

# Sizewell C Project

## Combustion Activity Permit Application

### Appendix D: Application Site Condition Report

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APPLICATION SITE CONDITION REPORT

## DOCUMENT CONTROL

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## REVISION HISTORY

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# NON-TECHNICAL SUMMARY

This Application Site Condition Report (SCR) is provided as additional information to an environmental permit application to enable electricity generation on site during the construction phase of the Sizewell C Ltd (SZC) nuclear new build project. The construction of SZC will utilise static diesel and mobile diesel generators to enable construction prior to the electrification of the site, anticipated early 2027. The generators are needed to support the construction activities.

The site is expected to have a total installed capacity of up to 123.2 MWth. The static generators installed capacity is expected to be up to 109.9 MWth, and mobile generators is expected to have a total capacity of up to 13.3 MWth. The power demand during the peak construction is expected to be up to 82.4 MWth, after adjusting the load to account for the utilisation of the hybrid operational mode of the generators.

In total, up to 52 static and 8 working areas, which are considered to be area sources for the purposes of the application, will be located on site. The static generators on site will consist of up to 45 stage V emission static generators with hybrid batteries linked to the package substations, located within the MDS, and up to 7 static generators associated with ADs, located within or adjacent to the MDS. The site will also house a number of mobile generators for cranes and lighting on the construction site which are designed to be, and will be, moved around within a particular working area or contractor's platform which is expected to have a total capacity of up to 13.3 MWth. The mobile generators are represented as volume sources, split across 8 working areas which comprise: MCA, MCA perimeter, TCA compounds south-east, TCA compounds south-west, TCA compounds north-east, TCA stockpiles, ACA and TCA rail. Please see the Air Emissions Risk Assessment (AERA) in Appendix C of the Supporting Information Document (SID) for further information regarding these working areas. The makeup of the generator inventory may change depending on the requirements of the construction activity however, the air quality model is based on precautionary estimates and allows headroom to allow for any potential changes.

## Purpose

This document represents the SCR for the proposed SZC Power Station Construction Site located 2.4 km east to the town of Leiston and directly north of Sizewell B to be owned and operated by Sizewell C Limited (SZC Ltd). The SCR is required to be submitted to the Environment Agency (EA) as part of the SZC permit application for an installation activity environmental permit, EPR Schedule 1, Section 1.1A(1)(a): Burning of any fuel in an appliance with a rated thermal input of 50 MW or more.

The SCR is designed to be a live document which is maintained throughout construction related combustion activities, from permit application to permit surrender. It provides a centralised source for relevant data and site records; such as ongoing environmental and/or infrastructure monitoring/testing carried out with the aim of protecting the land and groundwater from pollution (fugitive emissions) arising due to the operation of combustion plant.

The purpose of this SCR is to capture the condition of the land and groundwater at the start of the permitted activity is therefore undertaken on the basis of the original assessments made plus those records and written arrangements in place by SZC to manage the condition of the land during construction of the Power Station.

The report format and contents are in accordance with Environment Agency's H5 SCR Guide for Applicants v3 (April 2013). In accordance with the H5 guidance, Sections 1 to 3 have been completed for the permit application stage; Sections 4 to 7 are required to be maintained by SZC for the duration of the combustion activities; and Sections 8 to 10 are required to be completed as part of an application to surrender the Environmental Permit. The sections of the report are summarised in Table 1 - SCR phases and sections

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**Table 1 - SCR phases and sections**

Permit Stage	Section
Permit Application Stage: (Current stage)	Section 1 Introduction and Site Details Section 2 Condition of the Land at Permit Issue Section 3 Permitted Activities
Permit Operational Phase: (to follow issue of an Environmental Permit)	Section 4 Changes to the Activity Section 5 Measures Take to Protect the Land Section 6 Pollution Incidents that may have had an Impact on Land, and their Remediation Section 7 Soil, Gas and Water Quality Monitoring
Permit Surrender Stage:	Section 8 Decommissioning and Removal of Pollution Risk Section 9 Reference Data and Remediation Section 10 Statement of Site Condition

## Definitions

Term / Abbreviation	Definition
ACA	Ancillary Construction Area
AD	Associated Development
AIRE	Applications in Real Environment
AONB	Area of Outstanding Natural Beauty
BGL	Below Ground Level
BTEX	Benzene, toluene, ethylbenzene and xylene
C4SLs	Category 4 Screening Levels
CLEA	Contaminated Land Exposure Assessment
COMAH	Control of Major Accident Hazards Sites
CPTs	Cone Penetration Tests
DCO	Development Consent Order
DQRA	Detailed Quantitative Risk Assessment
DWS	Drinking Water Standards
EA	Environment Agency
EDRMS	Electronic Document and Records Management System
EQS	Environmental Quality Standards
GAC	Generic Assessment Criteria
GQRA	Generic Quantitative Risk Assessment
IED	Industrial Emissions Directive
LOD	Limits of Detection
MDS	Main Development Site

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Term / Abbreviation	Definition
MCA	Main Construction Area
NGR	National grid reference
NIHHS	Notification of Installations Handling Hazardous Substances
NNB	Nuclear New Build
OCP	Organochlorine Pesticide
OPP	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated biphenyl
PCSM	Preliminary Conceptual Site Model
PPE	Personal Protective Equipment
RIGS	Regionally Important Geological or Geomorphological Sites
S4ULs	Suitable for Use Levels
SAC	Special Area of Conservation
SCR	Site condition report
SGVs	Soil Guideline Values
SOM	Soil Organic Matter
SPA	Special Protected Area
SPOSH	Significant Possibility of Significant Harm
SPTs	Standard Penetration Tests
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SSVs	Soil Screening Values
SVOC	Semi-volatile Organic Compound
SZC	Sizewell C
TCA	Temporary Construction Area
TPH	Total Petroleum Hydrocarbons
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WAC	Waste Acceptance Criteria
WMB	Water Management Board
WQS	Water Quality Standards

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## APPLICATION SITE CONDITION REPORT

# 1 SITE DETAILS

This document represents the Site Condition Report (SCR) for the proposed Sizewell C Power Station Main Development Site (MDS) located 2.4 km east to the town of Leiston and directly north of Sizewell B. As some of the proposed combustion units are mobile the permit will include the full construction area. The combustion activities will be part of the SZC construction works and will still benefit from the management controls associated with those works in addition to any permit requirements.

The overall purpose of the SCR is to describe the condition of the land and groundwater at the site and allow the Operator to demonstrate that these environmental receptors have been protected throughout construction related combustion activities. At the point of permit surrender, a Surrender SCR (SSCR) must be produced to demonstrate that the site is in a satisfactory state so that the Environment Agency can allow the permit to be surrendered. The Application SCR, which describes the condition of the land and groundwater at the site at the beginning of the permitted operations, is designed to allow a comparison to be made with the condition of the land prior to and during the permitted operations at the point of permit surrender.

The SCR is designed to be a live document which is maintained throughout the completion of construction related combustion activities, from permit application to permit surrender. It provides a centralised repository for relevant data; such as ongoing environmental monitoring and/or infrastructure monitoring/maintenance carried out with the aim of protecting the land from pollution arising due to the permitted activities. Any remedial works required following the accidental release of potentially polluting substances to the land during the permitted operations will also be documented and referenced in the SCR. Future updates of the SCR will include information from various complementary studies.

The report format and contents are set out in accordance with Environment Agency H5 SCR Guide for Applicants v3 (April 2013) [1]. Table 2 provides a summary of the site details as laid out in the H5 guidance.

**Table 2 - Site Details**

Name of the applicant	Sizewell C Limited
Activity address	Sizewell C, Sizewell Power Station, Leiston IP16 4UR
National grid reference	TM 47284 64085
Document reference and dates for Site Condition Report at permit application and surrender	Application Site Condition Report (Ref: 101254825) January 2024
Document references for site plans (including location and boundaries)	See appendix A of the SID for site plans

The proposed development comprises a Nuclear New Build Power Station. This will include a Power Station building, reactor buildings, turbine halls, cooling water infrastructure, interim waste / fuel storage, foul and industrial treatment facilities, operational service centre and offices, electricity transmission equipment and the temporary works area.

The site of the proposed development is centred at UK National Grid Reference (NGR) TM 47355 64128. It is located on the Suffolk coast, approximately mid-way between Felixstowe and Lowestoft, to the north-east of the town of Leiston. The site address being used for the construction works is Sizewell B power station, near Leiston, Suffolk, IP16 4UR (as the nearest operational facility).

This permit application relates to the following areas of the site:

- Main Construction Area (MCA);

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- Temporary Construction Area (TCA);
- Ancillary Construction Area (ACA);
- Associated Development 4 (AD4) and,
- Associated Development 6 (AD6)

The MCA, TCA and ACA are classified as falling within the MDS, while AD4 and AD6 are located to the west of the MDS comprising a highway scheme required to support the proposed development

A full description of the proposed development, including details on how it will operate once built, is available publicly online. In summary, and for the purposes of informing the reader of this document, the proposed development comprises two main elements from a construction perspective:

**The Main Development Site (MDS):** to include aspects such as the reactor buildings, turbine halls, cooling and drainage water infrastructure, interim waste / fuel storage, operational service centre and offices and electricity transmission equipment. The MDS comprises the MCA, TCA and ACA.

**Associated Development (AD) sites:** including Darsham Park and Ride, Wickham Market Park and Ride, a Freight Management Facility and improvements to rail / highways infrastructure including the Sizewell Link Road, Two Village Bypass, Yoxford Roundabout, AD6 Road Scheme (which forms part of this permit application) and Leiston Branch Line upgrades.

The areas to which this permit application relates to include: the MCA, the TCA, the ACA, AD4 and AD6.

**Main Construction area (MCA):** The MCA comprises the main platform for the proposed development. It is located to the east of the MDS, along the Sizewell Foreshore. Sizewell Marshes Site of Special Scientific Interest (SSSI) is located to the west of the MCA.

**Temporary Construction area (TCA):** The TCA comprises the area of land located primarily to the north and west of the MCA and to the north of Sizewell Marshes Site of Special Scientific Interest (SSSI).

**Ancillary Construction Area (ACA):** The ACA is isolated from the rest of the MDS and is located immediately north-east of the town of Leiston. Currently, the ACA is a greenfield site used for agriculture. The area comprises approximately 30 ha. It is bounded by Valley Road to the north, Lover's Lane to the east, King George's Avenue to the south and an existing railway line along the western boundary, beyond which the Eastlands Industrial Estate is located. Note that the Development Consent Order (DCO) and associated planning documents refer to the ACA as Land East of Eastlands Industrial Estate.

**Associated development 6 (AD6):** AD6 refers to 'Associated Development 6' which forms part of the proposed development but is considered separate from the MDS. This part of the project is located to the west of the MCA and Sizewell Marshes SSSI. It comprises a new highway scheme and roundabout which will form an integral route for both construction and operational phase traffic.

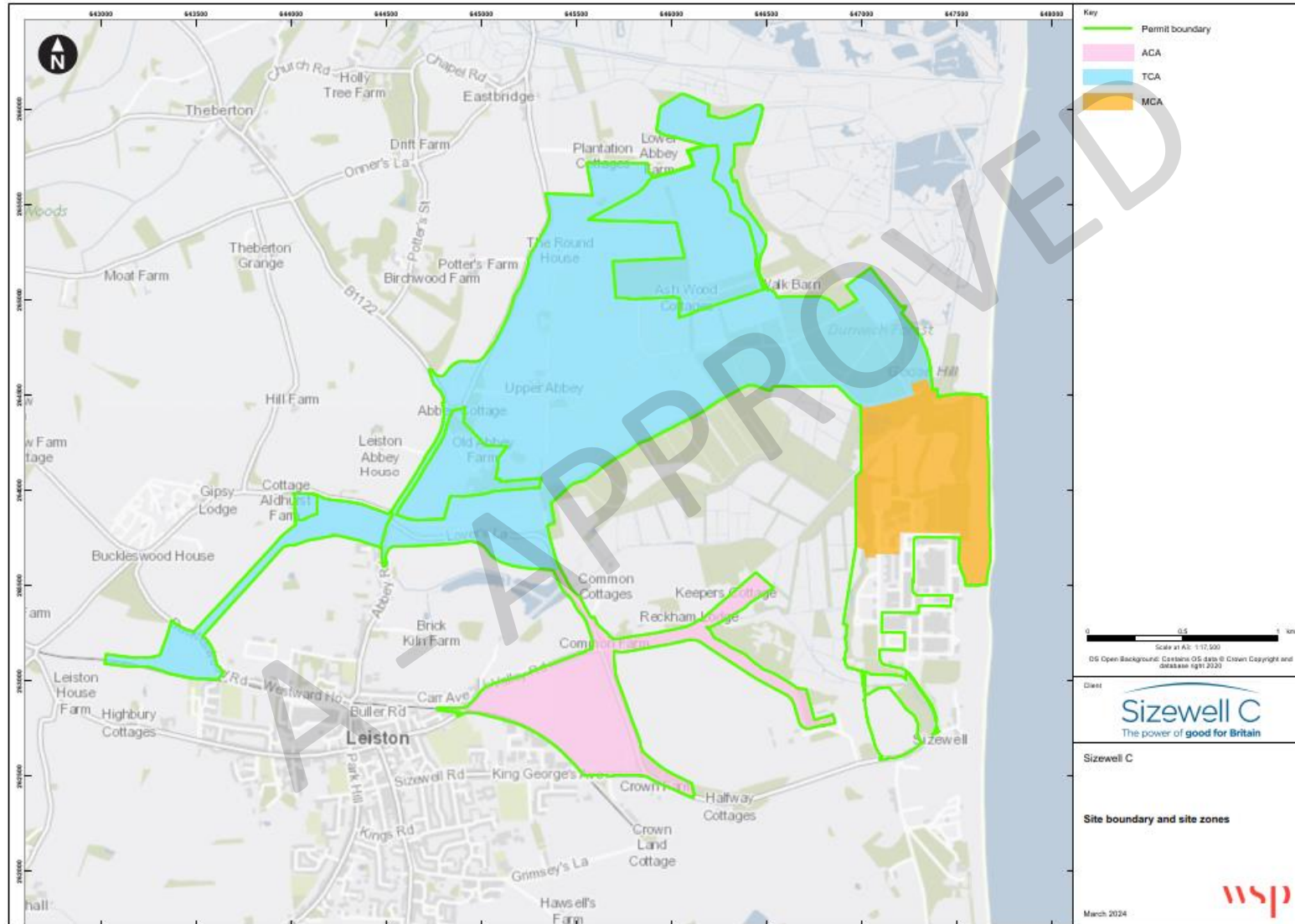
The site boundary and the site zones can be seen within Appendix A of the SID. This also includes plans displaying sensitive receptors, monitoring points and site drainage.

The approximate co-ordinates for the centre of each zone located within the site are as follows:

- The MCA is centred around at approximate NGR TM 47284 64085
- The TCA is centred around at approximate NGR TM 46235 64729; and
- The ACA is centred around at approximate NGR TM 45592 62778.

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Figure 1 - Site Boundary and Zones



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### 1.1 Site description

The northern section of the MCA largely comprises open fields. The Sizewell Marshes SSSI and associated drains are present in the north-western section of the zone. The MCA car park is concreted and is located in the western corner of the zone.

The central section of the MCA extends into the existing Sizewell B Power Station and comprises several buildings and hardstanding associated with the Power Station. The southern section of the MCA consists of a circular area of land immediately south of the existing Sizewell B Power Station which comprises open fields, Sandy Lane and several drains. An access road from Sizewell Gap running north into the MCA is present in the south-east of the zone. As part of the construction works, much of the MCA has been deforested and vegetation has been removed.

The TCA largely comprises agricultural land and open fields with a few residential properties, lanes and tracks. The majority of the residential properties appear to be farms. Several forested areas including Goose Hill and Kenton Hills, Great Mount Wood, Ash Wood and Greenhouse Plantation are also present within the zone.

The ACA comprises open fields. The Great Eastern Railway Line is present running through the southern section of the zone into Sizewell Halt rail terminal which will be upgraded as part of the temporary works.

Surrounding land uses primarily comprise a mixture of agricultural land, open fields, the Sizewell Marshes SSSI, the Minsmere – Walberswick Heaths and Marshes SSSI and residential and commercial properties. The village of Leiston, approximately 2.4 km south-west of the MCA and adjacent to the ACA, comprises a mixture of residential and commercial properties. There are no ancient woods or national and local nature reserves within or adjacent to the proposed site.

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## 2 CONDITION OF THE LAND AT PERMIT ISSUE

The information included in this section is primarily sourced from that which was presented in: Sizewell C: Phase 2 Geo Environmental Interpretative Report [38].

### 2.1 Environmental Setting

This section provides a summary of the environmental setting at the time of permit issue.

#### 2.1.1 Geology

The published geological information for the site [38] is summarised in Table 3.

**Table 3 - Summary of Published Geological Conditions**

	Unit	Sub-Unit	Age		Details
Superficial Deposits	Beach Deposits	Tidal Flats	Quaternary	Holocene	Present close to coast
		Sand and Gravel			
	Peat	-			Low lying marshy areas (SSSI)
	Alluvium	Sand and clay		Anglian	Locally present, predominantly at the topographic highs to the north, north-west and west of the development area
	Head	-			
	Lowestoft Formation	Lowestoft Till			
Lowestoft Sand and Gravel					
Bedrock	Crag Group	Norwich Crag Formation	Tertiary (Paleogene)	Pliocene - Pleistocene	Present in entire regional study area
		Red Crag Formation			
	Thames Group	London Clay Formation		Palaeocene - Eocene	Present in entire regional study area at depth
		Harwich Formation			
	Thanet Group	Thanet Sand Formation			
	Lista Formation	Ormesby Clay Member			
Chalk Group	White Chalk	Cretaceous	-	Present in entire regional study area at depth	

It is noted that Made Ground is likely to be present at the site within the MCA associated with the construction of the adjacent Sizewell B power station, in the southern section of the ACA associated with the railway line and in the centre of the TCA around Upper Abbey associated with former pits located in this area.

The following tables provide a summary of the ground conditions encountered during the investigations [2] [6] [11] [14] [15] [31] [36] [38] [37] [48] [49] [50] [55]. The ground conditions for the site have been divided into three zones including the MCA, TCA and ACA. The depths quoted are relative to the ground levels prevailing at the time of the ground investigations.

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**Table 4 – MCA Encountered Geology**

Ground conditions	Description	Encountered depths (meters bgl)
Topsoil	Topsoil was encountered comprising either brown orange silty, clayey sand or fine to medium grained sand and sandy gravelly clay. The layer generally included rootlets.	0.1-0.8
Made Ground	Made Ground comprising re-worked Crag materials from the construction of Sizewell A and B beneath the main platform and re-worked natural soils described as brown, slightly gravelly, silty fine to medium sand or sandy gravel beneath the northern mound.	0.1 – 15.0
Alluvial Clay and Peat	A layer of Alluvial Clay was encountered beneath the Made Ground within a number of locations in the northern and southern sections of the main platform. The thickness and lateral extent of the clay is not consistent across the area and generally absent in other locations or mixed with Peat in a peaty clay layer. The Alluvium comprised a grey sandy clay or clayey silt interbedded with varying amounts of brown or dark yellow fibrous, slightly silty Peat. Distinctive hydrogen sulphide odours were noted within the Alluvium with the thickness of the strata ranging from 2.1m to 4.6m. An average thickness of approximately 3.5m was recorded.	3.6 - 12.85
Marine Deposits	Sand and gravel were encountered across the eastern sections of the main platform. In this area the Marine Deposits generally comprised rounded to sub-angular orange gravel with a varying content of medium to coarse-grained sands.  Beneath the sea defence area the top of the stratum generally comprised loose to medium dense light brown sub-rounded to rounded gravelly sand to 0.6m bgl. Gravel content increased with depth, described as medium sandy sub-rounded to rounded fine to coarse flint gravel with occasional shell fragments.	0.1 - 12.7
Tidal Flat Deposits	The stratum typically comprised firm grey sandy silty clay and Peat in the main platform area. The stratum typically comprised soft grey sandy slightly gravelly silt or clay and Peat in the sea defence area.	5.1 - 15.0

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Crag Group	<p>Beneath the main platform the Crag Group generally consisted of either orange, brown or grey fine to coarse silty sand (density increasing rapidly with depth in the Red Crag Formation from medium dense to very dense) with occasional subangular to rounded flint gravel. Clasts of grey clayey sand were encountered in several boreholes, in addition to bands of shell fragments.</p> <p>The Crag Group beneath the northern mound generally comprised medium dense to very dense orangish brown and greenish brown medium sandy to very sandy sub-angular to sub-rounded fine to coarse gravel of flint and quartz.</p> <p>In the sea defence area the stratum generally comprised dense to very dense orangish brown and greenish brown medium sandy to very sandy sub-angular to sub-rounded fine to coarse gravel of flint and quartz.</p>	0.15 - 45.0
Thames Group	Very stiff, locally stiff, grey and dark grey thinly laminated extremely closely fissured Clay with occasional thin laminae of silt.	1.75 - 12.65
Montrose Group	The Ormesby Clay Member of the Lista Formation was encountered beneath the Lambeth Group comprising greyish brown silty clay. The average thickness of the Montrose Group is around 9m.	68.4 - 72.3
Chalk Group	The chalk (Beeston, Weybourne and Pre-Weyborne Members) generally comprised structureless chalk consisting of white slightly sandy slightly gravelly silt with gravel and very weak to strong, medium to very high density closely jointed white burrow mottled light grey chalk. The upper members are characterised by numerous large flints and a reduced marl content. The base of the chalk was not proven.	77.0 - 92.3

**Table 5 - TCA Encountered Geology**

Ground conditions	Description	Encountered depths (meters bgl)
Topsoil	Topsoil was present in the majority of borehole and typically comprised a brown sand/loam and brown gravelly silty sand with varying quantity of organic material. Humic topsoil with tree detritus was encountered in	0.1 - 0.7

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	boreholes situated beneath pine trees.	
Made Ground	<p>Made Ground was encountered within exploratory hole locations which comprised orange silty sand with charcoal fragments or sub-rounded to rounded gravel. Twisted metal fragments were observed. Reworked landfill materials were also observed in two boreholes (GW1S and GW1D). The Made Ground primarily comprised of domestic waste within either a sand matrix or sandy clay matrix. The waste material is likely to originate from the historical Abbey Pit landfill site present adjacent to the south-west of this zone. The thickness of this waste layer was recorded up to 3.2m bgl.</p> <p>Reworked topsoil (ploughed) was encountered in the boreholes and comprised either brown sand or clayey loam to a depth of 0.2m bgl. Pottery fragments were observed between the ground surface and 0.1m bgl. Reworked Crag Group was present within a number of locations underlying landfill waste material to a depth of 4.0m bgl and comprised orange/brown/black silty and clayey sand with variable gravel content.</p> <p>Anthropogenic material was recorded in the form of a single cobble of brick and rare plastic in GW1S between depths of 1.30 m bgl and 3.00 m bgl. Rare fragments of plastic were also recorded in GW1D between depths of 0.00 m bgl and 0.50 m bgl.</p> <p>Within trial pits TP01 to TP06, anthropogenic material was recorded in Made Ground between 0.2 m and 0.6 m bgl comprising ash and fragments of brick, plastic, ceramics and glass. Staining and odours were also noted in several of the trial pits although no details on the type of odour was recorded.</p>	0.1 - 4.2
Alluvial Clay	Alluvial Clay was present within locations in the south-east of the zone predominantly overlain by Made Ground. The Alluvium comprised soft grey to black silty clay and clayey silt, with a predominantly organic odour.	3.6 - 7.0

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Lowestoft Till Formation	Lowestoft Till Formation was present within many exploratory hole locations with the exception of the east of the area. This was generally described as medium dense orangish brown slightly gravelly medium to coarse sand. Gravel was subangular to surrounded, fine to coarse flint and quartzite.	0.1 - 1.0
Crag Sand Formation	The Crag Group (Norwich Crag Formation and Red Crag Formation) was encountered within the majority of exploratory holes excavated in the TCA. The Crag Group generally consisted of orange brown, slightly silty fine to coarse grained sand, with a low content of sub-rounded to rounded flint gravel, subangular sandstone gravel and occasional silty and clayey laminations. Occasional iron staining and poorly cemented, thinly laminated bands of silty fine sand and siltstone were observed in seven boreholes. Shell fragments was observed in the Red Crag Formation with occasional rounded fine chalk gravel.	0.1 - 16.0

**Table 6 - ACA Encountered Geology**

Ground conditions	Description	Encountered depths (meters bgl)
Topsoil	Topsoil was encountered in exploratory holes and comprised brown slightly gravelly silty fine to medium sand. The layer generally included rootlets, with a low content of gravels such as flint and quartzite.	-
Made Ground	Made Ground was encountered within two exploratory hole locations (ACA-TP04-EW and ACA-WLS01-EW). The Made Ground comprised brown slightly gravelly sandy silty Clay and brown gravelly very silty Sand with flint gravel and occasional fragments of brick and concrete.	0.1 - 3.5
Lowestoft Till Formation	Lowestoft Till Formation was present within the majority of exploratory hole locations. This was generally described as medium dense orangish brown slightly gravelly medium to coarse sand. Gravel is subangular to surrounded, fine to coarse flint and quartzite.	0.4-0.8
Crag Sand Formation	The stratum was generally described as orange brown, slightly gravelly fine to coarse sand.	0.0 - 5.0

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### 2.1.2 Local Geological Sites

According to mapping on the Suffolk Biological Records Centre website [5] the site is not located within a Local Geological Site formerly known as Regionally Important Geological or Geomorphological Sites (RIGS).

## 2.2 Mineral Extraction and Ground Stability

### 2.2.1 Mining and Natural Cavities

Reference to the Envirocheck reports [3] indicates that the site is not located in an area that is likely to be affected by coal mining, other mining activities or natural cavities.

### 2.2.2 Historical Extractive Activities

Reference to the Envirocheck reports [3] indicates that there are no historical extractive activities on or within 500 m of the site. However, reference to the site history maps included in the Envirocheck reports [3] indicates that several sand and clay pits were located across the site and in the local area which are now marked as disused.

### 2.2.3 Ground Stability

Ground stability hazards identified in the Envirocheck reports [3] are summarised in Table 7.

**Table 7 - Summary of Ground Stability Hazards**

Geological Hazard	Details
Collapsible Ground	Very Low
Compressible Ground	The majority of the site presents No Hazard, with an area of peat within the TCA classified as Moderate to High and the southern section of the MCA classified as High [7]
Ground Dissolution	No Hazard
Landslide	Very Low to Low
Running Sand	Very Low to Low, with an area adjacent to the coast classified as Moderate [7]
Shrinking or Swelling Clay	No Hazard to Low

## 2.3 Radon

Reference to the Envirocheck reports [3] indicates that site is in a lower probability radon area, as less than 1% of homes are above the action level. No radon protective measures are considered necessary in the construction of the new Power Station.

## 2.4 Hydrogeology

The Environment Agency's aquifer classifications [3] for the geology underlying the site are summarised in Table 8.

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**Table 8 - Aquifer Designations**

Geology	Description	Aquifer Classification
Superficial	Tidal Flat Deposits	Secondary A Aquifer <sup>1</sup>
	Sand and Gravel	Secondary A Aquifer
	Peat	Unproductive Strata <sup>2</sup>
	Alluvium	Secondary A Aquifer
	Head	Unproductive Strata
	Lowestoft Till	Unproductive Strata
	Lowestoft Sand and Gravel	Secondary A Aquifer
Bedrock	Red Crag Formation	Principal Aquifer <sup>3</sup>
	London Clay Formation	Unproductive Strata
	Harwich Formation	Secondary A Aquifer
	Woolwich and Reading Beds Formation	Secondary A Aquifer
	Thanet Sand Formation	Secondary A Aquifer
	White Chalk	Principal Aquifer

Peat is technically classified as an unproductive stratum. However, due to their ecological importance associated with the Sizewell Marshes SSSI they are considered as a high value receptor for the purpose of the contamination risk assessment.

The Crag Group and chalk bedrock underlying the site are classed as Principal Aquifers. The two aquifers are hydraulically separated by the presence of the London Clay Formation (Unproductive Strata). Due to the thickness of the low permeability London Clay Formation aquiclude, there is not considered to be the potential for significant environmental effects on the chalk aquifer and is therefore not considered further as a receptor.

#### 2.4.1 Groundwater Vulnerability

Defra Magic Map<sup>4</sup> indicates that the ACA and parts of the TCA are located within a Source Protection Zone (SPZ) III (Outer Zone).

<sup>1</sup> Secondary A Aquifers are permeable layers 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.

<sup>2</sup> Unproductive Strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

<sup>3</sup> Principal Aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

<sup>4</sup> <https://magic.defra.gov.uk/magicmap.aspx>

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The soils underlying the majority of the site are identified as having high permeability, with the exception of the peat deposits and Lowestoft Formation, which are identified as having intermediate leaching potential [4].

### 2.4.2 Groundwater Abstractions

Reference to the Envirocheck reports [3] indicates that two permitted groundwater abstractions are located on site including:

- An abstraction at Upper Abbey Farm for general farming and domestic purposes from the Crag Group. The permit is operated by British Energy Generation Ltd. with a start date of 31 December 1998. The permit end date is not supplied.
- A groundwater abstraction at Sizewell B Power Station for make-up/top-up water from the Marine Deposits. The permit is operated by British Energy Generation Ltd with a start date of 31 December 1998. The permit end date is not supplied.

An additional 20 groundwater abstractions are listed within 1 km of the site. The closest abstraction to the site is a SPZ borehole located 244 m to the southwest of the TCA at Leiston Old Abbey associated with the SPZ III located to the west of the ACA.

It is noted that this information was obtained in 2012 [3] and new abstractions or changes to the details above may have occurred in the intervening period.

Additionally, SZC operates groundwater 2 abstraction licenses (Rackham Pits: 7/35/03/\*S/0075 and Two Penny Bridge: 7/35/03/\*S/0047) within the MDS. SZC may apply for further groundwater abstraction licenses if required.

## 2.5 Hydrology

The main surface water feature within 500 m of the study area is the coastal waters of the North Sea located adjacent to the eastern boundary of the site.

A series of surface freshwater features are also present within 1 km of the site. These include an extensive network of ponds and drainage ditches, referred to as the Sizewell Belts located adjacent to the west and south of the site. Leiston Beck, located to the west of the MCA, receives drainage from the Sizewell Belts and runs north, parallel with the coast, before joining the Minsmere New Cut, a large watercourse running west to east discharging to the sea via a sluice gate known as 'The Sluice', approximately 2 km north of the site.

The Minsmere New Cut River is classified as a heavily modified waterbody with an ecological status of moderate and a chemical status of good in 2016 [19].

Leiston Beck is classified as a heavily modified waterbody with an ecological status of moderate in 2022. Leiston Beck failed in its chemical status due to unacceptable levels of mercury and its compounds and Polybrominated diphenyl ethers [24].

WMB Drain 7 (DRN163G0101) is located in the North of the TCA, in proximity to the red line boundary and is a receptor for discharge from the outfall.

There is also a series of water features such as ditches and wetland located within Wild Aldhurst located in the centre of Abbey Road, Lovers land and Valley Road/Carr Avenue.

### 2.5.1 Flood Risk

Several areas of the site are indicated to be at risk of flooding (Flood Zone 3) as a result of rivers or seas without defences, including the southern, western and northern sections of the MCA and the eastern and southern sections of the TCA [3]. A temporary and permanent sea defence will provide a standard of protection for

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storm events of 1 in 10,000 year return period, including climate change allowances and no cliff-edge effects. These structures will replace the current flood protection provided by the Bent Hills [23].

The site currently holds 7 flood risk activity permits located across the MDS (EPR/AB3054MS, EPR/BB3590JX, EPR/BB3590JX, EPR/DB3495YG, EPR/RB3859MY, EPR/AB3054MS and EPR/BB3590JX), more will be applied for in the future.

### 2.5.2 Discharge Consents

The Environment Agency's public register<sup>5</sup> was checked for any discharge to surface and groundwater permits within 1 km of the IP16 4UR, IP16 4RG and IP16 4TP to represent the MCA, TCA and MCA respectively. The search returned 4 discharge permits which are displayed in Table 9.

**Table 9 - Discharge to Surface Water and Groundwater: Public Register Check**

Permit Reference	Operator	Discharge Point (National Grid Reference)
AN/PRELF20769/002	Mr & Mrs Dowley	TM 44560 65220
AN/ASENF1669/003	Anglian Water Services Limited	TM 45090 63080
AN/ASENF1122/011	Anglian Water Services Limited	TM 45077 63133
AN/ASENF16165/002	Anglian Water Services Limited	TM 45230 63300

Additionally, Leiston Sewage Works also discharge into Leiston Drain via a combined sewage overflow at Aldhurst Farm, this flows east through site to North Sea.

SZC will be applying for discharge permits associated with the construction which will cover surface water runoff, groundwater and other discharges associated with construction activities. A permit application for the discharge of surface water and dewatered groundwater was submitted to the EA in March 2024.

### 2.5.3 Pollution Incidents to Controlled Waters

Reference to the Envirocheck reports [3] that 30 pollution incidents have been recorded within 1 km of the site including incidents relating to oils, chemicals, organic wastes, crude and storm sewage and naturally occurring pollutants.

Several of the incidents relate to pollution of the North Sea from activities associated with the existing Power Station. The remaining incidents involve Leiston Beck and its tributaries.

One of the incidents was recorded on site within the MCA on 15 March 1993 relating to entry of an unknown pollutant into Leiston Beck, listed as a Category 3 (minor) incident.

It is noted that this information was obtained in 2012 [3] and additional pollution incidents may have occurred in the intervening period.

SZC maintains an organisational learning tool (Insight) that is used to record observations/non-conformances/good practice etc. Pollution incidents are recorded in this tool and these records can be made available upon request.

<sup>5</sup> <https://environment.data.gov.uk/public-register/view/search-all>

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### 2.6 Landfill Sites

Two registered landfills and three historical landfill sites are present within 1 km of the site [3] [7] including:

- Ogilvie at Home Farm, Sizewell, a registered landfill site located 200 m south of the MCA. There is no identified restriction on the source of waste received by the landfill. The dates of operation of the landfill are not provided. The status of the licence is listed as lapsed;
- Leiston Landfill, a registered landfill site located 500 m to the west of the ACA. The landfill was operational from June 1977 and there is no identified restriction on the source of waste received by the landfill. The status of the licence is listed as lapsed/cancelled or surrendered;
- Carrs Pit historical landfill located 500 m to the west of the ACA. Inert and industrial waste were accepted at the landfill from December 1976 to December 1987;
- Abbey Pit historical landfill located present adjacent to the south-west of the TCA. No information is provided on the waste type or quantity received by the landfill or the dates of operation; and
- Aldhurst Farm historical landfill located 300 m to the north-west of the ACA and 340 m west of the southern section of the MCA. Inert, industrial, commercial, household and other (construction, demolition and dredging) wastes were accepted at the site from June 1990. There is no end date for acceptance of waste. The landfill is listed as large receiving equal to or greater than 75,000 tonnes or waste per year.

Additionally, groundworks have exposed that there are several historical landfills within the site boundary. Within the TCA there is a historical landfill (extends beyond original Abbey Pit footprint) and an old encampment. Farmers fly tipped waste has been found at badger sett 4. In July 2023, during the construction of the Site Establishment Early Access Road (Access Road), unexpected Made Ground soils containing landfill type wastes were encountered within the western end of the Access Road near Lovers Lane [2].

During Unexploded Ordnance (UXO) surveys undertaken in the ACA, and during a previous ground investigation undertaken in 2021, an area of suspected landfill, fly tipping or similar, was identified in the northern half of the area [25].

### 2.7 Waste Management Sites

The Environment Agency's public register was checked for any waste operation permits within 1 km of the IP16 4UR, IP16 4RG and IP16 4TP to represent the MCA, TCA and MCA respectively. The search returned one result for a Household Waste Amenity Site located on Lovers Lane 350 m to the north of the ACA. The licence for the site was issued in May 1994 to Waste Recycling Ltd but has since been transferred to FCC Environment (UK) Limited.

### 2.8 Hazardous Substances

Aside from Sizewell B Power Station, none of the following were identified on or within 500 m of the site According to the Envirocheck Reports [3] and a COMAH 2015 Public Information Search<sup>6</sup>:

- Control of Major Accident Hazards Sites (COMAH);
- Explosive Sites;
- Notification of Installations Handling Hazardous Substances (NIHHS);

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<sup>6</sup> <https://notifications.hse.gov.uk/COMAH2015/Search.aspx>



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- Planning Hazardous Substance Consents; or
- Planning Hazardous Substance Enforcements.

### 2.9 Other Environmental Permitting (England and Wales) Regulations 2016 Permits

The Environment Agency's public register indicated that there are a number of radioactive substances and installation permits relating to Sizewell A, B and C within 1 km of the MCA.

### 2.10 UXO

A Zetica Risk Map was obtained to assess the risk of encountering UXO at the site<sup>7</sup>. The UXO map indicates that the site is listed as being in an area at 'moderate bomb risk'.

A detailed UXO risk assessment undertaken by UXO specialists [8] has identified a medium to high risk across currently undeveloped areas of the main development site, primarily due to its former use as a rifle range. In alignment with the description of risk categorization provided below, this former land use means that the entire Goose Hill area has been categorized as high risk for UXO due to there being evidence of ordnance at this location. The following definitions of medium and high risk provided by SafeLane Global, the contracted UXO specialists on the project, are outlined below:

- High Risk (Red areas in Figure 2): An area where there is evidence (anecdotal or documented) that ordnance has been used or there is a high likelihood of encountering ordnance items.
- Medium Risk (Amber areas in Figure 2): An area that has been identified to have had military training or activity with a likelihood of ordnance items or ancillaries being found in the area.
- Low Risk (Green area in Figure 2): Categorization attributed by UXO Specialists based on historical military evidence indicating that the area has not been previously used as a military base, munitions store or manufacturing area, nor are there any records of significant recorded munitions remaining in the area. UXO survey works are therefore not required for pre-clearance of low-risk areas.

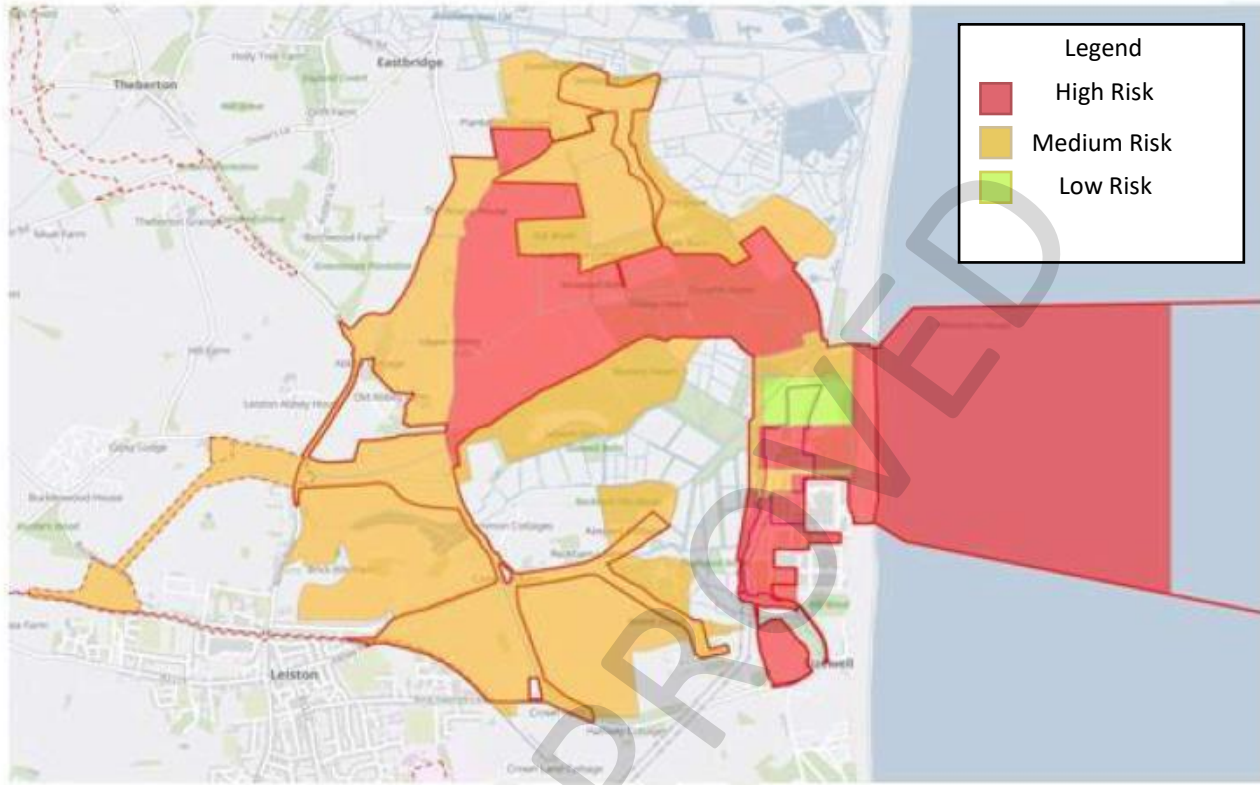
UXO clearance works will proceed in way as to which to reduce risk to protected species.

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<sup>7</sup> <https://zeticauxo.com/guidance/risk-maps/>

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**Figure 2 - UXO risk map of the MDS**



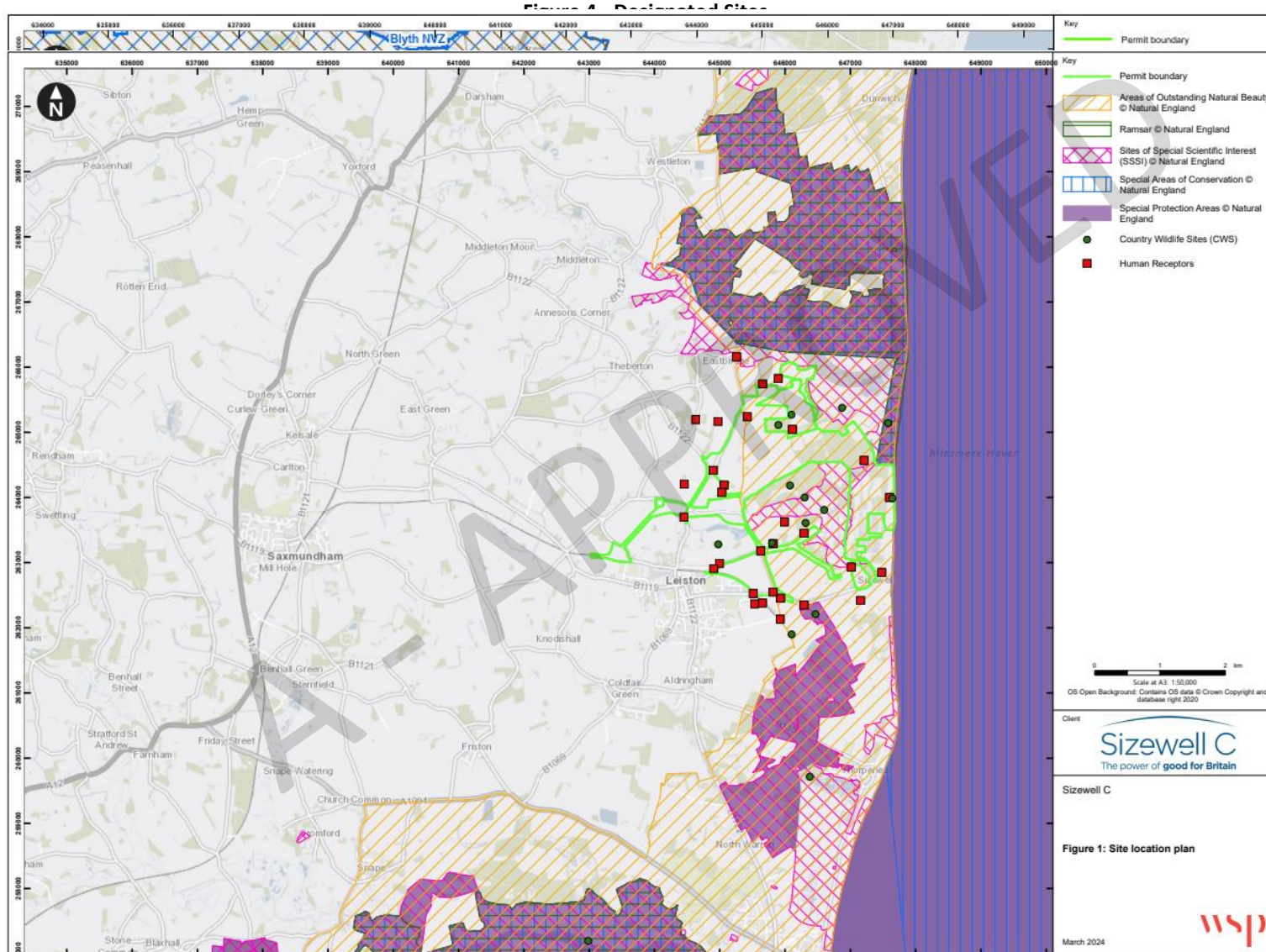
## 2.11 Sensitive Land Uses

The site is located within 1 km of several sensitive land uses [3] as follows:

- Nitrate Vulnerable Zone – the entire site is located within a Nitrate Vulnerable Zone (see Figure 3).
- Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB) – the AONB is present within the MCA, the eastern edge of the TCA and adjacent to the eastern edge of the ACA.
- Sizewell Marshes SSSI – the SSSI is present within the western edge of the MCA and adjacent to the south and north of the TCA (see Figure 4).
- Minsmere-Walberswick Heaths and Marshes SSSI, Special Area of Conservation (SAC), Ramsar and Special Protected Area (SPA) – is located adjacent to the north-east of the TCA (see Figure 4).

Leiston Abbey (second site) and moated site, which is designated as a Scheduled Monument (SM 1014520) is present 125 m to the west of the site. Several Grade II listed buildings are also indicated to be present within the study area including Upper Abbey Farmhouse and the Barn which are located within the site boundary.

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## 2.12 Potential Receptors

This section details potential receptors which are relevant to the current and future site uses and may be relevant to the construction and operation of the site. Potential receptors are outlined in Table 10.

**Table 10 - Summary of potential receptors**

Receptor Groups	Current site use	Future site use
Human health (on-site) e.g. SZC staff, contractors, construction workers and site visitors.	Pedestrians and road users using existing roads, footpaths, railway and fields within the site	Pedestrians and road users using existing roads, footpaths and fields within the site (noted that Power Station site will be secure)
	Agricultural workers	Agricultural workers
	Recreational site users of the SSSI, marshes and beach along the foreshore	Recreational site users of the SSSI, marshes and beach along the foreshore
	Current Sizewell B site workers using the MCA and SZC construction workers	Future site workers
	Residents within TCA	Residents within TCA
Human health (off-site)	Occupants of nearby residential, recreational and commercial properties	Occupants of nearby residential and commercial properties
	Pedestrians accessing surrounding roads and footpaths	Pedestrians accessing surrounding roads and footpaths
	Recreational site users of the surrounding SSSI and marshes	Recreational site users of the surrounding SSSI and marshes
	Agricultural workers	Agricultural workers
	Workers in adjacent Sizewell B Power Station	Workers in adjacent Sizewell B Power Station
Controlled Waters	Groundwater in Principal bedrock aquifer (crag and chalk)	Groundwater in Principal bedrock aquifer
	Groundwater in Secondary A superficial aquifer (alluvium, lowestoft, head etc.)	Groundwater in Secondary A superficial aquifer
	North Sea	North Sea
	Ponds and drains on site and within 500 m of the site	Ponds and drains (including WMB Drain No 7 and Leiston and Sizewell Drains) on site and within 500 m of the site
Property e.g. residential property within TCA and existing structures associated with Sizewell B	Existing on site services and structures	Existing on site services and structures
	-	Proposed on-site services and structures
	Existing off-site services and structures	Existing off-site services and structures
Agricultural land	Crops and livestock (on-site and off-site)	Crops and livestock (on-site and off-site)
Ecological	Sizewell Marshes SSSI	Sizewell Marshes SSSI

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Receptor Groups	Current site use	Future site use
	Minsmere-Walberswick Heaths and Marshes SSSI, RAMSAR, SAC and SPA	Minsmere-Walberswick Heaths and Marshes SSSI, RAMSAR, SAC and SPA
	Suffolk Coast and Heaths AONB	Suffolk Coast and Heaths AONB

It has been assumed that there will be limited public access to areas of the site during construction and operation particularly to the Power Station which will be a secure site. However, access to the site will be possible via existing roads and footpaths. In addition, the current red line boundary includes the foreshore and therefore recreational users have been included in the Preliminary Conceptual Site Model (PCSM).

Risks in relation to short term exposure to contamination by construction workers have not been considered further as part of this assessment. Acute exposure risks will need to be assessed as part of the development of the construction phase health and safety plan and managed through standard good practice health and safety procedures.

2.12.1 Potential Migration / Exposure Pathways

This section details the potential migration or exposure pathways between the sources of contamination and receptors identified above. For a pollutant linkage to exist between the contaminant sources identified and the potential receptors, a pathway must exist.

**Potential Human Exposure Pathways:**

Potential exposure pathways to the identified on-site human receptors include:

- Dermal contact with and/or ingestion of contaminants in soils, soil-derived dusts and water;
- Inhalation of soil derived dust, fibres and gas/vapours and,
- Inhalation of bacteria and toxins from water resources (e.g. from dust suppression and engineered water systems).

The potential exposure pathways to the identified off-site human receptors include:

- Dermal contact with and/or ingestion of contaminants in windblown soil-derived dusts and water that may have migrated off site; and,
- Inhalation of windblown soil derived dust, fibres and gas/vapours which may have migrated off site.

**Potential Controlled Waters Exposure Pathways:**

- Leaching of contaminants in soil to groundwater in underlying aquifers;
- Migration of contaminated water through preferential pathways such as underground services, pipes and granular material to groundwater in underlying aquifers;
- Migration of contaminated water into underlying aquifers followed by lateral migration into nearby watercourses; and,
- Discharge of contaminants entrained in surface water run-off followed by overland flow and discharge.

**Potential Property Exposure Pathways:**

- Direct contact of contaminants in soil and/or groundwater with existing and proposed structures and buried services; and

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- Migration of ground gas along strata and preferential pathways such as service routes or differentially permeable strata.

**Potential Ecological Exposure Pathways:**

- Direct contact between soil and water contamination and ecological receptors;
- Windblown dust; and,
- Contaminated surface run-off impacting upon the ecological receptors.

## 2.13 Pollution History

This section summarises the sites pollution history.

### 2.13.1 Historical land-uses and associated contaminants

A review of the historical land use of the site and surrounding area has been undertaken to identify the nature and location of potentially contaminative activities that may have taken place on or adjacent to the site.

Historical maps between 1883 and 2012 at 1:10,560 and 1:10,000 scales and between 1882 and 1995 at 1:2,500 scale are presented within the Envirocheck reports [3], available upon request. Current online mapping has been reviewed to assess land use changes between 2012 and 2018. The historical review looks at previous land uses within 500 m of the boundary of the site.

Key aspects of the site history are summarised in the tables below. The site history details are divided into three zones including the MCA, TCA and ACA.

**Table 11 - MCA Historical Land Uses**

Date	Within the Zone	Surrounding Area (approximate distance and direction)
1883-1884	The zone comprises open fields in the north and south. There are drains and an old drainage pump located in the north and centre of the zone. Two sand pits and Warren House are located in the south of the northern section of the zone. Sandy Lane is present in the west of the southern section of the MCA.	The surrounding land use comprises primarily open fields, woodland and agricultural land. Sizewell Gap is present adjacent to the southern boundary of the MCA. There are two sand pits located 250 m north-west and south-east of the northern section of the zone and three sand pits located 60 m north-east, 100 m and 500 m north of the southern section of the zone. The Sizewell Belts are located to the adjacent west of the zone. Sizewell Farm is approximately 150 m south of the zone. The Vulcan Arms Public House is approximately 50 m east of the zone and Sizewell Cottage is approximately 200 m east of the zone. A 'Coastguard Station' is labelled approximately 200 m south-east of the zone.
1905	A wind pump is located in the north-eastern corner of the zone and additional sand pits are present in the centre of the zone.	An additional sand pit is present 500 m west of the zone.
1928-1958	The area of drains in the north and centre of the zone are labelled as 'Liable to Floods'. There is a rifle range in the centre of the zone and targets located in the east of the zone. 'Form Fours Wood' and 'Coronation Wood' are labelled along the southern boundary of the zone. Additional sand pits are indicated in the south-western corner of the zone.	The area of land to the north of the zone is labelled as 'Liable to Floods'.
1976	The drains are now labelled on the map as 'drains' and there are several ponds present in the north-western corner of the zone. There appear to be some	The foundations present in the south of the zone extend off-site further to the south. Sizewell Power Station is labelled

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Date	Within the Zone	Surrounding Area (approximate distance and direction)
	foundations within the southern half of the zone. These are likely to be related to the Sizewell B Power Station. A sewage works is present within the western boundary of the zone adjacent to the foundations.	located 500 m south of the zone. 'Cliff House Caravan Park' is labelled approximately 400 m south-east of the zone.
2006-2012	Sizewell B Power Station has been developed further extending into the southern half of the zone.	Additional drains are present surrounding the zone. An electricity substation is present approximately 150 m west of the zone.
2018-2024	No significant changes.	No significant changes.

Table 12 - TCA Historical Land Uses

Date	Within the Zone	Surrounding Area (approximate distance and direction)
1883-1884	The zone comprises open fields, farmland, marshland and woodland including Goose Hill in the east and Greenhouse Plantation in the west. Several roads and tracks are present transecting the zone from north to south including Lover's Lane and Abbey Road. Isolated residential properties and farms are present across the zone. Upper Abbey is present in the west of the zone around Theberton. Drains and a Sand Pit are present in the east of the zone around Goose Hill. Several other areas which appear to be pits are present in the centre of the zone around Upper Abbey.	The surrounding land use comprises primarily open fields (which appear to be farmland), marshland and woodland. Leiston Carr and the Sizewell Belts are located adjacent to the south of the zone. Isolated residential properties and farms are present surrounding the zone. The village of Eastbridge is located 500 m to the north-west of the zone. The town of Leiston is located 1.5 km to the south of the zone and Theberton is located 1 km to the north-west of the zone. Leiston Old Abbey is present adjacent to the south-west of the zone. Lower Abbey is present 200 m to the north-east of the zone around Eastbridge. An Old Sand Pit is present 250 m to the south of the zone, south of Leiston Old Abbey.
1905	No significant changes.	A wind pump is labelled adjacent to the east of the zone around Goose Hill.
1928-1951	A wind pump is present adjacent to Upper Abbey in the west of the zone.	The area of land to the north-east and east of the zone around Goose Hill is labelled as 'Liable to Floods'.
1976-1958	An area in the east of the zone around Goose Hill is labelled as 'Turf Pits'.	The wind pump adjacent east of the zone around Goose Hill is now labelled as a 'Drainage Pump'.
1976	An area in the east of the zone adjacent to Goose Hill is now labelled as 'Dunwich Forest'. The drains in the east of the zone around Goose Hill are now labelled on the map as 'drains'. The Sand Pit and other unnamed pits in the centre of the zone around Upper Abbey are now labelled as 'Pit (disused)'.	A complex drainage network is present adjacent to the south and north of the zone around Dunwich Forest and Goose Hill. Sizewell Power Station is now labelled on the map located approximately 750 m south-east of the zone.
1982	No significant changes.	The villages surrounding the zone have expanded.
2006	No significant changes.	As above
2012	No significant changes.	As above
2018	No significant changes.	As above

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**Table 13 - ACA Historical Land Uses**

Date	Within the Zone	Surrounding Area (approximate distance and direction)
1883-1884	The zone comprises open fields. The Great Eastern Railway Line (Aldeburgh Branch) is present running through the south-west of the zone. A signal post related to the railway line is labelled in the west of the zone. 'Broom Covert' is labelled in the centre of the proposed access road at the eastern extent of the zone.	The surrounding land use comprises primarily open fields (which appear to be farmland), marshland and woodland. The village of Leiston is present adjacent to the south-west of the zone. Valley Road and Lover's Lane are present running along the northern and eastern boundaries of the zone. A Brick Works, Works Farm and an associated clay pit are located 300 m to the north-west of the zone. A Brick Field and kilns are present 300 m to the west of the zone. A Smithy is located approximately 450 m south-east of the zone. A windmill (pumping) is shown approximately 460 m west of the zone and a windmill (corn) is located approximately 220 m west of the zone.
1905	An area of buildings / hardstanding is shown adjacent to the railway line in the southern arm of the zone. A well and several buildings are shown in the area of Sizewell Crossing.	A tank and sewage outfall are present 100 m to the north-west of the zone. The Brick Field and kilns are no longer labelled on the map. An additional Brick Works is indicated 500 m to the south-west of the zone. The Smithy and windmill (pumping) is no longer shown on the maps. The land to the south of the railway is now shown as allotment gardens.
1928	No significant changes.	The Brick Works and Works Farm are now labelled as Brick Works Farm. The tank and sewage outfall are now labelled as Sewage Disposal Works with 'septic tanks'. A gasworks is now shown approximately 40 m from the western corner of the zone, comprising two gasholders and several tanks. 'Tanks' are labelled approximately 380 m west of the zone. The town of Leiston has expanded. An Isolation Hospital is present 500 m to the south-west of the zone.
1938-1958	No significant changes.	The town of Leiston has continued to expand.
1971	The railway line is shown to have been dismantled from approximately halfway along the southern section of the zone.	A factory is present adjacent to the south of the zone. An electricity substation is shown approximately 100 m south-west of the zone. A coal yard is present approximately 55 m west of the zone, adjacent to the gas works. A school is labelled approximately 350 m south-west of the zone with an associated playing field and recreation ground. The 'tanks' to the west of the zone are now labelled as gas holders.
1976-1977	No significant changes.	Brick Works Farm is now labelled as Brick Kiln Farm and the associated clay pit is marked as disused. A caravan park is shown approximately 75 m south-west of the zone. A refuse tip is shown approximately 130 m north of the zone beyond the sewage works. The town of Leiston has continued to expand.
1986	A small reservoir is shown in the north- west of the zone, adjacent to the road; this is not shown on present day maps and was confirmed to be absent during the site walkover in 2015. Aerial photography indicates that it may be been infilled.	-
2012	A cycle track is present in the southern extent of the zone. A pond is shown in the central area of the northern field area; current aerial photography shows this to be a poorly drained	The gas works have been demolished, now showing a vacant area. The factory adjacent to the south of the zone has expanded and is labelled as 'Eastlands Industrial Estate'.

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Date	Within the Zone	Surrounding Area (approximate distance and direction)
	area. The southern arm of the zone is covered with roads / hardstanding. An electricity substation is present within the eastern extent of the proposed access road in the east of the zone.	
2018	No significant changes.	No significant changes.

2.13.2 Additional Information

SZC’s Land Contamination Summary Report [56] lists potential historical sources of contamination identified within the previous geo-environmental reports include:

- The ground surface within the MCA was raised with surplus spoil from the construction of Sizewell A and then used as a contractors’ compound for fabrication, processing, storage and spoil disposal areas during the construction of Sizewell B;
- The buildings and other above ground structures appear to have been demolished and removed from the MCA upon completion of Sizewell B and structures such as lagoons and other excavations appear to have been backfilled. A remaining mound of surplus spoil in the northern area of the MCA formed the NM (flood bund);
- Made Ground and construction waste up to 6m deep has been reported within the MCA;
- Several areas of potential contamination and potentially contaminating activities were identified within the adjacent Sizewell B power station site including tanks, drainage and waste storage areas; and,
- Two concrete reservoirs and associated pump houses were present within the area of the Sizewell B relocated facilities in the south of the MCA. Asbestos was indicated to be present within the pump houses. The structures were demolished and removed from site in 2018, but no further information has been provided in relation to the removal / demolition works.

2.13.3 Potential Contaminants

The potential sources of contamination and associated groups of potential contaminants of concern have been identified from the desk-based review of information [38] and are outlined in Table 14 below. The list of activities and contaminants of concern listed in the table below should not be considered exhaustive and provides a guide to the likely range of contaminants which may be present at the site within the three zones including the MCA, TCA and ACA or within the surrounding area.

**Table 14 - Summary of potential on and off-site sources of contamination**

Location	Activity / Feature	Potential Contaminants
On-site (within MCA, TCA and ACA)	Former rifle range located in the centre of the MCA	Inorganic and organic contamination including metals, hydrocarbons and asbestos from historic structures.
	Made Ground within the north-east of the MCA.	Inorganic and organic contamination including metals and hydrocarbons and Polychlorinated biphenyls (PCBs), asbestos. Ground gas generation including carbon dioxide and methane.

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Location	Activity / Feature	Potential Contaminants
	Drainage and wind pumps in the north and centre of the MCA	Inorganic and organic contamination including metals and hydrocarbons.
	Sewage treatment works located on the western boundary of the MCA.	Metals, organic contaminants including biological contaminants and nutrients.
	Made Ground, materials disposal and construction waste on the MCA associated with the construction of Sizewell B and former contractors' compound.	Inorganic and organic contamination including metals and hydrocarbons, PCBs and asbestos. Ground gas generation including carbon dioxide and methane.
	Activities relating to the former contractors' compound on the MCA for Sizewell B including possible storage areas, fabrication areas, lagoons, stone washing / concrete batching area.	Inorganic and organic contamination including metals and hydrocarbons, PCBs, solvents, paints, oils and asbestos.
	Car park located on western edge of the MCA.	Fuels and oils attributed to spills from vehicles, plus exhaust particulates. A range of inorganic and organic contaminants.
	Activities within the MCA associated with the operation of Sizewell B Power Station including radioactive materials.	Radioactive materials, fuel oil contamination, asbestos and PCBs.
	Former infilled sand pits located across the MCA and TCA.	Inorganic and organic contamination including metals and hydrocarbons, PCBs and asbestos. Ground gas generation including carbon dioxide and methane.
	Peat and alluvial deposits within the eastern edge of the TCA and in the MCA.	Ground gas generation including carbon dioxide and methane.
	Grass covered mounds (suspected Made Ground) located in the north-east of the TCA.	Inorganic and organic contamination including metals and hydrocarbons, PCBs and asbestos. Ground gas generation including carbon dioxide and methane.
	Fly tipping in the north-west of the ACA and TCA.	Inorganic and organic contamination including metals and hydrocarbons, PCBs and asbestos.
	Railway line running through the southern extent of the ACA and associated buildings.	Possible inorganic and organic contaminants including hydrocarbons, diesel, lubricating oils, PCBs, Polycyclic Aromatic Hydrocarbon (PAH), solvents, herbicides, metals, asbestos and ash used as fill material.
	Made Ground present within the southern section of the ACA associated with the railway line and in the northern section associated with an infilled reservoir.	Inorganic and organic contamination including metals and hydrocarbons, PCBs and asbestos. Ground gas generation including carbon dioxide and methane.
	Electricity substation at the eastern extent of the proposed access road in the east of the ACA.	Heavy metals, asbestos and PCBs.
	Farming activities across the entire site area including potential for unmarked farmer's tips e.g. Bellmouth and Badger Sett 4 pit	Contamination risk from herbicides, pesticides, silage, effluent, and fuel oils. Inorganic and organic contamination including metals and hydrocarbons, asbestos, coal tar, creosote, tyres, machinery and fencing.
	Contaminated Soil from the burning of UXO.	Explosive residues which could contain polluting substances such as lead, antimony, uranium,

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Location	Activity / Feature	Potential Contaminants
		dinitrotoluene, trinitrotoluene, and hexahydro-1,3,5-trinitro-1,3,5-triazine.
	Made Ground associated with the construction of roads crossing the various areas of the site as well as activities associated with their operation.	Fuels and oils attributed to spills from vehicles on the roads, plus exhaust particulates. A range of inorganic and organic contaminants including the potential for asbestos.
	Historical landfills and fly tipping	Contamination from waste which is dependent on the waste type present.
Off-site (surrounding area)	Activities associated with the operation of Sizewell A and B Power Stations including asbestos lined tanks and their infill, the deposition of radioactive materials on the MCA and migration of contaminated groundwater onto the MCA.	Radioactive materials, fuel oil contamination, asbestos and PCBs.
	Former sand pits located 250 m north-west and south-east of the MCA and 250 m to the south of the TCA which have been infilled.	Inorganic and organic contamination including metals and hydrocarbons, PCBs and asbestos. Ground gas generation including carbon dioxide and methane.
	Former brick works, brick field and clay pit located 300 m to the west of the ACA which have been infilled.	Inorganic and organic contamination including metals and hydrocarbons, PCBs and asbestos. Ground gas generation including carbon dioxide and methane.
	Smithy located approximately 450 m south-east of the ACA.	Inorganic and organic contamination including metals and hydrocarbons.
	Tank and sewage works located 500 m to the south west of the ACA.	Metals, hydrocarbons, organic contaminants including biological contaminants and nutrients
	Gasworks, coal yard and tanks/gas holders located 40 m to the west of the ACA.	Coal tar, natural gas processing, fuels. Inorganic chemicals acids and alkalis, other inorganic compounds, metals and metal compounds and asbestos.
	Historical landfills within 500 m of the site including unnamed refuse tip, Ogilvie at Home Farm, Leiston Landfill, Carrs Pit, Abbey Pit and Aldhurst Farm.	A range of inorganic and recalcitrant organic contaminants including metals, leachate, nitrates, and the potential for ground gas generation.
	Electrical substation located 100 m south-west of the ACA.	Inorganic and organic contamination including metals and hydrocarbons and PCBs.
	Farming activities in surrounding areas including potential for unmarked farmer's tips.	Herbicides, pesticides, silage, effluent, and fuel oils. Inorganic and organic contamination including metals and hydrocarbons, PCBs and asbestos.
	Allotments adjacent to the south of the ACA.	Herbicides, pesticides and fuel oils.
	Works and factories within Eastlands Industrial Estate.	Vapours and a range of inorganic and organic contamination, including metals, solvents, fuels and oils.
	Made Ground associated with the construction of roads surrounding the site as well as activities associated with their operation.	Fuels and oils attributed to spills from vehicles on the roads, plus exhaust particulates. A range of inorganic and organic contaminants including the potential for asbestos.

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### 2.13.4 Visual/olfactory evidence of existing contamination

This section provides a summary of contamination and anthropogenic materials encountered during previous ground investigations [2] [6] [11] [14] [15] [31] [36] [37] [38] [48] [49] [50] [55]. The ground conditions for the site have been divided into three zones including the MCA, TCA and ACA. The depths quoted are relative to the ground levels prevailing at the time of the ground investigations.

#### MCA

Measurements derived from on-site screening of arisings for the presence of volatile organic compounds (VOCs) from exploratory holes within the MCA were generally <5ppm. A sample from GW11D collected at a depth of 8.5m bgl from the Alluvium/Peat layer recorded a VOC concentration of 20ppm.

Organic odours or hydrogen sulphide odours were noted within the Alluvium in the central and northern sections of the zone. Various anthropogenic materials likely to be associated with the construction of Sizewell A and Sizewell B were recorded, including concrete, rebar, brick fragments, slag, geotextile fabric and plastic pipe.

An organic hydrocarbon type odour was recorded within the Made Ground in NM-SON04-EW at 3.45m bgl to 4.5m bgl. No other visual or olfactory signs of contamination are recorded within the exploratory logs available for this zone

Recent geo-technical trials encountered a strong organic odour was recorded within the Peat deposits in YG202, which is located within the SSSI in the north-west corner of the MCA, between depths of 2.8 m and 4.3 m bgl.

Anthropogenic material including brick, black plastic and concrete was recorded within Made Ground within exploratory holes EH1, EH2, EH3 and EH4 as part of the 2023 ground investigation.

#### TCA

Measurements derived from on-site screening of arisings for the presence of VOCs from exploratory holes excavated in this zone recorded concentrations of up to 3.6ppm.

Organic odours or hydrogen sulphide odours were noted within the Alluvium. Various anthropogenic materials were found and considered likely to originate from the domestic waste of the adjacent former Abbey Pit landfill site, including concrete, rebar, brick fragments, plastic cup, wood fragments and plastic pipe.

Descriptions of the Made Ground soils encountered during the July 2023 trial pit investigation, within and adjacent to the footprint of the Early Access Road, near lovers Lane, are presented below:

- Trial Pit 1 (TP01) - Anthropogenic material was encountered at 0.2 m bgl with some areas of darker staining likely associated with ash. A non-natural odour was described.
- Trial Pit 2 (TP02) - Anthropogenic material was recorded in the form of brick fragments to 0.75 m bgl. A non-descript odour was present.
- Trial Pit 3 (TP03) - Anthropogenic material was encountered at 0.3 m bgl and hand digging continued to 0.6 m bgl. Staining and a non-descript odour were recorded.
- Trial Pit 4 (TP04) - No visual or olfactory evidence of contamination was identified and soil was described as clean natural material.
- Trial Pit 5 (TP05) - Anthropogenic material was encountered at 0.5 m bgl. This location was positioned at the eastern boundary of the Made Ground soils encountered during the investigation.

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- Trial Pit 6 (TP06) - Anthropogenic material in the form of brick, plastics and ceramics were recorded to 0.75 m bgl. This location was positioned at or near to the northern boundary of the Made Ground soils encountered during the investigation.

### ACA

'Coarse coke' is noted within one exploratory hole location within the zone. Black speckling is indicated within the Lowestoft Formation at one location. A moderate hydrocarbon odour was noted in Made Ground within ACA-TP04-EW from 0.95 m bgl. PID readings of this stratum ranged from <0.1 to 0.4 ppm.

### 2.13.5 Evidence of damage to pollution prevention measures

There are no pollution prevention measures in place.

## 2.14 Baseline soil and groundwater reference data

Several geo-environmental intrusive ground investigations have been carried out at the site [2] [6] [11] [14] [15] [31] [36] [37] [38] [48] [49] [50] [55].

Groundwater and surface water monitoring and sampling events were undertaken at the site by AMEC between 2010 and 2013 [9] [10] [51] [52], by Atkins from 2013 to 2022 [17] and by Fugro in 2020 and 2021 [48] [49] [50]. Ground gas monitoring was carried out by AMEC in 2011 [12], by Structural Soils in 2020 [37], by Atkins in 2020 to 2022 [17], by Fugro in 2020 and 2021 [48] [49] [50] and by Atkins in 2022 [57].

AMEC carried out a radiological survey at the proposed SZC site in 2010 including soil and groundwater assessments. Aurora undertook a radiological ground survey in 2020 [41].

The aims of the various ground investigations and monitoring have been to:

- Characterise the ground and groundwater conditions within the site (including the soil type, composition, depth, thickness and groundwater flow direction);
- Obtain geotechnical information for the proposed development; and/or,
- Characterise the contamination status of the soils and groundwater and the ground gas regime at the site.

The design of the investigations was based on the development proposals at the time they were undertaken.

### 2.14.1 Ground Investigation Scope of Works

Previous ground investigations comprised of:

- 267No. cable percussion boreholes (with standpipe installations) to a maximum depth of 56.7m bgl;
- 31No. cable percussion boreholes (without standpipe installations) to a maximum depth of 25.5m bgl;
- 4No. cable percussion boring extended by rotary core drilling to a maximum depth of 120m bgl;
- 35No. rotary cored boreholes to a maximum depth of 122.9m bgl;
- 48No. rotary open hole boreholes to a maximum depth of 100.6m bgl;
- 2No. rotary core and rotary open hole boreholes to a maximum depth of 125.8m bgl;
- 5No. window samples to a maximum depth of 3.45m bgl;
- 206No. trial pits to a maximum depth of 5.0m bgl;
- 33No. sonic boreholes to a maximum depth of 120.0m bgl;
- 28No. soakaways tests in trial pits;
- 16No. permeability tests in boreholes;
- Gas and groundwater monitoring installations in window sample, rotary cored holes, sonic boreholes and cable percussion holes;

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- Menard pressure meter tests, Standard Penetration Tests (SPTs) and Cone Penetration Tests (CPTs);
- Gas and groundwater level monitoring (following the site works);
- Geotechnical laboratory testing; and
- Chemical and radiochemical laboratory testing of soils, leachate, surface water and groundwater.

### 2.14.2 Soils Scope of Works

A total of 632No. soil samples were selected for contamination testing across the various ground investigations.

Samples were tested for a range of contaminants of concern including pH; ammoniacal nitrogen; sulphide; metals; cyanide; phenols; PAHs; Total Petroleum Hydrocarbons (TPH); benzene, toluene, ethylbenzene and xylene (BTEX); VOCs; Semi-volatile Organic Compounds (SVOCs); PCBs; Organochlorine Pesticides (OCPs); Organophosphorus Pesticides (OPPs); herbicides and asbestos. A total of 122No. soil samples across the investigation phases were scheduled for the radiochemical analysis including gross alpha (calibrated with americium-241) and gross beta (calibrated with potassium-40), high-resolution gamma spectrometry, total tritium and carbon-14.

A total of 39No. soil samples were scheduled for waste acceptance criteria (WAC) analysis (full WAC suite) as part of the 2019 and 2020 ground investigations.

### 2.14.3 Leachate Scope of Works

Leachability testing was carried out on a total of 92No. soil samples collected from the MCA and TCA. These included 49No. soil samples collected from the MCA in 2019, 2020 and 2021 ground investigations and 43No. soil samples collected from the TCA in the 2015, 2020 and 2021 ground investigations.

Samples were tested for a range of contaminants of concern including pH, ammonium, ammoniacal nitrogen, sulphate, sulphide, chloride, nitrate, calcium, metals and PAHs.

### 2.14.4 Groundwater Scope of Works

Monthly monitoring of surface water and groundwater has been undertaken by AMEC between 2011 and 2013 and Atkins from 2013 to 2022.

Groundwater samples were collected on 13No. occasions by AMEC between 2011 and 2012, 12No. occasions by Atkins between 2014 and 2019 and a further 11No. occasions between 2020 and June 2022.

As part of the enabling works ground investigation, Fugro also collected groundwater samples from the TCA between 2020 and 2021.

A total of 789No. groundwater samples were collected from monitoring boreholes located within the MCA and TCA.

Surface water samples were collected on 37No. occasions by AMEC between 2010 and 2013, by Atkins on 8No. occasions between 2014 and 2022. A total of 659No. surface water samples were collected from a series of interconnected drainage ditches located within the MCA and in the area upstream and downstream of the MCA including Leiston Drain, SSSI drains, unnamed watercourses and Sizewell Drain.

Water samples were tested for a range of parameters and contaminants of concern including pH, ammonia, ammonium, hardness, chloride, nitrate, cyanide, metals, PAHs, BTEX, TPHs, PCBs, VOCs, SVOCs and phenols.

Selected samples were also scheduled for the radiochemical analysis including gross alpha (calibrated with americium-241) and gross beta (calibrated with potassium-40), high-resolution gamma spectrometry, total tritium and carbon-14.

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Groundwater sampling was conducted at a small number of targeted locations around the MDS between September 2021 and June 2022. A total of 38 samples (including 11 duplicates) were collected

### 2.14.5 Generic Assessment Criteria (GAC)

#### Human Health GAC

A Tier 2 human health Generic Quantitative Risk Assessment (GQRA) has been undertaken to evaluate the potential risks to human health, soil data have been screened against GAC as described below, to reflect the various uses of the site and surrounding area. Detailed guidance on human health risk assessment is available in Environment Agency Science Report SR2 [20] SR3 [21], Contaminated Land: Applications in Real Environment (CL:AIRE) SP1010 [53] and the CLEA Model. The GAC used in this assessment include the following:

#### Soil Screening Values (SSVs)

Atkins has produced SSVs based on minimal toxicological risk [20] for a variety of standard land uses at 1% Soil Organic Matter (SOM) (sand soil type) and 6% SOM (sandy loam soil type) using CLEA v1.071 in accordance with Environment Agency [21] and CL:AIRE guidance [53].

#### Category 4 Screening Levels (C4SLs)

A revision to the Statutory Guidance of Part 2A of the Environmental Protection Act 1990 was published in April 2012, introducing a new category-based system for assessing risks associated with land contamination including the assessment of the 'significant possibility of significant harm' (SPOSH) whereby Category 1 sites are clearly contaminated and represent a high risk and Category 4 sites are clearly identifiable as low risk and as such would not be classified as Contaminated Land.

C4SLs for nine contaminants (arsenic, cadmium, hexavalent chromium, lead, benzene, benzo(a)pyrene, vinyl chloride, trichloroethene and tetrachloroethene) for a sandy loam soil with 1%, 2.5% and 6% SOM were issued by CL:AIRE in December 2014 [22] and May 2021 to provide an indication of "low risk" (i.e. the site is clearly within Category 4), whereas GAC, such as SSVs, are based on "minimal risk". If soil concentrations exceed the C4SLs, then further assessment is required to confirm whether the site lies within Category 4 or may lie within Categories 1-3. The Department for Communities and Local Government has indicated the C4SLs can also be used under the planning regime. Therefore, for this site C4SLs have been used for available determinants in preference of SSVs.

GAC for a commercial end use have been adopted for the majority of the soil assessments, as they are considered conservative for the proposed site end-use of a power station. The commercial GAC are based on an office scenario which assumes a critical receptor (female worker, age 16 to >65 years) working five days a week for 46 weeks of the year, with an exposure frequency of 230 days per year.

Soil data have also been screened against GAC for a public open space (parks) to assess risks to recreational users of the SSSI, marshes and beach along the foreshore and within the adjacent area. Soil data collected from the ACC, which will include an accommodation campus and a caravan site, have been assessed against more conservative GAC for a residential end use (without plant uptake).

In the general absence of soil SOM data for the majority of samples, the GAC developed for a SOM content of 1% have been adopted as this is a more conservative assessment.

Based on the ratio of genotoxic PAHs to benzo(a)pyrene, the surrogate marker approach for genotoxic PAHs as set out in the C4SL Project Methodology [22] has been adopted.

Potential acute risks resulting from short term exposure to contamination by construction/ maintenance workers involved with the proposed development cannot be assessed using these GAC because they relate to the long-term (chronic) risk. Risks to construction/maintenance workers should be managed with the use of appropriate safe systems of work including Personal Protective Equipment (PPE).

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It should be noted that the GACs are liable to change as new policy and technical guidance, including toxicological data, are published by the Environment Agency, CL:AIRE and other authoritative sources. Further to this, a Detailed Quantitative Risk Assessment (DQRA) may be required to review the level of conservatism in the screening values, depending upon the outcome of the generic data screening exercise at detailed design stage.

### Controlled Waters GAC

A Tier 2 controlled waters GQRA has been undertaken to assess the potential risks posed to the identified controlled waters receptors from the migration of contaminants from identified on-site sources. To assess potential risks to the identified receptors, a comparison of soil-derived leachate and groundwater data against Water Quality Standards (WQS) has been undertaken.

The screening criteria for controlled waters assessment are dependent on the nature of the key receptor. The site is underlain by the Crag Sand and Chalk Formations, which are classified as a Principal Aquifers and an abstraction borehole associated with a Zone III groundwater SPZ is located adjacent to the south-west of the TCA. The ACA is located within a SPZ Zone III. Drainage ditches associated with the SSSI marshland are present across the site draining into Leiston Beck and the New Minsmere Cut. The North Sea is present adjacent to the east of the MCA.

The primary controlled waters receptors are considered to be the Principal Aquifer as a groundwater resource. However, it is noted that there is significant saline intrusion within the Crag Sand Formation Aquifer underlying the majority of the site [16], which would reduce its value as a potable water resource. The associated watercourses within the SSSI are also identified to be key controlled waters receptors.

Soil leachate and groundwater data have therefore been screened against WQS based on both Drinking Water Standards (DWS) to assess the potential risk posed to the underlying Principal Aquifer to assess risks to the surface watercourses within the SSSI.

### 2.14.6 Contamination Assessment Summary

The following presents a summary of the soil, leachate, surface water and groundwater analytical data and ground gas monitoring data, collected from the ground investigations completed between 2011 and 2022 [6] [11] [14] [15] [31] [36] [37] [38] [48] [49] [50] [54] and provides a preliminary assessment of the results based on the proposed end use for the site.

#### Soil Assessment

A total of 632 No. soil samples were tested from the MCA and TCA as part of the onshore ground investigations. No exceedances of the commercial land use or public open space (parks) GAC were identified in the soil or sediment samples tested from the MCA, TCA and ACA. In addition, no exceedances were reported above residential (without plant uptake) GAC in soil samples tested. Herbicides, pesticides and PCBs were not detected above the laboratory limit of detection.

PCBs were recorded at concentrations above the laboratory limit of detection of <0.004 mg/kg in one sample at TP01 (depth unknown) within the TCA, with a maximum recorded concentration of 0.05 mg/kg for PCB101. There are no SSVs/GACs for the PCB congeners analysed and therefore the risk to health from these contaminants cannot be quantified at this stage, but the detection of such is considered a potential exceedance of GAC at this screening stage.

A total of 33 samples were tested from the exploratory holes undertaken within the ACA as part of the Structural Soils [15] [45] and Fugro [46] ground investigations. The soil samples were analysed for a range of contaminants. Samples were also visually screened for the presence of asbestos. The results of the soil screening identified concentrations of inorganic, organic, polycyclic aromatic hydrocarbons and heavy metal determinands above laboratory limits of detection (LOD). However, there were no concentrations of



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contaminants of concern exceeding the GAC for commercial end use. No asbestos was identified in any of the samples in the ACA. Low concentrations of polycyclic aromatic hydrocarbons were found in ACA-TP04-EW where hydrocarbon odours had been noted.

### Asbestos

As part of the ground investigations undertaken to date, a total of 519No. samples have been visually screened for the presence of asbestos. These include 144No. samples collected from the Made Ground at depths of between ground level and 6.0m bgl and 375No. samples collected from topsoil, Peat, Marine Deposits, Alluvial Clay, Lowestoft Formation and weathered Crag Group (sand) at depths of between 0.3m and 21.3m bgl.

The presence of asbestos was identified in 3No. samples obtained in the 2019 investigation [37] from two adjacent boreholes located in the south-west of the MCA within the main platform area (MGS\_2019\_B and MGS\_2019\_B2). The presence of amosite and chrysotile as loose fibres, board and bitumen was reported in these locations at depths of between 4.0m and 5.0m bgl within the Made Ground. Quantification by hand picking in the laboratory showed asbestos to be present at between 0.023% and 0.130% by weight.

The positive asbestos identification is interpreted to be associated with a localised area of historical excavation and infilling, including the disposal of construction and demolition materials [43]. Current site users are unlikely to be exposed to dust/fibres as the soils are at depth and are not currently being disturbed. The potential for asbestos fibre release during excavation and construction works will need to be further assessed and managed by a suitably qualified asbestos specialist.

Potential contamination risks associated with the current land use are considered to be very low for human health. Risks during construction without mitigation measures are considered to be very low to low. Risks during operation without mitigation measures are considered to be very low.

### Soil Leachate

A total of 92No. samples collected from the and TCA were tested for their leachability of contaminants. Several elevated concentrations of inorganics, metals and PAHs were recorded in leachate samples when assessed against the WQS.

### Groundwater

A total of 789No. groundwater samples from a range of strata were collected from monitoring boreholes across the MCA and TCA. Contaminants of concern including inorganics, BTEX, PAHs and volatile organic compounds were identified in groundwater against the WQS comprising estuarine environmental quality standards (EQS) and DWS. Elevated concentrations of inorganics including chloride, sulphate, ammonium, ammoniacal nitrogen, nitrate and sodium are widespread across the site and are likely indicative of marine influences. Elevated concentrations of metals and inorganics were generally reported within the same order of magnitude or one order of magnitude above the WQS are widespread across the site and are likely to be due to influences from the underlying geology, Peat, adjacent marshes and farming activities in the surrounding areas. BTEX and PAHs were reported in samples from four boreholes (GW6D, Pz2009\_16, Pz2009\_14, GW11S1 and GW20) located within the MCA. There is no obvious source of the elevated levels of these contaminants and the exceedances may be due to influences from the underlying peat deposits which can cause elevated organic concentrations. Exceedances of the free cyanide were recorded in ten groundwater samples across the TCA on one occasion in March 2022. In other rounds of monitoring from the same exploratory locations, free cyanide was generally not detected above the laboratory limit of detection This indicates that the recorded exceedances may erroneous and could be due to laboratory error. Free cyanide was recorded in GW20 on previous occasions in 2011 and 2012 but was not detected in 2022 sampling rounds.

Four concentrations of fluoranthene were reported to exceed the WQS screening criteria. The four boreholes are located within the MCA (DCBH2019\_5, PZ2009\_5, PZ2009\_7 and SP-BH03-EW). The exceedances were reported in excess of an order of magnitude above the WQS but within the same order of magnitude as the

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LOD. A single concentration of anthracene was reported borehole in DCBH2019\_5. The exceedance is within the same order of magnitude as the WQS screening value. The exceedances were identified in a single monitoring round only with all other PAH results reported below the laboratory limit of detection.

Elevated concentrations of TPH were reported in six locations within the MCA (PZ2009\_6, PZ2009\_7, PZ2009\_15, PZ2009\_18 and SCBH2019), twelve locations within the TCA (GW6, GW7, GW11D, GW11S, GW24S, TCA-BH3, TCA-BH6, TCA-BH4, TCA-BH9, NW-BH6, NW-BH5 and NW-BH03-EW) and one location within the ACA (ACC-BH2102-EW). The majority of exceedances are within the same order of magnitude as the WQS screening value with the exception of aliphatic TPH >C12-C1, aliphatic TPH >C16-C21 and aliphatic TPH >C21-C35 chains which were reported to exceed by over an order of magnitude of the WQS in three locations.

There have been potentially contaminative historical uses within the MCA, however no obvious source of the contaminants recorded in groundwater samples have been identified during the investigations undertaken. Reference to the exploratory hole logs indicates the geology encountered in the locations comprised superficial Alluvium and Lowestoft Formation and bedrock of the Crag Group. Topsoil and Made Ground was present overlying these strata however no visual or olfactory signs of contamination are described within the exploratory logs [38] or groundwater monitoring undertaken at these locations. The boreholes were installed within natural strata including the superficial Alluvium and Lowestoft Formation and bedrock of the Crag Group. The source of the elevated concentration of organic contaminants recorded in groundwater is therefore uncertain.

In addition, the exceedances of the WQS recorded in the groundwater samples were not persistent between monitoring rounds. The exceedances were only reported on one monitoring round at each location. This indicates that the elevated contaminants recorded in groundwater are not ongoing.

Based on the available data, the risks in relation to controlled waters receptors are considered to be low to moderate/low risk.

### Surface Water

Surface water samples were collected on 37No. occasions by AMEC between 2010 and 2013 and Atkins on 8No. occasions between November 2014 and June 2022. A total of 659No. surface water samples from a series of interconnecting drainage ditches located on-site and in the area upstream and downstream of the MCA including Leiston Drain, SSSI drains, unnamed watercourses and Sizewell Drain were collected and tested.

Exceedances of metals and inorganic contaminants were identified in the majority of samples against WQS. The water chemistry is likely be influenced by discharges from the Leiston Sewage Treatment Works which may contribute to the elevated concentrations of ammonium and metals and the isolated occurrence of aliphatic TPH C21-C35. There are also likely to be marine influences (e.g. high sodium, sulphate and chloride concentrations) on the watercourses in the eastern and northern parts of the MCA and TCA.

Potential contamination risks associated with the current land use are considered to be low to moderate/low for controlled waters receptors. Risks during construction without mitigation measures are considered to be moderate/low.

### Ground Gas

A preliminary ground gas risk assessment has been undertaken in general accordance with BS 8485:2015+A1:2019 [39] code of practice for design of protective measures for methane and carbon dioxide ground gases for buildings.

Made Ground and organic Alluvium and Peat are considered to be the sources of ground gas at the site. The ground gas regime within the MCA and TCA has been classified as Characteristic Situation 2 (low risk) and the incorporation of ground gas protection measures within the proposed development would be required to mitigate potential risks associated with the ingress of carbon dioxide/methane. However, it is noted that this

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classification does not take into account any earthworks proposed on site and it is likely that the Made Ground and Alluvium and Peat will be removed as part of the excavation of material for the main platform. Further assessment of gas risks and requirements for gas protection measures will be required as part of detailed design and post earthworks.

The ground gas regime within ACA has been classified as Characteristic Situation 1, which indicates a very low risk and does not require gas protection measures.

### Radiological Risks

Radiochemical data has been collected from the MCA and surrounding areas from soil, groundwater, and surface water samples. The data was collected from ground investigations and sampling campaigns undertaken between 2011 and 2022. Two radiological surveys of the site have been undertaken. The first was completed in 2010 [40], and the second in 2020 [41].

Soil samples were collected as part of the 2010 and 2020 intrusive ground investigations. In the 2010 investigation, samples were collected and tested from the MCA and TCA, located south of the MDS. In the 2020 investigation, soil samples were collected from the MCA. The analysis of the soil samples indicated that the concentrations of radionuclides in the area were consistent with background activity levels, and there was no evidence to indicate the presence of elevated levels of either anthropogenic or naturally occurring radionuclides.

Groundwater samples were collected in 2011, 2013, 2014, 2015, 2020, 2021 and 2022. The analysis of the samples indicated that groundwater was not contaminated with elevated levels of anthropogenic radionuclides, although tritium was recorded in samples collected from GW16D (located near SZB). Due to the location of GW16D, it was concluded at the time that the tritium may have resulted from activities at SZB. A subsequent review of historical radiological events from SZB was undertaken in 2021 [42]. The review determined that, whilst there have been radiological events recorded at SZB, none of these events have the potential to significantly affect the SZB site or SZC land. Therefore, the presence of the tritium previously recorded in groundwater from GW16D is likely to be attributable to permitted discharges from SZB. Further sampling was attempted during 2021 and 2022 in the area to determine whether the presence of tritium from 2011 was an isolated result. However, GW16D was found to be dry and samples could not be obtained. Surface water samples were collected between 2011 and 2013 in areas generally situated to the north and west of the MCA. The radiochemical analysis indicate that the surface waters sampled were not contaminated with elevated amounts of man-made radionuclides.

No changes to the radiological baseline were noted by the radiological survey completed in 2020 [41].

Further surveys were undertaken in 2022 in which a total of 38 samples (including 11 duplicates) were collected. The samples found that the radiochemical analysis results from the groundwater monitoring campaigns around the MDS showed little evidence to indicate the presence of elevated levels of anthropogenic radionuclides. There were no positive results recorded for either tritium or carbon-14, with all the "less than" values reported coming significantly under the respective screening levels adopted in this assessment. Furthermore, all values for Co-60, Cs-134 and Cs-137 were also reported as "less than" values that were considerably below their respective screening values.

There were seven positive gross alpha results, with one value which exceeded the screening value of 0.1 Bq l<sup>-1</sup>. However, this value was reported with significant uncertainty and is not considered representative. Whilst positive results were also consistently recorded for gross beta, with some higher than the 1.0 Bq l<sup>-1</sup> screening value, this is attributable to naturally occurring radionuclides [58].

### Materials/Waste

SZC has made a commitment to re-use 100% of uncontaminated excavated materials on-site, where possible on grounds of both cost and sustainability. Early consideration of the re-use of material is recommended, in

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order to maximise opportunities. The re-use of on-site excavated soils and materials should be undertaken in accordance with the Overarching Material Management Strategy Excavated Material [60] and Soil Management Plan [61], including Waste Framework Directive exempt materials and the latest version of the CL:AIRE Definition of Waste Code of Practice.

Slightly acidic and slightly alkaline pH values were reported in several soil samples from the MCA. It is likely that the majority of the MCA will be covered with hardstanding. However, in areas of proposed landscaping, suitable growing medium may be required.

A preliminary waste assessment indicates that the majority of samples would be classified as non-hazardous waste. One sample was classified as hazardous waste due to elevated lead and zinc concentrations. However, the actual material if removed off-site for disposal will be appropriately classified and agreed with the chosen landfill operator.

2.14.7 Summary of Potential Contamination Risks

Based on the Conceptual Site Model developed as part of the Phase 2 Geo-Environmental Interpretative Report [38], a summary of the potential risks to the identified receptors from potential contaminant linkages is provided in Table 15 - Summary of Potential Contamination Risks.

**Table 15 - Summary of Potential Contamination Risks**

Receptor	Potential Contamination Risk	
	Baseline	Construction Phase (covered by the proposed activity in this application)
Human Health	Very low risk	Very low to low risk
Controlled Waters	Low to moderate / low	Low to moderate / low
Property	Very low risk	Very low to low risk
Ecological	Very low risk	Very low to low risk

The CSM is based on the following assumptions:

- The CSM is based on current ground conditions.
- The risk assessment assumes that short term acute exposure risks to construction workers will be assessed as part of the development of the construction phase health and safety plan and managed through standard good practice health and safety procedures.
- Gas risks assume that the Made Ground and Alluvial Clay and Peat will be removed as part of the excavation of material for the main platform.

The CSM and risk assessment will need to be reviewed in relation to any earthwork activities and any proposed changes in site levels and the potential risks re-assessed prior to redevelopment of the site once proposed earthworks and construction works are confirmed.

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### 3 PERMITTED ACTIVITIES

#### 3.1 Permitted activities

The construction of SZC will utilise static package substations and associated diesel hybrid generators prior to the electrification of the site from the proposed 132 kilovolt (kV) substation, anticipated in 2027. The substations and associated generators are needed to provide energy for elements such as welfare facilities and other construction related activities. In addition, the site will house mobile generators to provide electricity for cranes, lighting and other construction activities.

Generating equipment is required on site to support the construction of the SZC new nuclear Power Station and will continue to be required in some areas of the site for the foreseeable future given the complex nature of the construction phasing.

#### 3.2 Non-permitted activities

##### **Fuel handling and storage**

Transportation, handling and storage of fuels, oils and chemicals for the site works will follow current best practices, including the oil storage regulations for businesses (May 2015) [47].

Fuels are delivered to the permitted activities (generating equipment) using fuel bowsers, and oils/antifreeze are transported in manufacturers' packaging to prevent spills and leaks.

Fully bunded small-sized fuel tanks ranging between 1,000 – 3,000L are sited near the main site generators to ensure supplies are readily available when required. The fuel tanks have been suitably sited to minimise movement as the project progresses and have been set up with minimal risk of collision from vehicles or plant.

Fuels, oils and chemicals will be stored on hardstanding or similar surfaces with controlled drainage to prevent releases to the ground and to controlled waters. The quantities of fuels, oils and chemicals will be managed to ensure that the minimum volumes required for safe site operations are maintained.

##### **Waste management**

The suppliers of generators carry out scheduled servicing and maintenance on all generators on site. During the planned servicing/maintenance and in the event of repairs, some quantities of oils are removed from generators as waste. The quantities of oils taken out as waste are kept to a minimum and controlled to prevent spills.

SZC adopt the waste hierarchy on site for the segregation and management of wastes and the company has targets for the reduction of waste being sent to landfill for disposal written into the site DCO.

Waste associated with the SZC construction combustion activity would generally consist of waste lubricating oil, oily rags, small re-fuelling vessels, where used, and potentially small quantities of other COSHH waste associated with maintenance activities for generators. Facilities are available throughout the construction site for the segregation and disposal of these wastes and an external contractor will provide appropriate outlets for these waste streams.

##### **Surface Water Drainage**

Discharges of surface water will be regulated under a construction water discharge activity permit which was applied for in March 2024. The sites drainage arrangements proposed in the permit application can be viewed in the drainage plan in Appendix A of the SID.

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### 3.3 Stage 1 to 3 assessment for hazardous substances

Please see the stage 1 to 3 assessment for hazardous substances below. The purpose of the assessment is to assess the risk from relevant hazardous substances to soil and groundwater.

#### 3.3.1 Stage 1 Assessment – Identify Substances on Site

Stage 1 of the assessment requires a list of the substances used, produced, or released (excluding emissions to air) on-site – identifying those that are hazardous. These are detailed in Table 16 below.

**Table 16 - Identified substances**

Substance	Hazardous (Y/N)?
Diesel Oil	Y
Lubricating Oils	N
Coolant	Y
Hydrotreated Vegetable Oil	Y
Ad-blue	N
Antifreeze	Y

#### 3.3.2 Stage 2 Assessment – Identify Relevant Hazardous Substances

The aim of Stage 2 is to identify which of the hazardous substances identified on site (in Stage 1) can cause soil and / or groundwater contamination. To identify Relevant Hazardous Substances (RHS), the composition, solubility, toxicity, mobility, persistence, and physical state of each substance must be considered. This is detailed in Table 17.

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Table 17 - Relevant Hazardous Substances

Substance	Classification	Physical State	Solubility	Toxicity	Mobility	Persistence	Soil and Groundwater Pollution Potential	Relevant Hazardous Substance
Diesel Oil (CAS number: 68334-30-5)	H226 – Flammable liquid and vapor H227 – Combustible liquid. H332 – Harmful if inhaled. H315 – Causes skin irritation. H351 – Suspected of causing cancer. H304 – May be fatal if swallowed and enters airways. H373 – May cause damage to organs through prolonged or repeated exposure. (bone marrow, liver, thymus) H411 – Toxic to aquatic life with long lasting effects	Liquid	Very slightly soluble in water	Skin Corrosion/Irritation: Prolonged and repeated contact may cause skin irritation leading to dermatitis. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly. Serious Eye Damage/Irritation: Causes serious eye irritation Carcinogenicity:: Group 3, and ACGIH: NOIC:A3 IARC: Group 3 – Not classifiable as to their carcinogenicity to humans ACGIH: A3 – Confirmed animal carcinogen with unknown relevance to humans Aspiration Hazard: The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death. Potential Health Effects: Vapor irritating to skin, eyes, nose, and throat. Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhoea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of	Spillages may penetrate the soil causing groundwater contamination. This material may accumulate in sediments. Floats on water. Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day	Expected to be biodegradable	Transport through soil may contaminate groundwater. Diesel oil may also accumulate in sediment.	Yes

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Substance	Classification	Physical State	Solubility	Toxicity	Mobility	Persistence	Soil and Groundwater Pollution Potential	Relevant Hazardous Substance
				consciousness, coma, respiratory arrest, and death may occur. This material is expected to be toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.				
Coolant (CAS number: 107-21-1 and 19766-89-3)	H302 – Harmful if swallowed H361 – Suspected of damaging the unborn child H373 – May cause damage to organs (Kidney) through prolonged or repeated exposure	Liquid	Miscible	In high concentrations, mists/vapours may irritate throat and respiratory system and cause coughing. Prolonged or repeated contact may dry skin and cause irritation. Direct contact with eyes may cause temporary irritation Ingestion of ethylene glycol may result in nausea, vomiting, abdominal cramps, blindness, liver damage, irritation, reproductive effects, nerve damage, convulsions, oedema of the lung, cardiopulmonary effects (metabolic acidosis), pneumonia and kidney failure which could result in death. The single lethal dose for humans is about 100 ml. Inhalation of high levels of vapour or mists for prolonged periods of time may also result in toxic effects.	Soluble and may spread in water systems.	Expected to be readily biodegradable.	May cause short term contamination of soil and groundwater	Y
Hydrotreated Vegetable Oil (CAS number: 68334-28-1)	H226 - Flammable liquid and vapour H304 - May be fatal if swallowed and enters airways EUH066 –	Liquid	Insoluble	Skin contact: There may be mild irritation at the site of contact. Repeated exposure may cause skin dryness or cracking Eye contact: There may be irritation and redness.	Readily absorbed into soil	Rapidly biodegradable.	May cause short term contamination of soil and groundwater	Y

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Substance	Classification	Physical State	Solubility	Toxicity	Mobility	Persistence	Soil and Groundwater Pollution Potential	Relevant Hazardous Substance
	Repeated exposure may cause skin dryness or cracking			Ingestion: There may be soreness and redness of the mouth and throat. There may be difficulty swallowing. Nausea and stomach pain may occur. There may be vomiting. Inhalation: Absorption through the lungs can occur causing symptoms similar to those of ingestion				
Antifreeze (CAS numbers: 12179-04-3 and 107-21-1)	H302 Harmful if swallowed. H373 May cause damage to organs through prolonged or repeated exposure	Liquid	Miscible with water and acetone. Alcohols.	Inhalation of vapours may irritate throat and respiratory system and cause coughing. Ingestion may cause liver and/or renal damage. Irritating. May cause nausea, stomach pain and vomiting. Harmful: possible risk of irreversible effects if swallowed. Skin contact may cause slight irritation.	The product is water-soluble and may spread in water systems.	The product is expected to be biodegradable.	May cause short term contamination of soil and groundwater	Y

**3.3.3 Stage 3 Assessment – Site Specific Pollution Possibility**

The aim of Stage 3 is to identify if there is an actual risk of pollution to soil and groundwater from the RHS identified in Stage 2. This stage of the assessment considers the quantity of the RHS used and stored, the existing pollution prevention measures and whether they are fit for purpose. These are detailed in Table 18 below.

**Table 18 - Summary of Pollution Risk**

Relevant Hazardous Substance	Amount used annually (litres)	Maximum amount stored on site (litres)	Details of pollution prevention measures	Pollution risk (Yes/No)
Diesel Oil	Peak usage (2026) predicted to be 38,43,896	125,056	Fully bunded small-sized fuel tanks ranging between 1,000 – 3,000L are sited near the main site generators to ensure supplies are readily available when required. The fuel	No

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Relevant Hazardous Substance	Amount used annually (litres)	Maximum amount stored on site (litres)	Details of pollution prevention measures	Pollution risk (Yes/No)
			<p>tanks have been suitably sited to minimise movement as the project progresses and have been set up with minimal risk of collision from vehicles or plant.</p> <p>Each of the generators will have their own day tank which will be self-bunded and can store between 1,000 to 2,000 litres dependent on the model of generator.</p> <p>The generators on site are internally bunded and maintained in accordance with their manufacturer's requirements.</p> <p>The fuel system for each Genset shall include an electronic engine governor, fuel metering equipment, filter and fuel cutoff valves, and a diesel fuel oil tank. The fuel oil tank shall be of all welded steel construction complete with supports, access manhole, moisture drain valve, inlet and outlet connections, valved drain connection, level gauge, level alarm contacts (high and low), air breather, shielded level gauge and strainer. The capacity of the day tank is expected to be 3000 Litres. The tank shall be coated with oil resistant paint. The fuel tank shall be hydrostatically tested.</p> <p>The fuel tank shall be made of 3 mm thick MS sheet. The tank shall have fuel level indicator with brass cover for mechanical protection, filling inlet with removable fuel screen, outlet located at minimum of 25 mm above from the bottom of the drain plug, air vent and necessary piping. The inlet of the pump shall be provided with flexible/rigid pipe with suitable filters. The fuel tank shall have control box for the valves related to the pump system</p>	
Coolant	1,473	1,473	The coolant will be stored within the generator which is fully bunded.	No
Hydrotreated Vegetable Oil	The use of HVO is currently being trialled. This information will be provided at a later date should SZC decide to use HVO as an alternative fuel.		HVO will have the same management techniques as diesel oil should SZC decide to use HVO as an alternative fuel.	No
Antifreeze	The site uses coolants which are resistant to freezing weather conditions and resist boiling conditions when operated at peak loads for long periods. Therefore, the quantities of anti-freeze used are minimal.		The antifreeze will be stored within the generator which is fully bunded.	No

Please note that there are no underground structures at the site.

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## 4 Operational phase SCR

In accordance with the template detailed in the Environment Agency publication: EPR H5 Site Condition Report: Guidance and Templates (Version 3.0 April 2013), the Operational Phase SCR requires the maintenance of four key areas:

- 4.0 Changes to the activity;
- 5.0 Measures taken to protect land;
- 6.0 Pollution incidents that may have had an impact on land, and their remediation; and
- 7.0 Soil gas and water quality monitoring (where undertaken).

These key areas are listed below and are intended to be updated and altered as required.

### 4.0 Changes to the activity

Have there been any changes to the activity boundary?	To be completed for future variations.
Have there been any changes to the permitted activities?	To be completed for future variations.
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	To be completed for future variations.

### 5.0 Measures taken to protect land

Measures taken to Protect the Land	To be completed for future variations.
Checklist of supporting information	To be completed for future variations.

### 6.0 Pollution incidents that may have had an impact on land and their remediation

Pollution incidents that may have had an impact on land, and their remediation	To be completed for future variations.
Checklist of supporting information	To be completed for future variations.

### 7.0 Soil gas and water quality monitoring (where undertaken)

Soil gas and water quality monitoring (where undertaken)	To be completed for future variations.
Checklist of supporting information	To be completed for future variations.