmland birds. There are extensive areas of arable and woodland habitats in the surrounding landscape, and proposed planting as part of the proposed design, and whilst there may be some displacement of the farmland and woodland bird assemblages due to construction, the overall effect on breeding birds is considered to be **not significant**. Similarly, whilst breeding birds could be impacted by noise, as well as visual disturbance, during the construction phase, the impacts would be infrequent over a short period of time, and the effect is considered to be **not significant**.

Bats are likely to experience impacts associated with habitat loss and fragmentation, as well as disturbance from noise and light. Whilst there would be a loss of habitat, the impact would be

minimised by proposed planting discussed above. Additionally, in the event that a tree to be felled is found to be occupied by a roosting bat, licensing and mitigation procedures would be followed. Disturbance during construction would also be reduced though management of construction lighting and provision of closed boarded fencing where the site abuts woodland. Overall the effects on the bat assemblage are **not significant**.

The wide pan of the bridge over the River Alde would help to protect the integrity of the river corridor and minimise impacts on otter and water vole during construction. There would be some diversions to local drainage, although these species' use more the River Alde itself than adjacent smaller ditches. Construction works could result in injury or mortality as part of clearance works, however, with mitigation in place such as undertaking pre-construction surveys and managing works through a protected species licence and appropriate method statement, it is considered there would be sufficient protection of water vole and otters during construction. Overall, **no significant** effects are anticipated on these species.

iii. Operational phase

The proposed habitat planted at the end of construction phase would continue to establish, and the increase in habitat would improve connectivity to the wider environment. Once the planting has established, there would be a beneficial effect, although this is considered to be **not significant**. Changes in traffic movements have the potential to impact on the woodlands and CWS, however, based on modelled results for nitrogen deposition, the effect is considered to be **not significant**.

The creation and establishment of the additional habitats including additional hedgerows and woodlands would have beneficial effects on both breeding bird and bat assemblages, however, the effect is considered to be **not significant**. The extent of noise and lighting from the proposed two village bypass would be restricted to the footprint of the road and habitats within the immediate vicinity, and the effects on breeding birds and bats is considered to be **not significant**.

No significant effects on floodplain grassland, invertebrate assemblages, otters or water voles are anticipated during the operational phase.

Water vole

e) Amenity and recreation

i. Context

Chapter 8 of **Volume 5** of the **ES** presents the assessment of potential effects of the proposed two village bypass on amenity and recreation receptors. The assessment of amenity and recreation effects considers the visual, noise and transport impacts which have the potential to affect amenity and use of recreational resources.

There are six public rights of way within or partially within the site. There are a further 42 public rights of way within the 1km study area.

Other amenity and recreation receptors within the study area include Sustrans Regional Cycle Route 41, which coincides with the Suffolk Coastal Cycle route.

It was considered that the users of the footpaths which are located within or immediately adjacent to the site, as well as additional footpaths that make up a circular network of public rights of way to the south of the A12 between Farnham and the A1094, and Sustrans Regional Cycle Route 41/Suffolk Coastal Cycle Route have the potential to be affected by the proposed works and were, therefore, taken forward for further assessment. The other amenity and recreation resources within the study area would experience limited impacts and, therefore, were not considered further.

ii. Construction phase

During construction of the proposed two village bypass, four footpaths would be diverted to maintain connectivity during construction. Other potential impacts on amenity and recreation receptors include increased noise and dust from operation of machinery and vehicles, earthworks and construction of the roads and bridges, which would be reduced as much as practicable through measures set out in the **CoCP** (Doc Ref. 8.11). The retention of existing hedgerow and woodland, where practicable, would help screen the works from users, however, construction activity would still be visible.

During construction, a **significant adverse** effect would occur on the users of two of the footpaths that cross the site, due to the length of proposed diversions and disturbance to users from visual and noise impacts arising from construction activity, which would alter their perception of tranquillity. In addition, a **significant adverse** effect has been identified on an additional three footpaths on the adjacent fields due short-term impacts from construction noise and changes to views. The users of the other amenity and recreation receptors during construction would also experience changes in tranquillity, as well as noise impacts and impacts on visual amenity, however, the effects are considered to be **not significant**.

iii. Operational phase

Following completion of construction, four footpaths would have been permanently diverted from their existing alignment. For some of the routes, users would experience delays, and users of the

footpaths would experience changes in tranquillity from increased impacts on amenity from increased views of the road, and increased noise and air quality, where the footpath is in close proximity to the new road. However, these impacts would be worst where the footpaths are closest to the road and would rapidly diminish as the user moves further away. The woodland and hedgerow planting proposed as part of the design would also help to integrate the road with the surrounding landscape, and emissions would remain within the limits of the air quality standards.

Overall, the effects on amenity and recreation receptors are considered to be **not significant**, with the exception of the two footpaths permanently diverted where a **significant** effect would remain due to pedestrians needing to cross the carriageway to reach the footway on the opposite side of the carriageway.

f) Terrestrial historic environment

i. Context

Chapter 9 of **Volume 5** of the **ES** presents the assessment of potential effects of the two village bypass on above and below ground heritage assets within the site boundary and in the surrounding area.

Glemham Hall Registered Park and Garden (Grade II) extends into a small section of the site, south-west of Stratford St Andrew where it extends to the A12. Farnham Manor is located to the south-east of the village, and the site boundary abuts the east wall of its garden. An ancient woodland (Foxburrow Wood) is located adjacent to the site. Other designated assets within the setting study area include: Grade I Little Glemham Hall, two Grade II* listed churches are the Church of St Mary at the southern edge of Farnham, and the Church of St Andrew within the village of Stratford St Andrew. The other designated buildings within the setting study area are listed at Grade II, the majority of which comprise houses and shops to either side of the A12 in Farnham and Stratford.

Within the site, there is the potential for prehistoric remains representing elements of settlement and associated agricultural activity. Medieval remains of dispersed farmsteads or industrial sites may be present within the site. There are also records of archaeological finds within the surrounding area; whilst most of the finds are from the prehistoric period, finds also include metal and pottery from the Romano-British and medieval periods. Modern features comprise anti-invasion defences, including two World War II auxiliary hides within Glemham Park, and a pillbox to the south of the A12 at the eastern edge of Stratford St Andrew.

ii. Construction phase

During construction of the two village bypass, there would be intrusive groundworks that would disturb any surviving and unrecorded archaeological remains. Prior to the commencement of construction, an agreed scheme of archaeological investigation would be undertaken to ensure that the archaeological interest of any significant deposits and features within the site could be appropriately investigated, recorded and disseminated, preserving the archaeological interest of these remains. Therefore, **no**

significant effects are anticipated on buried heritage assets with implementation of an agreed written scheme of investigation.

Construction activities have the potential to change the visual and auditory environment and impact on the setting of heritage assets in the area. The perception of construction works between Farnham Manor and Foxburrow Wood would disrupt the historical relationship between the manor and ancient woodland, however this change would be limited to the period of construction and result in limited harm to heritage significance. This effect is considered to be **not significant**.

Benhallstock Cottages would be located adjacent to the temporary contractor compound, near the junction of the A12 and A1094 Friday Street. Construction noise and views of construction works would be perceptible in the environment within which the asset may be appreciated and would likely result in limited harm to heritage significance. This effect is considered to be **not significant**.

A small section of Glemham Hall (park and garden) would be within the site where a section of the A12 is realigned to join the proposed roundabout. There would be increased perception of construction works due the scale of development and changes to the noise environment. However, the impact would result in limited harm to heritage significance, and the effect is considered to be **not significant**.

Construction works would be less perceptible to assets within the villages of Stratford St Andrew and Farnham due to intervening land forms. Those assets closer to the proposed development may experience some changes in the surrounding visual and auditory environment, however the works would not alter the understanding or ability to appreciate their historical function, and therefore would result in **no effect**.

iii. Operational phase

Any disturbance of archaeological heritage assets within the site would have occurred, therefore **no further effects** are anticipated during operation.

The proposed two village bypass would alter traffic movements in the area, with vehicles using the new bypass rather than passing through the villages of Stratford St Andrew and Farnham. This would result in **significant beneficial** effects on the following Grade II Listed Buildings: Elm Tree Farmhouse; Elm Tree Cottage; Post Office Stores; George and Dragon; Turret Cottage Turret House; Four Cottages 30 metres south of St Andrew's Church and Grade II* Church of St Andrew.

Where the proposed route of the two village bypass passes between Farnham Manor and Foxburrow Wood, traffic noise would be audible in the environment surrounding Farnham Manor, with increased noise levels compared to the existing environment. However, the change in noise levels would not contribute to the loss of historic interest. Whilst the proposed two village bypass would be partially screened from the Farnham Manor by existing vegetation and proposed planting, its presence would sever the existing and historical connection with the ancient woodland, which would give rise to limited harm to heritage significance. The effect is considered to be **not significant**.

Whilst the operation of the new road may be perceptible from the other heritage assets, it would not alter the understanding or ability to appreciate their historical function, and therefore would result in **no effect**.

g) Soils and agriculture

i. Context

Chapter 10 of **Volume 5** of the **ES** presents the assessment of potential effects of the proposed two village on soils and agriculture. The soil types varied across the site:

- within the western part of the site (with the exception of the area around the floodplain associated with the River Alde) the soils are described as slightly acidic, with a mix of sand, silt and clays soils with impeded drainage, and the land mainly used for cereals, sugar beet and other arable crops;
- within the area of the River Alde floodplain, the soils are described as deep peat soils associated with clayey over sandy soils and in part can be very acidic; and
- for the rest of the site the soils are mapped as being freely draining, slightly acidic, sandy soils.

The main agricultural land use is described as being arable crops such as barley, other cereals and sugar beet, with some coniferous woodland and lowland heath habitats.

Approximately 50% of the site comprises land which is considered to be best and most versatile land (specifically Grades 2 and 3a). The remaining areas of the site comprise lower grades of agricultural land and non-agricultural land. Approximately 3.2ha of land has not been surveyed and is assumed to be best and most versatile land for a worst-case assessment. The agricultural land on the site is owned by three separate agricultural holdings.

ii. Construction phase

Construction of the two village bypass would result in the permanent loss of 38.7 ha of land from primary agricultural productivity and a further 11.7ha would be required temporarily.

Approximately 30.3 ha of best and most versatile land would be required during construction (including 3.2ha of land which has not been surveyed and is assumed to be best and most versatile land). The loss of best and most versatile land is considered to be a **significant adverse** effect on the agricultural land resource. Upon completion of construction 6.6ha of best and most versatile land would be returned to agricultural use. However, even with this land reinstated, the effect would still remain **significant** due to the permanent loss of best and most versatile land.

Land would be required during the construction period from three agricultural holdings. Severance of these holdings has been minimised as far as practicable through provision of accommodation access tracks and reducing land required permanently. In addition, SZC Co. would continue to liaise with all landowners to reduce the effects on the holdings affected, as far as practicable. On this basis, it is considered the effects would be **not significant** on all land holdings.

iii. Operational phase

During operation, no additional land would be required beyond that reported for the construction phase, and **no further effects** on best and most versatile land or agricultural land holdings are anticipated.

There is the potential for invasive weed species to grow within the site. However, this would be controlled through an appropriate management regime that would remove weed growth that might threaten adjoining agricultural land. Therefore, **no significant** effects are anticipated.

h) Geology and land quality

i. Context

Chapter 11 of **Volume 5** of the **ES** presents the assessment of potential effects of the proposed two village bypass on ground conditions, including an assessment of physical effects on soil erosion, soil compaction, waste soils and mineral resources as well as contamination, of the site and surrounding area.

The site is largely underlain by a mix of consolidated sand and gravels, and poorly sorted sediments as well as areas of loose unconsolidated sediment. These deposits are absent in some areas in the east of the site. The bedrock geology beneath the site comprises three different rock types of sands, gravels, silts of various ages.

There is the potential for contamination on the site and surrounding areas due to current and historical land uses and potential for fly tipping. There are no geological faults recorded within the study area, and the site is also identified as having a low risk of unexploded ordnance. The site has a low potential for ground stability hazards and there is up to moderate potential for compressible ground hazards.

ii. Construction phase

The construction phase may introduce new sources of contamination and could disturb and mobilise existing contamination within soils. However, as set out within the **CoCP** (Doc Ref 8.11), mitigation measures would be incorporated into the construction process, which include the adoption of working methods to manage contamination risk to soils and groundwater, implementation of appropriate pollution incident control and the safe storage of fuel, oils and equipment. With these mitigation measures in place, no significant risks to human health, water and property receptors during construction phase have been identified, and, therefore, **no significant effects** are anticipated.

There is no current viable mineral extraction taking place and the site is not located within an area of historical or planned mineral extraction or a Minerals Safeguarding Area. Earthworks such as excavation of the cuttings and construction of embankments, would be required and therefore there is the potential for impacts on soil erosion and compaction, and for waste soils to be generated. However, impacts would be managed through mitigation measures included within the design and as part of construction management measures, such as constructing embankments in layers and

compacting to design standards. The materials management strategy would seek, as far as reasonably practicable, to reuse and recycle soils on site, and to actively reduce the amount of hazardous soils generated from the development. Overall, **no significant** effects are anticipated.

iii. Operational phase

During operation, there would be limited impacts of soil erosion, ground stability and compaction, on mineral resources, and on waste soils through maintenance operations. The proposed two village bypass would be operated in accordance with the relevant regulations and standards. Effects on soil erosion, mineral resources and waste are therefore considered to be **not significant**.

The operation of the proposed two village bypass could introduce new sources of contamination, such as leaks and spillages from the use of the new roads (including link roads) as well as new pathways for the migration of contamination. The **Outline Drainage Strategy** (**Volume 2, Appendix 2A** of the **ES**) incorporates measures to prevent pollution from the operation of the two village bypass. In addition, the proposed two village bypass would be operated and maintained in accordance with relevant regulations, best practice and pollution prevention guidance. Therefore, the risk of contamination to human, water and property receptors during operation is considered to be **not significant**.

i) Groundwater and surface water

i. Context

Chapter 12 of **Volume 5** of the **ES** presents the assessment of potential effects on groundwater and surface water resources arising from the construction and operation of the proposed two village bypass. The assessment is also supported by the **Two Village Bypass Flood Risk Assessment** (Doc. Ref 5.5) and project-wide **Water Framework Directive Compliance Assessment** (Doc. Ref 8.15).

Several aquifers lie beneath the site; the poorly consolidated sediments that underlie the majority of the site are classified as a Secondary Aquifer (undifferentiated) whereas the consolidated sands and gravel sediments are Secondary A Aquifers. The deeper bedrock aquifers are classified as Principal Aquifers. The Secondary Aquifer (undifferentiated) is expected to be of relatively low permeability and have limited connectivity to underlying aquifers.

The western end of the site crosses the River Alde and associated floodplain. The site is also partially within the catchment of the River Fromus. There are ten licensed groundwater abstraction and one licensed surface water abstraction within 1km of the site.

The majority of the site is located in Flood Zone 1, and therefore has a low risk of flooding from tidal and fluvial sources, and the risks associated with groundwater, sewer and reservoir flooding at the site are also considered to be low. However, the lower lying ground adjacent to the River Alde is at located in Flood Zone 3 and

is considered to be at high risk of both river and surface water flooding.

ii. Construction phase

Construction activities could impact upon groundwater and surface water drainage through reduction in discharge to ground, changes to surface water flows and hydromorphology. There is also the potential for an increase in the supply of fine sediment, or release of fuels, oils and lubricants through leaks and spills, which could have adverse impacts on both groundwater and surface water hydrology, geomorphology and water quality. The removal of on-site vegetation and the compaction of soils due to construction vehicles and materials storage may locally reduce the rate at which rainfall makes its way into the groundwater for a short duration. However, the overall volume of water discharging to ground is unlikely to change. Therefore, the effect is considered to be **not significant**.

Whilst the current groundwater levels at the site have not been established, available hydrogeological data suggest that it varies across the site. The construction of the cutting where the route of the two village bypass passes Foxburrow Wood is anticipated to be the Secondary (undifferentiated) aquifer, so it is considered unlikely that the groundwater of underlying aquifers or groundwater abstractions would be affected. If required, any dewatering would be localised and short-term in nature. The effect is considered to be **not significant**.

The flow regime of the River Alde and associated floodplain, as well as surface drainage, would be altered by the embankment across the floodplain during periods of higher (out of bank) flow. The offset between the banks of the River Alde and the proposed bridge structure would avoid direct interaction of the development with the current river channel. **No effect** is therefore predicted for the River Alde. During construction, works would be phased to minimise floodplain constraints to within those identified within the final design. Whilst there would be disruption to the floodplain, and impacts on surface drains, overall the effects are considered to be **not significant**.

Construction activity has the potential to introduce new sources of contamination to the site or mobilise existing sources through the creation of new pathways. The **CoCP** (Doc Ref. 8.11) sets out proposed measures to be implemented by the construction contractors to protect groundwater and surface water. In addition, ground investigation and relevant risk assessments would be undertaken prior to commencement of construction works, with remediation undertaken, if necessary. Overall, with these measures in place, **no significant** effects arising from contamination are anticipated on groundwater and surface water resources during construction phase.

Construction activity within the floodplain and adjacent to the River Alde has the potential to put the workforce at risk from a flood event. The **CoCP** (Doc Ref. 8.11) sets out measures to alert and protect the workforce. This would be further developed in a flood risk emergency plan.

During construction, drainage would be contained within the site, with infiltration to ground. Measures to reduce risk of flooding in

south-west side of the site include a low bund to intercept run-off. Construction would also be undertaken in accordance with the **CoCP** (Doc Ref. 8.11), including no stockpiles or storage of materials in areas at risk of flooding. Construction activities would not lead to loss in floodplain storage or displacement of sea or river flood water. Overall, it is considered that there would be **no effect** on flood risk.

iii. Operational phase

A drainage strategy has been developed for the site (refer to **Volume 2, Appendix 2A** of the **ES**) to manage and control surface water run off rates through infiltration to ground and includes pollution prevention techniques that would be implemented through standard good practice and good design. This would include the use of sustainable drainage systems such as the provision of swales along the length of the route of the proposed two village and associated link roads, and infiltration basins.

On this basis, the effect of the proposed two village bypass on groundwater and surface water levels and quality is considered to be **not significant**.

The existing site is currently 'greenfield' with no impermeable surfaces and small localised areas of surface water flood risk. Therefore, the proposed highway development would increase the impermeable area on the site. Measures to reduce the risk of flooding in areas of flood risk include provision of a bridge over the River Alde and flood arch culverts within the embankment to allow water to flow beneath during a flood. Modelling has shown, there is an increase in water levels some areas to the north of the proposed overbridge during a 1 in 100 year event (including an allowance for climate change). The land affected comprises agricultural fields and is already inundated without the proposed development in place. Therefore overall, there is considered to be **no effect** on flood risk. However, written consent from the landowner would be required for the increased flood depth, hazard and velocity in the localised areas affected and SZC Co. would continue to engage with the land owner to reach such an agreement.

As this agreement has not been obtained at the time of submission of the development consent order application, the proposed development includes areas within the site to the north of the proposed bridge that could provide flood compensation. It is not considered that this flood compensation land is required for the proposed development. It is nevertheless being put forward as part of the application in case the Secretary of State disagrees with this position and takes the view that it is in fact required.

8. Sizewell link road

8.1 Introduction

Volume 6 of the **ES** provides a detailed description of how the Sizewell link road would be constructed and operated, and the likely significant environmental effects that are anticipated to arise as a result of these activities.

8.2 Description of development

The Sizewell link road would comprise a new, permanent 6.8 km single carriageway road, with a design speed of 60 miles per hour (mph), which begins at the A12 south of Yoxford, bypasses Middleton Moor and Theberton before joining the B1122 (see **Figure 8.1**).

The proposed Sizewell link road would be used by SZC Co. during the construction phase of the Sizewell C main development site to transport construction workers arriving by car, buses from both northern (who would only use the Sizewell link road east of the Middleton Moor link) and southern park and ride sites, and goods vehicles (both light and heavy) delivering freight to the Sizewell C main development site. It would also be open to the public.

The Sizewell link road would include:

- a connection with the A12, approximately 180m north of The Red House Farm, south of Yoxford, and continue in an easterly direction;
- a single span bridge over the East Suffolk line;
- a new link road (referred to as the 'Middleton Moor link') to allow connectivity to Middleton Moor;
- realignment of Fordley Road on the south side of the proposed route of the Sizewell link road to allow northbound traffic to join the new road. Fordley Road would be stopped up on the north side of the route;
- a staggered crossroads, ghost island junction to give access to Trust Farm located to the south and to the existing B1122 to the north, as well an access road to Hawthorn Cottages;
- realignment of Hawthorn Road on the south side of the proposed route of the Sizewell link road. On the north side Hawthorn Road would be stopped up;
- a new ghost island junction would be formed with an extension of the B1125 and reconfiguration of the existing B1122 (Leiston Road) to form new junctions. This includes a provision of a new link road between the route of the proposed Sizewell link road and Leiston Road (the 'B1125 link');

- realignment of Pretty Road on the south side of the proposed route of the Sizewell link road. On the north side Pretty Road would be stopped up;
- a new overbridge for non-motorised users only (pedestrians, cyclists, equestrians) over Pretty Road;
- a new priority junction on the west side of Moat Road to maintain access to the existing properties including Theberton Grange and Moat House;
- a new road and junction connecting the Sizewell link road to the B1122 to provide access to Theberton, and a realignment of the B1122 to the south-east of the new junction to tie in to the route of the Sizewell link road. Approximately 360m of the B1122 would be permanently converted to footpath.

The proposed Sizewell link road would cross two rivers (referred to as Middleton Watercourse and Theberton Watercourse) as well as three unnamed watercourses. Some watercourses are crossed by both the route of the Sizewell link road as well as side roads.

Where possible, public rights of way would be retained on their existing alignments. However, several public rights of way would require a diversion to ensure connectivity across the route of the bypass.

The route of the proposed Sizewell link road would be mostly unlit, with lighting only provided at the A12 roundabout and the roundabout connecting the Middleton Moor link to the B1122 (Yoxford Road).

Figure 8.1 Illustrative masterplan of the proposed Sizewell link road

8.3 Construction

It is expected that the proposed development would take approximately 24 months to build. Construction would take place during the early years of construction of the Sizewell C Project, and the road would be largely built in a west to east direction off-line, with the exception of junction tie-ins. Construction works would take place during Monday to Saturday 07:00 to 19:00 hours, with no working on Sundays or bank holidays. However, some activities may require 24 hour working and East Suffolk Council would be notified in advance.

The anticipated construction sequence would follow the below stages:

- Preparatory works: site set-up and clearance including removal of trees and hedgerows, erection of temporary fencing, creation of alternative access arrangements and rights of way, setting up of temporary contractor compounds, welfare facilities and temporary utilities;
- Construction works: earthworks, road construction and surfacing, construction of bridges and civil structures, utility and drainage installation, construction of pavements, kerbs, footways and paved areas, installation of permanent fencing, road signs and marking, and road lighting, permanent connections to existing road networks, and landscaping.

It is anticipated that three temporary contractor compounds would be required during construction. One compound would be located in the western area of the site adjacent to the A12, the second adjacent to the East Suffolk line and the third to the west side of the proposed Middleton Moor road link north to the B1122, west of Middleton Moor. It is estimated that the peak construction workforce would be approximately 300 people on the construction site at any one time.

All heavy goods construction traffic would use the A12 and B1122 between Yoxford and new roundabout west of Middleton Moor. The construction of the Sizewell link road is expected to generate up to 100 lorry (each way) movements per day during the construction period (200 movements in total).

All construction works would be managed in accordance with construction environmental management measures set out within the **CoCP** (Doc Ref. 8.11).

8.4 Operation

The route of the proposed Sizewell link road would be open for public use alongside as well as construction traffic associated with the Sizewell C project.

Routine maintenance would be undertaken such as periodic inspection and maintenace of drainage systems and vegetation clearance.

During the peak construction period at the Sizewell C main development site, the daily number of vehicles using the Sizewell link road, on a typical day, is forecast to be between 2,300 to 8,500 depending on the stretch of the road. This would reduce flows along the existing B1122 to between 350 and 500 vehicle movements.

Once construction of the main development site is complete, the Sizewell link road would remain open and the daily number of vehicles using the Sizewell link road, on a typical day, is forecast to be between 1,400 to 7,200 depending on the stretch of the road. This would reduce flows along the existing B1122 to approximately 400 vehicle movements.

8.5 Summary of likely environmental effects

This section provides a summary of the likely environmental effects predicted to occur as a result of the construction and operation of the proposed Sizewell link road. The proposed mitigation measures are also summarised.

a) Noise and vibration

i. Context

Chapter 4 of **Volume 6** of the **ES** presents the assessment of potential noise and vibration effects as a result of the construction and operation of the Sizewell link road.

To inform the assessment, baseline sound surveys were undertaken at monitoring locations in the vicinity of the Sizewell link road site, along the existing B1122 and adjacent roads to characterise the sound levels, currently experienced by receptors such as residential properties. Baseline noise modelling has also been undertaken.

The assessment considers what the anticipated noise and vibration levels would be during construction activity and from construction and operational traffic at representative receptors within the vicinity of the site and along the existing B1122.

ii. Construction phase

The assessment considers noise and vibration generated through construction activities such as site clearance, construction of the temporary contractor compounds, earthworks, surfacing of the road and construction of the overbridges.

A range of measures are proposed to mitigate the effects during construction including good practice measures to minimise noise and vibration impacts as set out in the **CoCP** (Doc Ref 8.11). Further acoustic screening and working methodologies would be considered by the contractor, such as limiting noisy construction activities on Saturday afternoons. As a result, all construction noise levels are predicted to be **not significant**. In addition, **no significant** effects from vibration during construction have been identified. Notwithstanding these outcomes, a programme of monitoring and a system for the receipt and recording of any noise and vibration complaints from occupiers of noise sensitive receptors would be put in place.

iii. Operational phase

The assessment of road traffic noise considers three operational scenarios:

- During the typical day of the peak construction period (in 2028) when the road would be used by Sizewell C construction traffic as well as be open to the public;

- During the busiest day of the peak construction period (in 2028) when the road would be used by Sizewell C construction traffic as well as be open to the public; and
- When construction of the power station is complete and Sizewell C is operational (in 2034).

During the peak construction period in 2028, on both the typical and busiest days, **significant adverse** noise effects have been identified on the following residential properties: Fir Tree Farm, Buskie Farm, Fordley Hall, Trust Farm, Dovehouse Farm, Theberton Hall, Church Farm, Doughty Wylie Crescent, Theberton Grange, Theberton House, Oakfield House, Hawthorn Cottages, Rookery Farm, Keepers Cottage, Town Farm, Hawthorn Farm, Moat House, south of Therberton Grange, and Rose Farm.

Noise levels at properties along the Sizewell link road are expected to reduce following the completion of the Sizewell C power station when the proposed route of the Sizewell link road is no longer used by Sizewell C construction traffic. However, **significant adverse** noise effects are anticipated to remain on the following receptors or receptor groups: Fordley Hall, Trust Farm, Dovehouse Farm, Doughty Wylie Crescent, Theberton Grange, Oakfield House, Hawthorn Cottages and Moat House.

Significant beneficial effects are also anticipated at the majority of receptors or receptor groups along the section of the B1122 from Middleton Moor to Theberton during all operational scenarios. This is due to the reduction of traffic within the villages, with the majority of vehicles using the new link road instead.

SZC Co. would continue to seek measures to avoid or reduce these significant adverse effects. The **Noise Mitigation Scheme** would be made available for all properties, where the specified noise criteria are exceeded (see **Volume 2, Appendix 11H** of the **ES**). In doing so SZC Co. would engage with stakeholders to further understand the affected receptors, their use and the benefit of the measures.

b) Air quality

i. Context

Chapter 5 of **Volume 6** of the **ES** presents the assessment of potential effects on air quality arising from the construction and operation of the Sizewell link road.

To inform the assessment, the current and future year baseline pollutant levels were established through a review of existing published data from Defra and East Suffolk Council, and modelling of predicted traffic emissions for a baseline year of 2018, and future baseline years of 2023, 2028 and 2034. The baseline assessment demonstrated that the existing concentrations of air pollutants are well below air quality standards set out in legislation for the protection of human health across the study area.

The assessment considered the predicted emissions arising from dust and construction traffic during the construction phase, and traffic during operational phase at 'representative' receptors close to the Sizewell link road site and along the existing B1122.

ii. Construction phase

During construction, the proposed construction activities could give rise to changes in dust deposition rates and to changes in

concentrations of particulate matter (PM_{10}) in air. An **Outline Dust Management Plan** has been developed (refer to **Volume 2, Appendix 12A** of the **ES**) which sets out measures to manage activities to minimise impacts of dust, including effective dust suppression measures and monitoring. With the implementation of these measures, **no significant** effects on air quality from construction dust emissions are anticipated.

Due to the volume of construction traffic expected during construction of the proposed Sizewell link road, and the number of developments undergoing construction during the early years of the Sizewell C Project in the wider study area (Lowestoft to Ipswich), a detailed assessment of transport emissions for the construction phase scenario has been undertaken. Concentrations of air pollutants associated with road traffic emissions (NO_2, PM_{10} and $PM_{2.5}$) at the nearby sensitive receptors, and those along the existing road network along the B1122 from the A12 to east of Theberton showed imperceptible to low increases. However, the overall concentrations would be well below the air quality objective values, and therefore the effects are considered to be **not significant**.

iii. Operational phase

The assessment considered effects on air quality in two operational scenarios:

- during peak construction of the main development site when the proposed Sizewell link road would also be used for Sizewell C construction traffic as well as be open to the public (2028); and
- once the Sizewell C power station is complete and operational (2034).

The assessment considered emissions from operational traffic using the Sizewell link road at receptors along the site and the existing road network (along the B1122 from the A12 to east of Theberton). In both operational scenarios, the assessment concluded the effects on representative receptors along the proposed Sizewell link road would be **not significant**.

Receptors along the existing B1122 within Theberton would experience a reduction in emissions due to reduced traffic, leading to improvements in air quality. However, due to the overall low concentrations, the effects on air quality are considered to be **not significant.**

c) Landscape and visual

i. Context

Chapter 6 of **Volume 6** of the **ES** presents the assessment of potential effects of the proposed Sizewell link road on the landscape character and visual amenity during construction and operation.

The review of baseline information identified two landscape character types to be assessed in further detail due to the potential impacts on their character, the Ancient Estate Claylands and the Rolling Estate Claylands.

Eight receptor groups were identified which may experience effects on visual amenity and, therefore, were considered further in the assessment:

- **Group 1** - Users of public footpaths, local residents and motorists on local roads between the boundary of Rookery Park to the north, the East Suffolk line to the east, Town Farm Lane to the south, and the A12 to the west.
- **Group 2** - Users of public footpaths and local residents south of Town Farm Lane for one field (between The Red House Farm and Town Farm), and west of the A12 for one field (between Kelsale Lodge and Long Wood).
- **Group 3** - Users of public footpaths, local residents (including at Middleton Moor) and motorists on local roads between the B1122 (Yoxford Road/Middleton Road) to the north, Fordley Road to the east, vegetation around Fordley Hall to the south, and the East Suffolk line to the west.
- **Group 4** - Users of public footpaths, local residents and motorists on local roads between the B1122 (Yoxford Road) to the north, Hawthorn Road to the east, vegetation around Parkway Farm to the south and Fordley Road to the west.
- **Group 5** - Users of public footpaths, local residents and motorists on local roads between the B1122 (Yoxford Road/Leiston Road) to the north-east, Pretty Road to the south, Theberton Woods to the south-west and Hawthorn Road to the north-west.
- **Group 6** - Users of public footpaths, local residents, and motorists on local roads between the extent of the ZVI to the north-east and the B1122 (Yoxford Road/Leiston Road) to the south-west.
- **Group 7** - Users of public footpaths, local residents (including at Theberton) and motorists on local roads between Pretty Road to the to the north, the B1122 (Leiston Road) and Theberton to the east, Moat Road to the south and Theberton Woods to the west.
- **Group 8** - Users of public footpaths, local residents and motorists on local roads between the B1122 (Yoxford Road/Leiston Road) to the east, the extent of the ZVI to the south-west and Moat Road to the north-west.

The assessment also considered long distance routes as well as the effects on the special landscape area which follows the valley of the River Yox, then Minsmere River and Minsmere Old River.

The design has sought to retain existing woodland and hedgerow, where possible, except where the proposed Sizewell link road crosses existing field boundaries or tree belts. Hedgerow planting is proposed along the route to replace that lost as well as woodland planting adjacent to the Middleton Moor link, adjacent to East Suffolk line, in vicinity of Fordley Road, Trust Farm to Hawthorn Road, and Dovehouse Farm, around the proposed Pretty Road overbridge and south of Theberton.

ii. Construction phase

The proposed Sizewell link road would lead to changes to the existing landscape and visual amenity during construction through the removal of elements of the existing landscape and alterations to landform, and views of construction activity. However, the design

has sought to minimise loss of existing woodland and hedgerow where possible, and measures set out in the **CoCP** (Doc Ref. 8.11) would also reduce construction disturbance, such as the use of site hoarding and measures to limit light spill.

No significant effects on the landscape character during construction are anticipated. However, there would be **significant adverse** effects on five of the receptor groups (Groups 1, 3, 4, 5 and 7) due to the view of construction activity and plant seen above existing planting. The effects on the visual amenity for the other receptor groups and users of long-distance routes are considered to be **not significant**, as is the effect on the special landscape area.

iii. Operational phase

The proposed Sizewell link road would become a permanent feature within the landscape. During operation, the scale of effects on the landscape would remain the same as during construction except for the removal of the contractor compounds. Overall, **no significant** effects are anticipated on the landscape character.

During the first year of operation, visual amenity effects would reduce from the removal of construction activity and contractor compounds in views, however, where the road rises on embankments it would be a prominent feature and moving vehicles would be apparent. By year 15, the planting proposed within the landscape strategy would mature and would become more effective in screening the road such that the visual effects would reduce, with only receptors within Group 5 anticipated to experience **significant** visual effects, partly due to the visibility of the Pretty Road overbridge. In addition, **significant** visual effects have been identified on Group 1 due to views of lighting at night. The effects on the visual amenity for the other receptor groups and users of long-distance route are **not significant**, as is the effect on the special landscape area.

d) Terrestrial ecology and ornithology

i. Context

Chapter 7 of **Volume 6** of the **ES** presents the assessment of potential effects of the proposed Sizewell link road on terrestrial ecology and ornithology within the site and surrounding area. The assessment considers effects on designated sites, habitats and protected species. In addition, a **Shadow Habitats Regulations Assessment Report** (Doc Ref. 5.10) is submitted with the application of development consent to identify potential effects on European designated sites (Natura 2000 sites).

Based on survey data and other data collected, the following receptors were taken forward for detailed assessment:

- habitats including lowland mixed deciduous woodland, hedgerows and ponds;
- great crested newt;
- breeding bird assemblage; and
- bat assemblage.

i. Construction phase

The route of the proposed Sizewell link road has been designed to avoid direct land take from designated sites. The design has also sought to retain existing woodland, hedgerows and ponds, where possible, except where the proposed development crosses existing field boundaries or tree belts.

Table 8.1 provides a summary of habitats of ecological importance that would be lost and re-provided by the proposed Sizewell link road. Whilst there would a loss of woodland and hedgerow due to the construction of the proposed Sizewell link road, new planting would be provided in strategic locations along the route to integrate these areas into the surrounding landscape and reduce impacts on habitat fragmentation. The landscape planting would be undertaken towards the end of the construction phase and it is anticipated that it would take a number of years to mature and be of maximum benefit to ecological receptors. The overall effect on these habitats is considered to be **not significant**.

There are eight ponds within the site boundary of which one would be lost permanently and seven would be lost temporarily. A further twelve ponds are located outside the site but have the potential to be indirectly impacted. Three of these ponds are confirmed to support breeding great crested newts and they are presumed to breed in a fourth pond. Mitigation for the loss of ponds has been incorporated into the design. 14 new ponds would be created, providing habitat suitable to support amphibian species (including great crested newts) and invertebrates. Eight of the ponds would provide replacement habitat for the loss of existing breeding ponds and would need to be established prior to their removal.

Table 8.1 Habitat lost and re-provided at Sizewell link road

Habitats	Extent of temporary land take	Extent of permanent land take	Replacement habitat
Lowland mixed deciduous woodland	0.17ha	0.41ha	13.1ha of new woodland 0.17ha of woodland reinstated
Hedgerows	1,036m	4,537m	12,853m of new hedgerow 1,036m of hedgerow reinstated
Ponds	7 ponds	1 pond	14 new ponds

Other mitigation measures included within design comprise the provision of crossing points or culverts to reduce impacts from habitat fragmentation and mortality, as well as appropriate dust management and pollution prevention control. With these measure in place, the overall effect is assessed as **not significant**.

Construction works would also result in the loss of habitat used by foraging and breeding farmland birds. There are extensive areas of arable and woodland habitats in the surrounding area, and new planting is proposed as part of the design. Whilst there may be some displacement of the farmland and woodland bird

assemblages due to construction, the overall effect on breeding birds is considered to be **not significant**. Similarly, whilst breeding birds could be impacted by noise, as well as visual disturbance, the impacts would be over a short period of time, and the effect is considered to be **not significant**.

Bats are likely to experience impacts associated with habitat loss and fragmentation, as well as disturbance from noise and light. Whilst there would be a loss of habitat, the impact would be minimised by proposed planting. Additionally, in the event that a tree to be felled is found to be occupied by a roosting bat, licensing and mitigation procedures would be followed. Disturbance during construction would also be reduced though management of construction lighting to reduce light spill and the provision of closed boarded fencing where the site abuts woodland. Overall the effects on the bat assemblage are considered to be **not significant**.

ii. Operational phase

The proposed habitat planted at end of construction phase would continue to establish, and total increase in the extent of habitat would improve connectivity to the wider environment. Once the planting has established, there would be a beneficial effect, although this is considered to be **not significant**. The creation and establishment of the planted areas would also have a beneficial effect on both breeding bird and bat assemblages, however, this effect is considered to be **not significant**. The extent of noise and lighting from the operation of Sizewell link road is likely to be restricted to the footprint of the road and habitats within the immediate vicinity. Therefore, this effect is considered to be **not significant**.

With the habitat mitigation measures described under construction, **no significant** effects on ponds or great crested newts are anticipated during the operational phase.

Great crested newt

e) Amenity and recreation

i. Context

Chapter 8 of **Volume 6** of the **ES** presents the assessment of potential effects of the proposed Sizewell link road on amenity and recreation receptors. The assessment of amenity and recreation effects considers the visual, noise and transport impacts which have the potential to affect amenity and use of recreational resources.

There are 16 public rights of way within or partially within the site and a further 38 within the 1km study area.

Other amenity and recreation receptors within the study area include:

- Middleton Moor (an area of registered common land and open access land),
- Theberton Woods (an area of open access land),
- Leiston Abbey, and
- Sustrans Cycle Route 41.

Sandlings Walk long distance recreational route also passes through the eastern edge of the study area.

It was considered that the users of the footpaths which are located within the site, as well as footpaths within close vicinity, and the registered common land and open access land at Middleton Moor would have the potential to be impacted by Sizewell link road. Therefore, these receptors were taken forward for further assessment. The other amenity and recreation resources within the study area would experience limited impacts and therefore have not been considered further.

ii. Construction phase

During construction of the proposed Sizewell link road, 14 footpaths would be diverted in total to maintain connectivity during construction. Other potential impacts on amenity and recreation receptors include increased noise and dust from operation of machinery and vehicles, earthworks and construction of the roads and bridges. The retention of existing hedgerow and woodland, where practicable, would help screen the works from users, however, construction activity would still be visible.

Significant adverse effects have been identified on the users of eight footpaths that would be permanently diverted and five footpaths that would be temporarily diverted. This is because of the length of proposed diversions and disturbance to users from visual and noise impacts arising from construction activity, which would alter their perception of tranquillity.

Although users of other amenity and recreation receptors may experience short-term impacts from construction noise and changes to views, the effects are considered to be **not significant**.

iii. Operational phase

Following completion of construction, 13 footpaths would be permanently diverted from their existing alignment. For some of the routes, users would experience delays due to the new road crossing, impacts on amenity from increased views of the road, and increased noise and air quality effects, where the footpath is close to the new road. Eight footpaths would experience **significant adverse** effects due to the length of the diversions and the need to cross the new carriageway. These include five footpaths that are diverted over the proposed Pretty Road overbridge. The orientation of the bridge structure and associated earthworks mean that it would not be possible to implement planting that would successfully screen the structure any further, whilst minimising the length of the diversions. Therefore, it would not be possible to reduce the effect on these amenity and recreation resources.

The effects on the other amenity and recreation receptors during operation are **not significant**.

f) Terrestrial historic environment

i. Context

Chapter 9 of **Volume 6** of the **ES** presents the assessment of potential effects of the proposed Sizewell link road on above and below ground heritage assets within the site boundary and in the surrounding area.

There is one designated heritage asset within the site boundary, the Grade II listed Gate and Gate Piers at junction of Leiston Road and Onner's Lane. There are a further 44 listed structures within the setting study area, including the Grade I listed Church of St Peter, Grade II* listed Theberton House; the remainder being listed at Grade II. There is also one scheduled monument which extends into the south-eastern part of the study area; comprising Leiston Abbey (second site) and moated site.

Archaeological remains have been recorded within the surrounding area, including finds from prehistoric and Roman periods, as well as possible shards of medieval pottery within a linear ditch and post-medieval ditches relating to historic field boundaries and former parkland from Theberton Hall (Plumtreehills Covert marks the edge of the former parkland).

ii. Construction phase

During construction of the proposed Sizewell link road, there would be intrusive groundworks that would disturb any surviving and unrecorded archaeological remains. Prior to the commencement of construction, an agreed scheme of archaeological investigation would be undertaken to ensure that the archaeological interest of any significant deposits and features within the site could be appropriately investigated, recorded and disseminated, preserving the archaeological interest of these remains. Therefore, **no significant** effects are anticipated on buried heritage assets.

Whilst within the site boundary, the Grade II Listed Gate and Gate Piers at junction of Leiston Road and Onner's Lane would not be directly impacted by construction works and would be retained in their entirety. Construction activities have also the potential to change the visual and auditory environment and impact on the setting of heritage assets in the area. With the implementation of construction environmental management measures to minimise disturbance, as set out within the **CoCP** (Doc Ref. 8.11), and provision of landscaping to provide screening, **no significant adverse** effects have been identified.

iii. Operational phase

Any disturbance of archaeological heritage assets within the site would have occurred during construction, and therefore **no further effects** are anticipated during operation.

The proposed Sizewell link road would alter existing traffic movements in the area, with vehicles using the new link road rather

than passing through the villages of Middleton Moor and Theberton. This would result in beneficial effects to a number of listed buildings within or adjacent to these villages. However, this beneficial effect is considered to be **not significant**.

The introduction of Sizewell link road would result in Theberton Hall being surrounded by vehicular traffic on all sides, whilst historically it was bounded only to the east and south by roads. However, the change in views from Theberton Hall would be restricted due to the existing screening immediately north of the Hall, and would progressively reduce as the screening planting to the eastern side of the Sizewell link road matures. During the peak construction of the main development site, when the road is used by construction traffic, there would be adverse effects due to the introduction of traffic movements (though considered to be **not significant**). Once construction of the main development site is complete, and the proposed route of Sizewell link road is no longer used for Sizewell C construction traffic, the screening planting would have matured sufficiently to effectively screen vehicle movements along the road and the effect would reduce.

Whilst the operation of the new road may be perceptible from the other heritage assets, it would not alter the understanding or ability to appreciate their historical function, and therefore would result in **no effect**.

g) Soils and agriculture

i. Context

Chapter 10 of **Volume 6** of the **ES** presents the assessment of potential effects of the proposed Sizewell link road on soils and agriculture. The main soil type present within the site is shown as being predominantly slowly permeable, and seasonally waterlogged, clayey, silty and sandy soils. However, within the eastern part of the site the soils are described as freely draining and slightly acidic.

The site comprises approximately 92.8 ha of agricultural land, out of which approximately half is considered to be best and most versatile land for agriculture. The remaining areas of the site comprise less valuable agricultural land and non-agricultural land. Approximately 14.5ha of land has not been surveyed and is assumed to be best and most versatile land to ensure that a worst-case assessment has been undertaken.

The agricultural land on the site is owned by 13 separate agricultural holdings, with five of the holdings having more than 10% of their land within the site boundary.

ii. Construction phase

Construction of the Sizewell link road would result in the permanent loss of 76.5ha of land from primary agricultural productivity and a further 16.3ha would be required temporarily.

Approximately 65.1ha of best and most versatile land would be required during construction (including 14.5ha of land which has not been surveyed and assumed to be best and most versatile land). The loss of best and most versatile land is considered to be a **significant adverse** effect on agricultural land resource. Upon completion of construction, 16.3ha of best and most versatile land would be returned to agricultural use. However, with this land returned, the effect would still remain significant due to the extent of permanent loss.

Land would be required either temporarily during the construction period or permanently from up to 13 agricultural holdings. The temporary and permanent land requirement would occur simultaneously at the start of the construction period, and it is the combined impact of both that would have the most impact on the holding. Severance of holdings has been minimised as far as practicable through provision of accommodation access tracks and reducing land required permanently. SZC Co. would continue to liaise with all landowners to reduce the effects on the holdings, as far as practicable. On this basis, it is considered the effects on all holdings would be **not significant**.

iii. Operational phase

During operation, no additional land would be required beyond that used during construction. Therefore, **no further effects** on best and most versatile land or agricultural land holdings are anticipated.

There is the potential for invasive weed species to grow within the site. However, this would be controlled using an appropriate management regime that would remove weed growth that might threaten adjoining agricultural land. Therefore, **no significant** effects on agricultural land from weed growth are anticipated.

h) Geology and land quality

i. Context

Chapter 11 of **Volume 6** of the **ES** presents the assessment of potential effects of the proposed Sizewell link road on ground conditions, including an assessment of physical effects on soil erosion and soil compaction, waste soils and mineral resources as well as contamination, of the site and surrounding area.

The site is largely underlain by a mix of consolidated sand and gravels, and poorly sorted sediments. There is also a thin strip of windblown deposits where the site crosses Fordley Road and Hawthorn Road. The bedrock of geology beneath the site comprises sand of the Crag Group.

There is the potential for contamination on the site and surrounding areas due to current and historical land uses and potential for fly tipping. There are no ground stability hazards or geological faults recorded within the study area, and the site is also identified as having a low risk of unexploded ordnance.

ii. Construction phase

The construction phase may introduce new sources of contamination and could disturb and mobilise existing contamination within soils. However, as set out within the **CoCP**

(Doc Ref. 8.11), mitigation measures would be incorporated into the construction process, which include the adoption of working methods to manage contamination risk to soils and groundwater, implementation of appropriate pollution incident control and the safe storage of fuel, oils and equipment. With these mitigation measures in place, **no significant adverse** effects on human health, water and property receptors have been identified.

There is no current viable mineral extraction taking place and the site is not located within an area of historical or planned mineral extraction or a Minerals Safeguarding Area. Earthworks such as excavation of the cuttings and construction of embankments, would be required and, therefore, there is the potential for impacts on soil erosion and compaction, and for waste soils to be generated. However, impacts would be managed through the mitigation measures included within the design and as part of construction management, such as constructing embankments in layers and compacting to the design requirements. The materials management strategy would seek, as far as reasonably practicable, to reuse and recycle soils on site and to actively reduce the amount of hazardous soils generated. Overall, **no significant effects** have been identified.

iii. Operational phase

During operation, there would be limited impacts of soil erosion and compaction, on mineral resources, and on waste soils through maintenance operations. The proposed Sizewell link road would be operated in accordance with the relevant regulations and standards. Effects on soil erosion, mineral resources and waste are therefore considered to be **not significant**.

The operation of the proposed Sizewell link road could introduce new sources of contamination, such as leaks and spillages from the use of the new roads (including link roads). This includes potential creation of new pathways for the migration of contamination not present at baseline. However, the **Outline Drainage Strategy** (refer to **Volume 2, Appendix 2A** of the **ES**) incorporates measures to prevent pollution from the operation of the proposed Sizewell link road. In addition, the proposed Sizewell link road would be operated and maintained in accordance with relevant regulations, best practice and pollution prevention guidance. Therefore, **no significant** effects to human, water and property receptors as a result of contamination have been identified.

i) Groundwater and surface water

i. Context

Chapter 12 of **Volume 6** of the **ES** presents the assessment of potential effects on groundwater and surface water resources arising from the construction and operation of the proposed Sizewell link road. The assessment is also supported by the **Sizewell Link Road Flood Risk Assessment** (Doc. Ref 5.6) and project-wide **Water Framework Directive Compliance Assessment** (Doc. Ref 8.15).

Several aquifers lie beneath the site; the windblown deposits and poorly consolidated sediments that underlie the majority of the site are as classified as Secondary Aquifers (undifferentiated), whereas the consolidated sands and gravel sediments are Secondary A Aquifers. The deeper bedrock aquifer is classified as a Principal

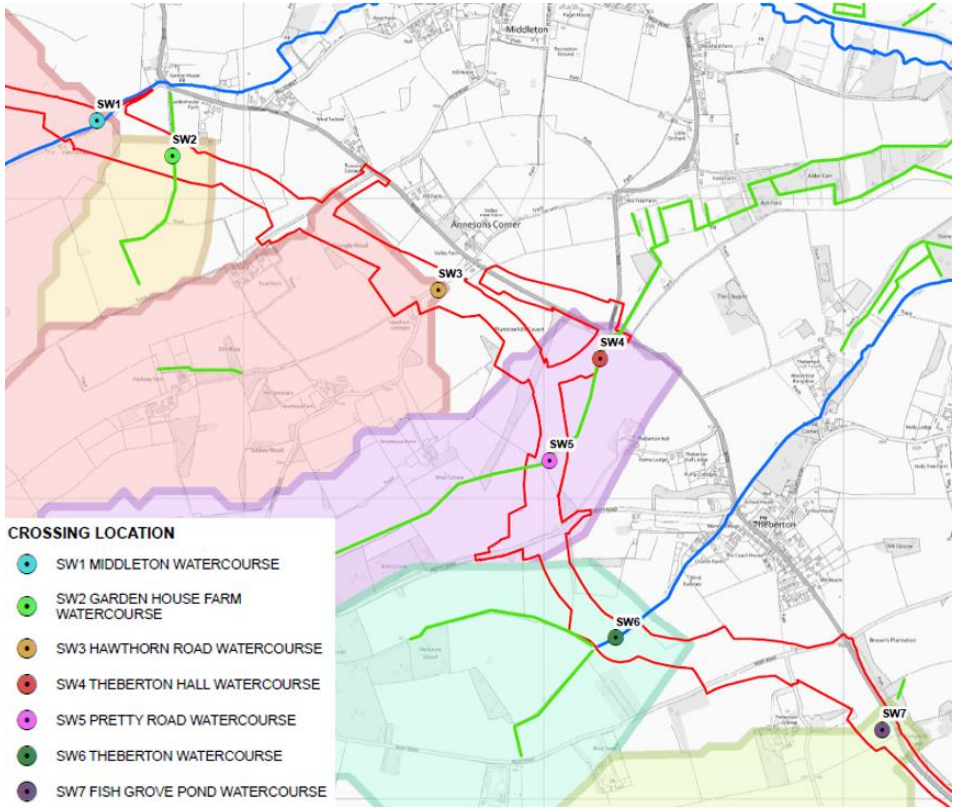
Aquifer. The poorly sorted sediment aquifer is expected to be of relatively low permeability and have limited connectivity to underlying aquifers.

The proposed development would cross seven watercourses west to east along its route (see **Plate 8.1**): Fordley Road (a main river), Garden House Farm Watercourse, Hawthorn Road Watercourse, Theberton Hall Watercourse, Pretty Road Watercourse, Moat Road (a main river - tributary of the Minsmere Old River) and Fish Grove Pond Watercourse.

Nine licensed groundwater abstraction and one licensed surface water abstraction have been located within 1km of the site.

The majority of the site is located in Flood Zone 1, and therefore has a low risk of flooding from fluvial sources. Risks associated with groundwater, sewer and reservoir flooding at the site are also considered to be low. Whilst the majority of the site is also at very low risk of flooding from surface water, a small section of the site (northern end of Fordley Road) along the south-west edge is at high risk of flooding from both fluvial and surface water, and falls within Flood Zones 2 and 3. This area represents a preferential flow route (topographic low) which connects the Middleton Watercourse located to the south of Middleton to the Minsmere River to the north.

Plate 8.1 Sizewell link road watercourse crossings



ii. Construction phase

Construction activities could impact upon groundwater and surface water drainage through reduction in discharge to ground, changes to surface water flows and hydromorphology. There is also potential for increase in the supply of fine sediment, or release of fuels, oils and lubricants through leaks and spills, which could have adverse impacts on both groundwater and surface water hydrology, geomorphology and water quality. The removal of on-site vegetation and the compaction of soils due to construction vehicles and materials storage may locally reduce the rate at which rainfall makes its way into the groundwater for a short duration. However, the overall volume of water discharging to ground is unlikely to change. Therefore, the effect is considered to be **not significant**.

Whilst the current groundwater levels at the site have not been established, available hydrogeological data suggest that it varies across the site. The construction of a series of cuttings at depths of up to 6 metres below ground level is anticipated to be wholly within the poorly sorted consolidated sediment Secondary (Undifferentiated) aquifer, and so it is considered unlikely that the groundwater of underlying aquifers would be affected, due to its limited connectivity and low permeability. If required, any dewatering would be localised and short-term in nature. The effect is, therefore, considered to be **not significant**.

Construction activity has the potential to introduce new sources of contamination to the site or mobilise existing sources through the creation of new pathways. The **CoCP** (Doc Ref. 8.11) sets out proposed measures to be implemented by the construction contractors to protect groundwater and surface water. In addition, ground investigation and relevant risk assessments would be undertaken prior to commencement of construction works, with remediation undertaken, if necessary. With these measures in place, **no significant** effects are anticipated on groundwater and surface water resources during the construction phase.

Construction activity within the floodplain and adjacent to the Fordley Road watercourse has the potential to put the workforce at risk from a flood event. The **CoCP** (Doc Ref. 8.11) sets out measures to alert and protect the workforce. This would be further developed in a flood risk emergency plan.

As the majority of the site is located in Flood Zone 1, construction activities would not lead to a loss in functional floodplain storage or displacement of sea or river flood water. **No significant** effect is predicted.

iii. Operational phase

An **Outline Drainage Strategy** (refer to **Volume 2, Appendix 2A** of the **ES**) has been developed for the site to manage and control surface water run off rates through infiltration to ground and includes pollution prevention techniques that would be implemented. These include the use of sustainable drainage systems such as the provision of swales along the length of the route of the proposed Sizewell link road and associated link roads, and infiltration basins. The drainage strategy incorporates measures to minimise effects on groundwater and surface water flows and to prevent contamination from accidental spills and leaks during the operation of the park and ride. Therefore, the effect of

the proposed development on groundwater and surface water levels and quality is considered to be **not significant**.

The majority of the site is located in Flood Zone 1, meaning that there would be no loss in functional floodplain storage, or displacement of sea, or river flood water as a result of the proposed development. The existing site is currently 'greenfield' with the only impermeable surfaces being existing roads and tracks that would connect to the proposed link road. Therefore, the proposed highway development would significantly increase the impermeable area on the site. The **Outline Drainage Strategy** includes measures for the sustainable management of surface water run-off and controlled discharge of flows to the surrounding environment, through infiltration to ground. It is considered that there is **no effect** on flood risk.

9. Yoxford roundabout and other highway improvements

9.1 Introduction

Volume 7 of the **ES** provides a detailed description of the off-site highway improvements proposed to support the construction and operation of the Sizewell C nuclear power station. It describes how they would be constructed and operated, and the likely significant environmental effects that are anticipated to arise as a result of these activities.

9.2 Description of development

Four locations have been identified, where there is a need to provide highway improvement works. The works proposed are summarised in **Table 9.1**.

Road safety analysis has identified potential highway safety issues at two additional sites (the B1078 and B1079 junction east of Easton and Otley College and the A140 and B1078 junction west of Coddenham). Highway safety measures at these sites would be delivered through a legal agreement. It is envisaged that these works would include improvements of visibility splays, provision of signage and road markings.

The locations of all off-site highway improvements are shown on **Figure 9.1**. All of the proposed highway improvement works would be retained permanently.

An environmental screening exercise was undertaken to identify which highway improvement works may give rise to environmental effects that could potentially be significant. The following works were screened in for further assessment:

- provision of new roundabout at A12 and B1122 junction, east of Yoxford (referred to as 'Yoxford roundabout'), refer to **Figure 9.2**; and
- improvements at the A12/A144 junction south of Bramfield, refer to **Figure 9.3** (screened in for noise and vibration and terrestrial historic environment assessments only).

All other proposed highway improvements were not considered likely to give rise to significant adverse effects and, therefore, were screened out of the assessment.

Table 9.1 Summary of proposed highway improvement works

Highway Improvement	Summary of Works	Site area
A12 and B1122 east of Yoxford.	Provision of a new roundabout at the junction (referred to as the 'Yoxford roundabout').	2.9 ha
A1094/B1069 junction south of Knodishall.	Improvements of visibility splays and provision of signage and road markings. SZC Co. would also seek to reduce the speed limit from 60 miles per hour (mph) to 40mph.	1.5 ha
A12/A144 junction south of Bramfield.	Provision of central reservation island and waiting area.	1.2 ha
A12/B1119 junction at Saxmundham.	Improvements of visibility splays, alteration of the B1119 at the junction with the A12, and provision of signage and road markings.	0.9 ha

9.3 Construction

It is envisaged that all highway improvement works would be undertaken in the early stages of construction of the Sizewell C Project. Due to the varying nature of the works proposed, the duration of construction works would vary across the highway improvement sites. All construction works would be managed in accordance with construction environmental management measures set out within the **CoCP** (Doc Ref. 8.11).

It is anticipated that the proposed Yoxford roundabout would take six to nine months to build. The roundabout would be largely constructed, whilst avoiding the need for long-term temporary road closures or the diversion of the A12 in this location. However, traffic management measures would be implemented during the construction of the tie-ins back to the A12 and B1122 once the roundabout has been built. A temporary contractor compound would be constructed in the field immediately to the north the B1122.

Improvements to the A12 and A144 junction south of Bramfield are anticipated to take up to six months to complete. The works include the provision of a physical central reservation island and waiting area, and localised widening of the A12 and provision of pedestrian walkways. Traffic management would be required during construction to facilitate the proposed road-widening.

9.4 Operation

On a typical day during the peak period of Sizewell C construction, there would be 4,550 vehicles per day travelling along the B1122 immediately east of the proposed roundabout at Yoxford. It is anticipated that 16,400 vehicles per day would use the southern A12 arm of the roundabout and around 16,900 vehicles per day would use the northern A12 arm.

Upon completion of construction of the Sizewell C main development site, there would be 4,150 vehicles per day travelling along the B1122 immediately east of the proposed roundabout at Yoxford. It is anticipated that 16,550 per day would use the southern A12 arm and around 16,900 vehicles would use the northern A12 arm.

Figure 9.1 Location Yoxford roundabout and other highway improvements

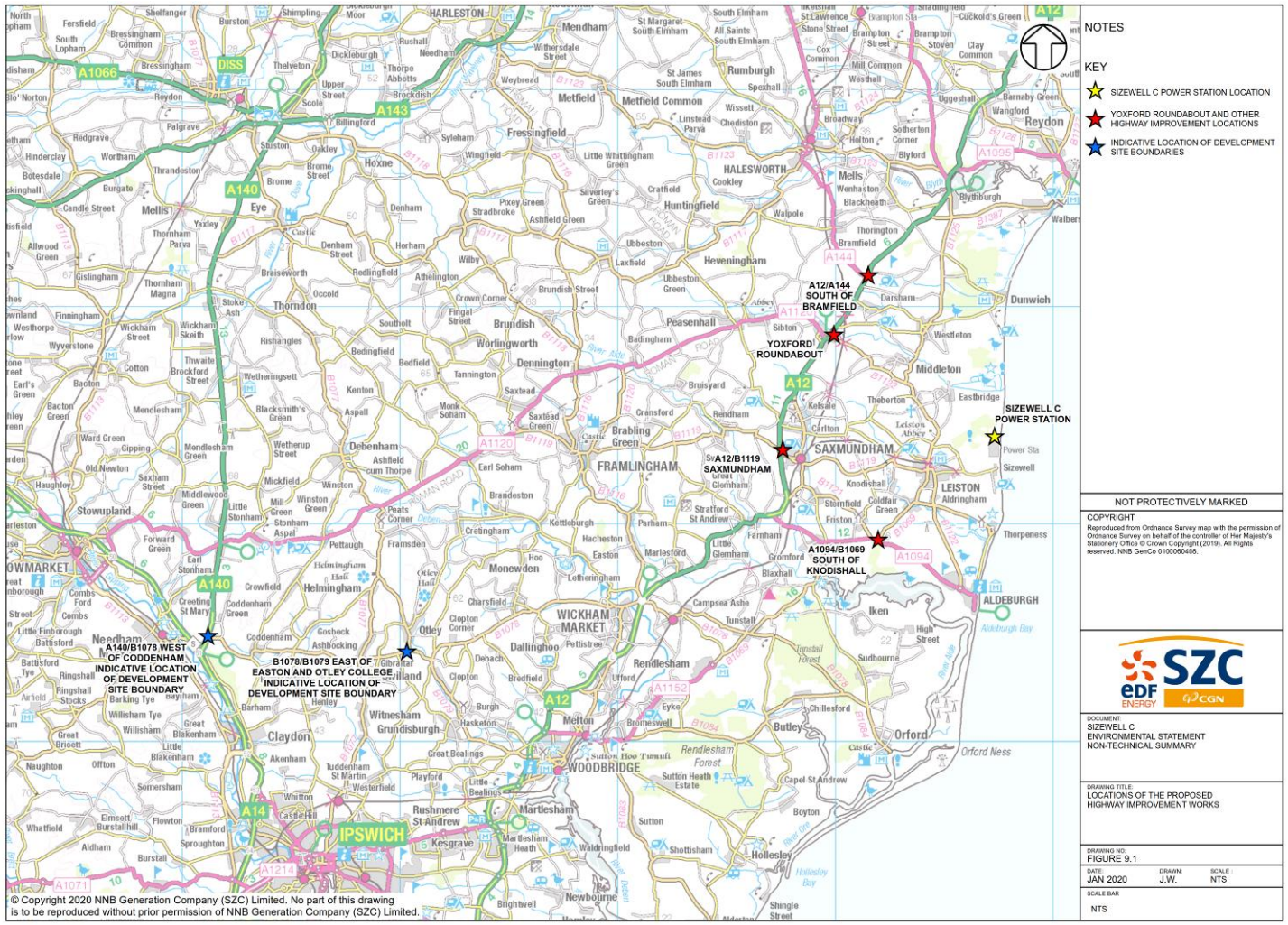


Figure 9.2 Illustrative masterplan for Yoxford roundabout

Figure 9.3 Illustrative masterplan for A12/A144 junction south of Bramfield

9.5 Summary of likely environmental effects

This section provides a summary of the likely environmental effects predicted to occur as a result of the construction and operation of the highway improvements which have been scoped in to the EIA. The proposed mitigation measures are also summarised.

a) Noise and vibration

i. Context

Chapter 4 of **Volume 7** of the **ES** presents the assessment of potential noise and vibration effects from the construction and operation of the Yoxford roundabout. In addition to the assessment of works at Yoxford roundabout, the potential noise and vibration effects from the construction of the proposed A12/A144 junction improvement works south of Bramfield have been assessed. The operational use of the proposed A12/A144 junction improvement works south of Bramfield have not been assessed, as these were considered unlikely to give rise to any significant effects.

To inform the assessment, baseline sound surveys were undertaken at monitoring locations in the vicinity of the proposed Yoxford roundabout site and the A12/A144 junction to characterise the sound levels currently experienced by receptors, such as residential properties.

ii. Construction phase

The assessment considered construction noise and vibration generated through construction activities such as site clearance, construction of the temporary contractor compound, earthworks and surfacing of the road.

A range of measures are proposed to mitigate the effects during construction including good practice measures to minimise noise and vibration impacts as set out in the **CoCP** (Doc Ref 8.11). Further acoustic screening and working methods would be considered by the contractor, such as limiting noisy construction activities on Saturday afternoons. As a result, all construction noise levels are predicted to be **not significant**. In addition, **no significant** effects from vibration during construction have been identified. Notwithstanding these outcomes, a programme of monitoring and a system for the receipt and recording of any noise and vibration complaints from occupiers of noise sensitive receptors would be put in place.

iii. Operational phase

For Yoxford roundabout, the modelling of road traffic noise for the two 2028 scenarios (during a typical day and a busiest day of main development site construction) and the 2034 scenario (operation of Sizewell C power station) demonstrated that in all scenarios **no significant** noise and vibration effects would occur.

b) Air quality

i. Context

Chapter 5 of **Volume 7** of the **ES** presents the assessment of potential effects on air quality arising from the construction and operation of the proposed Yoxford roundabout.

To inform the assessment, the current and future year baseline pollutant levels were established through a review of existing published data from Defra and East Suffolk Council, and modelling of predicted traffic emissions for a baseline year of 2018, and future baseline years of 2023, 2028 and 2034. The baseline assessment demonstrated that the existing concentrations of air pollutants are well below air quality standards set out in legislation for the protection of human health across the study area.

The assessment considered the predicted emissions arising from dust and construction traffic during the construction phase, and traffic during operational phase at 'representative' receptors close to the proposed Yoxford roundabout site and along the existing road network.

ii. Construction phase

During construction, the proposed construction activities could give rise to changes in dust deposition rates and to changes in concentrations of particulate matter (PM_{10}) in air. An **Outline Dust Management Plan** (see **Volume 2, Appendix 12A** of the **ES**) has been developed which sets out measures to manage activities to minimise impacts of dust, including effective dust suppression measures and monitoring. With the implementation of these measures, **no significant** effects on air quality from construction dust emissions are anticipated.

Although the anticipated number of vehicle movements required to build the proposed Yoxford roundabout would be relatively low, due to the number of developments undergoing construction during the early years of the Sizewell C Project in the wider study area (Lowestoft to Ipswich), a detailed assessment of transport emissions for the construction phase scenario (in 2023) has been undertaken. Whilst the concentrations of road traffic emissions (NO_2 PM_{10} and $PM_{2.5}$) at nearby sensitive receptors adjacent to the proposed Yoxford roundabout site are predicted to increase slightly, the overall concentrations would be well below the air quality objective values, and therefore the effects are considered to be **not significant**.

iii. Operational phase

The assessment considered the effects on air quality in 2028 (assumed peak year of main development site construction) and in 2034 (once the Sizewell C power station is complete and operational). In both scenarios the assessment concluded that the effects on representative receptors along the modelled road lines are **not significant**.

c) Landscape and visual

i. Context

Chapter 6 of **Volume 7** of the **ES** presents the assessment of potential landscape and visual effects of the proposed Yoxford roundabout on landscape character and visual amenity.

There are three landscape character types within the 0.5km study area, two of which were assessed in further detail due to the potential impacts on their character, the Valley Meadowlands and Fens and Rolling Estate Claylands. Three receptor groups were identified which may experience effects on visual amenity:

- **Group 1** – users of footpaths through Cockfield Hall and residents of properties within Cockfield Hall in the areas around their homes;
- **Group 2** – users of the B1122 as a local road, residents of properties north east and south of the site and users of footpaths to the south of the site; and
- **Group 3** – residents and visitors to Yoxford.

The assessment also considered long distance routes within the study area, specifically the A12 as well as the effects on the special landscape area which includes the River Yox and Minsmere Old River Valley, and the historic parklands around Yoxford (Cockfield Hall, Rookery Park and Grove Park).

The design has sought to retain existing woodland and hedgerow where possible, including the tree belt to the north-west of the site, along the boundary of Satis House Hotel, as well as the hedgerow along the southern side of the B1122. New hedgerow and tree planting is proposed along the realigned sections of road, as well as around the proposed infiltration basin.

ii. Construction phase

The construction of the proposed Yoxford roundabout would lead to changes to the existing landscape and visual amenity during construction through the removal of elements of the existing landscape and alterations to landform, and views of construction activity. The design has sought to minimise loss of existing woodland and hedgerow, where possible, and measures are set out in the **CoCP** (Doc Ref. 8.11) to reduce construction disturbance, including light spill. Overall, **no significant** effects on the landscape character, visual amenity of identified receptor groups, long distance routes and the special landscape area have been identified.

iii. Operational phase

The proposed Yoxford roundabout would become a permanent feature within the landscape. During operation, the scale of effects on the landscape would remain the same as for construction other than the removal of the contractor compound. Overall, **no significant** effects are anticipated on the landscape character.

Effects on visual amenity would reduce over time as proposed planting matures and becomes more effective in providing screening. **No significant** effects on the visual amenity of the identified receptor groups, users of the long-distance routes and the special landscape area have been identified.

d) Terrestrial ecology and ornithology

i. Context

Chapter 7 of **Volume 7** of the **ES** presents the assessment of potential effects of the proposed Yoxford roundabout site on ecology within the site and the surrounding area. The assessment considers effects on designated sites, habitats and protected species. In addition, a **Shadow Habitats Regulations Assessment Report** (Doc Ref. 5.10) is submitted with the application for development consent to identify potential effects on European designated sites (Natura 2000 sites).

Based on a combination of survey data collected to date and a precautionary approach, the following receptors were taken forward for a detailed assessment:

- Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site, and SSSI;
- Roadside Nature Reserve 197;
- Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS; and
- River Yox.

ii. Construction phase

The construction of the proposed Yoxford roundabout has the potential to impact indirectly on the designated sites listed above through changes in water quality. In addition, there is the potential for changes in hydrology and hydrogeology of the River Yox. All construction works would be undertaken in compliance with the **CoCP** (Doc Ref. 8.11) which sets out measures for pollution prevention across the site. In addition, a 5m buffer area with the River Yox would be maintained, where feasible. No storage of equipment or material would be allowed within the buffer zone. With these measures in place, **no significant** effects are anticipated on these sites.

The site boundary is adjacent to the Roadside Nature Reserve 197 which is designated for Sandy Stilt Puffball (a fungus). As above, all construction works would be undertaken in compliance with the **CoCP** (Doc Ref. 8.11) which would minimise impacts on water quality, local hydrology and hydrogeology of the site. During construction, there would be an increase in total nitrogen deposition; however, this would be limited. Overall, **no significant** effects have been identified on this site.

Sandy Stilt Puffball

iii. Operational phase

The **Outline Drainage Strategy** (**Volume 2, Appendix 2A** of the **ES**) for the proposed Yoxford roundabout has been developed to minimise surface water run-off and prevent diffuse pollution from sediment and other pollutants arising and reaching the River Yox or nearby designated sites. As a result, there would be **no significant** effect on these sites.

Similarly, pollution prevention measures embedded within drainage design would prevent impacts on the water quality, local hydrology and hydrogeology of the Roadside Nature Reserve 197. There would also be a decrease in total nitrogen deposition with reduction in traffic, once construction of the Sizewell C Project is complete. Overall, **no significant** effects are anticipated on this site.

e) Amenity and recreation

i. Context

Chapter 8 of **Volume 7** of the **ES** presents the assessment of potential effects of the proposed Yoxford roundabout on amenity and recreation receptors. The assessment of amenity and recreation effects includes consideration of visual, noise and transport impacts which have the potential to affect amenity and use of recreational resources.

There are no public rights of way within or partially within the site. However, three footpaths in close proximity to the site were scoped into the assessment.

ii. Construction phase

During construction of the proposed Yoxford roundabout, users of footpaths within the vicinity of the site may have glimpsed views of construction works. Users may also experience an increase in noise associated with construction works and an increase in construction traffic along the A12. However, due to the limited scale of works, **no significant** effects have been identified.

iii. Operational phase

Following completion of construction, the temporary construction compound, temporary lighting and signage associated with construction would be removed, and the roundabout would become permanent. **No significant** effects on the users of footpaths within the vicinity of the site have been identified.

f) Terrestrial historic environment

i. Context

Chapter 9 of **Volume 7** of the **ES** presents the assessment of potential effects of the proposed Yoxford roundabout and the A12/ A144 junction works on heritage assets within the site boundary and in the surrounding area.

ii. Yoxford roundabout

The Yoxford Conservation Area extends into the westernmost edge of the site, encompassing the current A12 and its junction with the B1122. An extension of Yoxford Conservation Area has been proposed and is currently under consultation which would extend

the boundary of the Conservation Area along the southern boundary of the site to its eastern extent. There are also a further 26 listed buildings within the 500m study area. Most of the listed buildings are within the Yoxford Conservation Area. In summary, the following heritage assets were scoped into the assessment:

- Yoxford Conservation Area and associated listed buildings;
- Rookery Park (an area of non-designated parkland);
- Rookery Cottages (Grade II listed building);
- Cockfield Hall Park (an area of non-designated parkland); and
- Cockfield Hall Lodge (Grade II listed building).

Previous archaeological investigations within the site boundary have identified the eastern fringe of the historic settlement core of Yoxford, a former bridge over the River Yox and Rookery Park. Further historic environment records are located within the 500m study area, which comprise a variety of features ranging from prehistoric flint artefacts to a World War II pillbox.

Construction phase

During construction of the proposed Yoxford roundabout, there would be intrusive groundworks that would disturb any surviving, and unrecorded, archaeological remains. Prior to the commencement of construction, an agreed scheme of archaeological investigation would be undertaken to ensure that the archaeological interest of any significant deposits and features within the site could be appropriately investigated, recorded and disseminated, preserving the archaeological interest of these remains. Therefore, **no significant** effects on buried heritage assets are anticipated.

Construction activities also have the potential to change the visual and auditory environment and impact on the setting of heritage assets in the area. Whilst construction activities may be clearly visible and at times intrusive to parts of the Yoxford Conservation Area, the duration of perceptually intrusive works would be limited and any harm to the historic interest of the asset would be limited. Views of construction works at the identified listed buildings would be screened by existing planting. Noisy operations would be intermittent and of short duration. Overall, the works are considered to result in either no or limited harm to heritage significance; therefore, the effects would be **not significant**.

Operational phase

Any disturbance of archaeological heritage assets within the site would have already occurred during the construction and therefore **no further effects** are anticipated during operation.

The operation of the proposed Yoxford roundabout would affect the eastern boundary of the Yoxford Conservation Area through the perceptible presence of the new roundabout and associated infrastructure. The resulting change in traffic would not be sufficient to give rise to a change in the perception of the Conservation Area, which already occupies the junction between two key routes. Overall, there would be **no significant** effect on the conservation area.

In addition, **no significant** effects on listed buildings have been identified, as intervening vegetation and landform would screen the roundabout from views, and any perceptual change arising from increased traffic movements is unlikely to present a sufficient increase to give rise to any impact.

iii. A12/A144 junction

Grade II-listed Stone Cottage is located immediately north of the junction between the A12 and the A144. The proposed improvements at the A12/A144 junction south of Bramfield have the potential to alter the setting of this listed building and therefore these works were screened in for further assessment.

The Grade II listed building is set back from the existing busy junction behind a dense and high hedgerow and separated from the existing road. During construction, whilst there would be some direct visibility of the proposed works from upper storeys of the house, the works would not affect the viewer's ability to appreciate the architectural interest of the house and any perceptual change would be consistent with periodic road works that might be expected. Therefore **no effect** would arise.

During operation, the proposed works would not lead to any qualitative perceptual change in the setting of the listed building. Consequently, **no effect** would arise.

g) Soils and agriculture

i. Context

Chapter 10 of **Volume 7** of the **ES** presents the assessment of potential effects of the proposed Yoxford roundabout on soils and agriculture.

The soils across the site are freely draining, slightly acidic base-rich soils (i.e. rich in calcium or magnesium), and the majority of the agricultural land is comprised of moderate to poor quality as well as non-agricultural land. The agricultural land on the site falls under a single ownership.

ii. Construction phase

Construction of the proposed Yoxford roundabout would result in the permanent loss of 1.56 ha of land from primary agricultural productivity and a further 0.34ha would be required temporarily. As no best and most versatile agricultural land would be lost, the effect is considered to be **not significant**.

Land would be required temporarily during the construction period or on a permanent basis from one agricultural holding. SZC Co. would continue to liaise with the landowner to reduce the effects on the holding, as far as practicable. On this basis, it is considered the effect would be reduced to **not significant.**

iii. Operational phase

During operation, no additional land would be required beyond that reported for the construction phase, and **no further effects** on the agricultural land quality or land holdings are anticipated.

There is the potential for invasive weed species to grow within the site. However, this would be controlled using an appropriate management regime that would remove weed growth that might threaten adjoining agricultural land. Therefore, **no significant** effects are anticipated.

h) Geology and land quality

i. Context

Chapter 11 of **Volume 7** of the **ES** presents the assessment of potential effects of the proposed Yoxford roundabout on ground conditions. Approximately 20% of the site is underlain by wind blown deposits comprising a mix of clay, silt, sand and gravel. The bedrock of geology beneath the site comprises sand of the Crag Group.

There is the potential for contamination on the site and surrounding areas due to current and historical land uses and potential for fly tipping. There is no or very low potential for ground stability hazards within the study area.

ii. Construction phase

The construction phase may introduce new sources of contamination and disturb and mobilise existing contamination within soils. Best practice measures set out within the **CoCP** (Doc Ref. 8.11) would be implemented to reduce risks associated with contamination. Therefore, **no significant** effects are anticipated.

The site is not located within an area of historical or planned mineral extraction or a Minerals Safeguarding Area. Earthworks such as excavation of cutting at the roundabout location, would be required and, therefore, there is the potential for impacts on soil erosion. However, through mitigation measures included within the design and as part of construction management, the overall effect on soil features and mineral resources would be **not significant.** Waste soils may be generated during construction. A materials management plan would be implemented for the site which would seek, as far as reasonably practicable, to reuse and recycle soils on site and to actively reduce the amount of hazardous soils generated. Overall, **no significant** effects have been identified.

iii. Operational phase

During operation, the proposed Yoxford roundabout would be operated in accordance with relevant regulations, best practice and guidance. Effects on soil erosion, mineral resources and waste would be limited and are therefore considered to be **not significant**.

Risk of contamination from the operation of the proposed Yoxford roundabout would be mitigated by pollution prevention measures embedded within the **Outline Drainage Strategy** (**Volume 2, Appendix 2A** of the ES). Therefore, **no significant** effects on human, water and property receptors would occur.

i) Groundwater and surface water

i. Context

Chapter 12 of **Volume 7** of the **ES** presents the assessment of potential effects on groundwater and surface water resources arising from the construction and operation of the Yoxford roundabout. The assessment is also supported by the **Yoxford roundabout and other highway improvements Flood Risk Assessment** (Doc. Ref 5.7) and project-wide **Water Framework Directive Compliance Assessment** (Doc. Ref 8.15).

The wind-blown sediments in the north of the site are classified as a Secondary Aquifer (undifferentiated), and the Crag Group bedrock underlying the site as a Principal Aquifer. The River Yox is located directly to the north of the site and an unnamed tributary of the River Yox is located 10m to the east of the site. Additionally, a sewage treatment works is located to the north-east of the site, approximately 100m from the site boundary. Two licensed groundwater abstractions and one licensed surface water abstraction have been identified within 1km of the site.

The majority of the site is located in Flood Zone 1, and therefore has a low risk of flooding from tidal or fluvial sources. However, the northern extent of the site is in Flood Zone 2 by the A12 bridge over the River Yox. Risks associated with groundwater, sewer and reservoir flooding at the site are considered to be low.

ii. Construction phase

Construction activities could impact upon groundwater and surface water drainage through reduction in discharge to ground, changes to surface water flows and hydromorphology. The increase in the supply of fine sediment, or release of fuels, oils and lubricants through leaks and spills, could have adverse impacts on both groundwater and surface water hydrology, geomorphology and water quality. Construction drainage and pollution prevention principles are set out within the **CoCP** (Doc Ref. 8.11). In addition, ground investigation and relevant risk assessments would be undertaken prior to commencement of construction works, and remediation undertaken, if necessary. With these measures in place, **no significant** effects on groundwater and surface water quality and levels have been identified.

The cutting for the construction of the realignment of the B1122 is unlikely to encounter groundwater in the underlying Crag aquifer during construction and groundwater dewatering during construction is not likely to be required. There would also be no effect on the River Yox with respect to groundwater level and flow.

As the majority of the site is located in Flood Zone 1, construction activities would not lead to a loss in functional floodplain storage or displacement of sea or river flood water. Therefore, **no significant** effect on flood risk is anticipated.

iii. Operational phase

An **Outline Drainage Strategy** (refer to **Volume 2, Appendix 2A** of the **ES**) has been developed for the site to manage and control surface water run off rates through infiltration to ground. The drainage strategy incorporates measures to minimise effects on groundwater and surface water flows and to prevent contamination from accidental spills and leaks during the operation of the roundabout. Therefore, the effect of the proposed Yoxford roundabout on groundwater and surface water levels and quality would be **not significant**.

The site is currently a mixture of existing highways infrastructure and greenfield, and would increase the impermeable area of the road, which would increase the associated surface water runoff from the site. However, the drainage design would reduce surface water flood risk from run-off that currently flows along the existing A12 into Yoxford village. In the unlikely event that ground conditions prevent full use of infiltration to ground, the pond provided on-site as part of the drainage strategy would become a combined infiltration and attenuation pond. The proposed Yoxford roundabout is considered to have **no effect** on flood risk.

10. Freight management facility

10.1 Introduction

Volume 8 of the **ES** provides a detailed description of how the proposed freight management facility would be constructed, operated and removed and reinstated, and the likely significant environmental effects that are anticipated to arise as a result of these activities.

10.2 Description of development

The proposed freight management facility is located near Seven Hills and would assist in allowing a controlled pattern of deliveries to the main development site with reduced movements during peak or sensitive hours on the network (see **Figure 10.1**).

The facility would provide buildings and external areas where paperwork and goods can be checked prior to delivery to the main development site. It would be a location where Heavy Goods Vehicles are held while they wait to enter the main development site or in the event of an accident on the local road network which prevents access to the main development site.

The approximately 11ha site predominantly comprises arable farmland. The site is located to the south-east of the A12 and A14 junction, south-east of Ipswich and is bounded by the A14 to the north and Felixstowe Road to the south.

The freight management facility would comprise:

- parking for approximately 150 Heavy Goods Vehicles including up to six covered Heavy Goods Vehicle spaces for screen and search activities;
- up to 12 car parking spaces for staff and visitors including up to one accessible space;
- up to ten spaces for minibuses/vans;
- up to four motorcycle parking spaces;
- covered cycle parking for up to ten bicycles;
- security fencing and lighting;
- an amenity and welfare building comprising toilets and staff room;
- a security building including an administration office;
- a security booth adjacent to an exit loop for errant vehicles;
- a smoking shelter;
- site access, including a ghost island junction;
- other ancillary development, including road markings, signage, lighting, closed circuit television and utilities; and
- external areas including roadways, footways, landscaping (including bunds), and drainage infrastructure.

Figure 10.1 Illustrative masterplan for the freight management facility

10.3 Construction

Construction is anticipated to take approximately 12 to 18 months to complete and is likely to comprise the following phases:

- Phase 1: Enabling works;
- Phase 2: Earthworks and excavation;
- Phase 3: Laying of concrete pavement for parking areas and internal circulation route;
- Phase 4: Construction and fit out of buildings, and installation of utilities; and
- Phase 5: Final surfacing.

The anticipated route of construction traffic to the site would be from the A12. The freight management facility would generate up to 21 lorry (each way) movements per day (42 lorry movements per day in total). There are also expected to be up to 182 car movements during the construction of the proposed development.It is estimated that the peak construction workforce would be approximately 40 people on the construction site at any one time.

All construction works would be managed in accordance with construction environmental management measures set out within the **CoCP** (Doc Ref. 8.11).

10.4 Operation

The freight management facility would operate for a minimum of 7.5 hours a day for 5 days a week, to a maximum of 24 hours a day 7 days a week during the peak construction of the main development site.

The proposed development would control the flow of Heavy Goods Vehicles delivering construction materials to the main development site, by holding them at the facility until an appropriate delivery time. Also, in the event of an incident requiring site deliveries to be temporarily suspended, the vehicles would be held at the facility to avoid congestion on the road network.

10.5 Removal and reinstatment

Once the need for the facility has ceased, the buidlings and associated infrastructure would be removed in accordance with a removal and reinstatement plan, which would maximise the potential for re-use of building modules and materials. When the site has been cleared, the area would be returned to agricultural use. It is anticipated that the removal and reinstatement works would follow a programme broadly in the reverse of construction.

10.6 Summary of likely significant environmental effects

This section provides a summary of the likely significant environmental effects predicted to occur as a result of the construction, operation and removal and reinstatement of the freight management facility. Proposed mitigation measures are also summarised.

a) Noise and vibration

i. Context

Chapter 4 of **Volume 8** of the **ES** presents the assessment of potential noise and vibration effects from the construction, operation and removal and reinstatement of the proposed freight management facility.

ii. Construction phase

A range of mitigation measures are proposed to mitigate the construction effects of the proposed freight management facility, including following good practice measures to minimise noise and vibration impacts, as set out in the **CoCP** (Doc Ref 8.11). As a result, all construction noise levels are predicted to be **not significant**. In addition, **no significant** effects from vibration during construction have been identified. Notwithstanding these outcomes, a system for the receipt and recording of any noise and vibration complaints from occupiers of noise sensitive receptors would be put in place.

iii. Operational phase

During operation, noise is likely to be generated by the operation of the proposed development as a result of vehicle movements and mechanical plant. The mechanical plant would be selected so that the target noise levels are below the significant noise effect level. Overall, **no significant** effects are predicted.

iv. Removal and reinstatement phase

The same mitigation measures that applied during construction would also apply during the removal and reinstatement phase. Therefore, **no significant** noise effects are predicted to occur at representative receptor locations.

b) Air quality

i. Context

Chapter 5 of **Volume 8** of the **ES** presents the assessment of potential air quality effects arising from the construction, operation and removal and reinstatement of the proposed freight management facility.

To inform the assessment, the current and future year baseline pollutant levels were established through a review of existing published data from Defra and East Suffolk Council, and modelling of predicted traffic emissions for a baseline year of 2018, and future baseline years of 2023 and 2028. The baseline assessment demonstrated that the existing concentrations of air pollutants are well below air quality standards set out in legislation for the protection of human health across the study area.

ii. Construction phase

The proposed construction activities could give rise to dust and result in changes to the concentrations of particulate matter (PM_{10}) in air. However, with the application of measures to manage dust, as set out in the **Outline Dust Management Plan** (**Volume 2, Appendix 12A** of the **ES**), such as use of surface covering and dust suppression, **no significant** construction dust effects are anticipated.

Further modelling and assessment of road traffic air pollutants (NO_2, PM_{10} and $PM_{2.5}$) was undertaken to consider the effects of construction traffic in 2023 at representative receptor locations in proximity to the freight management facility site. The assessment concluded that there would be **no significant** effects.

iii. Operational phase

An assessment of the road traffic emissions from operational traffic associated with the freight management facility site at the peak of main development site construction considered both an average day and busiest day during the operation of the facility. **No significant** effects are predicted to occur.

iv. Removal and reinstatement phase

As for the construction phase, the proposed activities associated with the removal and reinstatement phase could give rise to changes in dust deposition rates and to changes in concentrations of particulate matter (PM_{10}) in air. However, with the application of measures to manage dust generation, **no significant** construction dust effects are anticipated.

Additionally, as construction traffic associated with the removal and reinstatement phase is not expected to be greater than the construction phase traffic, **no significant** effects are predicted.

c) Landscape and visual

i. Context

Chapter 6 of **Volume 8** of the **ES** presents the findings of the assessment of potential effects of the proposed freight management facility on the landscape character and visual amenity.

The review of baseline information identified two landscape character types, which were assessed in further detail due to the potential impacts on their character, the East Sandlands and Plateau Estate Farmlands.

Six receptor groups were identified which may experience effects on visual amenity and, therefore, were considered further in the assessment:

- **Group 1** – users of public rights of way, registered common land / open access land and residents of 1 and 2 Keepers Cottages to the east and south-east of the site;
- **Group 2** – users of public rights of way east of Keepers Cottages and of the A14;

- **Group 3** – users of the footpath, Bridge Road and the Levington Park complex to the south of the site;
- **Group 4** - users of a local road (Felixstowe Road) within and to the south of the site;
- **Group 5** – users of the A1156 to the west of the site around Porter's Covert and Seven Hills Crematorium; and
- **Group 6** – users of footpaths and local roads (Tenth Road and Levington Lane) south of Bucklesham and north of the A14.

In addition, motorists travelling on the A14 and rail passengers on the Ipswich to Felixstowe line were scoped into the assessment, as they may experience brief views of the site.

ii. Construction phase

The proposed freight management facility would lead to changes to the existing landscape and visual amenity during construction through the removal of elements of the existing landscape and alterations to landform, and views of construction activity. The design has sought to minimise loss of existing woodland and hedgerow, where possible, and measures set out in the **CoCP** (Doc Ref. 8.11), such as the use of site hoardings and measures to limit light spill, would reduce construction disturbance. Once constructed, the landscape bunds would provide screening from the south-east and north-west of the site.

No significant effects on the landscape character during construction have been identified. However, there would be a **significant adverse** effect on the visual amenity of Group 1 due to views of construction activity and plant. Effects on the visual amenity for the other receptors are **not significant.**

iii. Operational phase

Effects arising from the presence and operation of the freight management facility on the landscape would be more perceptible within the site and in adjacent fields to the south-east and north-west. However, **no significant** effects are anticipated on the landscape character and visual amenity receptors.

iv. Removal and reinstatement phase

During the removal and reinstatement phase, the anticipated impacts on the landscape and visual amenity would be similar to those experienced during the construction phase. As with the construction phase, **no significant** effects on the landscape character during construction are anticipated. However, there would be a **significant adverse** effect on the visual amenity of Group 1 receptors, due to the views of construction activity and plant. Effects on the visual amenity of all other receptors would be **not significant**.

d) Terrestrial ecology and ornithology

i. Context

Chapter 7 of **Volume 8** of the **ES** presents the assessment of potential effects of the proposed freight management facility site on ecology within the site and the surrounding area. The assessment considered effects on designated sites, habitats and protected species. In addition, a **Shadow Habitats Regulations**

Assessment Report (Doc. Ref 5.10) is submitted with the application for development consent to identify potential effects on European designated sites (Natura 2000 sites).

Based on a combination of survey data collected to date and a precautionary approach, the following receptor group was taken forward for detailed assessment:

- Bat assemblage.

All other ecological receptors were unlikely to be significantly affected by the proposed works.

ii. Construction phase

During construction, bats have the potential to be impacted by loss of habitat and disturbance from noise and light. The construction of the freight management facility would result in the loss of foraging habitat, part of a linear feature suitable for use by commuting bats and features suitable for bats to roost in. However, habitat loss has been minimised, as far as practicable, through the retention of the majority of hedgerows. Disturbance from noise and light would be minimised, as far as practicable, as set out within the **CoCP** (Doc Ref. 8.11), for example by minimising construction activity at night (where lighting would only be provided for safety and security). Overall, with these measures in place, the effects on bats are considered to be **not significant**.

iii. Operational phase

During operation, impacts on the bat assemblage would be associated with disturbance from noise and light, as the freight management facility would operate overnight. However, the extent of noise is likely to be restricted to the site and habitats on the immediate boundary. Light spill beyond the site boundary would be limited and there would be minimal light spillage into adjacent habitats. Whilst lighting levels would be higher along the new access road, and this could act as a deterrent, bats using the site are almost certainly not dependent on the sub-optimal habitats present within the site. Overall, the effects on bats would be **not significant**.

iv. Removal and reinstatement phase

During the removal and reinstatement phase, activities would be similar to those during construction and the land would be restored to agricultural use. Through the reinstatement of the site, where practicable, boundary planting would be left in situ and original hedgerows lines would be re-established. Overall, **no significant** effects on bats have been identified.

e) Amenity and recreation

i. Context

Chapter 8 of **Volume 8** of the **ES** presents the assessment of potential effects of the proposed freight management facility on amenity and recreation receptors. The assessment of amenity and recreation effects includes consideration of visual, noise and transport impacts which have the potential to affect amenity and use of recreational resources.

There are no public rights of way within the site boundary, however there are ten rights of way that are located close to the site and have been taken forward for further assessment. All of these are located to the east and south-east of the freight management facility site in an area of registered common land / open access land.

ii. Construction phase

During construction of the proposed freight management facility, users of bridleways and footpaths to the east and south-east of the site may experience views of the construction works. Users may also experience disruption as a result of increase in noise, changes to air quality, the provision of lighting associated with construction works and an increase in construction traffic along the A12. However, with measures in place to minimise construction disturbance, as set out within the **CoCP** (Doc Ref. 8.11), **no significant** effects are predicted.

iii. Operational phase

During the operation of the proposed freight management facility, users of bridleways and footpaths to the east and south-east of the site would have limited views into the site, as the proposed freight management facility would be partially screened by a landscape bund and planting. As a result, **no significant** effects are predicted.

iv. Removal and reinstatement phase

Once the need for the facility has ceased, the buildings and associated infrastructure would be removed in accordance with a removal and reinstatement plan. Activities would be broadly similar to those undertaken during the construction phase and likely to result in similar effects. Therefore, **no significant** effects are predicted.

f) Terrestrial historic environment

i. Context

Chapter 9 of **Volume 8** of the **ES** presents the assessment of potential effects of the proposed freight management facility on above and below ground heritage assets within the freight management facility site boundary and in the surrounding area.

There are no designated heritage assets within the site, although there are six scheduled monuments and one listed building within a 1km study area of which only the six scheduled monuments have been taken forward for detailed assessment. These comprise bowl barrows[21] and a ring ditch south-west of Redhouse Farm.

The desk-based assessment and field survey data for archaeology has confirmed that buried archaeological remains of three confirmed or probable Bronze Age funerary monuments, are located within the freight management facility site boundary.

[21] Bowl barrows are a type of burial mound.

ii. Construction phase

During construction of the proposed freight management facility, there would be intrusive groundworks that would disturb any surviving, and unrecorded, archaeological remains. Prior to the commencement of construction, an agreed scheme of archaeological investigation would be undertaken to ensure that the archaeological interest of any significant deposits and features within the site could be appropriately investigated, recorded and disseminated, preserving the archaeological interest of these remains. Therefore, **no significant** effects are anticipated on buried heritage assets.

During construction, the proposed freight management facility has the potential to change the setting of the scheduled bowl barrows and ring ditch south-west of Redhouse Farm due to views of construction and loss of archaeological remains within the site, if present. With the implementation of a scheme of archaeological investigation, which would contribute to the understanding of these archaeological remains within a wider context, there would be **no significant** effects.

Historic landscape character has the potential to be affected through the removal of a hedgerow in the centre of the field and the presence of construction activity. However, the proposed planting at the eastern, northern and western borders of the site would provide mitigation and, therefore, **no significant** effects are predicted.

iii. Operational phase

Any disturbance and or removal of archaeological heritage assets within the site would have already occurred during the construction and, therefore, **no further effects** are anticipated during operation.

Landscape bunds and planting would screen the operational facility from the scheduled bowl barrows and ditch south-west of Redhouse Farm. Therefore, **no significant** effects due to a change to the setting of these assets would occur. In addition, with the provision of screening, **no significant** effects on the historic landscape character have been identified.

iv. Removal and reinstatement phase

No further effects on archaeology would occur during the removal and reinstatement phase.

While construction-related activity may be visible or audible at times during this phase, works would mostly be screened by landscape bunds and mature screening planting, with progressive removal of the landscape bunds during the reinstatement of the site to agricultural use. These works would be perceived as the progressive removal of the development, presenting a short-term and temporary change in setting that would not diminish heritage significance. The removal and reinstatement phase would see a return to the existing landscape character of the site through a return to agricultural use and replanting of the central hedgerow, which would serve to restore the former enclosed arrangement of the fields within the site. No adverse change is anticipated and, therefore, **no effect** would arise.

g) Soils and agriculture

i. Context

Chapter 10 of **Volume 8** of the **ES** presents the findings of the assessment of potential effects of the proposed freight management facility on soils and agriculture.

Soils on site are described as deep, freely draining coarse loamy and often stoneless. The majority of the site is categorised as best and most versatile agricultural land (7.6ha), with smaller areas of poorer quality agricultural land and non-agricultural land also present. The agricultural land on site is owned by a single agricultural land holding and forms part of a wider estate.

ii. Construction phase

Construction of the freight management facility would result in the temporary, long term loss of 9.4ha of land from primary agricultural productivity. Approximately 7.6ha (69.5%) of this land is best and most versatile land for agriculture. This is considered to be a long-term temporary **not significant** effect.

Approximately 9.4ha of the existing agricultural land holding would be required, representing less than 1% of the total landholding. SZC Co. would continue to liaise with the landowner to reduce the effects on this holding, as far as practicable. On this basis, it is considered the effects would be **not significant**.

iii. Operational phase

During operation of the proposed development, no additional land would be required beyond that reported for the construction phase, and, therefore, **no further effects** on best and most versatile land or the agricultural land holding are anticipated.

There is the potential for invasive weed species to grow within the site. However, this would be controlled using an appropriate management regime to remove weed growth that might threaten adjoining agricultural land. Therefore, **no significant** effects are anticipated.

iv. Removal and reinstatement phase

Once the need for the facility has ceased, the buildings and associated infrastructure would be removed and the land would be reinstated for agricultural use. This would be undertaken in accordance with a soil management plan, produced for the site and specific to site conditions. Overall, **no significant** effects are anticipated.

h) Geology and land quality

i. Context

Chapter 11 of **Volume 8** of the **ES** presents the assessment of potential effects of the proposed freight management facility on ground conditions.

The site is underlain by fluvial sands and gravel, silts, clays and peats. The bedrock of geology beneath these deposits comprises

sands. Whilst no contamination has been found on site, potential sources of historical contamination within and adjacent to the site include made ground associated with the Felixstowe branch line, the A14 and the artificial ground at Skouldings Pit Landfill, as well as other land uses located near the site.

There is either no hazard or very low potential for ground stability hazards and no geological faults within the study area. A low unexploded ordnance risk has been identified.

ii. Construction phase

The construction phase may introduce new sources of contamination and disturb and mobilise existing contamination within soils. However, as set out within the **CoCP** (Doc Ref. 8.11), appropriate measures for pollution incident control and the safe storage of fuel, oils and equipment would be implemented. With these in place and following further ground investigation (and remediation if necessary), the risks identified to human health, water and property receptors during the construction phase are **not significant**.

The site is not located within an area of historical or planned mineral extraction or a Minerals Safeguarding Area and whilst there is the potential for these impacts, through the mitigation measures included within the design and as part of construction management measures, **no significant** effects are predicted.

Waste soils would be generated during construction through excavations. There is the potential that waste soil generated would be classified as unsuitable for reuse on site, requiring removal from the site, although this risk is likely to be low. The design and materials management plan would seek, as far as reasonably practicable, to reuse and recycle soils on site and to actively reduce the amount of hazardous soils generated by the site. On this basis, **no significant** effects have been identified.

iii. Operational phase

During operation, there would be limited impacts of soil erosion, on mineral resources, and on waste soils through maintenance operations, with the majority of these hazards having been mitigated during construction. Therefore, **no significant** effects due to these impacts are likely to occur.

The operation of the site could introduce new sources of contamination, due to leaks and spillages. The **Outline Drainage Strategy** (included within **Volume 2, Appendix 2A** of the **ES**) incorporates measures to prevent pollution from the operation of the freight management facility. In addition, the freight management facility would be operated in accordance with relevant regulations, best practice and pollution prevention guidance. Therefore, **no significant** effects associated with the risk of contamination have been identified.

iv. Removal and reinstatement phase

The removal and reinstatement phase may result in effects on soil erosion, waste soils and mineral resources through the removal of structures, foundations, pavements, drainage and earthworks and reinstatement of subsoil/topsoil. The works would be undertaken in accordance with the **CoCP** (Doc Ref. 8.11) to minimise soil

exposure, as far as practicable, and would be managed to reduce soil erosion and dust production. In addition, soils would be managed through a materials management plan to allow the re-use of suitable soils during the reinstatement works. Effects on soil erosion, mineral resources and waste soils are therefore assessed as **not significant**.

The assessment of contamination effects during this phase considered any new sources and pollution pathways which may be introduced by removal and reinstatement activities. With mitigation implemented during the removal and reinstatement phase in accordance with the **CoCP** (Doc Ref. 8.11), risks identified to human health, water, property and ecological receptors are assessed as **not significant**.

i) Groundwater and surface water

i. Context

Chapter 12 of **Volume 8** of the **ES** presents the assessment of potential effects on groundwater and surface water resources arising from the construction, operation and removal and reinstatement of the proposed freight management facility. The assessment is also supported by the **Freight Management Facility Flood Risk Assessment** (Doc. Ref 5.8) and project-wide **Water Framework Directive Compliance Assessment**.

Several aquifers lie beneath the site, including a Secondary A Aquifer and a Principal Aquifer. The closest surface water feature to the site is a balancing pond located immediately adjacent to the northern boundary and a second pond is located approximately 400m to the south-west. There are no known water abstractions within 500m of the freight management facility site.

The site is located in Flood Zone 1 and has a low risk of flooding from rivers or the sea. In addition, the site is at very low or low risk of flooding from surface water, groundwater, reservoir and sewer flooding.

ii. Construction phase

Construction activities could impact upon groundwater and surface water receptors through reduction in discharge to ground, changes to surface water flows and hydromorphology. The increase in the supply of fine sediment, or release of fuels, oils and lubricants through leaks and spills, could have adverse impacts on both groundwater and surface water hydrology, geomorphology and water quality. The **CoCP** (Doc Ref. 8.11) sets out measures to be implemented by the construction contractors to protect groundwater and surface water. In addition, ground investigation and relevant risk assessments would be undertaken prior to commencement of construction works, with remediation completed, if necessary. With these measures in place, **no significant** effects on groundwater and surface water resources during the construction phase have been identified.

iii. Operational phase

An **Outline Drainage Strategy** (refer to **Volume 2, Appendix 2A** of the **ES**) has been developed for the site to manage and control surface water run off rates through infiltration to ground. Pollution prevention techniques would be implemented through standard

good practice and good design, including the use of sustainable drainage systems, such as swales and infiltration basins. The drainage strategy incorporates measures to minimise effects on groundwater and surface water flows and to prevent contamination from accidental spills and leaks during the operation of the freight management facility. As a result, the effect on groundwater and surface water levels and quality is considered to be **not significant**.

The freight management facility site is located in Flood Zone 1, so there would be no loss in functional floodplain storage or displacement of river flood water. However, the freight management facility would increase impermeable areas within greenfield land. Surface water run-off would be managed through sustainable drainage measures, as set out in the **Outline Drainage Strategy** (**Volume 2, Appendix 2A** of the **ES**), to ensure **no significant** effects from surface water flood risk occur.

iv. Removal and reinstatement phase

During the removal and reinstatement phase, the freight management facility site would be reinstated to existing conditions, as far as reasonably practicable. The removal and reinstatement activities would result in similar impacts as during the construction phase. In addition, intrusive activities from the removal of infrastructure could create new pathways for contamination. As during the construction phase, works would be undertaken in accordance with the **CoCP** (Doc Ref. 8.11). Further ground investigation and risk assessment post operation would confirm the risks at the time of removal and reinstatement and identify if there are areas requiring further remediation. With these measures in place, **no significant** effects are anticipated on groundwater and surface water resources during the removal and reinstatement phase.

11. Rail

11.1 Introduction

Volume 9 of the **ES** provides a description of the construction and operation of the rail infrastructure works that would be required as part of the Sizewell C Project, as well as the removal and reinstatment of the land used for the proposed rail extension route (part of the green rail route). A description of the likely significant environmental effects that are predicted to arise is also provided.

11.2 Description of development

The “green rail route” in its entirety comprises a temporary rail extension of approximately 4.5km from the existing Saxmundham to Leiston branch line to a terminal within the main development site. Part of this temporary rail extension, referred to as the ‘proposed rail extension route’ encompasses 1.8km of the green rail route from a junction with the existing Saxmundham to Leiston branch line up to the proposed B1122 (Abbey Road) level crossing, where it joins the main development site. In addition to this, rail track upgrades and works on up to eight level crossings would be required on the Saxmundham to Leiston branch line to accommodate the additional freight trains that would operate on the green rail route.

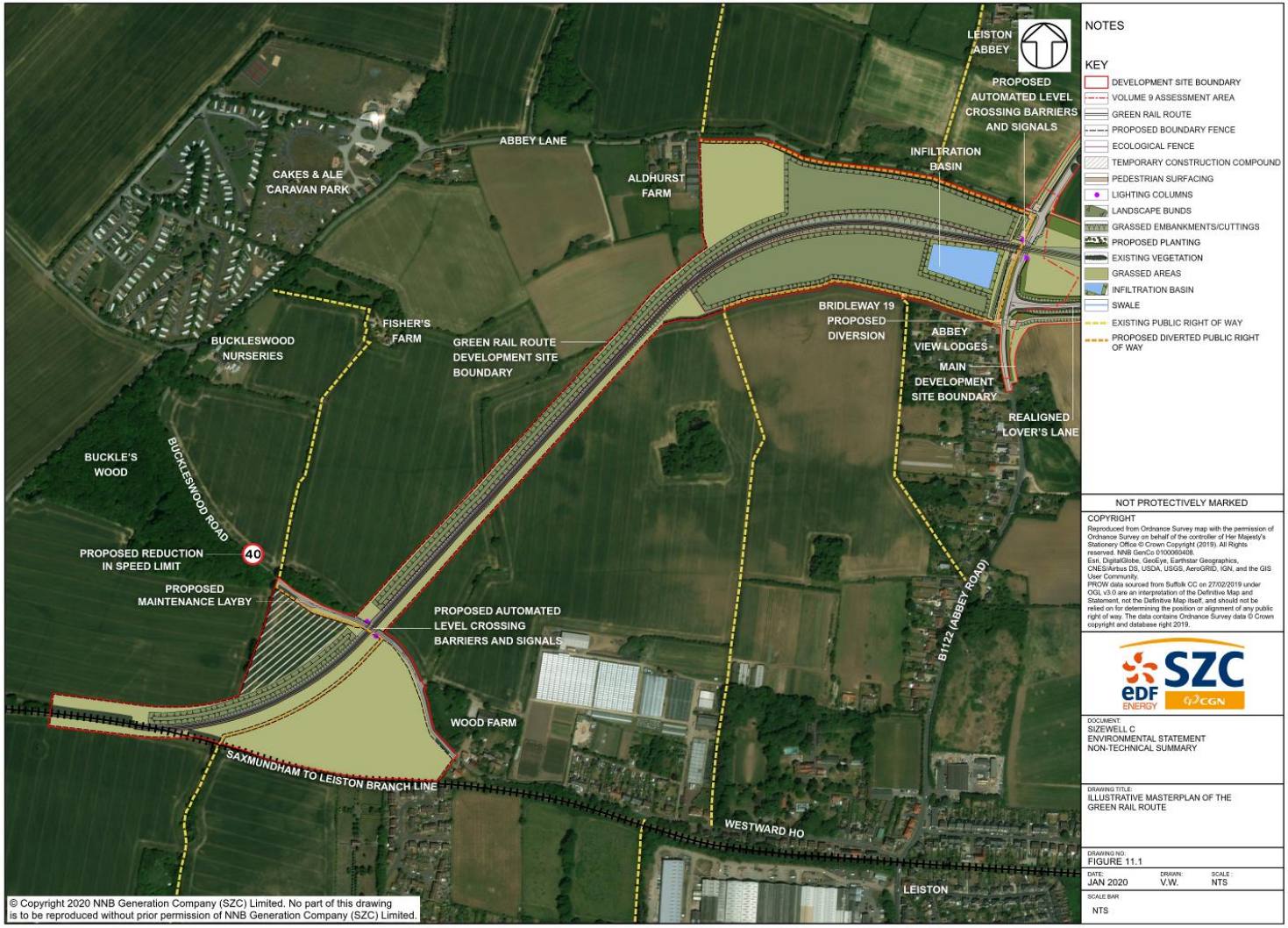
The proposed green rail route would allow freight deliveries by rail for up to three trains (six movements) per day to the main development site.

a) Rail extension route

The rail extension route comprises approximately 22ha of primarily agricultural land and is located between Saxmundham and Leiston. Running from west to east, the proposed rail extension route would include (see **Figure 11.1**):

- a temporary automated level crossing on Buckleswood Road;
- diversion of a footpath via the Buckleswood Road level crossing;
- a temporary automated level crossing where the rail extension crosses the B1122 (Abbey Road);
- footpath diversions via the B1122 (Abbey Road) level crossing;
- permanent relocation of the B1122 (Abbey Road) and Lover’s Lane junction (considered as part of the main development site assessment);
- sustainable drainage systems, including swales alongside the track with the potential for a larger infiltration pond, if required; and
- landscaping including the provision of landscape bunds, security fencing, grassed areas and other areas of proposed planting.

Figure 11.1 Illustrative masterplan of the rail extension route



b) Saxmundham to Leiston branch line

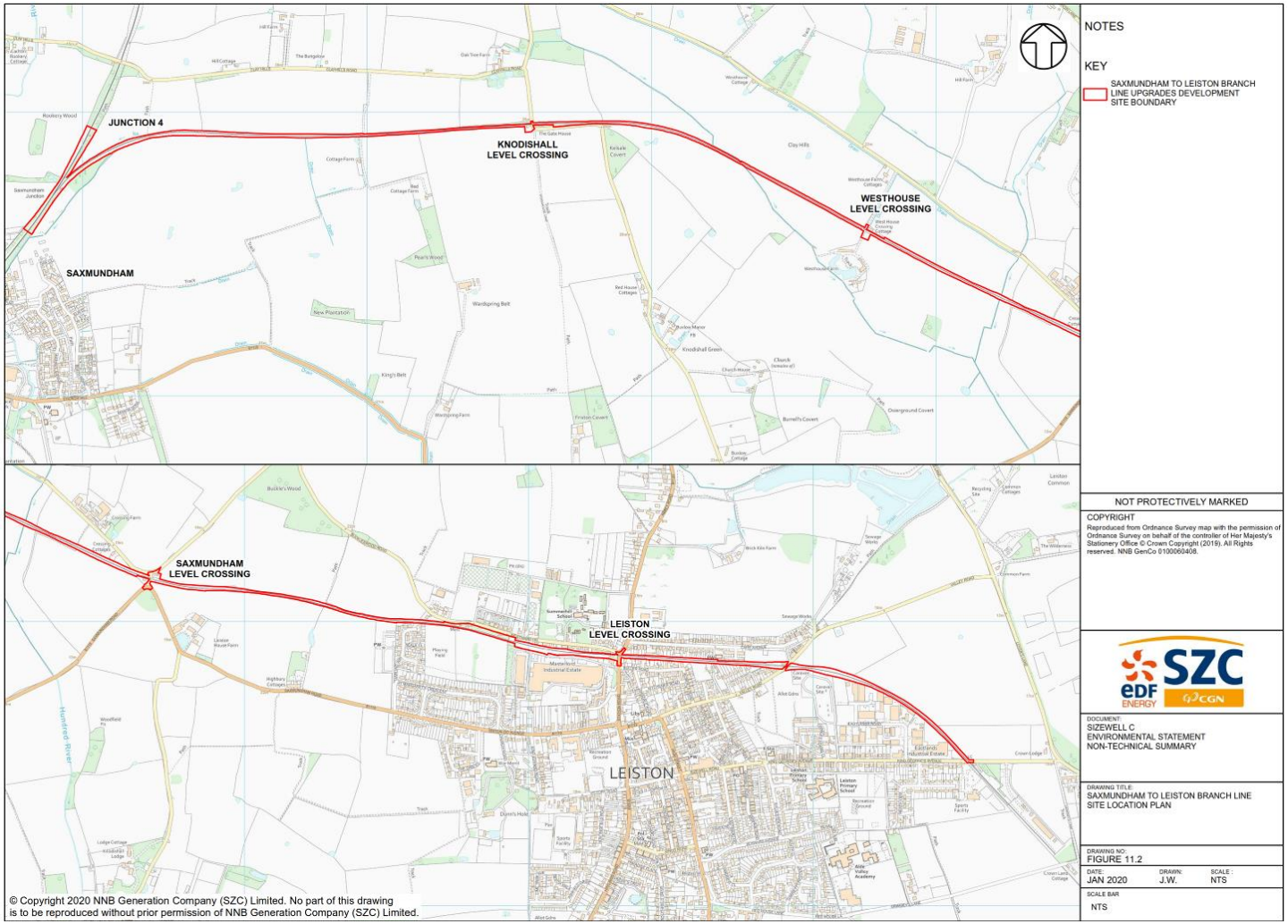
The site for the Saxmundham to Leiston branch line upgrades is approximately 11.1ha and includes all relevant land required in order to undertake the works, including up to eight level crossing upgrades (see **Figure 11.2**).

The proposed track replacement on the Saxmundham to Leiston branch line comprises the renewal of the entire length of track from Saxmundham junction up to the Sizewell level crossing. The proposed upgrades would ensure that the existing track would meet Network Rail standards for freight transport.

Upgrades would also be required on up to eight operational level crossings on the Saxmundham to Leiston branch line between the Saxmundham junction and the Sizewell level crossing. This is to enable safe use of the Saxmundham to Leiston branch line for freight deliveries to the main development site. These level crossings are located at:

- Bratts Black House;
- Knodishall;
- West House;
- Snowdens;
- Saxmundham Road;
- Buckles Wood;
- Summerhill; and
- Leiston.

Figure 11.2 Overview of the Saxmundham to Leiston branch line upgrade works



11.3 Construction

Construction for the proposed rail extension route would be managed from two compounds: a primary temporary construction compound located within the main development site at the eastern end of the green rail route, and a secondary temporary construction compound at the western end of the site, off Buckleswood Road.

For the delivery of the proposed rail improvement works, the secondary temporary construction compound would be used to facilitate the works. In addition, four satellite compounds on the Saxmundham to Leiston branch line would be used as bases to manage specific works on a particular level crossing site, with only minimal facilities required.

All construction works would be managed in accordance with construction environmental management measures set out within the **CoCP** (Doc Ref. 8.11).

a) Rail extension route

The proposed rail extension route would be constructed in the following principal phases:

- construction of level crossings at Buckleswood Road and B1122 Abbey Road;
- preparatory works, including vegetation clearance, erection of temporary worksite fencing;
- earthworks to support the new rail track and the construction of a temporary haul route;
- installation of the track which would link the main development site to the existing Saxmundham to Leiston branch line.

b) Saxmundham to Leiston branch line

The scope and extent of construction works proposed on the Saxmundham to Leiston branch line would generally comprise limited works confined to the existing rail and highways boundaries, wherever possible. SZC Co. is in discussions with Network Rail about the most appropriate way for the works to be carried out but is applying for the required powers over all of the land necessary for the development.

11.4 Operation

During the early years of construction, two trains per day each way (four movements) along the East Suffolk line and Saxmundham to Leiston branch lines are proposed, whilst the green rail route is under construction. Once the green rail route is operational, three trains per day each way (six movements) are proposed.

The operation of green rail route would replace up to 50 lorry movements per train, equivalent to 250 trips per day in each direction that would otherwise need to use the strategic road network and nearby local roads.

Trains would be timed to avoid peak periods of traffic movements such as school start and end times. It is proposed to run some trains into the main development site overnight. Once the green

rail route is operational, there would be up to five movements overnight (between 23.00 - 06.00) and one movement during the day outside of these hours.

11.5 Removal and reinstatement

At the end of main development site construction, the green rail route, including the proposed rail extension route, would be removed and the land would be returned to agricultural use. The upgrades to the Saxmundham to Leiston branch line are permanent.

11.6 Summary of likely significant environmental effects

This section provides a summary of the likely significant environmental effects predicted to occur as a result of the construction, operation and, where relevant, removal and reinstatement of the rail infrastructure. Proposed mitigation measures are also summarised.

An environmental screening exercise was undertaken to identify whether the proposed track upgrade and level crossing works on the Saxmundham to Leiston branch line may give rise to environmental effects that could potentially be significant. Where these works were screened into the assessment, a summary of the conclusions is provided in sections below.

a) Noise and vibration

i. Context

Chapter 4 of **Volume 9** of the **ES** presents the assessment of potential noise and vibration effects from the construction, operation and removal and reinstatement of the rail proposals. To inform the assessment, baseline sound surveys were undertaken around the green rail route and the Saxmundham to Leiston branch line to characterise the sound levels currently experienced by receptors, such as residential properties.

ii. Construction phase

A range of measures are proposed to mitigate the effects during construction including good practice measures to minimise noise and vibration impacts, as set out in the **CoCP** (Doc Ref 8.11). Further acoustic screening and working methods would be considered by SZC Co. and the contractor to reduce impacts from construction and ensure noise effects are **not significant** at all receptors. This is with the exception of Pro Corda music school at Leiston Abbey, where potentially more sensitive activities take place, such as indoor and outdoor music performances. As a high sensitivity receptor, a higher category of effect is possible, which would be considered **significant**. SZC Co. would undertake further assessment and liaise with Pro Corda on the timing of the construction works relative to the activities at the Abbey to reduce this effect.

No significant effects from vibration during construction have been identified. Notwithstanding these outcomes, a programme of

monitoring and a system for the receipt and recording of any noise and vibration complaints from occupiers of noise sensitive receptors would be put in place.

iii. Operational phase

Noise is likely to be generated throughout the use of the rail infrastructure. Continuously-welded rail and speed restrictions would be implemented, where possible, to minimise noise effects. Furthermore, to limit noise impacts from the use of the Saxmundham to Leiston branch line, no rail movements are proposed through Leiston at night. Despite the mitigation measures, the following **significant adverse** noise effects have been identified from the operational use of the rail route extension, the use of the East Suffolk line and Saxmundham to Leiston branch line:

- Use of Saxmundham to Leiston branch line in early years – **significant adverse** noise effects are expected during the early years from the operation of the branch line at night at Kelsale Covert and Westhouse Crossing Cottage.
- Rail route extension and use of Saxmundham to Leiston branch line in later years - **significant adverse** noise effects are expected at night at Kelsale Covert, Westhouse Crossing Cottage, Crossing Cottage and Crossing East.
- East Suffolk line – **significant adverse** noise effects are expected at night at up to 120 properties, assuming that arrangements are changed at Saxmundham junction to avoid stopping of trains to change points. Additionally, a number of properties near the East Suffolk line would experience **significant adverse** ground borne noise effects.

SZC Co. would develop a Rail Noise Mitigation Strategy in consultation with Network Rail and the rail freight operator to establish a package of measures to be implemented to mitigate air borne and ground borne noise impacts on the Saxmundham to Leiston branch line and the East Suffolk line. For example, it may be possible to use quieter locomotives to pull trains and further work is planned to evaluate the potential effectiveness of this.

iv. Removal and reinstatement phase

The same mitigation measures that applied during construction would also apply during the removal and reinstatement phase. Therefore, **no significant** noise effects are predicted to occur at representative receptor locations, except for the Pro Corda music school where a **significant adverse** effect is predicted as a worst case. Further assessment and engagement would be undertaken to reduce the effect to **not significant**.

b) Air quality

i. Context

Chapter 5 of **Volume 9** of the **ES** presents the assessment of potential air quality effects arising from the construction, operation and, in relation to the proposed rail extension route, the removal and reinstatement works.

To inform the assessment, the current and future baseline pollutant levels were established through a review of existing published data

from Defra and East Suffolk Council, and modelling of predicted traffic emissions in baseline year of 2018, and future baseline years of 2023 and 2028. The baseline assessment demonstrated that the existing concentrations of air pollutants are well below air quality standards set out in legislation for the protection of human health across the study area.

The assessment considered how the predicted emissions arising from dust, construction traffic, and rail movements compared to the established baseline conditions.

ii. Construction phase

During construction, the proposed construction activities could give rise to changes in dust deposition rates and to changes in concentrations of particulate matter (PM_{10}) in air. An **Outline Dust Management Plan** (**Volume 2, Appendix 12A** of the **ES**) has been developed to set out measures to minimise impacts from dust, such as siting the construction access at least 10m from residential properties and use of surface covering to minimise the extent of exposed soils and potential resuspension of dust. As a result, **no significant** construction dust effects have been identified.

Further modelling and assessment of pollutants from road emissions (NO_2, PM_{10} and $PM_{2.5}$) was undertaken to consider the effects of construction traffic in 2023. The assessment concluded that there would be **no significant** effects at representative receptor locations near the sites for the proposed rail works.

iii. Operational phase

An assessment of rail and road traffic emission during the peak year (2028) scenario for the construction of the main development site was undertaken. **No significant** effects were predicted to occur at representative receptor locations close to the sites for the proposed rail works.

iv. Removal and reinstatement phase

As for the construction phases, the proposed activities associated with the removal and reinstatement works could give rise to changes in dust deposition rates and to changes in concentrations of particulate matter (PM_{10}) in air. However, with the application of measures to manage dust generation, **no significant** construction dust effects are anticipated.

Additionally, as the construction traffic associated with the removal and reinstatement phase is not expected to be greater than the construction phase traffic, **no significant** effects are anticipated.

c) Landscape and visual

i. Context

Chapter 6 of **Volume 9** of the **ES** presents the assessment of potential effects of the proposed rail extension route on the landscape character and visual amenity.

The review of baseline information identified two landscape character types, which were assessed in further detail due to the potential impacts on their character, the Ancient Estate Claylands

and East Sandlands. In addition, five receptor groups were identified which may experience effects due to changes to visual amenity:

- **Group 1** – residents of and visitors to Leiston at their properties, driving through the settlement and using open space/footways/cycle routes within Leiston;
- **Group 2** – users of footpaths, which currently cross the site;
- **Group 3** – users of footpaths north of Abbey Lane and an existing bridleway, visitors to Leiston Abbey and motorists using minor roads to the north and north-east of the site;
- **Group 4** – Users of footpaths south of the Saxmundham to Leiston branch line and the permissive footpath along the northern side of Saxmundham Road from the edge of Leiston to Highbury Cottages, visitors to Leiston Cemetery and drivers using Saxmundham Road; and
- **Group 5** – local road users using Abbey Lane to the west of the site.

Users of the Suffolk Coastal Cycle Route and Sustrans Regional Cycle Route were also scoped into the assessment.

ii. Construction phase

The proposed rail extension route would lead to changes to the existing landscape and visual amenity during construction through the removal of elements of the existing landscape, alterations to landform, and views of construction activity. However, the design has sought to minimise loss of existing woodland and hedgerow, where possible. Additional measures to minimise construction disturbance are set out in the **CoCP** (Doc Ref. 8.11), such as the use of site hoardings and measures to limit light spill.

As a result, **no significant** effects on the landscape character during construction are anticipated. However, a **significant adverse** effect on the visual amenity of one receptor group (Group 2) has been identified, due to views of construction activity and plant. The effects on the visual amenity of all other receptor groups and users of long-distance routes are considered to be **not significant.**

iii. Operational phase

During the operation of the proposed rail extension route, the effects arising from presence and operation of the route on the landscape would be perceptible within the site and to the north of the site up to Abbey Lane. Overall, **no significant** effects on the landscape character have been identified. There would be a **significant adverse** effect on the visual amenity of Group 2 receptors. The effects on the visual amenity of all other receptor groups and users of long-distance routes are considered to be **not significant**.

iv. Removal and reinstatement phase

During the removal and reinstatement phase, the anticipated impacts on the landscape and visual amenity would be similar to those experienced during construction. As with the construction phase, **no significant** effects on the landscape character are anticipated. However, there would be a **significant adverse** effect

on Group 2 receptors. The effects on the visual amenity of all other receptor groups and users of long-distance routes are considered to be **not significant**.

d) Terrestrial ecology and ornithology

i. Context

Chapter 7 of **Volume 9** of the **ES** presents the assessment of potential effects of the rail proposals on ecology within the site and the surrounding area. The assessment considers effects on designated sites, habitats and protected species. In addition, a **Shadow Habitats Regulations Assessment Report** (Doc. Ref 5.10) is submitted with the application of development consent to identify potential effects on European designated sites (Natura 2000 sites).

Based on a combination of surveys and other data collected, the following receptors were taken forward for detailed assessment:

- Buckle's Wood County Wildlife Site;
- great crested newt; and
- bat assemblage.

The environmental screening exercise of works on the Saxmundham to Leiston branch line concluded that two level crossing upgrade works should be taken forward to the assessment of effects on terrestrial ecology and ornithology. These were Black Bratts House, which is assessed separately and Buckles Wood which is considered within the assessment of the proposed rail extension route.

ii. Rail extension route

Construction phase

The site boundary is adjacent to the Buckle's Wood County Wildlife Site. All construction works would be undertaken in compliance with the **CoCP** (Doc Ref. 8.11), which sets out measures to minimise dust generation and enforce pollution prevention and control across the site. On this basis, **no significant** effects are considered likely.

During construction, great crested newts have the potential to be impacted by loss and fragmentation of habitat. Whilst there would be some loss of hedgerow within the site, the extent of habitat loss has been minimised, as far as practicable, including by the retention of the majority of hedgerows within the site boundary. Vegetation clearance would be phased and timed to minimise impacts on great crested newts. With these measures in place, the effects on this species are considered to be **not significant**.

During construction, bats have the potential to be impacted by loss of habitat and disturbance from noise and light. The construction of the rail extension route would result in the loss of foraging habitat and features suitable for bats to roost in. However, this effect has been minimised, as far as practicable, through the retention of the majority of hedgerows and the loss only affects a small proportion of the available habitat for each bat species. Disturbance from noise and light would be minimised, as far as practicable. Overall, with these measures in place, the effects on bats are considered to be **not significant**.

Operational phase

During operation, the **Outline Drainage Strategy** (refer to **Volume 2, Appendix 2A** of the **ES**) for the proposed rail extension route has been developed to minimise surface water run-off, prevent diffuse pollution from sediment and other pollutants arising, and limit diffuse pollution reaching Buckle's Wood County Wildlife Site. With these measures in place there would be **no significant** effects on this site.

During operation, **no further effects** on great crested newts have been identified.

Impacts on the bat assemblage would be associated with disturbance from noise and light as there would be up to five train movements overnight (23:00-06:00) on the proposed rail extension route. However, the extent of noise is likely to be restricted to the site and habitats on the immediate boundary. The fixed lighting levels at level crossings would minimise light spill onto adjacent land and the potential for light disturbance would be limited. Bats using the existing site are not considered to be dependent on the sub-optimal habitats present and would be using a range of additional habitats in the surrounding area. Therefore overall, the effects on bats are considered to be **not significant**.

Removal and reinstatement phase

During the removal and reinstatement phase, activities would be similar to those during construction and the land would be restored to agricultural use. With mitigation in place, as implemented during construction, **no significant** effects on Buckle's Wood County Wildlife Site, great crested news, and bats have been identified.

iii. Blacks Bratts House level crossing

During construction works at Blacks Bratts House level crossing, great crested newts in this area have the potential to be impacted by loss and fragmentation of habitat. Whilst minor vegetation clearance works would be undertaken, the extent of habitat loss has been minimised as far as practicable and would be phased and timed to consider species seasonal constraints to minimise impacts. With these measures in place, the effects on great crested newts are considered to be **not significant**. There is no change to the operation of the level crossing, therefore, **no effects** would occur.

Natterer's bat

e) Amenity and recreation

i. Context

Chapter 8 of **Volume 9** of the **ES** presents the assessment of potential effects of the rail proposals on amenity and recreation receptors. The assessment of amenity and recreation effects includes consideration of visual, noise and transport impacts which have the potential to affect amenity and use of recreational resources.

Three footpaths crossing the proposed rail extension route were scoped into the assessment. In addition, potential effects on Suffolk Coastal Cycle Route, Sustrans Regional Cycle Route 42 and visitors to Leiston Abbey were considered.

The amenity and recreation resources in the wider study area would be subject to limited impacts and were, therefore, not assessed further.

ii. Construction phase

During construction of the proposed rail extension route, footpaths crossing the site would be diverted, which would result in less direct routes compared to the existing alignment. Within the site, users would experience views of construction works. The presence of landscape bunds would create a more enclosed environment that the current alignment, in addition users of the section of the footpaths along the new off-road bridleway parallel to the B1122 (Abbey Road) would see and hear road traffic. Construction disturbance due to noise and dust would be minimised in line with measures set out in the **CoCP** (Doc Ref. 8.11). Overall, **significant adverse** effects have been identified on the users of footpaths that cross the site of the proposed rail extension route.

Users of the Suffolk Coastal Cycle Route and Sustrans Regional Cycle Route 42 would be subject to indirect effects associated with disturbance from construction traffic, noise, and dust. These effects would be minimised through measures set out within the **CoCP** (Doc Ref. 8.11). In addition, users of these routes would have limited visibility of construction works and the overall visual experience is unlikely to change. Therefore, effects on the users of the Suffolk Coastal Cycle Route and Sustrans Regional Cycle Route 42 are considered to be **not significant**.

Visitors to Leiston Abbey would have limited views of the construction works and may be affected by construction noise. However, overall the effects on the amenity of visitors to Leiston Abbey is considered to be **not significant**.

iii. Operational phase

During operation of the proposed rail extension route, the footpath diversions introduced during construction would continue as long-term temporary diversions. Users may experience some delays to when the level crossing barriers are closed to allow trains to cross Buckleswood Road. Landscape bunds would provide visual and acoustic screening. Overall, the effect on the users of the diverted footpaths is considered to be **not significant**.

Users of the Suffolk Coastal Cycle Route and Sustrans Regional Cycle Route 42 would be subject to indirect effects associated with off-site traffic, noise and air quality. The proposed rail extension

route may be visible through existing vegetation along the eastern extent of Abbey Lane. Changes to noise and air quality are would be limited. Effects on the users of the Suffolk Coastal Cycle Route and Sustrans Regional Cycle Route 42 are, therefore, considered as **not significant**.

Visitors to Leiston Abbey would have limited views of the rail extension route and changes within the existing noise environment would be limited. Effects on the amenity of visitors to Leiston Abbey would be **not significant**.

iv. Removal and reinstatement phase

Once the need for the green rail route has ceased, the infrastructure would be removed in accordance with a removal and reinstatement plan. Activities would be broadly similar to those undertaken during the construction phase and likely to result in similar effects. Therefore, users of the footpaths that cross site would likely experience **significant adverse** effects. Effects on the users of Suffolk Coastal Cycle Route and Sustrans Regional Cycle Route 42 and visitors to Leiston Abbey would be **not significant**.

Post removal and reinstatement, the footpaths that were diverted would have be re-instated on their original routes, no permanent effects on users of these routes or other existing recreational resources would remain.

The section of the diversions linking footpaths to the new off-road bridleway, created as part of the main development site, would be retained permanently, delivering a permanent benefit (see **section 5.8h)**).

f) Terrestrial historic environment

i. Context

Chapter 9 of **Volume 9** of the **ES** presents the assessment of potential effects of the rail proposals on above and below ground heritage assets within the proposed rail extension route site boundary and in the surrounding area.

There are no designated heritage assets within the site. However, from the surrounding area, the Leiston Abbey (second site) Scheduled Monument and four listed buildings associated with Leiston Abbey, Fisher's Farmhouse and Wood Farmhouse were taken forward for detailed assessment.

The desk-based assessment and field survey data have confirmed that buried archaeological remains of pre-modern origin are present within the proposed rail extension route site.

ii. Construction phase

During the construction of the proposed rail route extension, there would be intrusive groundworks that would disturb any surviving, and unrecorded, archaeological remains. Prior to the commencement of construction, an agreed scheme of archaeological investigation would be undertaken to ensure that the archaeological interest of any significant deposits and features within the site could be appropriately investigated, recorded and disseminated, preserving the archaeological interest of these remains. Therefore, **no significant** effects are anticipated on buried heritage assets.

Construction of the proposed rail extension route could potentially harm buried archaeological remains associated with the Leiston Abbey. The construction works to the south of the Scheduled Monument, Grade I and Grade II listed buildings at Leiston Abbey would introduce new visible and perceptual elements to the setting of the asset group. Visibility of construction works would be intermittent, with views precluded from many parts of the asset group. It is also considered that construction noise would be limited, so no change to the perception of Leiston Abbey would occur. Additional mitigation is proposed to provide enhancements to the visitor experience of the two Leiston Abbey sites. Overall, **no significant** effect is predicted to occur.

During construction, there would be changes to some views as a result of the presence of construction activity. However, with the provision of landscape screening, these effects would be limited. There would be no impact on heritage significance of the Grade II listed Fisher's Farmhouse and the Grade II listed Wood Farmhouse and, therefore, **no effect** would arise.

Construction works are anticipated to have impacts on the historic landscape character through the loss of sections of hedgerows of potential historic importance across the centre of the site. However, these would be retained, where possible, towards the edges of the site. Views of construction activity would be clearly visible before the introduction of the landscape bunds and proposed planting which would provide screening. **No significant** effects are considered likely.

iii. Operational phase

Any disturbance and or removal of archaeological heritage assets within the site would have occurred during construction and therefore **no further effects** are anticipated during operation.

The operation of the proposed rail extension route to the south of Scheduled Monument, Grade I and Grade II Listed Buildings at Leiston Abbey would introduce new visible and perceptual elements to the setting of the group. Trains would be visible and audible as they pass to the south of Leiston Abbey, however the limited number of rail movements means that perceptibility of the rail operations would be intermittent and infrequent. With the provision of additional mitigation to provide enhancements to the visitor experience at Leiston Abbey, the overall effects on the Scheduled Monument and the associated listed buildings at Leiston Abbey are considered **not significant**.

During operation, trains passing along the proposed rail extension route would be visible in views and audible from the Grade II listed Fisher's Farmhouse. However, these effects would be limited and not affect the relationship of Fisher's Farmhouse to the immediately surrounding arable land. Therefore, **no significant** effect has been identified.

During operation, the proposed rail extension route would not be present in views from the Grade II listed Wood Farmhouse and would not affect the relationship of Wood Farmhouse to the immediately surrounding arable land. Therefore, **no effect** would arise.

The operation of the proposed rail extension route is anticipated to have impacts on the historic landscape character as it would cut across the existing field boundaries and create a discernible linear feature. However, this would result in limited harm and **no significant** effects are anticipated.

iv. Removal and reinstatement phase

Any disturbance and / or removal of archaeological heritage assets within the site would have occurred during the construction and therefore **no further effects** are anticipated.

While construction-related activity may be visible or audible at times during removal and reinstatement phase, works would mostly take place within the landscape bunds and mature screening planting, with progressive removal of the landscape bunds during the reinstatement of the site to agricultural use. These works would be perceived as the progressive removal of the development, presenting a short-term and temporary change in setting that would not diminish heritage significance. Construction-related activity associated with the removal and reinstatement phase may be visible or audible at times. Sections of hedgerow previously removed would be restored. Overall, no adverse change is anticipated and **no effect** would arise.

g) Soils and agriculture

i. Context

Chapter 10 of **Volume 9** of the **ES** presents the assessment of potential effects of the rail proposals on soils and agriculture.

The site comprises freely draining slightly acid but base-rich soils. Approximately 8.6ha of the site comprises best and most versatile agricultural land, with the remaining areas including poorer quality agricultural and non-agricultural land.

The site falls within three agricultural land holdings, all of which form parts of larger estates.

ii. Construction phase

Construction of the proposed rail extension route would result in the temporary, long term loss of approximately 22ha of land from primary agricultural productivity. Approximately 8.6ha of this land is considered to be best and most versatile land. This comprises a long-term temporary **not significant** effect.

Impacts on existing land holdings have been minimised by reducing land take as much as possible. In addition, SZC Co. would continue to liaise with landowners to reduce the effects on holdings, as far as practicable. Overall, **no significant** effects are anticipated.

iii. Operational phase

During operation of the rail proposals, no additional land would be required beyond that reported for the construction phase, and **no further effects** on best and most versatile land or agricultural land holdings would occur.

There is the potential for invasive weed species to grow within the site. However, this would be controlled using an appropriate

management regime that would remove weed growth that might threaten adjoining agricultural land. Therefore, **no significant** effects are anticipated.

iv. Removal and reinstatement phase

Once Sizewell C power station is operational, the proposed rail extension route would be removed and the land would be returned to agricultural use. This would be undertaken in accordance with a soils management plan, produced for the site and specific to site conditions. Overall, **no significant** effects are anticipated.

h) Geology and land quality

i. Context

Chapter 11 of **Volume 9** of the **ES** presents the findings of the assessment of potential effects of the rail proposals on ground conditions.

The geology beneath the proposed rail extension route site comprises deposits chalky till as well as sands and gravels, silts and clays of various geological ages. Bedrock beneath the proposed rail extension route site comprises sands.

Whilst there is no confirmed land contamination on site, potential sources of contamination include made ground associated with the existing Saxmundham to Leiston branch line, roads crossing the site or other small-scale structures, as well as other land uses located near to the site.

There are no ground stability hazards or geological faults within the study area, and the site is also identified as having a moderate unexploded ordnance risk due to the area having been subject to air raids during World War II.

ii. Construction phase

The construction phase may introduce new sources of contamination and disturb and mobilise existing contamination within soils. However, as set out within the **CoCP** (Doc Ref. 8.11), appropriate measures for pollution incident control and the safe storage of fuel, oils and equipment would be implemented. With these in place and following further ground investigation (and remediation if necessary), the risks identified to human health, water and property receptors during construction phase are **not significant**.

The site is not located within an area of historical or planned mineral extraction or a Minerals Safeguarding Area and whilst there is the potential for these impacts, through the mitigation measures included within the design and as part of construction management measures, **no significant** effects are predicted.

Waste soils would be generated during construction through excavations and during the installation of services. There is the potential that waste soil generated would be classified as unsuitable for reuse on site, requiring removal from the site, although based on historic evidence the risk for the rail extension is likely to be low, with the risk to the branch line upgrade slightly higher. The design and materials management plan would seek, as far as reasonably practicable, to reuse and recycle soils on site and

to actively reduce the amount of hazardous soils generated by the Site. On this basis, **no significant** effects have been identified.

iii. Operational phase

During operation, there would be limited impacts of soil erosion, on mineral resources, and on waste soils through maintenance operations, with the majority of these hazards having been mitigated during construction. Therefore, **no significant** effects due to these impacts are likely to occur.

The operation of the site could introduce new sources of contamination, due to leaks and spillages. The **Outline Drainage Strategy** (included within **Volume 2, Appendix 2A** of the **ES**) incorporates measures to prevent pollution from the operation of the proposed rail route extension. In addition, the green rail route would be operated in accordance with relevant regulations, best practice and pollution prevention guidance. Therefore, **no significant** effects associated with the risk of contamination have been identified.

iv. Removal and reinstatement phase

The removal and reinstatement phase may result in effects on soil erosion, waste soils and mineral resources through the removal of structures and earthworks and reinstatement of subsoil/topsoil. The works would be undertaken in accordance with the **CoCP** (Doc Ref. 8.11), to minimise soil exposure as far as practicable and would be managed to reduce soil erosion and dust production. In addition, soils would be managed through a materials management plan to allow the re-use of suitable soils during the removal and reinstatement phase of the proposed development. Effects on soil erosion and mineral resources and waste are therefore considered to be **not significant**.

The assessment of contamination effects during this phase considered any new sources and pollution pathways which may be introduced by removal and reinstatement activities. With proposed mitigation incorporated into the design and effectively implemented during the removal and reinstatement phase in accordance with the **CoCP** (Doc Ref. 8.11), risks identified to human health, water, property and ecological receptors are considered to be **not significant.**

i) Groundwater and surface water

i. Context

Chapter 12 of **Volume 9** of the **ES** presents the assessment of potential effects on groundwater and surface water resources arising from the construction, operation and removal and reinstatement of the rail proposals (where relevant). The assessment is also supported by the **Rail Flood Risk Assessment** (Doc. Ref 5.8) and project-wide **Water Framework Directive Compliance Assessment** (Doc. Ref 8.15).

Several aquifers lie beneath the site; including Secondary A Aquifer, a Secondary A (undifferentiated) Aquifer and a Principal Aquifer.

The Leiston Drain is located approximately 950m to the east of the proposed rail extension route site. The River Hundred is located

approximately 740m to the west of the proposed rail extension route site.

There are three known groundwater abstractions and no known surface water abstraction within 500m of the proposed rail extension route site; the nearest located approximately 265m south-west.

The rail extension route site is located in Flood Zone 1 and has a low risk of flooding from rivers or the sea. The majority of the site is at very low risk of flooding from surface water except for an approximately 2 ha area of high surface water flood risk located along the eastern boundary of the proposed rail extension route site.

The Saxmundham to Leiston branch line is predominantly located in Flood Zone 1 and at low risk of flooding from rivers or the sea, with one 72m section within Flood Zone 2 and 3 extents. The majority of the Saxmundham to Leiston branch line is at 'very low' risk of surface water flooding, although isolated sections have varied levels of surface water flood risk, ranging from 'low' to 'high'. The risk of groundwater and sewer flooding to the Saxmundham to Leiston branch line improvements site is considered to be low.

ii. Construction phase

Construction activities could impact upon groundwater and surface water drainage network through reduction in discharge to grounds, changes to surface water flows and hydromorphology. The increase in the supply of fine sediment, or release of fuels, oils and lubricants through leaks and spills, could have adverse impacts on both groundwater and surface water hydrology, geomorphology and water quality. The **CoCP** (Doc Ref. 8.11) sets out proposed measures to be implemented by the construction contractors to protect groundwater and surface water. In addition, ground investigation and relevant risk assessments would be undertaken prior to commencement of construction works, with remediation undertaken, if necessary. With these measures in place, **no significant** effects are anticipated on groundwater and surface water resources during construction phase.

iii. Operational phase

An **Outline Drainage Strategy** (refer to **Volume 2, Appendix 2A** of the **ES**) has been developed for the site to manage and control surface water run off rates through infiltration to ground. Pollution prevention techniques would be implemented through standard good practice and good design, including the use of sustainable drainage systems such as the provision of swales and infiltration basins.

The drainage strategy incorporates measures to minimise effects on groundwater and surface water flows and to prevent contamination from accidental spills and leaks during the operation of the site. Therefore, the effect of the rail proposals on groundwater and surface water levels and quality is considered to be **not significant**.

The rail extension route is located in Flood Zone 1, so there would be no loss in functional floodplain storage or displacement of river flood water. However, the rail proposals site would increase impermeable areas within greenfield land. Surface water run-off

would be managed through sustainable drainage measures, which would be designed to ensure **no significant** effects from existing surface water flood risk occur.

The Saxmundham to Leiston branch line has one 72m section within Flood Zone 2 and 3 extents. The proposed works would not change the existing watercourse crossings and therefore would have **no effect** on flood risk.

iv. Removal and reinstatement phase

During the removal and reinstatement phase, the site would be reinstated to existing conditions, as far as reasonably practicable. The removal and reinstatement activities would result in similar impacts as during the construction phase. In addition, intrusive activities from the removal of infrastructure could create new pathways for contamination. However, as during the construction phase, works would be undertaken in accordance with the **CoCP** (Doc Ref. 8.11). Further ground investigation and risk assessment post operation to confirm the risks at the time of removal and reinstatement would also be undertaken to identify if there are areas requiring further remediation, with remediation activities undertaken if necessary. With these measures in place, **no significant** effects are anticipated on groundwater and surface water resources during the removal and reinstatement phase.

12. Cumulative and transboundary effects

12.1 Introduction

Volume 10 of the **ES** presents an assessment of the potential cumulative and transboundary effects associated with the Sizewell C Project. This includes consideration of the following types of effects:

- Inter-relationship effects – where more than one different type of effect (e.g. noise and air quality) from the Sizewell C Project could be experienced by a single resource or receptor at the same time.
- Project-wide effects – where a resource or receptor could experience effects from multiple components of the Sizewell C Project at the same time.
- Effects with other plans, projects and programmes – where a resource or receptor could experience effects from the Sizewell C Project in combination with another plan, project or programme.
- Transboundary effects – where resources or receptors outside of the UK within another European Economic Area state (such as Belgium or France) could experience environmental effects from the construction or operation of the Sizewell C Project.

Sections 12.2 to **12.5** below summarise the methodology and the findings of the cumulative and transboundary effects assessment for the Sizewell C Project.

12.2 Inter-relationship effects

a) Context

The assessment of inter-relationships identifies where the different environmental impacts could combine with one another with the potential to result in significant effects on a resource or receptor (for example noise, dust and changes to visual amenity impacting a single property).

A two-stage screening exercise was undertaken to identify the potential inter-relationship effects associated with the construction and operation of the Sizewell C Project. The first stage of the screening exercise was to identify where resources and/or receptors could be affected by more than one type of effect (usually where they are considered in more than one technical chapter or assessment). The second stage of the assessment was to provide a summary of the inter-relationship effects that are considered within the technical chapters of **Volumes 2** to **9** of the **ES** in order to avoid duplication of assessments already undertaken.

Volume 10, Chapter 2 and **Appendix 2A** of the **ES** present the assessment of the identified potential inter-relationship effects that are not considered within the technical assessments in **Volumes 2** to **9** of the **ES**. Three receptor groups are assessed in **Volume 10, Chapter 2** and **Appendix 2A** because they are not considered

elsewhere within the ES. These are: schools, residential, and commercial receptors.

b) Assessment of inter-relationship effects on residential properties, commercial facilities and schools

In identifying potential inter-relationship effects, an exercise was undertaken to identify the residential receptor groups on a site by site basis. These receptor groups were identified within multiple technical assessments. Typically, this included those within the noise and vibration, air quality and landscape and visual assessments. Following the identification of the receptor groups and likely effects, professional judgement was used to determine if there was 'no', 'low' or 'high' potential for the combination of the identified effects to result in new, or different significant environmental effects.

i. Construction phase

During construction (including removal and reinstatement works), of the 101 receptors or receptor groups identified, 43 were considered to have high potential to experience new, or different significant environmental effects; the remaining receptors were considered to have low or no potential to experience for a new, or different significant environmental effects.

ii. Operational phase

During operation (including removal and reinstatement), of the 101 receptor groups identified, 31 were considered to have high potential to experience new, or different significant environmental effects and remaining receptors were considered to have low or no potential to experience for a new, or different significant environmental effects.

12.3 Project-wide effects

a) Context

The assessment of project-wide effects identifies the worst-case environmental effects of the proposed development and considers where a single resource or receptor may experience impacts from more than one component of the Sizewell C Project. For example, during construction, resources and receptors in proximity to the rail proposals could also be affected by impacts from construction activity at the main development site.

Effects were found to be no greater at the project-wide scale compared with the effects from the individual project components identified in **sections 5** to **11** of this **NTS** for the following topics:

- noise and vibration;
- air quality;
- landscape and visual;
- geology and land quality; and
- groundwater and surface water.

A summary of the effects assessed to be greater at the project-wide scale compared with the effects from the individual project components is presented below.

b) Terrestrial Ecology and Ornithology

i. Construction phase

Loss and fragmentation of woodland and hedgerow habitats would be greatest during the early years of construction. This would have impacts on the ecological communities that rely on these habitats, including breeding and farmland bird populations. The fragmentation and loss of habitat caused by the various project components would be **significant**, with the magnitude of effect likely to be greater at a project-wide level than on an individual basis.

ii. Operational phase

Effects on terrestrial ecology during operation identified at the project-wide level were assessed to be no greater than those identified in **sections 5** to **11** of the **NTS** for the individual project components.

c) Amenity and Recreation

i. Construction phase

During the early years of construction, there would be **significant** effects at the project-wide scale on recreational resources north of Leiston. The public rights of way within this area would be diverted temporarily due to the proposed rail extension route. In addition, some recreational resources north of Leiston would experience views of, and noise from, construction activity at the main development site and additional traffic on roads in combination with the construction works at the proposed rail extension route. Where these in-combination effects are possible, the effects would be greater than for those identified for the main development site or rail extension route alone.

ii. Operational phase

Effects on amenity and recreation receptors during operation identified at the project-wide level were assessed to be no greater than those identified in **sections 5** to **11** of the **NTS** for the individual project components.

d) Terrestrial Historic Environment

i. Construction phase

During construction, there would be **significant** effects at the project-wide scale on the historic landscape character and setting of heritage assets. The combined impacts of construction noise from and views of the main development site and proposed rail extension route would result in an increased impact on the historical landscape character of the area. Additionally, the setting and heritage significance of the Grade I listed St Mary's Abbey and the Scheduled Leiston Abbey (second site) would be greater at a project-wide scale than for the those identified for the main development site or rail extension route alone.

ii. Operational phase

Effects on the historic environment resources during operation identified at the project-wide level were assessed to be no greater than those identified in **sections 5** to **11** of the NTS for the individual project components.

e) Soils and Agriculture

i. Construction phase

During the early years of construction, the maximum extent of agricultural land would be required. The cumulative temporary and permanent loss of best and most versatile land and agricultural land production during the early years of construction would be **significant** at the project-wide scale. The project-wide impact would be greater than for the components on their own.

During peak construction, there would be no additional temporary effects on agricultural land. Where this land is required on a temporary basis, this would be reinstated to existing use by the end of the removal and reinstatement phase.

ii. Operational phase

Effects on soils and agriculture during operation identified at the project-wide level were assessed to be no greater than those identified in **sections 5** to **11** of the **NTS** for the individual project components.

12.4 Effects with other plans, projects and programmes

a) Introduction

The EIA Regulations require that the EIA considers 'cumulative effects' which may arise as a result of the proposed development in combination with other projects that are either planned or under construction in the vicinity of the site. These projects may, on an individual basis not result in significant effects but, cumulatively, have a significant effect on a resource or receptor.

Consultation was undertaken with East Suffolk Council and Suffolk County Council to agree the study area and the list of other projects, plans and programmes for consideration in the assessment of cumulative effects.

b) Methodology

A staged process, in accordance with the Planning Inspectorate's Advice Note 17 (Ref. 9), was devised. A summary of the process followed is detailed in **Plate 12.1**.

For each topic area a detailed cumulative effects assessment was undertaken to determine the likelihood for significant cumulative effects to arise. A summary of the findings of the cumulative effects assessment is presented in section below.

Plate 12.1 Stages of undertaking the cumulative effects assessment

Stage 1 – Define the reasonable maximum spatial area over which Sizewell C can exert an influence and identify a long-list of 'other developments'

Stage 2 – Identify those developments to be carried forward into the short list of other developments based on a consideration of the potential for combined effect with Sizewell C

Stage 3 – Gather and provide adequate information about the short-listed development in order to consider whether there is potential for cumulative effects, in order to undertake the cumulative effects assessment.

Stage 4 – Undertake the cumulative effects assessment

c) Summary of cumulative effects

Significant effects have the potential to arise from the cumulative impact of the proposed development with some other developments. The significance of effects from these schemes vary by topic. This is described in detail in **Volume 10, Chapter 4** of the **ES**. The long and short list of non-Sizewell C projects considered in the cumulative assessment are detailed in **Volume 10, Appendices 1A** and **1B** of the **ES** respectively.

Cumulative effects from the Sizewell C Project and other developments are most likely to occur during the construction phase, particularly in the early years. **Table 12.1** outlines the cumulative effects identified during construction and operation that are predicted to be greater than those expected for the Sizewell C Project alone.

For a number of topics, cumulative effects identified in **Volume 10, Chapter 4** of the **ES** have been assessed and none are anticipated to be greater than those effects predicted for the proposed development alone. These topics include: geology and land quality; groundwater and surface water; coastal geomorphology and hydrodynamics; marine historic environment; marine navigation; climate change; and major accidents and disasters. Therefore, these topics are not included in **Table 12.1.**

Table 12.1 Summary of those cumulative effects found to be greater than for the proposed development alone.

Receptor / topic	Phase	Schemes with the potential for cumulative effect	Mitigation	Cumulative effect
Conventional Waste and Material Resources				
Materials requirements: resource demands for concrete, steel, and bitumen	Construction (early & peak years)	All short-listed schemes	No further practicable and proportionate mitigation available	Significant adverse effect
Socio-economics				
Labour market: supply chain benefits and labour investment	Construction (early & peak years)	East Anglia THREE	None required	Significant beneficial effect
Labour market: supply chain benefits and labour investment	Operation	East Anglia ONE North, East Anglia TWO, East Anglia THREE	None required	Significant beneficial effect
Transport				
Fear and intimidation at A12 at Little Glemham and Marlsford	Peak construction	East Anglia ONE North and East Anglia TWO	Monitoring of construction programmes for Sizewell C Project and Scottish Power (East Anglia ONE North and East Anglia TWO) through Traffic Review Group to determine if worst case traffic flows are likely to arise. If likely, then additional freight management measures would be agreed with Traffic Review Group and funded through the transport	Significant adverse effect

Receptor / topic	Phase	Schemes with the potential for cumulative effect	Mitigation	Cumulative effect
			contingency fund.	
Noise and Vibration				
Construction noise	Construction	Land between Station Garage and Railway Cottage, Main Road, Darsham - 82 bedroom hotel with car parking and associated works	Changes to phasing or methodology or screening	No significant effect
Landscape and Visual				
Visual Receptor Group 18: Knodishall and Aldringham	Construction (early & peak years)	East Anglia ONE North and East Anglia TWO cable route and substation	No further practicable and proportionate mitigation available	Significant adverse effect
Visual Receptor Group 19: Aldringham Common and The Walks Visual Receptor Group 20: Sizewell to Thorpeness Coast	Construction (early & peak years)	• East Anglia ONE North, • East Anglia TWO, • Nautilus Interconnector, • Eurolink Interconnector, • Greater Gabbard extension and • Galloper Extension Offshore Wind Farms	No further practicable and proportionate mitigation available	Significant adverse effect
Ancient Estate Claylands landscape character type	Operation	East Anglia ONE North and East Anglia TWO substations	No further mitigation required	No significant effect
Terrestrial Ecology and Ornithology				
Designated sites: County Wildlife Sites	Construction (early & peak years) Removal and reinstatement	• Land at the rear of St Margaret's Crescent Leiston Suffolk • Johnsons Farm Saxmundham Road Leiston Suffolk • Land East of Abbey Road Leiston	No further mitigation required.	No significant effect
	Operation			No significant effect
Farmland birds: loss of	Construction (early			No significant effect

Receptor / topic	Phase	Schemes with the potential for cumulative effect	Mitigation	Cumulative effect
habitat; habitat fragmentation	years)	Suffolk • Part Land South West Aldringham House Aldeburgh Road Aldringham Cum Thorpe Suffolk • Land Between Station Garage and Railway Cottage Main Road Darsham Suffolk • Land to The South of Red House Lane Leiston Suffolk		
	Construction (peak years)			No significant effect
	Operation			No significant effect
Breeding Birds: loss of habitat; habitat fragmentation	Construction (early & peak years)			No significant effect
	Operation			No significant effect
Bats: loss of habitat; lighting	Construction (early) Removal and reinstatement		Best available techniques and best practicable measures to manage noise levels; engagement with local authorities; lighting mitigation measures.	No significant effect
Amenity and Recreation				
Visual Receptor Group 18: Knodishall and Aldringham	Construction (early & peak years)	East Anglia ONE North and East Anglia TWO cable route and substations	No further mitigation required	No significant effect
Visual Receptor Group 19: Aldringham Common and The Walks Visual Receptor Group 20: Sizewell to Thorpeness Coast	Construction (early & peak years)	• East Anglia ONE North, • East Anglia TWO, • Nautilus Interconnector, • Eurolink Interconnector, • Greater Gabbard extension and • Galloper Extension Offshore Wind Farms	No further practicable and proportionate mitigation available	Significant adverse effect
Visual Receptor Group 18: Knodishall and	Construction (early & peak years)	East Anglia ONE North and East Anglia TWO cable route and substation	No further mitigation required.	No significant effect

Receptor / topic	Phase	Schemes with the potential for cumulative effect	Mitigation	Cumulative effect
Aldringham				
Terrestrial Historic Environment				
Archaeological heritage assets: disturbance of archaeological remains	Construction (early years)	Development at Levington Lane, Bucklesham	No further mitigation required.	No significant effect
Soils and Agriculture				
Invasive species: spread of invasive weeds	Construction (peak years)	A combination of 26 various non-Sizewell C schemes	No further mitigation required.	No significant effect
Marine Ecology and Water Quality				
Noise disturbance / injury: harbour porpoise; harbour seals	Construction of the beach landing facility	• Hornsea Project Two offshore windfarm (OWF); • Dogger Bank Creyke Beck A OWF; • Dogger Bank Teeside A OWF; • Thanet Extension OWF; • Hornsea Project Three OWF, and; • East Anglia THREE OWF	No further mitigation required	No significant effect
Health and wellbeing				
Health and wellbeing effects associated with changes to air quality	Construction (early & peak years) Removal and reinstatement	• East Anglia ONE OWF; • East Anglia ONE (North) OWF; • East Anglia TWO OWF; • East Anglia THREE OWF including underground cabling; • Galloper Extension OWF; and	No further mitigation required.	No significant effect
Health and wellbeing effects associated with noise & vibration	Construction and operation		No further practicable and proportionate mitigation available	Significant adverse effect – rail proposals (construction)

Receptor / topic	Phase	Schemes with the potential for cumulative effect	Mitigation	Cumulative effect
		• Greater Gabbard Extension OWF.		Significant adverse/beneficial effect – two village bypass (construction and operation) No significant effect – Yoxford roundabout (construction and operation) No significant effect (not significant) – northern park and ride (construction)
Health and wellbeing effects associated with transport	Construction and operation		No further mitigation required.	No significant effect
Health and wellbeing effects associated with changes to socio-economic factors	Construction		None required	Significant beneficial effect
Health and wellbeing effects associated with changes to radiological exposure and changes to electromagnetic fields	Operation		No further mitigation required.	No significant effect
Health and wellbeing effects associated with changes to healthcare capacity	Construction		No further mitigation required.	No significant effect
Health and wellbeing	Operation		No further mitigation	No significant effect

Receptor / topic	Phase	Schemes with the potential for cumulative effect	Mitigation	Cumulative effect
effects associated with changes to general stress and anxiety			required.	

12.5 Transboundary effects

The EIA Regulations require that the potential for transboundary effects (effects on the environment in other European Economic Area states) from the construction and operation of Sizewell C is considered. SZC Co. has undertaken an assessment of the potential transboundary effects in accordance with the Planning Inspectorates Advice Note twelve: Transboundary Impacts and Process (Ref. 10). The assessment concluded that no such effects are likely.

13. What happens next?

SZC Co. has submitted the Sizewell C Project ES to the Planning Inspectorate as part of an application for development consent. The full ES can be found on the Planning Inspectorate's website:

https://infrastructure.planninginspectorate.gov.uk/projects/eastern/sizewell-c-new-nuclear-power-station/?ipcsection=overview

The Planning Inspectorate is responsible for examining the application and making a recommendation to the Secretary of State as to whether or not development consent for the Sizewell C Project should be granted.

Following submission, the Planning Inspectorate has 28 days to determine whether to formally accept the application. If accepted, the application will then enter the pre-examination phase. There is no statutory timescale for this stage, however it may last between 4 to 5 months. During this stage, the Planning Inspectorate will appoint an Examining Authority (a panel of Inspectors) to examine the application. A notice of acceptance will be published in local and national newspapers and statutory consultees and the local community will be notified. Members of the public will be invited to register as interested parties. This will entitle them to make Relevant Representations to the Planning Inspectorate in response to the application. Information on how to register can be found on the Planning Inspectorate's website:

https://infrastructure.planninginspectorate.gov.uk/application-process/the-process/

During the pre-examination phase, a preliminary meeting will be held by the Examining Authority to set the timetable for the examination, which registered interested parties will be invited to attend. The Examining Authority will identify the key issues raised by the application and take representations on a proposed timetable for the examination.

The examination period commences after the close of the preliminary meeting. The Planning Act 2008 requires the examination of the application to be completed within six months. Registered interested parties can send written comments to the Planning Inspectorate and can ask to speak at a public hearing, as well as issue specific hearings in accordance with a timetable and arrangements for the examination which will be published by the Examining Authority immediately after the preliminary meeting.

The Planning Inspectorate has three months from the end of the examination to provide its report and recommendation to the Secretary of State, who then has a further three months to make the decision.

14. References

Ref. 1. Department of Energy and Climate Change, Overarching National Policy Statement for Energy (EN-1) (London: The Stationery Office, 2011).

Ref. 2. Department of Energy and Climate Change, Overarching National Policy Statement for Energy (EN-1) (London: The Stationery Office, 2011).

Ref. 3. Department for Business, Energy & Industrial Strategy, Statement on Energy Infrastructure: Written statement (HLWS316) (London, 2017).

Ref. 4. Her Majesty's Stationery Office. The Planning Act 2008.

Ref. 5. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017,

Ref. 6. Her Majesty's Stationery Office. The Marine Works (Environmental Impact Assessment) Regulations 2007.

Ref. 7. Her Majesty's Stationery Office. Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (as amended)

Ref. 8. Suffolk Shoreline Management Plan (SMP7) http://www.suffolksmp2.org.uk/policy2/smp7index.php [accessed March 2020]

Ref. 9. The Planning Inspectorate (2019), Advice note seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf [Accessed March 2020]

Ref. 10. Planning Inspectorate (PINS) (2018), Advice Note Twelve: Transboundary Impacts and Process. https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2013/04/Advice-note-12v2.pdf [Accessed March 2020]