



The Sizewell C Project

6.3 Volume 2 Main Development Site Chapter 27 Major Accidents and Disasters

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None provided.

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Appendix 27A: Sizewell C Project Environmental Risk Record

27 Major Accidents and Disasters

27.1 Introduction

27.1.1 This chapter of **Volume 2** of the Environmental Statement (ES) presents an assessment of the Major Accidents and Disasters (MA&D) that have the potential to arise during the construction and operation of the Sizewell C power station at the main development site and the construction, operation and removal and reinstatement (where applicable) of the associated development sites (collectively referred to as ‘the Sizewell C Project’). This includes an assessment of the reasonably foreseeable worst-case environmental consequences (i.e. the likely significant effects), the requirements for mitigation, and the significance of the residual risks for MA&D hazards and threats relevant to the construction and operation of the Sizewell C Project.

27.1.2 MA&D assessment is a new EIA topic that requires the assessment of potential significant effects arising from the ‘vulnerability’ of the Sizewell C Project to MA&D and the potential of the Sizewell C Project to result in new sources of major accidents. The underlying objective of this assessment is to identify appropriate precautionary actions as part of the Sizewell C Project to prevent or mitigate potentially significant risks associated with MA&D.

27.1.3 As identified within the EIA Regulations¹, and further supported by paragraph 2.7.4 of the National Policy Statement for Nuclear Power Generation (NPS EN-6) (Ref. 27.1), the MA&D assessment within the ES can draw on assessments carried out pursuant to other legislation provided that the requirements of the EIA Regulations are still met. Moreover, NPS EN-6, paragraph 2.7.4 states that matters such as those considered by the Generic Design Assessment (GDA), the nuclear site licensing and environmental permitting regimes should not be an issue for examination within the Development Consent Order (DCO) process to avoid duplication. Therefore, the assessment presented within this chapter has sought not to duplicate the assessment of matters covered by other regulatory regimes. Instead this chapter provides a summary of the types of MA&D hazards and threats covered by these regimes, their reasonably foreseeable worst-case environmental consequences (i.e. the likely significant effects), and a summary of the required mitigation, in the form of regulatory requirements, to reduce these risks to as low as reasonably practicable (ALARP). This is to ensure that the processes for mitigating nuclear safety and security risks are transparent and understood by all. Further details of how the MA&D

¹ Schedule 4, paragraph 8 of the Infrastructure Planning EIA Regulations 2017 (Ref. 27.2) and Schedule 3, paragraph 9 of the Marine Works EIA Regulations 2007 (Ref. 27.3).

assessment presented in this chapter has considered matters regulated under other regimes is provided within **sections 27.3f)** and **27.5** of this chapter.

27.1.4 Detailed descriptions of the Sizewell C Project, the sites for the construction and operation of the Sizewell C Project, and the different phases of development are provided in **Chapters 1 to 4 of Volume 2** and **Chapters 1 and 2 of Volumes 3 to 9**. A description of the anticipated activities for the decommissioning of the Sizewell C power station, including a summary of the types of environmental effects likely to occur is provided in **Chapter 5 of Volume 2**. A glossary of terms and list of abbreviations used in this chapter is provided in **Volume 1, Appendix 1A** of the ES. **Volume 1, Appendix 6X** also provides further explanation of the terms used in the MA&D assessment.

27.1.5 This assessment has been informed by data from other assessments presented in **Volumes 2 to 9**, as follows:

- conventional waste management;
- socio-economics;
- transport;
- terrestrial ecology and ornithology;
- terrestrial historic environment;
- soils and agriculture;
- geology and land quality;
- groundwater and surface water;
- marine ecology;
- marine navigation;
- radiological assessment; and
- climate change.

27.1.6 This assessment has also been informed by data presented in the following technical appendix:

- **Appendix 27A:** Sizewell C Project Environmental Risk Record.

27.1.7 A standalone ES was prepared for the Sizewell B relocated facilities works for submission with the hybrid planning application under the Town and Country Planning Act 1990 (East Suffolk Council application ref. DC/19/1637/FUL). It is noted that the Sizewell B relocated facilities ES included in **Volume 1, Appendix 2A** did not include a standalone MA&D assessment chapter, as the ES was prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (Ref. 27.4), which did not require for a standalone MA&D assessment to be prepared as part of the EIA. The assessment presented within this chapter also accounts for the effects of the Sizewell B relocated facilities works, as it forms part of the Sizewell C Project.

27.2 Legislation, policy and guidance

27.2.1 **Volume 1, Appendix 6X** identifies and describes legislation, policy, and guidance of relevance to the MA&D assessment for the Sizewell C Project. This section provides an overview of the specific legislation, policy, and guidance of relevance to the assessment of MA&D with further detail provided in **Volume 1, Appendix 6X**.

a) International

27.2.2 International legislation and agreements² relevant to the MA&D assessment include the following:

- Directive 2014/52/EU Assessment of the Effects of Certain Public and Private Projects on the Environment amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment ('EIA Directive') (Ref. 27.5);
- Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances ('Seveso III Directive') (Ref. 27.6);
- Directive 2009/71/Euratom 'Nuclear Safety Directive' (Ref. 27.7);
- International Carriage of Dangerous Goods by Road (Ref. 27.8);
- International Carriage of Dangerous Goods by Rail (Ref. 27.9);

² At the point of submission of this application for development consent, the UK is within the transition period for exiting the European Union and the Euratom Treaty. The majority of requirements under the European and Euratom Directives identified through this ES have been implemented within UK domestic legislation, and as such post the transition period the requirements of these directives will remain in place. In addition, a number of statutory instruments have been prepared and laid before Parliament to address the UK's departure from Euratom.

- Directive 2008/68/EC on the inland transport of dangerous goods ('Dangerous Goods Directive') (Ref. 27.10);
- International Commission on Radiological Protection (ICRP) Publication 60: Recommendations of the International Commission on Radiological Protection (Ref. 27.11);
- Directive 2013/59/Euratom 'Basic Safety Standards Directive' (Ref. 27.12);
- Euratom Treaty (Ref. 27.13);
- Oslo and Paris Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) (Ref. 27.14);
- Espoo (Environmental Impact Assessment) Convention (Ref. 27.15);
- International Convention for the Safety of Life at Sea (SOLAS), 1974 (as amended) (Ref. 27.16); and
- International Convention for the Prevention of Pollution from Ships, 1973 (as amended) (MARPOL) (Ref. 27.17).

27.2.3 Further details of these, as relevant to the MA&D assessment, are provided within **Volume 1, Appendix 6X**.

b) **National**

i. **Legislation**

27.2.4 **Volume 1, Appendix 6X** summarises national legislation of relevance to the MA&D assessment for the Sizewell C Project. Key legislation includes:

- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref. 27.2);
- Marine Works (Environmental Impact Assessment) Regulations 2007 (Ref. 27.3)
- Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005 (Ref. 27.18);
- Legislation for the management of nuclear and radiological safety, such as the Nuclear Installations Act 1965 (Ref. 27.19), Nuclear Industries Security Regulations 2003 (Ref. 27.20), Ionising Radiations Regulations 2017 (Ref. 27.21), Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPPPIR) (Ref. 27.22),

Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (Ref. 27.23);

- Legislation for minimising hazards by design, such as Construction (Design and Management) (CDM) Regulations 2015 (Ref. 27.24), Pressure Systems Safety Regulations 2000 (Ref. 27.25), The Regulatory Reform (Fire Safety) Order 2005 (Ref. 27.26), Building Regulations 2010 (Ref. 27.27), Railways and Other Guided Transport Systems (Safety) Regulations 2006 (Ref. 27.28), Railways (Interoperability) Regulations 2011 (Ref. 27.29);
- Additional legislation for the management of hazards during construction and maintenance works, such as Lifting Operations and Lifting Equipment Regulations 1998 (Ref. 27.30), Control of Substances Hazardous to Health Regulations 2002 (Ref. 27.31);
- Legislation for minimising workplace hazards, such as Health and Safety at Work etc. Act 1974 (Ref. 27.32), The Management of Health and Safety at Work Regulations 1999 (Ref. 27.33), The Workplace (Health, Safety and Welfare) Regulations 1992 (Ref. 27.34), Personal Protective Equipment at Work Regulations 1992 (Ref. 27.35);
- Additional legislation for the management of hazardous substances, such as Dangerous Substances and Explosive Atmospheres Regulations 2002 (Ref. 27.36), Control of Major Accident Hazards (COMAH) Regulations 2015 (Ref. 27.37), Environmental Permitting Regulations (EPR) 2016 (Ref. 27.38), Planning (Hazardous Substances) Regulations 2015 (Ref. 27.39).

ii. Policy

27.2.5 The overarching National Policy Statement (NPS) for Energy (EN-1) (Ref. 27.40) and NPS for Nuclear Power Generation (EN-6) (Ref. 27.1) provide the primary policy framework within which the Sizewell C Project will be considered. As these were published in 2011, they pre-date the existing EIA Regulations, which include the requirement to consider MA&D in EIA and, therefore, no specific provisions for the MA&D assessment are made within the NPSs. Nevertheless, a number of NPS requirements are considered relevant to the MA&D assessment. The UK Marine Policy Statement (MPS) (Ref. 27.41) and National Planning Policy Framework (NPPF) (Ref. 27.42) also provide relevant considerations for the determination of the DCO. A summary of the relevant national policy, together with consideration of how the policy requirements have been taken into account in this ES, is provided in **Volume 1, Appendix 6X**.

c) Regional

27.2.6 Regional policy requirements of relevance to the MA&D assessment for the Sizewell C Project comprise the East Inshore and Offshore Marine Plan (Ref. 27.43). The requirements of this policy are described in **Volume 1, Appendix 6X**.

d) Local

27.2.7 There are no requirements of relevance to the MA&D assessment for the Sizewell C Project included within the Suffolk Coastal District Council Local Plan Core Strategy and Development Management Policies (2013) (Ref. 27.44). Relevant local policy considerations of Suffolk Coastal District Council Final Draft Local Plan (Ref. 27.45) are described in **Volume 1, Appendix 6X**.

e) Guidance

27.2.8 Notably, there is no specific guidance available which sets out the approach for undertaking a MA&D assessment within EIA. However, the assessment methodology adopted within this chapter has been developed with due regard to the following guidance documents:

- Chapter 4 of the Cabinet Office's Emergency Preparedness guidance on part 1 of the Civil Contingencies Act 2004 (hereafter referred to as the 'CCA risk assessment framework') (Ref. 27.46);
- Chemicals and Downstream Oil Industries Forum Guidelines, Environmental Risk Tolerability for COMAH Establishments (Ref. 27.47);
- European Commission's 2017 Guidance on EIA (Ref. 27.48);
- Planning Inspectorate's Annex G to Advice Note eleven: Working with public bodies in the infrastructure planning process (Ref. 27.49);
- European Commission's Overview of Natural and Man-made Disaster Risks the European Union May Face, 2017 (Ref. 27.50);
- Reducing Risks, Protecting People: HSE's decision making process, 1999 (Ref. 27.51);
- HSE Major Hazard Regulatory Model: Safety Management in Major Hazard Sectors (Ref. 27.52);
- Defra's The Green Leaves III Guidelines for Environmental Risk Assessment, 2011 (Ref. 27.53); and

- The International Standards Organization's ISO 31000:2018 Risk Management – Guidelines. 2018 (Ref. 27.54).

27.3 Methodology

a) Scope of the assessment

- 27.3.1 The generic EIA methodology is detailed in **Volume 1, Chapter 6**. The methodology adopted for the MA&D assessment differs from the generic methodology in that the MA&D assessment identifies the reasonably foreseeable worst-case environmental consequence of a hazard or a threat (i.e. the likely significant effect) on the basis of its potential severity of harm and duration. Subsequently, the likelihood of the environmental consequence occurring is determined.
- 27.3.2 The full method of assessment for MA&D that has been applied for the Sizewell C Project is included in **Volume 1, Appendix 6X**.
- 27.3.3 This section provides a summary of the MA&D assessment methodology. The scope of assessment considers the likelihood and the reasonably foreseeable worst-cast environmental consequence of potential hazards and threats that could occur during construction of the main development site (including the operation and removal and reinstatement of any temporary development) and the operation of the permanent development.
- 27.3.4 The off-site developments including the off-site sports facilities at Leiston, fen meadow compensation sites south of Benhall and east of Halesworth and, if required, a marsh harrier habitat improvement area at Westleton, have each been scoped out of the MA&D assessment, as these works are not likely to be susceptible or create new MA&D hazards.
- 27.3.5 The aim of the assessment is to identify any expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to MA&D risks which are relevant to the Sizewell C Project and to identify any measures to prevent or mitigate any significant adverse effects.
- 27.3.6 The scope of this assessment has been established through a formal EIA scoping process undertaken with the Planning Inspectorate. A request for an EIA Scoping Opinion was initially issued to the Planning Inspectorate in 2014, with an updated request issued in 2019. As the requirement for *“expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development”* to be assessed within the EIA process was introduced into by the EIA Regulations in 2017, a MA&D assessment methodology was only

provided within the 2019 EIA Scoping Report provided in **Volume 1, Appendix 6A**.

27.3.7 Comments raised in the EIA Scoping Opinion on the MA&D assessment received in 2019 have been taken into account in the development of the assessment methodology. These are detailed in **Volume 1, Appendix 6C**.

b) **Consultation**

27.3.8 The scope of the assessment has also been informed by consultation and engagement with statutory consultees. This has included discussions with ONR, Environment Agency, East Suffolk Council (ESC) and Suffolk County Council (SCC) on the assessment methodology, the scope of the assessment and the hazards and threats considered within this assessment. Further details of consultation undertaken are provided within **Volume 1, Appendix 6X**.

27.3.9 Consultation with emergency services was also undertaken as part of the socio-economics workstream. Further details of the consultation undertaken are provided within **Chapter 9** of this volume and the **Consultation Report** (Doc Ref. 5.1).

c) **Study area**

27.3.10 Each identified MA&D hazard and threat has been assigned an individual study area taking consideration of hazard or threat source, any identified impact pathways, potential receptors, and the reasonably foreseeable worst-case environmental consequence, if the event occurred. The study area for the identification of potential receptors differs depending on the specific hazard or threat and is determined on the basis of a worst-case impact area of a similar incident that has previously occurred, if information on this is available, or on the basis of professional judgement, if not available. The study areas are identified within the Environmental Risk Record included as **Appendix 27A** of this volume and range from the area within the site boundary to the catchment area modelled for flood risk (as set out in the relevant Flood Risk Assessments, Doc Ref. 5.2-5.9).

27.3.11 The MA&D assessment also considered the affected highway network included within the scope of the **Transport Assessment** (Doc Ref. 8.5).

d) **Assessment scenarios**

27.3.12 The MA&D assessment for the Sizewell C Project considers the following two assessment scenarios:

- Construction assessment scenario which comprises:

- Construction at the main development site and permanent associated development (including the operation and removal and reinstatement of temporary development at the main development site at the later stages of construction); and
- Construction, operation and removal and reinstatement of temporary associated developments (i.e. northern park and ride, southern park and ride, freight management facility, and green rail route).
- Operational assessment scenario which comprises:
 - Operation of the permanent development at the main development site; and
 - Operation of permanent associated development (i.e. two village bypass, Sizewell link road, highway and rail improvements).

e) **Assessment criteria**

- 27.3.13** As described in **Volume 1, Chapter 6**, the EIA methodology considers whether impacts of the Sizewell C Project would have an effect on any resources or receptors. Assessments broadly consider the magnitude of impacts and value/sensitivity of resources/receptors that could be affected in order to classify effects. As discussed above, the MA&D assessment approach differs from the generic EIA methodology.
- 27.3.14** The assessment first identifies the reasonably foreseeable worst-case environmental consequence of a hazard or a threat (i.e. the likely significant effect) on the basis of its potential severity of harm and duration. However as by definition, all MA&D hazards and threats would result in serious damage (refer to **Volume 1, Appendix 6X** for definition) and therefore, in significant environmental effects, the assessment then considers the likelihood of that hazard or threat occurring. Therefore, the MA&D assessment focuses on determining the tolerability of the identified risks, whilst taking into account any proposed mitigation measures. The assessment then provides a conclusion on the tolerability and significance of the residual risk.
- 27.3.15** Assessment criteria have been developed in accordance with the Chemical and Downstream Oil Industries Forum Guidelines on Environment Risk Tolerability for COMAH Establishments, which is a common approach adopted in MA&D assessments in recent applications for Nationally Significant Infrastructure Projects. However, as detailed in **Volume 1, Appendix 6X**, reference is also made to the criteria provided within the

CCA risk assessment framework to allow for consistency with future emergency planning at a local level.

27.3.16 In line with Chemical and Downstream Oil Industries Forum Guidelines, the MA&D assessment characterises threats or hazards against the following categories in order to assign a tolerability and a risk classification to each hazard or threat:

- severity of harm;
- duration;
- consequence; and
- probability.

27.3.17 Severity of harm, duration, and the consequence of a hazard or threat are determined on the basis of a reasonably foreseeable worst-case environmental effect of the event in the absence of mitigation. However, the probability of the hazard or threat occurring is determined whilst considering the proposed mitigation. This is because mitigation would reduce the likelihood of the maximum severity of harm, duration, consequence, and the frequency of a hazard or threat occurring.

27.3.18 The tolerability of the residual risk is determined by combining the reasonably foreseeable worst-case consequence and probability categories. All residual risks are categorised as ‘tolerable’, ‘tolerable if ALARP’ and ‘intolerable’.

27.3.19 As a general rule, tolerable and tolerable if ALARP risks are considered as ‘not significant’ and intolerable risks are considered as ‘significant’. Risks categorised as ‘tolerable if ALARP’ would generally require further approval of the details for proposed mitigation by a regulatory body.

27.3.20 Further information on how the assessment criteria have been defined is included in **Volume 1, Appendix 6X**.

i. Assessment of radiological hazards

27.3.21 As identified within the EIA Regulations³, and further supported by paragraph 2.7.4 of NPS EN-6, the MA&D assessment can draw on assessments carried out pursuant to other legislation provided that the requirements of the EIA Regulations are still met.

³ Schedule 4, paragraph 8 of the Infrastructure Planning EIA Regulations and Schedule 3, paragraph 9 of the Marine Works EIA Regulations.

- 27.3.22** A detailed assessment of safety, security and environmental risks associated with the UK EPR™ design has been undertaken as part of the Generic Design Assessment (GDA) process. A Design Acceptance Confirmation (DAC) was granted by the Office for Nuclear Regulation (ONR) and a Statement of Design Acceptability (SoDA) was issued by the Environment Agency in December 2012, confirming that the risks to the public and the environment had been eliminated or mitigated by design sufficiently to be considered as acceptable.
- 27.3.23** Furthermore, a detailed assessment of site-specific nuclear safety and security risks would be undertaken as part of the nuclear site licensing regime. For compliance with the nuclear site licensing regime, SZC Co. would need to ensure the safe operation of the Sizewell C Project and protection of the workers, the public, and the environment. This includes providing the ONR with a robust Safety Case demonstrating that all hazards associated with the development or that may impact the development are well understood and adequate arrangements are in place to reduce these risks to an acceptable level. In addition, it requires appropriate emergency plans and arrangements to be established and agreed with the local authority, for the range of accidents and incidents that could occur. It is considered that the ONR would not grant a nuclear site licence for the Sizewell C Project, unless it is demonstrated that all nuclear safety and security risks have been mitigated to ALARP levels.
- 27.3.24** Having regard to that context, it has been agreed with the ONR, Environment Agency, SCC and ESC that with the regulatory processes in place surrounding the safety and security of the UK EPR™ reactors and the operation of the site, a detailed assessment of nuclear safety and security risks is not required to be presented as part of the EIA. Instead, it is considered that compliance with existing regulatory regimes would reduce nuclear safety and security risks to be tolerable if ALARP (not significant).
- 27.3.25** The MA&D assessment therefore provides a summary of the types of hazards covered by the GDA, nuclear site licensing, and other regulatory regimes, their reasonably foreseeable worst-case environmental consequence, and a summary of the required mitigation, in the form of regulatory requirements, to reduce these risks to ALARP. This is to ensure that the processes for mitigating nuclear safety and security risks are transparent and understood by all.
- ii. Assessment of marine navigation risks**
- 27.3.26** A separate assessment of MA&D associated with marine navigation risks is presented within **Chapter 24** of this volume and follows a separate assessment methodology. A summary of the findings of the marine

navigation risk assessment is presented within this chapter and included within **Appendix 27A** of this volume.

f) [Assessment methodology](#)

27.3.27 As described in **Volume 1, Appendix 6X**, the methodology for the MA&D assessment followed the below staged process:

- Stage 1: Identification of hazards and threats;
- Stage 2: Screening of hazards and threats (including the identification of the reasonably foreseeable worst-case environmental consequence, i.e. the likely significant effect);
- Stage 3: Identification of mitigation; and
- Stage 4: Identification of residual risks and their significance.

27.3.28 In summary, the approach considers the reasonably foreseeable worst-case environmental consequences of the identified hazards and threats (i.e. the likely significant effects) identified at stage 2, the probability of these effects occurring, taking into account proposed mitigation (set out in **section 27.5**), and the acceptability of the subsequent risk to the environment. The assessment process is iterative with the aim to identify sufficient controls to mitigate all MA&D risks to be not significant.

g) [Assumptions and limitations](#)

27.3.29 The following limitations are relevant to this assessment:

- No modelling or detailed calculations have been undertaken but a qualitative assessment approach has been adopted.
- Where information is not available (such as historical evidence on the likelihood and the environmental consequence of an event), professional judgement has been used to reach a conclusion.
- Each hazard or threat has been considered on an individual basis. Where a hazard or threat has the potential to result in another hazard, this has been clearly identified within the Environmental Risk Record (**Appendix 27A** of this volume) to identify where an assessment of the additional hazard that could occur can be found.
- No surveys beyond those undertaken to inform other EIA topics have been completed to establish the baseline for the MA&D assessment.

27.4 Baseline environment

27.4.1 This section presents a description of the baseline environmental characteristics within the study area. The baseline relevant to this topic comprises:

- A description of potential natural hazards which may impact the main development site and associated development sites, including meteorological hazards, geological hazards and other types of hazards.
- Existing major accident hazard sources that may impact the main development site and associated development sites.
- Other hazards and threats identified within the UK National Risk Register (Ref. 27.56) and Suffolk Resilience Forum (SRF) Community Risk Register (Ref. 27.55).
- Sensitive environmental receptors within the study area at risk of MA&D hazards associated with the Sizewell C Project.

27.4.2 A 'long list' of hazards and threats has been identified and discussed with relevant stakeholders, as detailed in **Volume 1, Appendix 6X**. The long list considers the existing hazard and threat sources and potential new sources that could be introduced by the construction, operation and removal and reinstatement works of the Sizewell C Project.

27.4.3 The following subsections describe the existing hazard and threat sources at Sizewell C Project sites that have been considered as part of the long list. Potential new sources of hazards from the Sizewell C Project are identified in **section 27.6**. A full list of hazards and threats considered within the assessment can also be found in **Appendix 27A** of this volume.

a) Natural Hazards

Meteorological Hazards

27.4.4 Hazards resulting from severe weather events which could impact Sizewell C Project sites were identified from the UK National Risk Register (Ref. 27.56), SRF Community Risk Register (Ref. 27.55), UK Climate Change Risk Assessment (Ref. 27.57), climate change assessment presented within **Chapter 26** of this volume, and Annex 2 of ONR Nuclear Safety Technical Assessment Guide – External Hazards (Ref. 27.58). These hazards were identified on the basis that they could occur within the Sizewell C Project sites and that the Sizewell C Project could be considered vulnerable to these hazards:

- flooding, comprising:
 - flooding following heavy rainfall events (including fluvial, surface water, groundwater and sewer flooding);
 - coastal flooding following storm surge (relevant to main development site only);
- storms and gales;
- drought;
- heatwave;
- cold and snow;
- lightning and electrical storms (thunderstorms);
- events of reduced visibility (e.g. due to volcanic ash, dust sand or fog); and
- extreme humidity (high and low).

27.4.5 Further information on each of these hazards has been provided below.

Flooding

27.4.6 As summarised in groundwater and surface water assessment provided in **Chapter 19** of this volume, several areas of the main development site are located in Flood Zones 2 and 3, and therefore, are at risk of flooding from tidal or fluvial sources, in the absence of flood defences. Coastal flooding is a direct result of a combination of high tides and storm surges. It occurs because of inundation by the sea, where defences are overtopped or fail at a single location, or by the backing up of freshwater which is unable to drain to the sea due to high tides.

27.4.7 Risks associated with groundwater, sewer, reservoir flooding and surface water drainage are also considered to be present at the main development site. Further information on flood risk is provided in the **Main Development Site Flood Risk Assessment** (Doc Ref 5.2) submitted with the DCO application.

27.4.8 **Chapter 12** of **Volumes 3 to 9** provide a summary of flood risk for the associated development sites. The two park and ride sites, Yoxford roundabout, Sizewell link road, rail extension route and other rail improvements are located within Flood Zone 1, however include areas at risk of surface water flooding. There is no existing flood risk associated with the freight management facility. An area in the west of the two village

bypass site is located within Flood Zone 2, and is associated with fluvial flood risk from the River Alde. Further information on flood risk at associated development sites is provided in the respective **Flood Risk Assessment** (Doc Ref. 5.3 to 5.9) submitted as part of the DCO application.

- 27.4.9 The SRF Community Risk Register (Ref. 27.55) considers the risk of fluvial flooding in Suffolk to be medium⁴ and the risk of coastal flooding to be high. To manage emergency response for the flooding hazards within Suffolk, the SRF have produced the Suffolk Flood Plan (Ref. 27.59), which provides details of the arrangements for multi-agency emergency response in case of a major incident. With climate change, the risk of flooding is considered likely to increase (refer to **Chapter 26** of this volume for further information).

Storms and gales

- 27.4.10 The impacts of storms and gales can be wide-ranging from fallen trees to flooding (considered above). As summarised in the State of the UK Climate 2017 Report (Ref. 27.60), seven named storms affected the UK in 2017. The number and severity of these storms were not unusual compared to recent decades. No compelling trends in storminess were identified, on the basis of maximum gust speeds from the UK wind network over the last four decades (Ref. 27.60). The SRF Community Risk Register (Ref. 27.55) considers the risk of storms and gales in Suffolk to be medium.⁴

Drought

- 27.4.11 Droughts happen when there is insufficient rainfall to maintain adequate water levels in reservoirs, rivers and underground aquifers (groundwater). Each drought can be different in terms of its severity, location and duration. This can lead to a reduction in ability to supply water, either public water supply or other forms of abstractions. There is no immediate risk to public water supplies, but prolonged dry weather could lead to more serious shortages in the future. More recently, droughts were declared in Suffolk in both 2018 and 2019 (Ref. 27.55). With climate change, the frequency of droughts is considered likely to increase (refer to **Chapter 26** of this volume for further information). The SRF Community Risk Register (Ref. 27.55) considers the risk of drought in Suffolk to be medium⁴.

Heatwave

- 27.4.12 When temperatures remain abnormally high over more than a couple of days, it can prove fatal, particularly among certain 'at risk' groups.

⁴ Reported risk levels are as determined within the SRF Community Risk Register (Ref. 27.55) on the basis of the CCA risk assessment framework.

Heatwave conditions can also increase pressure on public services, especially health and social care, cause disruption to transport, lead to an increase in heat related animal deaths / welfare issues and an increase in fire risk and water rescue incidents. 2018 was the warmest summer in the UK in a series from 1910, along with 2006, 2003 and 1976 (Ref. 27.61). With climate change, the frequency of heatwaves is considered likely to increase (refer to **Chapter 26** of this volume for further information). The SRF Community Risk Register (Ref. 27.55) considers the risk of heatwaves in Suffolk to be medium⁴.

Cold and snow

- 27.4.13 Generally, the winter weather conditions in Suffolk are relatively mild with relatively short-lived periods of snow and ice. Winds can blow from between a northerly or easterly direction and bring severe and disruptive winter weather conditions. When this happens, daytime temperatures may not rise above freezing. As well as heavy snow and ice – bitterly cold and strong winds mean that the drifting of dry, powdery snow is likely, leading to the closure of many exposed road and rail routes, especially in rural areas.
- 27.4.14 Late severe winter weather in 2018 brought heavy snow to Suffolk. Snowdrifts of up to six feet in places developed, with many rural areas cut off at times during the cold spell, with countless roads closed or partially blocked by drifting snow and hundreds of Suffolk's schools closed for three days (Ref. 27.55). The SRF Community Risk Register (Ref. 27.55) considers the risk of cold and snow in Suffolk to be medium⁴.

Lightning and electrical storms

- 27.4.15 Lightning is suggested to strike the ground in Britain about 300,000 times per year, striking between 30 to 60 people, and on average, 3 (5-10%) being fatal (Ref. 27.62). Construction workers are considered to be amongst the most at risk.

Events of reduced visibility

- 27.4.16 Periods of reduced visibility can include localised weather conditions, such as fog, and extreme events, such as ash clouds from volcanic activity and dust transported by wind.
- 27.4.17 As stated within the UK National Risk Register, volcanoes in Iceland (such as Bárðarbunga and Eyjafjallajökull) are of most concern to the UK as they erupt frequently, and prevailing winds are more likely to blow ash and gas towards the UK. These events can result in disruption and increased likelihood of another hazard occurring, such as traffic incidents and poor air quality. The SRF Community Risk Register (Ref. 27.55) considers that the

risk from volcanic ash and gas impacting Suffolk is equivalent to the risk level nationally (medium⁴).

Extreme humidity conditions

- 27.4.18 Extreme high humidity conditions during winter are commonly associated with fog or low-lying cloud. During summer, extreme humidity may not lead to visible weather conditions, as air at higher temperature can carry more moisture. However, high humidity can be evidenced from enhanced rates of condensation.
- 27.4.19 Low humidity conditions during winter are commonly associated with high pressure weather systems, clear weather, low temperatures and low wind speeds. During summer, low moisture conditions are characteristic of high pressure weather systems and drought conditions, combined with high temperatures and low wind speeds.

SRF Severe Weather Response

- 27.4.20 The SRF Community Risk Register (Ref. 27.55) identifies those risks requiring hazard specific multi-agency plans and details how an incident in Suffolk would be responded to by the emergency services. For meteorological hazards, a Severe Weather Response Plan (Ref. 27.63) has been produced, which provides information on the response, management and roles and responsibilities of individual agencies in case of a severe weather event.
- 27.4.21 The Severe Weather Response Plan (Ref. 27.63) recognises that changing climate patterns are likely to present new challenges and Suffolk will continue to be susceptible to changing severe weather conditions. As described in the climate change assessment, **Chapter 26** of this volume, the Sizewell C Project sites are likely to experience an increase in average temperatures throughout the year, drier summers and wetter winters due to climate change.

Geological Hazards

Ground instability

- 27.4.22 The geology and land quality assessment presented in **Chapter 18** of this volume, and supported by the Landmark Envirocheck report in **Appendix 18A**, concludes that whilst the majority of the main development site is at no risk or very low to low risk of geological hazards, there is an area of peat within the temporary construction area which is classified as moderate to high risk of compressible ground, and the southern section of the main

platform area is classified as at high risk of compressible ground. Areas adjacent to the coast are at moderate risk of running sand.

27.4.23 As identified within geology and land quality assessments in **Chapter 11** of **Volumes 3, 4, 6, 7 and 8**, and supported by relevant Landmark Envirocheck Reports (included as **Appendix 11A** in **Volumes 3, 4, 6, 7 and 8**), the proposed northern park and ride, southern park and ride, Sizewell link road, Yoxford roundabout, other highway improvements, and freight management facility are located within areas of no risk or very low to low risk of hazards associated with ground stability, such as landslides, ground collapse, ground compression, sinkholes, running sand and shrinking or swelling of clay.

27.4.24 **Volume 5, Chapter 11** and the supporting **Appendix 11A** identify areas within the two village bypass which are at moderate risk of compressible ground hazards. Furthermore, **Volume 9, Chapter 11** and the supporting **Appendix 11A** identify areas within the rail improvement sites which are at moderate risk of compressible ground and shrinking or swelling clay ground stability hazards.

Seismic hazards

27.4.25 The SRF Community Risk Register (Ref. 27.55) does not identify earthquakes as a hazard pertinent to Suffolk. This position is supported by the British Geological Survey and Musson Sargent (2007) (Ref. 27.64) which provide national seismic hazard mapping and identifies Suffolk to be located within one of the lowest areas of seismic hazard risk in the UK. However, it should be noted that EQE (2002) (Ref. 27.65) identifies moderate risk of seismicity on the UK coastal shelf off the Suffolk coast.

Other Natural Hazards

27.4.26 The SRF Community Risk Register (Ref. 27.55) also identifies the following natural hazards pertinent to Suffolk, which have been considered within the MA&D assessment:

- wildfires; and
- space weather.

Wildfires

27.4.27 Suffolk has substantial areas of forest, scrubland and woodland areas and has had fires in woodland and heath land areas. Suffolk Fire and Rescue Service regularly deal with a number of incidents on varying scales on an

annual basis. The SRF Community Risk Register (Ref.27.55) considers the risk of wildfires in Suffolk to be medium⁴.

Space weather

27.4.28 Space weather is a collective term used to describe a series of phenomena originating from the Sun, such as solar flares, solar energetic particles which cause solar radiation storms and coronal mass ejections which cause geomagnetic storms. Space weather may cause electricity blackouts, loss or disruption of telecommunications systems, impacts on railway signalling and switching systems and an increase in ionizing radiation exposure (albeit the latter would be far too small to result in an observable health effect (Ref. 27.66)).

27.4.29 The SRF Community Risk Register (Ref. 27.55) recognises that space weather activities may affect residents in Suffolk and identifies there is little that can be undertaken on a local basis to mitigate risk. Therefore, the risk remains as described within the UK National Risk Register (Ref. 27.56) (high risk⁴).

i. Existing Major Accidents Hazard Sources

27.4.30 Existing major accident hazard sources include industrial sites (such as those operated under COMAH and Hazardous Substances Consents (HSC)), waste management sites, electricity, gas and fuel infrastructure which may pose a risk of fire, explosion or an industrial accident, such as chemical release, airfields, as well as residual risk from unexploded ordnance (UXO).

Industrial Sites

27.4.31 As described within the UK National Risk Register, hazards associated with existing industrial sites can include fires and explosions, chemical and biological contamination, and dam breach. The SRF Community Risk Register (Ref. 27.55) has assigned the following risk categories for hazards associated with industrial sites which are of relevance locally:

- radiation exposure from:
 - civil nuclear accidents (medium risk⁵);
 - malicious attack on civil nuclear installation;

⁵ Reported risk levels are as determined within the SRF Community Risk Register (Ref. 27.55) on the basis of the CCA risk assessment framework.

- radiation exposure from stolen goods (incorrect handling of a stolen source) (low risk);
- fire or explosion at neighbouring sites, including:
 - industrial explosions and major fires (medium risk);
 - fires in waste sites (high risk);
- contamination events from off-site sources, including:
 - major pollution of surface and groundwaters (low risk);
 - biological substance release (low risk);
 - local industrial accident involving a toxic chemical release (medium risk);
 - maritime pollution (low risk); and
 - food supply contamination (high risk).

27.4.32 Emergency arrangements for the management of civil nuclear risks associated with the existing Sizewell A and B site are summarised in section below. In addition, the SRF have produced the following multi-agency response plans to manage industrial risks locally (Ref 27.67):

- Suffolk Resilience Forum Generic Response Plan;
- Suffolk Resilience Forum Recovery Plan;
- Suffolk Resilience Forum Guide to Evacuation and Shelter in Suffolk;
- Suffolk Resilience Forum Mass Fatalities Plan;
- Suffolk Resilience Forum Mass Casualties Plan;
- Suffolk Resilience Forum Communications Plan;
- Suffolk Marine Pollution Emergency Response Plan; and
- Suffolk Resilience Forum COMAH External Emergency Plans.

27.4.33 **Table 27.1** provides a summary of existing industrial sites that have been identified as a potential major accident hazard source within 1km radius of the main development site and 500m of associated development sites.

27.4.34 It is noted that the SRF Community Risk Register (Ref. 27.55) also covers hazards associated with fuel distribution sites, fuel pipelines, Liquefied Petroleum Gas or Liquefied Natural Gas terminals, and flammable gas

storage sites. However, there are no sites that would fall under these categories within 1km radius of the Sizewell C Project sites and therefore, these hazards have not been considered further within this chapter.

Table 27.1: Existing industrial sites identified as a potential hazard source

Site Name	Description	Distance from the Site
Sizewell B power station	Nuclear site licensed power station, COMAH and HSC site	Partially within the main development site boundary
Sizewell A power station	Nuclear site licensed power station under decommissioning	Immediately adjacent to the main development site boundary
Home Farm	Registered landfill. The status of the license is listed as lapsed	Located approximately 200m south of the main development site boundary
Leiston Landfill	Registered landfill. The status of the license is listed as lapse/cancelled or surrendered	Approximately 500m west of land east of Eastlands industrial estate (LEEIE) on Lover's Lane
Suffolk Waste Disposal Company	Waste transfer site	Approximately 350m north of LEEIE on Lover's Lane
Darsham service station	Fuel station	Located adjacent to the south-eastern boundary of the northern park and ride
Stratford service station	Fuel station	Approximately 490m north-west of the two village bypass on the A12 to the south of Farnham.
Saxmundham service station	Fuel station	Approximately 310m south of the railway improvements

Emergency arrangements for the existing Sizewell A and B stations

27.4.35 In the event of a radiation emergency in the UK, there are four tiers which work together under the UK Government's Concept of Operations (Ref. 27.68) to deliver an effective response:

- Site: initial on-site management of the response to a radiation emergency ('on-site emergency plan').
- Local: Development and delivery of local multi-agency responses at the incident scheme ('off-site emergency plan').

NOT PROTECTIVELY MARKED

- National: There are three broad levels of emergency which are likely to require direct central Government engagement:
 - Level 1 Significant Emergency: Support provided primarily by the lead Government department.
 - Level 2 Serious Emergency: An emergency which threatens a wider/prolonged impact. The central Government response would be coordinated from the Cabinet Office Briefing Rooms (COBR), under the leadership of the lead Government department.
 - Level 3 Catastrophic emergency: An emergency with a high and potentially widespread impact. The Prime Minister would lead the coordination of national response via COBR.
- International: Lead on engagement with multi-national organisations such as the International Atomic Energy Agency (IAEA) or the EU, and countries with whom there are bi-lateral notification agreements with, in accordance with the IAEA Early Notification Convention.

27.4.36 A programme of regulated emergency exercises is carried out in the UK to test procedures, facilities, systems and equipment and to enable everyone to demonstrate their roles under the framework described above.

27.4.37 In summary, emergency arrangements for the existing Sizewell A and B stations are set out within on-site and off-site emergency plans, supported by national plans, in line with existing legislative requirements, including REPPiR and nuclear site licence conditions. The off-site emergency arrangements that would require multi-agency response are set out within the Sizewell Off-Site Emergency Plan (Ref. 27.69).

27.4.38 Sizewell A is considered unlikely to contribute significantly to a release of ionising radiation to the environment, as all nuclear fuel has now been removed from the station and it has been declared fuel free. Radioactive material is still present on site in the form of waste and structural materials, however the Sizewell Off-Site Emergency Plan identifies that these are unlikely to pose a significant risk.

27.4.39 At Sizewell B, irradiated nuclear fuel is present on site. Sizewell Off Site Emergency Plan identifies a Detailed Emergency Planning Zone within approximately 2.4km radius of Sizewell B station (with an extended boundary that includes the town of Leiston and part of the village of Aldringham) and an Extended Emergency Planning Zone within 15km radius. Within the Detailed Emergency Planning Zone, countermeasures in case of nuclear incident are pre-arranged/ issued for immediate implementation for certain identifiable groups within 1km from the site. All

identifiable groups within the Detailed Emergency Planning Zone are provided with prior information. Countermeasures within the Extended Emergency Planning Zone are pre-planned but not deployed and public within this wider area is able to access information on outline emergency planning arrangements.

27.4.40 For compliance with REPIR 2019, the existing Sizewell on-site and off-site emergency response plans are due to be updated.

27.4.41 Both Sizewell A and Sizewell B also hold other hazardous substances on site such as hydrocarbon fuels, bulk chemicals and specialist chemicals. At Sizewell A, quantities of hazardous substances are likely to be limited. At Sizewell B, hazardous substances are managed in accordance with the station's COMAH and Hazardous Substances Consents.

Utilities

27.4.42 The UK National Risk Register (Ref. 27.56) and SRF Community Risk Register (Ref 27.55) also recognise risks from the loss or failure of existing utilities, telecommunications and financial systems. The main consequences of such failures would be related to disruption to essential services, economic damage but also potential damage to property and some fatalities. SRF Community Risk Register (Ref. 27.55) has identified the following risk levels associated with the loss or failure of utilities, which are the same in Suffolk as across the rest of the UK:

- national electricity transmission network (very high risk⁶);
- regional electricity transmission network (medium risk);
- gas supply (medium risk);
- water supply infrastructure (low risk);
- telecommunications network (low risk); and
- failure of financial systems (low risk).

27.4.43 Existing utilities that have been identified within the Sizewell C Project sites are identified in **Table 27.2**.

⁶ Reported risk levels are as determined within the SRF Community Risk Register (Ref. 27.55) on the basis of the CCA risk assessment framework.

Table 27.2: Utilities identified at Sizewell C Project sites

Site Name	Telecommunications	Water	Electricity	Gas
Main development site	X	X	X	X
Northern park and ride	X	X	X	X
Southern park and ride	X	X	X	X
Two Village Bypass	X	X	X	
Sizewell Link Road	X	X	X	X
Yoxford and Other highway improvements	X	X	X	
Freight Management Facility	X	X	X	X
Rail	X	X	X	X

UXO risk

27.4.44 The risk of UXO within the Sizewell C Project sites has been considered on a site by site basis. Data in relation to UXO has been obtained from Zetica online UXO risk map, as summarised in **Chapter 18** of this volume and **Chapter 11** of **Volumes 3 to 9**. A summary of the risk at each of the Sizewell C Project sites is provided in **Table 27.3**.

Table 27.3: UXO risk at Sizewell C Project sites

Site Name	UXO Risk
Main development site	Moderate
Northern park and ride	Low
Southern park and ride	Low
Two Village Bypass	Low
Sizewell Link Road	Low
Yoxford and Other highway improvements	Low
Freight management facility	Low
Rail – rail extension route	Moderate

Site Name	UXO Risk
Rail – rail improvement works	Low/ Moderate

ii. Additional hazards and threats identified under CCA risk framework

27.4.45 The SRF Community Risk Register (Ref. 27.55) has also considered the risk of following hazards and threats:

- outbreak of disease, including:
 - animal health – notifiable disease (low risk⁷);
 - emerging infectious disease (low risk);
 - pandemic influenza (very high risk);
- road traffic accidents, including:
 - local accident on motorways and major trunk roads (high risk);
 - accidents with high consequence dangerous goods (such as explosives);
- civil unrest or protest, including:
 - industrial action by fuel tanker drivers (high risk);
 - industrial action – e.g. public mass transport strikes (medium risk);
 - public disorder (medium risk);
 - absence of prison officers;
- fuel supply (insolvency) (medium risk);
- poor air quality (high risk);
- cyber-attack and digital data security;
- aviation accidents (medium risk);
- radiation releases from foreign nuclear sites (low risk); and

⁷ Reported risk levels are as determined within the SRF Community Risk Register (Ref. 27.55) on the basis of the CCA risk assessment framework.

- influx of British nationals into the UK under various scenarios (low risk).

27.4.46 To manage emergency response within Suffolk for the hazards and threats above, the SRF emergency response plans identified for hazards from industrial sites would also apply as relevant. In addition, SRF have produced the Pandemic Influenza Response Framework (Ref. 27.70), and the Animal Disease Response Plan (Ref. 27.71), which provide details of the arrangements for multi-agency emergency response in case of a major incident. In addition, a Memorandum of Understanding (Ref. 27.72) has been agreed that sets out arrangements for the closure of the port of Felixstowe to large goods vehicles ('Operation Stack') to allow for coordinated contingency planning between individual agencies.

b) Sensitive Environmental Receptors

27.4.47 Existing sensitive receptors within the study area for the MA&D assessment are identified in **Tables 27.4** and **27.5** below. In addition to the receptors summarised below, the Environmental Risk Record provided in **Appendix 27A** of this volume also assesses the potential risk of MA&D hazards on construction workers and future Sizewell C station workers and visitors.

Table 27.4: Existing environmental receptors within the study area of the main development site

Receptor Type	Description	Reference
<i>Up to 5km from main development site boundary (based on the catchment area modelled for the main development site)</i>		
Population	<p>Sizewell A and B workers and visitors.</p> <p>Users of recreational resources within 5km of the main development site boundary.</p> <p>Settlements within 5km of the main development site include, but are not limited to, Dunwich, Westleton, Eastbridge, Darsham, Yoxford, (Sibton), Kelsale, Carlton, Saxmundham, Knodishall, Sternfield, Friston, Coldfair Green, Leiston, Aldringham, Sizewell, Thorpeness, Middleton.</p>	Volume 2, Chapter 9
Groundwater receptors	<p>Bedrock geology is classified as a ‘Principal’ aquifer with superficial geology classified as a ‘Secondary A’, ‘Secondary B’ and ‘Secondary undifferentiated’ aquifers.</p> <p>The Groundwater Vulnerability map identifies the main development site to be located within an area of high vulnerability.</p> <p>There are two licensed groundwater abstractions located within the main development site and a further 20 located within 1km. A Source Protection Zone (SPZ) III (Outer Zone) and a Source Protect Zone II (Inner Zone) are located approximately 500m and 750m to the west of the main development site.</p>	Volume 2, Chapter 19
Terrestrial (land) receptors	<p>Land surrounding the main development site comprises Grade 2, Grade 3 and Grade 4 agricultural land as well as land classified as ‘Non Agricultural’ and ‘Urban’.</p> <p>The following statutory designated sites are located within 5km of the main development site: Sizewell Marshes SSSI is located within the main development site. Minsmere to Walberswick Heath and Marshes SSSI and Special Area of Conservation (SAC) is located adjacent to the main development site. Minsmere to Walberswick Special Protection Area (SPA) and Ramsar is located adjacent to the main development site. Leiston to Aldeburgh SSSI is located 0.7km from the main development site boundary. Alde-Ore and Butley Estuary SAC, SPA and Ramsar and Alde – Ore Estuary SSSI are located 5km from the main development site boundary.</p> <p>A further six, non-statutory designated sites are located within 2km of the main development site.</p>	Volume 2, Chapters 14 and Multi-Agency Geographic Information for the Countryside (MAGIC) (Ref. 27.73)

Receptor Type	Description	Reference
Freshwater receptors	<p>There are a series of surface water channels and drainage units within the study area, these include The Minsmere New Cut River, The Leiston Drain, Scott's Hall Drain, the Sizewell Marshes and the Minsmere Marshes.</p> <p>There are two licensed surface water abstractions located within 1km of the main development site.</p>	Volume 2, Chapter 19
Marine receptors	<p>Marine receptors include the North Sea and Greater Sizewell Bay. The Greater Sizewell Bay is not a closed system and water exchanges with the rest of the southern North Sea.</p> <p>Outer Thames Estuary SPA is located within and adjacent to the main development site.</p> <p>Three species of marine mammals are known to regularly occur in the Greater Sizewell Bay. These include harbour porpoise (<i>Phocoena phocoena</i>), harbour seal (<i>Phoca vitulina</i>) and grey seal (<i>Halichoerus grypus</i>).</p> <p>No benthic species known to be present in the intertidal habitats of the Greater Sizewell Bay have a related conservation importance.</p> <p>One benthic community spans most of the Greater Sizewell Bay. 20 key taxa have been identified as potentially important and one species of conservation importance has been observed.</p> <p>Two habitats have been identified for their potential conservation and ecological importance within the Greater Sizewell Bay, these include the Coralline Crag and Sizewell-Dunwich Bank.</p>	Volume 2, Chapter 22
Built environment	<p>There are a large number of built heritage assets within 5km of the main development site. These include seven Scheduled Monuments, three Grade I listed buildings and 11 Grade II* listed buildings.</p> <p>No World Heritage Sites are located within the 5km study area.</p>	Volume 2, Chapter 16
Critical infrastructure	Leiston Police Station, Leiston Fire Station, Leiston GP Surgery, existing utilities, B1122	Online mapping

Table 27.5: Existing environmental receptors within the study area of the associated development sites

Receptor Type	Description	Reference
Northern park and ride		
<i>500m radius – maximum study area (on the basis that no significant quantities of hazardous materials would be stored on this site)</i>		
Population	Users of recreational resources within 500m of the northern park and ride site boundary. There are no settlements located within 500m of the northern park and ride site, however a number of residential properties are located to the north, east and south of the site.	Volume 2, Chapter 9
Groundwater receptors	Bedrock geology is classified as a ‘Principal’ aquifer with superficial geology classified as a ‘Secondary undifferentiated’ aquifer. The Groundwater Vulnerability map identifies the northern park and ride site to be located within an area of low vulnerability. There are no licensed groundwater abstractions located within 500m of the northern park and ride site nor is the site located within a Source Protection Zone.	Volume 3, Chapters 11 and 12
Terrestrial (land) receptors	Land surrounding the northern park and ride site comprises Grade 2 and Grade 3 agricultural land. Sillet’s Wood County Wildlife Site and Ancient Woodland is located approximately 300m to the north of the northern park and ride site. Little Nursery woodland is located adjacent to the site and is known to support bats.	Volume 3, Chapter 7 and MAGIC (Ref. 27.73)
Freshwater receptors	An unnamed ordinary watercourse originates to the north-west of the northern park and ride site. The watercourse crosses the East Suffolk line to the south of Willow Marsh Lane and flows southwards along the western boundary of the northern park and ride site. The Darsham Watercourse runs north to south, approximately 100m from the eastern edge of the northern park and ride site. One pond is located within the northern park and ride site boundary and a number of small ponds are located adjacent to the boundary. A dry pond was also recorded in Little Nursery Wood.	Volume 3, Chapter 7 and Chapter 12
Built environment	There are a number of listed structures within the 500m study area, including Grade II listed Oak Hall located 50m to the north-east of the site northern park and ride site boundary.	Volume 3, Chapter 9

Receptor Type	Description	Reference
Critical infrastructure	<p>The A12, providing a road link from London to Lowestoft is located adjacent to the site boundary.</p> <p>The northern park and ride site is located adjacent to the East Suffolk line and Darsham Railway Station is located to the south-west of the site.</p>	Volume 3, Chapter 1
<i>Southern park and ride</i>		
Population	<p>Users of recreational resources within 500m of the southern park and ride site boundary.</p> <p>Settlements within 500m of the southern park and ride site include Lower Hacheston to the south of the site and the outskirts of Wickham Market to the west.</p>	Volume 2, Chapter 9
Groundwater receptors	<p>Bedrock Geology is classified as a ‘Principal’ aquifer with superficial geology classified as a ‘Secondary undifferentiated’ aquifer. The Groundwater Vulnerability map identifies the southern park and ride site to be located within an area of intermediate vulnerability.</p> <p>There is one licensed groundwater abstraction point within 500m of the southern park and ride site, located 60m to the east.</p> <p>The southern park and ride site lies within zone three of the Source Protection Zones, identified as a Total Catchment.</p>	Volume 4, Chapters 11 and 12
Terrestrial (land) receptors	<p>Land surrounding the southern park and ride site comprises Grade 2, Grade 3 and Grade 4 agricultural land.</p> <p>There are no statutory or non-statutory designated ecological sites located within 500m of the southern park and ride site.</p>	Volume 4, Chapter 7 and MAGIC (Ref. 27.73)
Freshwater receptors	<p>A single pond is present within the site and a further five ponds are located within 500m of the southern park and ride site.</p> <p>The River Ore is located approximately 475m north-east of the southern park and ride site boundary at its closest point.</p> <p>There is one licensed surface water abstraction point within 500m of the southern park and ride site, located 420m to the west.</p>	Volume 4, Chapter 12

Receptor Type	Description	Reference
Built environment	Two Grade II listed buildings (Ash Cottage and 36 Ash Road) are located both approximately 500m south of the southern park and ride site boundary.	Volume 4, Chapter 9
Critical infrastructure	The A12, providing a road link from London to Lowestoft is located adjacent to the site boundary.	Volume 4, Chapter 1
Two Village Bypass		
<i>500m radius – maximum study area (on the basis that no significant quantities of hazardous materials would be stored on this site)</i>		
Population	Users of recreational resources within 500m of the two village bypass site boundary. Settlements within 500m of the two village bypass site include Farnham, Stratford St Andrew and Friday Street.	
Groundwater receptors	Bedrock Geology is classified as a 'Principal' aquifer with superficial geology classified as a 'Secondary A' aquifer and the Diamicton deposits classified as 'Secondary undifferentiated'. The two village bypass site is not located within 500m of a groundwater Source Protection Zone. There are six licensed groundwater abstractions within 500m of the two village bypass site.	Volume 5, Chapters 11 and 12
Terrestrial (land) receptors	Land surrounding the two village bypass site comprises Grade 2, Grade 3 and Grade 4 agricultural land. Foxburrow Wood CWS and ancient woodland and Farnham Churchyard CWS are located adjacent and 60m west of the two village bypass site respectively.	Volume 5, Chapter 7 and MAGIC (Ref.27.73)
Freshwater receptors	No ponds are present within the site however, 25 ponds are located within 500m of the two village bypass site. The western end of the two village bypass site crosses the River Alde and floodplain. There is one licensed surface water abstractions within 500m of the two village bypass site.	Volume 5, Chapter 12
Built environment	There are two Grade II* and 13 Grade II listed buildings within 500m of the two village bypass site.	Volume 5, Chapter 9
Critical infrastructure	The two village bypass site connects to the A12 at two points, one south-west of Stratford St. Andrew and one north-east of Farnham.	Volume 5, Chapter 1

Receptor Type	Description	Reference
Sizewell Link Road		
Up to 2km from Sizewell link road site boundary (based on the catchment area modelled for the Sizewell link road)		
Population	Users of recreational resources within 500m of the Sizewell link road site boundary. Settlements within 2km of the Sizewell link road site include, but are not limited to: Yoxford, Middleton Moor, North Green, Middleton, Annesons Corner, Theberton and East Bridge.	
Groundwater receptors	Bedrock Geology is classified as a ‘Principal’ aquifer with superficial geology classified as a ‘Secondary A’ aquifer and the Head deposits classified as ‘Secondary undifferentiated’. The Sizewell link road site is not located within 500m of a groundwater Source Protection Zone. There are eight licensed groundwater abstractions within 1km of the Sizewell link road site.	Volume 6, Chapters 11 and 12
Terrestrial (land) receptors	Land surrounding the Sizewell link road site comprises Grade 2 and Grade 3 agricultural land. There are five statutory designated sites of nature conservation importance within 2km of the site. These are: Minsmere to Walberswick Heaths and Marshes SSSI (525m north-east), Minsmere to Walberswick Heaths and Marshes SAC, SPA and Ramsar site (1.5km north-east) and Sizewell Marshes SSSI (2km south-east). Fifteen non-statutory designated CWS are within a 2km radius of the Sizewell link road site.	Volume 6, Chapter 7 and MAGIC (Ref. 27.73)
Freshwater receptors	No ponds are present within the site however, 107 ponds are located within 500m of the Sizewell link road site. The Middleton Watercourse and the Theberton Watercourse, designated as Main Rivers flow through the site. Additionally, there are three unnamed watercourses within the site. There is one licensed surface water abstractions within 1km of the Sizewell link road site.	Volume 6, Chapter 12
Built environment	There are approximately 30 listed buildings located within 500m of the Sizewell link road site. These include the Grade II listed Gate and Gate Piers at junction of Leiston Road and Onner’s Lane, which is located within the site boundary.	Volume 6, Chapter 9

Receptor Type	Description	Reference
Critical infrastructure	The Sizewell link road is proposed to connect the A12, south of Yoxford to the B1122, south of Theberton, passing over the East Suffolk line, Fordley Road and Pretty Road.	Volume 6, Chapter 1
<i>Yoxford and other highway improvements</i>		
<i>500m radius – maximum study area (on the basis that no significant quantities of hazardous materials would be stored on this site)</i>		
Population	Users of recreational resources within 500m of the Yoxford and other highway improvements site boundary. Settlements located within 500m of the Yoxford and other Highway Improvements site boundary include Yoxford and Benhall. A number of other residential properties are located within 500m of the Yoxford and other Highway Improvements site boundary.	Volume 2, Chapter 9
Groundwater receptors	Bedrock Geology is classified as a ‘Principal’ aquifer with superficial geology on the boundary between a ‘Secondary A’ and ‘Secondary undifferentiated’ aquifer. The Groundwater Vulnerability map identifies the Yoxford and other Highway Improvements site to be located within an area of intermediate and high vulnerability. There are two licensed groundwater abstraction points within 500m of the Yoxford and other Highway Improvements site, located 100m west and 300m south of the site boundary. The Yoxford and other Highway Improvements site is not located within a Source Protection Zone.	Volume 7, Chapters 11 and 12
Terrestrial (land) receptors	Land surrounding the Yoxford and Other Highway improvements site comprises Grade 3 Agricultural land. Roadside Nature Reserve (RNR) 197, is located adjacent to the Yoxford and Other Highway improvements site boundary on the southern side of the B1122 (Middleton Road). Minsmere Village Reckford Bridge to Beveriche Manor County Wildlife site is located 320m east of the Yoxford and Other Highway improvements site.	Volume 7, Chapter 7 and MAGIC (Ref. 27.73)
Freshwater receptors	The bridge at the north of the Yoxford and other Highway Improvements site is the boundary between the River Yox and Minsmere River. There is an additional unnamed ordinary watercourse to the south-east of the Yoxford and other Highway Improvements site. No ponds are located within the Yoxford and Other Highway improvements site, however eleven are located within 500m.	Volume 7, Chapter 7 and Chapter 12

Receptor Type	Description	Reference
	A surface water abstraction point is located 240m to the east of the Yoxford and other Highway Improvements site.	
Built environment	There is one designated heritage asset within the Yoxford and Other Highway improvements site: the Yoxford Conservation Area which continues beyond the boundary, and 26 listed buildings within 500m. These include the Grade I listed Cockfield Hall.	Volume 7, Chapter 9
Critical infrastructure	The A12, providing a road link from London to Lowestoft is located within the site boundary. Yoxford and Peasenhall Primary School is located to the north west of the Yoxford roundabout site. A sewage treatment works is located to the east of the Yoxford roundabout site boundary.	Volume 7, Chapter 1
Freight management facility <i>500m radius – maximum study area (on the basis that no significant quantities of hazardous materials would be stored on this site)</i>		
Population	Users of recreational resources within 500m of the freight management facility site boundary. There are no settlements located within 500m of the freight management facility site, however residential properties to the east of the site are located within 500m.	ONS, 2017 (Ref 27.59)
Groundwater receptors	The Crag Group is the dominant geology type within the freight management facility site. Records of superficial geology for the site as part of the Kesgrave Catchment Subgroup - Sand and Gravel. Bedrock Geology is classified as a 'Principal' aquifer with superficial geology classified as a 'Secondary undifferentiated' aquifer. The Groundwater Vulnerability map identifies the freight management facility site to be located within an area of high vulnerability. There are no licensed groundwater abstraction points located within 500m of the freight management facility site. The freight management facility site is note located within a Source Protection Zone.	Volume 8, Chapters 11 and 12
Terrestrial (land) receptors	Land surrounding the freight management facility site comprises Grade 2 and Grade 3 agricultural land. There are no statutory or non-statutory designated ecological sites located within 500m of the freight management facility site.	Volume 8, Chapter 7 and MAGIC (Ref. 27.73)

Receptor Type	Description	Reference
Freshwater receptors	Two linear waterbodies immediately north of the site boundary. No ponds are located within the freight management facility site, however four are located within 500m. There are no licensed surface water abstraction points located within 500m of the freight management facility site.	Volume 8, Chapter 12 Ordnance Survey mapping
Built environment	There are three scheduled monuments within 500m of the freight management facility site. These are a group of bowl barrows. There are no other designated assets located within 500m of the freight management facility site.	Volume 8, Chapter 9
Critical infrastructure	The A12, providing a road link from London to Lowestoft is located adjacent to the site boundary.	Volume 8, Chapter 1
Rail <i>500m radius – maximum study area (on the basis that no significant quantities of hazardous materials would be stored on this site)</i>		
Population	Users of recreational resources within 500m of the rail proposals site boundary. Leiston and Saxmundham are located within 500m of the rail proposals site boundary.	Volume 2, Chapter 9
Groundwater receptors	The bedrock geology is classified as a ‘Principal’ Aquifer. The groundwater vulnerability is considered to range from ‘low’ through ‘Intermediate’ to ‘High’ in a west to east direction. The Crag Group is the dominant geology type within the rail extension route site. Records of superficial geology for the site as the Lowestoft Formation. The Aquifer Designation map classifies the superficial geology as a ‘Secondary undifferentiated’ aquifer. In addition, the rail extension route site is not located within 500m of any licensed groundwater abstraction points, however is located within ‘zone three’ of the Source Protection Zones, identified as a ‘Total Catchment’. The proposed rail improvement works site is underlain by the Lowestoft Formation with small section of Alluvium Deposits. The Aquifer Designation map classifies the superficial geology as predominantly ‘Secondary undifferentiated’, with small sections of ‘Secondary A’.	Volume 9, Chapters 11 and 12

Receptor Type	Description	Reference
	Three licensed groundwater abstraction point is located with 500m of the rail extension route and rail improvement works sites which are also located within 'zone three' of the Source Protection Zones, identified as a 'Total Catchment'.	
Terrestrial (land) receptors	Land surrounding the Rail proposals site comprises Grade 2 and Grade 3 agricultural land. Buckle's Wood Ancient Woodland and County Wildlife Site is located adjacent to the rail extension route site.	Volume 9, Chapter 7 and MAGIC (Ref. 27.73)
Freshwater receptors	The rail extension route site does not cross any rivers; however Leiston Beck is located approximately 500m to the east of the site. In addition, an ordinary watercourse is identified to the east of the B1122 (Abbey Road). The rail improvement works site intersects the Hundred River. 28 ponds are located within 500m of the rail extension route site. There are no licensed surface water abstraction points with 500m of the rail extension route and rail improvement works sites.	Volume 9, Chapter 12
Built environment	One Scheduled Monument, Leiston Abbey, is located to the north of the rail extension route site within 500m. Woodhouse Farm is located and Fisher's Farmhouse Grade II listed buildings are also located within 500m of the rail extension route site. Saxmundham Conservation Area and 28 listed buildings are located within 500m of the rail improvement works site.	Volume 9, Chapter 9
Critical infrastructure	The rail improvement works site connects to the East Suffolk line. The B1122 (Abbey Road) is intersected by the site and would temporarily be realigned during the construction of a level crossing. Cakes and Ale Holiday Park with static caravan and camping facilities is located to the west of the rail extension route site.	Volume 9, Chapter 1 and Chapter 8

c) Future baseline

27.4.48 The future baseline for the MA&D assessment considers natural population growth and how predicted climate change might affect existing conditions on site. Suffolk is predicted to experience an increased frequency and severity of flooding, sea level rise, more frequent and stronger storms, wetter winters and drier summers. The consideration of increased frequency and severity of natural hazards due to climate change, as per the UKCP18 projections (Ref. 27.74), is inherent to the assessment, as the reasonably foreseeable worst-case consequence of each hazard has been determined.

27.4.49 A review of the identified short list schemes provided in **Volume 10, Appendix 1B** has been undertaken to identify additional critical infrastructure that could introduce new receptors and/ or hazards to be considered as part of the baseline during the construction and operation of the Sizewell C Project. The following scheme was identified:

- DC/18/0322/FUL: an 80,000 cubic metre reservoir covering an area of approximately 3.5 hectares, with the reservoir basin water surface area being 2.48 hectares. The reservoir is to be situated north of Hill Farm Road, 150m from two village bypass and over 3km from all other Sizewell C Project sites. The reservoir will be used to store and supply water to the in hand farming business for the irrigation of crops during the summer months. Risk of reservoir flooding has been considered as part of the overall flooding hazard within the MA&D assessment. Flood risk due to reservoirs is residual, only occurring due to structural failure of the reservoir.

27.4.50 Additionally, the short list provided in **Volume 10, Appendix 1B** identifies a number of schemes which would introduce new population receptors prior to the construction of the Sizewell C Project. However, these are unlikely to result in a substantial increase of population within the study area.

27.5 Environmental design and mitigation

27.5.1 As detailed in **Volume 1, Chapter 6**, a number of primary mitigation measures have been identified through the iterative EIA process and have been incorporated into the design and construction planning of the Sizewell C Project. Tertiary mitigation measures are legal requirements or are standard practices that would be implemented as part of the Sizewell C Project. A summary of primary and tertiary measures relevant to the MA&D assessment is presented below.

a) Primary mitigation

27.5.2 Primary mitigation is often referred to as ‘embedded mitigation’ and includes modifications to the location or design of the development made during the pre-application phase that are an inherent part of the Sizewell C Project. Primary mitigation relevant to MA&D assessment is summarised below.

i. Main development site design

UK EPR™ Generic Design Assessment - Nuclear safety and security

27.5.3 For new nuclear designs, the safety and security principles of a generic reactor design are assessed under the GDA process, overseen by the ONR and the Environment Agency. A Design Acceptance Confirmation (DAC) was granted by the ONR and a Statement of Design Acceptability (SoDA) was issued by the Environment Agency for the UK EPR™ in December 2012, confirming that the risks to the public and the environment associated with the generic UK EPR™ reactor had been eliminated or mitigated by design sufficiently to be considered as acceptable.

27.5.4 A description of the general design and safety aspects of the UK EPR™ design is presented in the pre-construction safety report for the GDA submission (Ref. 27.75). In line with the IAEA Safety Standard, the UK EPR™ utilises a defence in depth philosophy which comprises of five levels:

- A combination of conservative design, quality assurance, and surveillance activities is applied to prevent departures from normal operation;
- Detection of deviations from normal operation is implemented and protection devices and control systems provided to cope with them;
- Engineered safety features and protective systems that are provided to mitigate accidents and consequently to prevent their development into severe accidents, such as making use of redundant systems to provide back up, if one system fails (for example provision of emergency diesel generators and batteries for Loss of Operational Power), diversity of systems to avoid a common failure in one affecting many, and segregated systems to avoid damage due to external events, such as fire;
- Measures are implemented to preserve the integrity of the containment and enable control of severe accidents;

- Off-site emergency response (refer to tertiary mitigation in **section 27.5b**)).

27.5.5 In addition to the defence in depth approach, significant efforts have been made in the reactor design to:

- reduce production of effluents and waste from reactor operation and those arising from dismantling at the end of reactor life,
- improve reactor operation by enabling some maintenance activities to be carried out at power and by reducing operator doses collectively and individually by provisions defined within design, and
- minimise in addition to nuclear hazards all non-nuclear risks to the environment produced by the plant.

Site specific design measures

27.5.6 Site-specific nuclear safety and security measures would be subject to assessment under the nuclear site licensing regime and therefore have been considered to form part of tertiary mitigation (refer to summary in **section 27.5b**)).

27.5.7 However, there a number of design measures which will minimise the vulnerability of Sizewell C to MA&D hazards and are also set out within the DCO application. These include the following (but exclude safety features that form part of standard UK EPR™ design):

- Specification of a minimum platform and SSSI crossing height at 7.3m Above Ordnance Datum (AOD), which would reduce the risk of the main platform and access to it from being flooded. This has been set above the still water level for 1 in 1,000-year return period events for the theoretical maximum lifetime of Sizewell C with an allowance for sea level rise with climate change (refer to **Main Development Site Flood Risk Assessment** (Doc Ref. 5.2) for further information). An adaptive design for the SSSI crossing to enable future raising from 7.3m AOD to 10.5m AOD to reduce the risk of overtopping.
- Provision of a continuous hard coastal sea defence feature which would tie into Sizewell B sea defences, including the rebuilt Northern Mound, and the provision of a sacrificial soft coastal defence feature which would be replenished when it erodes.
- Specification of a minimum sea defence crest height at 10.2m AOD with adaptive design to potentially raise the defence up to 14.2m AOD to reduce the risk of overtopping, if required. The crest height has

been set above the still water level for 1 in 10,000 year return period events over the lifetime of the proposed development with an allowance for sea level rise with climate change (refer to **Main Development Site Flood Risk Assessment** (Doc Ref. 5.2) for further information).

- During initial stages of construction, a temporary reinforced coastal flood defence with crest level of 7m AOD would be built to form a haul road used for construction until the main sea defence is completed.
- To minimise the risk of ground collapse, deep excavation within the cut off wall would be sheet piled and ground anchors used to maintain the stability of slopes. The cut off wall would remain in place during operation and mitigate the risk of groundwater flooding, albeit any underground structures would be designed to be flood resistant.
- The geotechnical design of permanent and temporary development would be required to take into account the ground conditions including the potential for ground movement, compaction, ground gas and ground aggressivity. If required, ground gas mitigation measures would be provided in the buildings on site and other relevant structures, the design of which would be dependent on the risk profile and the nature/usage of the building/structure.
- The use of appropriate drainage systems in accordance with the Outline Drainage Strategy provided in **Volume 2, Appendix 2A** to reduce the potential for contamination to migrate and impact on the ground, groundwaters and surface waters. For permanent development, this would include the use of lined drainage and bypass separators where necessary to protect the ground and underlying groundwater and separate out oils/hydrocarbons for suitable off-site disposal. Surface water drainage and treated effluent would be discharged to the sea in compliance with the requirements of an operational water discharge activity permit (refer to **section 27.5b**)), with sufficient capacity to attenuate flows to maintain safe operation, access and no flooding of safety classified buildings. Furthermore, buildings on the main platform would be built with a flood resistant design. Maintenance and cleaning schedule would be implemented for the management of the drainage system.
- The Outline Drainage Strategy provided in **Volume 2, Appendix 2A** also sets out the principles for the management of surface water and foul water drainage during construction. This includes the use of sustainable drainage systems (SuDS) for the attenuation of runoff and pollution prevention via the use of ditches, swales, bunds, water management zones, oil and petrol interceptors. All foul water

generated during construction from the main and temporary construction areas would be pumped to construction sewage treatment plants and the treated water would then enter the site drainage systems before being discharged to sea, such that there would be no risk to groundwater or surface water receptors. Temporary arrangements would be required until the construction sewage treatment plant is operational. A package treatment plant is likely to be provided at LEEIE to treat domestic foul sewage generated from the facilities in this location, including the proposed caravan park. A groundwater control strategy is proposed to manage groundwater flooding risk at the main development site.

- To mitigate marine navigation risks, intake and outfall structures would be marked with buoys or beacons and offshore pilings for the beach landing facility would be marked with buoys (refer to **Chapter 24** of this volume for further information).
- Provision of on-site temporary water resource storage area for construction water supply (refer to **Chapter 3** of this volume).
- Connection to mains electrical supply would be provided early in the programme.
- If provided, the Combined Heat and Power plant used during construction to power the accommodation campus would be retained during operation for back-up power supply for the emergency equipment store.

27.5.8 In addition during the construction phase, an on-site occupational health service provision will form a planning commitment under the Section 106 agreement (see **draft Section 106 Heads of Terms** provided as an appendix to the **Planning Statement** (Doc. Ref. 8.4)).

ii. **Design features – associated development sites**

27.5.9 Key features that would mitigate MA&D risks embedded within the design of the northern park and ride, southern park and ride and freight management facility include:

- Measures set out within the **Outline Drainage Strategy** provided in **Volume 2, Appendix 2A** for the management of flood risk and pollution prevention, such as:
 - use of permeable surfaces, where possible, to manage the increase in surface water runoff on the site; and

- use of bypass separators, where necessary, to protect the underlying groundwater and surface water receptors.

27.5.10 Key features embedded within the design of the two village bypass that would also mitigate MA&D hazards include:

- the bypass would be a single carriageway, designed in accordance with the Design Manual for Roads and Bridges (DMRB) standards for a 60 miles per hour (mph) design speed;
- flood arch culverts would be provided through the embankment where the road crosses the floodplain;
- measures set out within the **Outline Drainage Strategy** provided in **Volume 2, Appendix 2A**, such as:
 - swales would be provided along the route of the bypass;
 - existing local drainage from surrounding fields would be culverted to ensure their use remains unchanged; and
 - water draining from the road infrastructure would pass through appropriate drainage, including the incorporation of SuDS and petrol/oil interceptors, where necessary.

27.5.11 Key features embedded within the design of the Sizewell link road that would also mitigate MA&D hazards include:

- the link road would be a single carriageway, designed in accordance with the DMRB standards for a 60mph design speed;
- measures set out within the **Outline Drainage Strategy** provided in **Volume 2, Appendix 2A**, such as:
 - up to 14 infiltration basins would be located along the length of the road and would be designed to cater for 100 years flood event plus a 40% allowance for climate change;
 - Swales, up to 3.5m wide, would be provided along the length of the road;
 - water draining from the road infrastructure would pass through appropriate drainage, including the incorporation of SuDS and petrol/oil interceptors, where necessary.

27.5.12 Key features embedded within the design of the Yoxford roundabout and other highway improvements that would also mitigate MA&D hazards include:

- design of the roundabout and the selection of construction materials would be in accordance with the DMRB, British Standards and best practice guidance at the time of the design;
- measures set out within the **Outline Drainage Strategy** provided in **Volume 2, Appendix 2A**, such as:
 - channels, kerb drains or gullies to remove surface water run-off into underground drains; and
 - use of bypass separators where necessary to protect the underlying groundwater and surface water receptors.

27.5.13 Key features embedded within the design of the rail proposals that would also mitigate MA&D hazards include:

- design of the railway and upgraded safe level crossings would be in accordance with relevant Network Rail design standards; and
- measures set out within the **Outline Drainage Strategy** provided in **Volume 2, Appendix 2A**, such as:
 - swales would be created on both sides of the proposed rail extension route in locations where the track is in cutting and where the route is at grade or on an embankment.

b) Tertiary mitigation

27.5.14 Tertiary mitigation would be required regardless of any EIA assessment, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices. Tertiary mitigation of relevance for the MA&D assessment is summarised below.

i. Construction

27.5.15 The following documents submitted with the DCO application incorporate measures that mitigate MA&D risks:

- A **Code of Construction Practice (CoCP)** (Doc Ref. 8.11) has been prepared to set out how construction activities would be managed and controlled in order to deliver the mitigation commitments arising from the Sizewell C project. The CoCP sets out the requirement for construction works to be completed in compliance with accredited safety and environmental management systems, relevant legislation and environmental permits, consents and licences. Requirements would also be set out for information security. The CoCP also sets out

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arrangements in case of an emergency, access for emergency services, monitoring of extreme weather events, an incident response plan, incident drills and auditing, pollution prevention and control measures in the terrestrial and marine environments.

- As required by the **CoCP**, during construction, site security and lighting would be provided 24 hours a day 7 days a week. This would include the provision of fencing and security arrangements which would be monitored on site, including CCTV. Security vetting and drug and alcohol testing would be implemented across the site. Required standards of behaviour as a condition for working on site would be set out in the Workers Code of Conduct.
- To mitigate risks for marine navigation, the **CoCP** also sets out requirements for the notification of mariners and nearby offshore windfarms, implementation of a delivery and logistics plan for Abnormal Indivisible Loads (AILs) and the appointment of a Fisheries Liaison Officer. Should a Competent Harbour Authority be established the Sizewell C Project will look to deploy temporary safety zones, monitored by guard vessels, around sensitive areas of installation and/or maintenance to safely manage navigation. Without a Competent Harbour Authority 'minimum safe passing distances' will be used and promulgated in place of the temporary safety zones.
- The draft **Marine Mammal Mitigation Protocol (Appendix 22N)** of this volume) states that in the case UXOs identified during marine works, appropriate management actions and mitigation measures would be required to minimise effects including the potential for seasonal effects, consideration of alternative disposal methods or relocation. Such measures would be highly dependent on the location of the UXO, HSE considerations and logistical constraints. The available mitigation measures would therefore require review on a case-by-case basis in consultation with statutory consultees.
- Services critical to the Sizewell C Project would be protected at all times during the construction works. Inspection pits for the buried utilities would be undertaken and clearances clearly demarcated on site. Critical services may require back up power supply or batteries.
- The stockpiling of materials on the main development site would be undertaken in accordance with the **Materials Management Strategy** provided in **Appendix 3B** of this volume, with safe slopes maintained to prevent the risk of collapse.
- A **Traffic Incident Management Plan** (Doc Ref. 8.6) has been prepared to describe the arrangements to control Heavy Goods

Vehicles (HGV) and bus movements in the event of an incident on the routes between park and rides and the main development site, and sets out proposals for coordinated working practices between SZC Co, Suffolk County Council and emergency services in the event of a traffic incident. In addition to unplanned incidents, Traffic Incident Management Plan also considers arrangements for planned events, including planned closures of Orwell Bridge and section of A14, the Operation Stack (Ref. 27.72) and Latitude festival. The implementation of this **Traffic Incident Management Plan** would be secured through obligations in a Section 106 Agreement (see **draft Section 106 Heads of Terms** provided as an appendix to the **Planning Statement** (Doc Ref. 8.4)).

- A **Construction Traffic Management Plan** (CTMP) (Doc Ref. 8.7) has been prepared to establish the management of all freight traffic during the construction of the Project (i.e. Heavy Goods Vehicles (HGVs), Light Goods Vehicles (LGVs) and Abnormal Indivisible Loads (AILs) to the main development site and associated development sites. The aims of this are to: minimise the volume of freight traffic associated with the construction of Sizewell C so far as reasonably practicable; maximise the safe and efficient movement of materials required for Sizewell C so far as reasonably practicable; and minimise the impacts both for the local community and visitors to the area using the road network so far as reasonably practicable. The CTMP also sets out arrangements for the management, monitoring and review of Sizewell C construction traffic and AILs (e.g. notifications of AILs to be provided to Highways England, SCC and police). The implementation of this **Construction Traffic Management Plan** would be secured through obligations in a Section 106 Agreement (see **draft Section 106 Heads of Terms** provided as an appendix to the **Planning Statement** (Doc Ref. 8.4)).
- A **Construction Worker Travel Plan** (Doc Ref. 8.8) has been prepared to describe the approaches which would be put in place to ensure successful delivery of this bus-based approach to the daily movement of the construction workforce. The implementation of this **Construction Worker Travel Plan** would be secured through obligations in a Section 106 Agreement (see **draft Section 106 Heads of Terms** provided as an appendix to the **Planning Statement** (Doc Ref. 8.4)).

27.5.16 In addition, during construction contractors would be required to manage sealed sources⁸ for radiography under the contractors' mobile source permit, as part of the SZC Co. management arrangements under the Nuclear Site Licence.

Health and Safety requirements

27.5.17 SZC Co. operates its activities in accordance with the Health and Safety at Work Act 1974 (Ref. 27.32) and other health and safety legislation (e.g. CDM Regulations 2015 (Ref. 27.24), Personal Protective Equipment at Work Regulations 1992 (Ref. 27.35), Lifting Operations and Lifting Equipment Regulations 1998 (Ref. 27.30), COSHH Regulations 2002 (Ref. 27.31) etc).

27.5.18 The contractor(s) would be responsible for setting out how health and safety matters are managed, risks are identified and reduced in accordance with the current best practices and legal requirements. The Health and Safety Plan would provide and focus on the health and safety of the contractor(s) staff and workforce and ensure the health and safety of any visitors to the site and its compounds and members of the general public in the vicinity of any activities. A safe system of work would be established, so that all steps necessary for safe working can be identified.

27.5.19 The contractor(s) would be regularly audited on its health and safety performance. All procedures and processes would be periodically reviewed internally by the contractor(s) and by SZC Co.

ii. Design

27.5.20 All design would be developed in compliance with relevant existing legislative requirements for minimising hazards by design, such as Construction (Design and Management) (CDM) Regulations 2015 (Ref. 27.24), Pressure Systems Safety Regulations 2000 (Ref. 27.25), The Regulatory Reform (Fire Safety) Order 2005 (Ref. 27.26), Building Regulations 2010 (Ref. 27.27), Railways and Other Guided Transport Systems (Safety) Regulations 2006 (Ref. 27.28), and Railways (Interoperability) Regulations 2011 (Ref. 27.29).

27.5.21 Layout and buildings on the main development site would be designed in accordance with Secured by Design principles.

⁸ A sealed radioactive source is radioactive material that is permanently sealed in a capsule or bonded and in a solid form. The capsule of a sealed radioactive source is designed to prevent the radioactive material from escaping or being released during normal usage and under probable accident conditions.

iii. Operation

27.5.22 As set out within **Chapter 4** of this volume, SZC Co. is committed to setting its own high standards in ensuring compliance with all of its legal and regulatory obligations. This would include developing appropriate management arrangements for Sizewell C Project that would utilise best practice from industry regulators and the SZC Co parent company. A key aspect of the management arrangements would be that they would form part of a fully integrated management system, certified to appropriate international standards, and compliant with relevant regulatory requirements, as described below.

Compliance with Nuclear Site Licence

27.5.23 As discussed in **section 27.3(e)**, for compliance with the nuclear site licensing regime, SZC Co. would need to ensure the safe operation of the Sizewell C Project and protection of the workers, public and environment. This includes providing the ONR with a robust Safety Case demonstrating that all hazards associated with the development or that may impact the development are well understood and adequate arrangements are in place to reduce these risks to an acceptable level.

27.5.24 In accordance with the ONR's Safety Assessment Principles (Ref. 27.76) and relevant Technical Assessment Guides, the Safety Case would set out the detailed assessment and protection measures for internal plant faults, internal hazards (such as fire and explosion, internal flooding, steam release, pipe whip and jet impact, internal missiles, toxic or corrosive gas releases, dropped loads etc) and external hazards (such as seismic, meteorological, flooding, geological, electromagnetic interference, space weather, biological, industrial, and other off-site accidental man-made hazards, e.g. aircraft crash).

27.5.25 Malicious attacks and cyber security would be assessed in accordance with ONR's Security Assessment Principles (Ref. 27.77). The ONR Civil Nuclear Security Division is responsible for approving security arrangements within the civil nuclear industry. For instance, the ONR Civil Nuclear Security Division would require for its approval the submission of a Sizewell C site security plan, before the proposed development is brought into use.

27.5.26 The Nuclear Site Licence establishes 36 licence conditions that Sizewell C must operate in accordance with (Ref. 27.78). Nuclear Site Licence Condition 11 requires appropriate emergency plans and arrangements to be established and agreed with the local authority, for the range of accidents and incidents that could occur.

27.5.27 The principle of continuous improvement is central to achieving sustained high standards of nuclear safety, including the requirement for periodic safety reviews. Application of this principle ensures that, no matter how high the standards of nuclear design and subsequent operations are, improvements should always be sought. Seeking and applying lessons learned from events, new knowledge and experience, both nationally and internationally, is a fundamental feature of the periodic safety reviews as part of the Nuclear Site Licence requirements.

27.5.28 The ONR would hold SZC Co. accountable for ensuring that as the operator, it fulfils all its regulatory and legal responsibilities for managing safety and security risks in accordance with the Nuclear Site Licence.

Compliance with other regulatory requirements

27.5.29 Nuclear Installations Act 1965 (Ref. 27.19) underpinning the nuclear site licensing regime is not the only health and safety law that applies for nuclear sites. Nuclear operators must also comply with the relevant statutory provisions of the Health and Safety at Work etc Act 1974 (Ref. 27.32). In particular, radiation protection is regulated under the Ionising Radiations Regulations 2017 (Ref. 27.21) and emergency preparedness and associated radiation protection are regulated against the REPPiR 2019 (Ref. 27.22), but also the Nuclear Industries Security Regulations 2003 (Ref. 27.20) and Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (Ref. 27.23).

27.5.30 Other relevant legislation includes the Management of Health and Safety at Work Regulations 1999 (Ref. 27.33), which require, among other things, a suitable and sufficient risk assessment, the Lifting Operations and Lifting Equipment Regulations 1998 (Ref. 27.30); Personal Protective Equipment at Work Regulations 1992 (Ref. 27.35), Pressure Systems Safety Regulations 2000 (Ref. 27.25), Environmental Permitting Regulations 2016 (Ref. 27.38), Control of Major Accident Hazards (COMAH) Regulations 2015 (Ref. 27.37); Dangerous Substances and Explosive Atmospheres Regulations 2002 (Ref. 27.36), and Planning (Hazardous Substances) Regulations 2015 (Ref. 27.39). This list is not exhaustive.

Compliance with the requirements of REPPiR

27.5.31 REPPiR 2019 (Ref. 27.22) sets out the requirements for emergency preparedness and response in relation to premises which work with ionising radiation. These regulations requires operators to identify all events that have the potential to cause a radiation emergency, and then evaluate the possible on and off-site consequences for the range of events identified. The hazard evaluation and consequence assessment is provided to the

local authority, with a recommended distance for a Detailed Emergency Planning Zone.

- 27.5.32 The local authority would be able to use this information to be better able to develop and implement an effective and proportionate emergency response plan (Off-Site Emergency Plan) specific to the site recognising the local geographical limitations and demographics. ONR would provide independent oversight to this. These duties partially overlap with the requirements of the Nuclear Site Licence discussed above.

Compliance with the requirements of Environmental Permits, COMAH and Hazardous Substances Consent

- 27.5.33 As described in **Volume 1, Chapter 5**, Sizewell C would be operated in accordance with the following environmental permits:

- Combustion Activities permit;
- Operational Water Discharge Activity permit; and
- Radioactive Substances Regulations permit.

- 27.5.34 These permits are granted by the Environment Agency under the Environmental Permitting Regulations 2016 (as amended) (Ref. 27.38) and set out proposed limits to emissions and/or discharges, and monitoring and management arrangements for each of the activities to be regulated. Prior to emissions or discharges related to the combustion and water discharge activities taking place under these permits, operational management plans would need to be developed. This includes the development of Accident and Incident Management Plans, which would supplement the information provided within the environmental permit applications, including quantitative risk assessments of hazards and measures for the prevention and mitigation of these.

- 27.5.35 Emergency arrangements for radiological hazards would be regulated under the Nuclear Site Licence conditions, as described in sections above.

- 27.5.36 In addition, Sizewell C would store and use hazardous substances and would therefore require prior consent under the COMAH Regulations 2015 (Ref. 27.37) and Planning (Hazardous Substances) Regulations 2015 (Ref. 27.39). For compliance with consents under these regulations, SZC Co. would prepare a Major Accident Prevention Policy to ensure that all measures necessary are implemented to prevent major accidents at Sizewell C and limit any consequences to people and the environment. The Major Accident Prevention Policy would detail:

- Roles and responsibilities of those involved in the management of major hazards, including training needs.
- Arrangements to identify and evaluate the potential for major hazards to arise from site activities and to prepare, test and review emergency plans in response to such emergencies. In addition, a management of change, operating and maintenance and processes for managing the integrity of safety and environmental equipment would be established.
- Arrangements for the investigation and corrective action in the event of failure to achieve the stated objectives, aims and standards. Procedures would be in place for the reporting of unsafe or hazardous conditions and for corrective action to correct these conditions and to follow up on the basis of lessons learnt.

27.5.37 The installation would implement well-developed hazard and risk management systems and a philosophy of safe working practices to minimise the potential for environmental impacts.

Marine Navigation

27.5.38 As set out in **Chapter 24**, the following measures are considered to form standard practice for the mitigation of marine navigation risks:

- During deliveries of AIL, a temporary safety zone or minimum safe passing distances would apply, thereby restricting access to beachfront recreational and fishing activities in immediate area.
- A delivery and logistics plan will be developed for AIL deliveries.
- Sizewell C Project cooling water intake/outfall headwork positions would be marked on Admiralty charts.
- Details of the Sizewell C cooling water intake/outfall headwork positions would be included in fishermen's awareness charts issued by Kingfisher.
- Notice to Mariners would be issued to identify presence of infrastructure.

27.6 Assessment

a) Introduction

27.6.1 This section presents the findings of the MA&D assessment for the construction and operation of the Sizewell C Project.

27.6.2 A detailed assessment of MA&D hazards and threats relevant to the construction and operation of the Sizewell C Project is provided in **Appendix 27A** of this volume. A total of 53 hazards or threats were identified for both construction phase (including the operation and removal and reinstatement of associated development where necessary) with 45 identified for the operation of the Sizewell C Project and have been assessed in accordance with the methodology set out in **Volume 1, Appendix 6X**.

b) Construction

i. Potential MA&D hazard sources introduced by the construction of the Sizewell C Project

27.6.3 As part of the MA&D assessment, consideration is given to new MA&D hazard or threat sources that are introduced as a result of the construction of the Sizewell C Project. The following hazard sources have been identified and are considered within the Environmental Risk Record provided in **Appendix 27A** of this volume:

- Fire and/or explosion at the main development site or off-site associated development sites (including UXO).
- Disturbance of unidentified UXO in the marine environment.
- Ground instability, including collapse of deep excavations and stockpiles.
- Major leaks and spillages at the main development site or off-site associated development sites resulting in contamination or release of hazardous substances.
- Loss or failure of electricity transmission through contact with unidentified utilities within Sizewell C Project sites.
- Loss or failure of gas supply through contact with unidentified utilities within Sizewell C Project sites.

- Loss or failure of water supply through contact with unidentified utilities within Sizewell C Project sites.
- Loss or failure of telecommunications through contact with unidentified utilities within Sizewell C Project sites.
- Emergency response activities implemented on a Sizewell C Project sites impacting on sensitive receptors.
- Absent or deficient safety and environmental management systems (e.g. inadequate planning, resource provision, procedures).
- Marine navigation risks as described in **Chapter 24** of this volume.
- Road traffic accidents involving Sizewell C Project construction traffic.
- Construction incident (e.g. major leaks and spillages) within the marine environment.
- Absent or deficient security provision (e.g. inadequate planning, resource provision, procedures).
- Ionising radiation risk from radiography during construction.
- Train derailment or collision.
- Injury to member of public using level crossing.

ii. **Construction risk assessment**

27.6.4 A summary of the construction phase assessment is provided within **Table 27.6**. Further details of the risk assessment can be found in **Appendix 27A** of this volume.

Table 27.6: Assessment of MA&D risks during construction

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
Vulnerability of the proposed development to natural disasters during construction						
C1	Flooding from rivers, surface water, groundwater, reservoirs and sewers	MDS & AD	<p>Extreme rainfall event, subsequent flooding and run-off from the site resulting in damage to on-site and off-site properties, critical infrastructure, built environment receptors, and contamination of groundwater, terrestrial (land), freshwater and marine receptors.</p> <p><u>Not covered under this item:</u></p> <p>Release of contaminants into the environment, resulting in a major pollution incident due to run-off from the construction site (see Risk ID C18 and C19);</p> <p>Disruption to utilities (Covered under risk IDs C20-23 and IDs C41-C44).</p>	<p>On site: Damage to construction equipment and risk of injury to construction personnel due to flooding;</p> <p>Off-site: Damage to and evacuation of affected properties, ecological sites and heritage assets due to flooding as a result of the proposed development; Damage to crops.</p>	<p>Outline Drainage Strategy - sets out measures for the attenuation of flood waters.</p> <p>Code of Construction Practice (CoCP) - sets out requirements for emergency preparedness and monitoring of extreme weather events.</p> <p>Community Safety Management Plan (CSMP) – sets out the requirement for 24/7 on-site emergency response provision. The implementation of the CSMP would be secured through a Section 106 Agreement (see the draft Section 106 Heads of Terms provided as an appendix to the Planning Statement (Doc Ref. 8.4)).</p>	Tolerable (not significant)

⁹ Refer to Volume 1, Appendix 6X for the full assessment criteria.

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
					Flood risk emergency plan - to identify safe access and escape routes, demonstrate free and safe movement of people during a design flood and set out the potential for evacuation before a more extreme event.	
C2	Coastal flooding	MDS	<p>Sea level rise, storm surge and tsunamis flooding the site, resulting in risk of injury of construction personnel, damage to on-site and off-site properties, critical infrastructure, built environment receptors, and contamination of groundwater, terrestrial (land), freshwater and marine receptors.</p> <p><u>Not covered under this item:</u> Release of contaminants into the environment, resulting in a major pollution incident due to run-off from the construction site (see Risk ID C18 and C19);</p> <p>Disruption to utilities (Covered under risk IDs C20-23 and IDs C41-C44).</p>	<p>On site: Collapse and subsidence of ground can lead to damage to equipment and death or injury;</p> <p>Off-site: Damage to property and risk of injury to general public; Physical damage to sensitive environmental receptors.</p>	<p>Main development site design – sea defences incorporated within design and platform height.</p> <p>CoCP - sets out requirements for emergency preparedness and monitoring of extreme weather events.</p> <p>24/7 on-site emergency response provision.</p>	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
C3	Storms and gales	MDS & AD	Strong winds resulting in damage to on-site and off-site properties, critical infrastructure, built environment receptors, risk of injury or death of construction personnel.	<p>On site: Damage to construction equipment and risk of injury or death of construction personnel;</p> <p>Off-site: Damage to property and risk of injury to general public</p>	<p>CoCP - sets out requirements for emergency preparedness and monitoring of extreme weather events.</p> <p>24/7 on-site emergency response provision</p> <p>A safe system of work will be established for the operation of lifting equipment.</p>	Tolerable (not significant)
C4	Drought	MDS & AD	<p>Prolonged periods of dry weather creating hard and dry surfaces across the construction site.</p> <p>Potential creation of dust from construction site due to dry weather</p> <p><u>Not covered under this item:</u></p>	<p>On site: Soiling of equipment;</p> <p>Off-site: Dust deposition on properties, agricultural land, and sensitive environmental sites.</p>	<p>The effects are unlikely to result in serious damage as defined for the purposes of the MA&D assessment¹⁰. Effects due to dust emissions from the construction site and appropriate mitigation have been considered as part of the air quality assessments presented in Volumes 2 to 9 of the ES.</p>	Not a MA&D

¹⁰ Serious damage includes the potential loss of life or permanent injury and/or permanent or long-lasting damage to an environmental receptor which cannot be restored through minor clean-up and restoration efforts and requires the use of resources beyond those of SZC Co. or its contractors to manage. MA&D assessment only considers hazards and threats which have the potential to result in serious damage. Refer to Volume 1, Appendix 6X for further information.

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
			Heat exhaustion of construction personnel (considered under risk ID C5); Wildfires (considered under risk ID C12)			
C5	Heatwave	MDS & AD	Extreme heat impacting construction workers	On site: Heat exhaustion of construction personnel	The effects are unlikely to result in serious damage and therefore, fall within the scope of the MA&D assessment. S106 - Sizewell Health will provide 24/7 first aid on site..	Not a MA&D
C6	Cold and snow	MDS & AD	Low temperatures, snow and ice resulting in risk of injury and contamination of groundwater, terrestrial (land), freshwater and marine receptors. <u>Not covered under this item:</u> Utilities freezing on-site - see disruption to utilities (Covered under risk IDs C20-23 and IDs C41-C43). Icy surfaces resulting in traffic accidents involving construction traffic - see Risk ID C37	On site Risk to the health of construction workers due to freezing temperatures; and Failure of construction machinery	CoCP - sets out requirements for emergency preparedness and monitoring of extreme weather events. 24/7 on-site emergency response provision. A safe system of work would be established for the operation of construction machinery and for undertaking works The contractor is to comply with the provisions of the Health and Safety	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
			Melting snow and ice washing pollutants and contaminants into surrounding areas - see Risk ID C18 and C19		at Work Act 1974, ensuring occupational health and safety arrangements are in place	
C7	Lightning and Electrical storms	MDS & AD	<p>Lightning and electrical storms, resulting in risk of injury or death of construction personnel.</p> <p><u>Not covered under this item:</u></p> <p>Fire at a Sizewell C Project site (considered under risk IDs C14 and C15).</p> <p>Loss of electricity (considered under risk IDs C20)</p> <p>Loss of telecommunications (considered under risk IDs C23)</p>	<p>On site:</p> <p>Damage to construction equipment and risk of injury or death of construction personnel</p>	<p>CoCP - sets out requirements for emergency preparedness and monitoring of extreme weather events.</p> <p>24/7 on-site emergency response provision</p> <p>A safe system of work would be established for the operation of equipment which may attract lightning or for any works at increased risk (e.g. roofing, pipework etc.).</p>	Tolerable (not significant)
C9	Geological hazards, e.g. ground instability, landslides, ground collapse, sinkholes and UXO	MDS & AD	Ground instability resulting in collapse and subsidence of excavations, physical damage to on-site and off-site properties, critical infrastructure, built environment receptors, and terrestrial (land) receptors.	<p>On site:</p> <p>Collapse and subsidence of ground can lead to damage to equipment and death or injury;</p> <p>Off-site:</p>	Geotechnical design - design of earthworks and foundations and selection of materials in accordance with relevant standards, taking into account	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
				Damage to property and risk of injury to general public; Physical damage to sensitive environmental receptors.	potential for ground movement and compaction.	
C10	Seismic hazards such as earthquakes or tremors	MDS & AD	Earthquakes, tremors resulting in physical damage	On site: Collapse and subsidence of ground can lead to damage to equipment or injury; Off-site: Damage to property and risk of injury to general public; Physical damage to sensitive environmental receptors.	24/7 on-site emergency response provision. Geotechnical design - design of earthworks and foundations and selection of materials in accordance with relevant standards, taking into account potential for ground movement and compaction. All safety critical features would be seismically qualified.	Tolerable (not significant)
C11	Space weather (e.g. geomagnetic storms, radiation storms and solar flares)	MDS & AD	Increased radiation risk to human health Disruption to railway signalling <u>Not covered under this item:</u> Loss of communication (covered under risk ID C23 and C44)	On-site Increase in exposure to radiation resulting in illness Disruption to the use of East Suffolk Line,	In line with Public Health England guidance, a significant space weather event may cause people on the ground to receive an unusual radiation dose, however it would be far too small to produce an observable health effect	Not a MA&D

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
			Loss of electricity transmission network (covered under risk IDs C20 and C41)	Saxmundham to Leiston branch line and green rail route	Disruption to railway signalling would stop freight trains from running, however is unlikely to result in serious damage.	
C12	Wildfires	MDS & AD	<p>Wildfire spreading on to site, resulting in risk of injury or death of construction personnel and damage to on-site and off-site properties, critical infrastructure, built environment receptors, and terrestrial (land) receptors.</p> <p><u>Not covered under this item:</u> Emergency response activities could result in impacts on sensitive receptors off-site (covered under risk ID C24)</p>	<p>On site: Damage to construction equipment and risk of injury or death of construction personnel;</p> <p>Off site: Fire spreading from site to a neighbouring site resulting in damage to property and risk of injury or death to the general public; Physical damage to sensitive environmental receptors; Indirect effects on human health, property, heritage assets and wildlife due to smoke and ash deposition.</p>	<p>CoCP - sets out requirements for fire prevention and control.</p> <p>24/7 on-site emergency response provision</p>	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
<i>Vulnerability of the construction of the proposed development to major accidents from on-site sources and the potential major accidents resulting from its construction</i>						
C14	Fire and/or explosion at the main development site	MDS& AD	<p>Fire and/ or explosion at the site resulting in damage to on-site and off-site properties, critical infrastructure, built environment receptors, contamination of groundwater, terrestrial (land), freshwater and marine receptors, injury or death of construction personnel or the general public.</p> <p><u>Not covered under this item:</u> Emergency response activities could result in impacts on sensitive receptors off-site (covered under risk ID C24)</p>	<p>On site: Damage to construction equipment and risk of injury or death of construction personnel;</p> <p>Off-site: Fire spreading from site to a neighbouring site resulting in damage to property and risk of injury or death to the general public; Indirect effects on human health, property, heritage assets and wildlife due to smoke and ash deposition</p>	<p>24/7 on-site emergency response provision. Fire safety risks at the construction site will be managed in compliance with CDM Regulations 2015 and Regulatory Reform (Fire Safety) Order 2005 (England and Wales).</p> <p>Associated development site design - Gas mitigation measures would be provided in the buildings on site and other relevant structures where required, the design of which would be dependent on the risk profile and the nature/usage of the building/structure.</p>	TifALARP (not significant)
C15	Fire and/or explosion at an associated development site					TifALARP (not significant)
C16	Unexploded Ordnance in the marine environment	MDS	<p>Hazards associated with unexploded ordnance resulting in damage to marine receptors, injury or death of construction personnel or the general public.</p>	<p>On site: Death or injury of construction personnel. Mortality and potential mortal injury of fish species and marine mammals</p>	<p>Draft Marine Mammal Mitigation Protocol - detailed marine UXO risk assessment would be used to determine mitigation measures required to minimise risks. If UXOs are discovered at the site, alternative disposal methods and relocation would be considered</p>	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
				Off-site: Mortality and potential mortal injury of fish species and marine mammals	over underwater detonations, if possible.	
C17	Ground instability - collapse of deep excavations and stockpiles	MDS & AD	Collapse of slopes during deep excavations and stockpiling leading to damage to on-site and off-site properties, critical infrastructure, built environment receptors, terrestrial (land), injury or death of construction personnel or the general public	On site: Collapse and subsidence of ground that can lead to damage to equipment and death or injury of construction personnel. Off-site: Damage to property, agricultural land, heritage assets and risk of injury or death to the general public; Physical damage to sensitive environmental sites.	Geotechnical design - design of earthworks and foundations and selection of materials in accordance with relevant standards, taking into account potential for ground movement and compaction. Materials Management Strategy (MMS) - stockpiling of materials will be undertaken in accordance with the MMS. Main development site design - deep excavation within the cut off wall will be sheet piled and ground anchors used to maintain the stability of slopes.	TifALARP (not significant)
C18	Major leaks and spillages at the main development site	MDS	Major leaks and spillages at a Sizewell C project site, resulting in physical	On site:	Outline Drainage Strategy - measures embedded within the	TifALARP

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
	resulting in contamination or release of hazardous substances		damage to on-site and off-site properties, critical infrastructure, built environment receptors, and contamination of groundwater, terrestrial (land), freshwater and marine receptors.	Risk of contact with hazardous substances to construction personnel	drainage design for pollution prevention and control.	(not significant)
C19	Major leaks and spillages at the off-site associated development sites resulting in contamination or release of hazardous substances	AD		Off-site: Risk of contact with hazardous substances by general public; Contamination of sensitive environmental receptors and agricultural land.	CoCP – sets out requirements relating to pollution prevention, including arrangements for pollution incident response and control, compliance with regulatory requirements (such as COSHH Regulations) and environmental permits.	TifALARP (not significant)
C20	Loss or failure of electricity transmission	MDS & AD	Unidentified utilities impacted by excavation, piling, cutting and drilling works. Damage to electricity transmission network from meteorological conditions or due to flooding impacting the proposed development <u>Not covered within this item:</u> Disruption of utilities can lead to an interruption of communications (covered under risk ID C23 and C44)	On site: Failure of equipment reliant on mains power. Disruption to construction activity and the operation of AD sites. Limited ability for an emergency response plan to be implemented, if reliant on mains power, and delay to emergency response. Limited ability to implement and effective	CoCP - sets out requirements for emergency preparedness. Utilities connections would be protected at all times during the construction works. Inspection pits for buried utilities would be performed and clearances clearly demarcated on site. Critical services may require back up power supply or batteries. 24/7 on-site emergency response provision.	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
			and services which may increase other MA&D risks;	safety, security and environmental management systems Off-site Disruption to properties Limited ability for an emergency response plan to be implemented, if reliant on mains power, and delay to emergency response.		
C21	Loss or failure of gas supply	MDS & AD	Unidentified utilities impacted by excavation, piling, cutting and drilling works. Damage to gas supply network from meteorological conditions.	On site Failure of equipment reliant on gas supply (e.g. CHP plant at accommodation campus). Disruption to construction activity and the operation of AD sites. Off-site Disruption to properties	The loss of utilities is unlikely to result in serious damage as defined for the purposes of this assessment. Utilities connections would be protected at all times during the construction works. Inspection pits for buried utilities would be performed and clearances clearly demarcated on site.	Not a MA&D
C22	Loss or failure of water supply	MDS & AD	Unidentified utilities impacted by excavation, piling, cutting and drilling works.	On site:	CoCP - sets out requirements for emergency preparedness. Utilities connections would be protected at	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
			Damage to water supply network from meteorological conditions.	<p>Disruption to construction activity and the operation of AD sites.</p> <p>Limited ability for an emergency response plan to be implemented, if reliant on water supply, and delay to emergency response.</p> <p>Limited ability to implement and effective safety and environmental management systems</p> <p>Off-site Disruption to properties Limited ability for an emergency response plan to be implemented, if reliant on water supply, and delay to emergency response.</p>	<p>all times during the construction works. Inspection pits for buried utilities would be performed and clearances clearly demarcated on site.</p> <p>24/7 on-site emergency response provision.</p> <p>Main development site design - includes water resource storage area for the provision of on-site water supply.</p>	
C23	Loss or failure of telecommunications	MDS& AD	Unidentified utilities impacted by excavation, piling, cutting and drilling works.	On site: Interruption of communications and	CoCP - sets out requirements for emergency preparedness. Utilities connections would be protected at all times during the construction	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
			<p>Loss of telecommunications due to cyber attack</p> <p>Damage to electricity transmission or telecommunications networks from meteorological conditions.</p>	<p>services which may lead to other MA&D risks;</p> <p>Limited ability of an emergency response plan to be implemented and delay to emergency response</p> <p>Limited ability to implement effective safety, security and environmental management systems</p> <p>Off-site</p> <p>Disruption to properties</p> <p>Limited ability for an emergency response plan to be implemented and delay to emergency response</p>	<p>works. Inspection pits for buried utilities would be performed and clearances clearly demarcated on site.</p> <p>24/7 on-site emergency response provision.</p>	
C24	Emergency response activities implemented on the main development site impacting on sensitive receptors	MDS	Implementation of emergency response activities resulting in contamination of groundwater, terrestrial (land), freshwater and marine receptors.	On site: contamination and pollution of identified sensitive environmental receptors	Outline Drainage Strategy - measures embedded within the drainage design for pollution prevention and control.	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
				Off-site: Contamination and pollution of identified sensitive environmental receptors	CoCP – set out requirements relating to pollution prevention, including arrangements for incident response and control, compliance with regulatory requirements (such as COSHH Regulations) and environmental permits	
C25	Absent or deficient safety/ environmental management systems (e.g. inadequate planning, resource provision, procedures)	MDS & AD	Absent or deficient safety/ environmental management systems increasing the risk of any MA&D hazards identified	On site: construction personnel and equipment Off-site: General public Agricultural land Sensitive environmental receptors (ecological and heritage sites, groundwater, surface water and marine receptors)	CoCP – sets out the requirement for construction works to be completed in compliance with accredited safety and environmental management systems (e.g. certified to ISO 45001 and 14001 standards or equivalent)..	TifALARP (not significant)
C26	Marine Navigation (Risk of collision, disruption to activities and vessel grounding)	MDS	Vessel collisions and vessel grounding resulting in resulting in contamination of marine receptors and increased risk of safety for members of the public and construction staff.	On-site/ off-site Loss of life or injury Contamination of the marine environment	CoCP - measures set out within the CoCP to mitigate marine navigation risks during construction, including but not limited to communication of information, compliance with	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
					relevant regulatory requirements, deployment of temporary safety zones around works areas, implementation of a delivery and logistics plan and Fisheries Liaison Officer to safely manage marine navigation. Furthermore, buoyed construction zones and patrol launch to assist vessels in difficulty are proposed.	
C27	Construction within the marine environment	MDS	Construction incident within the marine environment resulting in contamination of marine receptors.	Off-site: Risk of contact with hazardous substances by general public; Contamination of marine environment	CoCP – sets out the requirements relating to pollution prevention in the marine environment, including compliance with relevant environmental permits for construction discharges to the sea, site-wide speed restrictions for all working vessels and compliance with relevant regulatory controls. Measures set out with regards to emergency arrangements and incident control.	TifALARP (not significant)
C28	Absent or deficient security provision (e.g. inadequate planning, resource provision, procedures)	MDS & AD	Absent or deficient security provision resulting in death or risk of injury to construction personnel	On site: Death or risk of injury to construction personnel; Damage to construction equipment	Main development site and associated developments design - Implements Secured By Design principles, provision of security fencing, lighting and CCTV	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
				Off-site: Risk of long term injury of death of members of the public	amongst other security arrangements. CoCP - 24/7 on-site security provision. Security vetting and drug and alcohol testing would be implemented across the site. Required standards of behaviour as a condition for working on site will be set out in the Workers Code of Conduct.	
C29	Ionising radiation risk from radiography during construction	MDS	Ionising radiation risk from radiography during construction, impacting on the health of site workers	On site: Risk of long term injury to construction personnel	CoCP - requirement for compliance with relevant regulatory requirements (e.g. Risk Analysis as required by the CDM Regulation, Ionising Radiation Regulations and regulations for the carriage of dangerous goods) NSL – Contractor mobile permits.	Tolerable (not significant)
C30	Train derailment or collision	MDS & AD	Rail incident on the proposed green rail route	On site: Risk of injury or death to members of the public or construction personnel using a level crossing.	Design and operation in accordance with relevant Network Rail standards.	TifALARP (not significant)

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
				Off-site: Risk of injury or death to members of the public or construction personnel in proximity to the operational railway.		
C31	Injury to member of public using level crossing	MDS & AD		On site: Risk of injury or death to members of the public or construction personnel using a level crossing.	Design and operation in accordance with relevant Network Rail standards.	TifALARP (not significant)
<i>Vulnerability of the construction of the Proposed Development to major accidents from off-site sources</i>						
C32	Civil nuclear incident at Sizewell B	MDS	Nuclear Incident at Sizewell B resulting in risk of injury or death construction staff and damage to on-site and off-site properties, critical infrastructure, built environment receptors, and terrestrial (land) receptors.	On-site: Risk of injury or death to construction workers and damage to equipment/ site	CoCP - sets out requirements for emergency preparedness. 24/7 on-site emergency response provision. NSL - Licence Condition 11 requires emergency arrangements on a nuclear licenced site that will reflect the adjacent hazard and the construction site area will be enveloped with this.	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
C33	Fire at a neighbouring site	MDS & AD	<p>Fire at a neighbouring site impacting on the construction of the proposed development or the operation of temporary associated developments</p> <p><u>Not covered under this item:</u> Potential to result in fire on site (covered under risk ID C14) Impeded access to site, limiting the ability to implement emergency response activities (covered under risk ID C53).</p>	<p>On-site: Indirect effects on human health and equipment due to smoke and ash deposition.</p>	<p>Effects are not likely to fall within the scope of the MA&D assessment. S106 - Sizewell Health will provide 24/7 first aid on site.</p>	Not a MA&D
C34	Explosion and structural collapse at neighbouring sites	MDS & AD	Explosion and structural collapse at neighbouring sites resulting in injury or death of construction personnel.	<p>On site: Falling debris or collapse of infrastructure within the neighbouring area resulting in damage to construction equipment and risk of injury of construction personnel</p>	<p>CoCP - sets out requirements for emergency preparedness. 24/7 on-site emergency response provision.</p>	Tolerable (not significant)
C36	Vandalism/crime leading to increased risk to the safety of members of public and site workers	MDS & AD	Vandalism/crime/terrorism leading to increased risk to the safety of members of public and site workers	<p>On site: Death or risk of injury to construction personnel; Damage to construction equipment</p>	<p>Main development site and associated developments design - Implements Secured by Design principles, provision of security fencing, lighting and CCTV</p>	TifALARP (not significant)

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
				<p>Off-site: Risk of injury or death to the general public.</p>	<p>amongst other security arrangements. CoCP – sets out the requirement for 24/7 on-site security provision. Security vetting and drug and alcohol testing will be implementing across the site. Required standards of behaviour as a condition for working on site will be set out in the Workers Code of Conduct.</p>	
C37	Road Traffic Accident on the wider traffic network (including high consequence dangerous goods)	MDS & AD	Road traffic accidents involving the proposed development's construction traffic or due to highway works associated with proposed development.	<p>Off-site: Death or injury of road users on construction personnel; Damage to properties; Risk of contact with hazardous substances by general public; Contamination of sensitive environmental receptors and agricultural land.</p>	<p>Construction Traffic Management Plan (CTMP) (Doc Ref. 8.7) and Construction Worker Travel Plan (CWTP) (Doc Ref. 8.8) set out measures for the management of construction traffic, including measures to reduce risks associated with road safety. The implementation of the CTMP and CWTP would be secured through a Section 106 Agreement (see the draft Section 106 Heads of Terms provided as an appendix to the Planning Statement (Doc Ref. 8.4)).</p>	TifALARP (not significant)

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
					<p>Traffic Incident Management Plan (TIMP) (Doc Ref. 8.6) (sets out arrangements to control Heavy Goods Vehicles (HGV) and bus movements in the event of an incident on the routes between park and rides and the main development site, and sets out proposals for coordinated working practices between SZC Co, Suffolk County Council and emergency services in the event of a traffic incident. The implementation of the TIMP would be secured through a Section 106 Agreement (see the draft Section 106 Heads of Terms provided as an appendix to the Planning Statement (Doc Ref. 8.4)).</p> <p>Pollution prevention and control measures are set out under risk ID C18 and C19.</p>	
C38	Civil unrest or protest	MDS & AD	<p>Members of the public protesting; Construction staff industrial action Not covered under this item: Criminal damage or vandalism - see risk ID C36.</p>	<p>On site: Disruption to construction activities.</p>	<p>No effects resulting in serious damage as defined for the purposes of this assessment are considered likely to occur as a result of civil unrest or protest.</p>	Not a MA&D

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
C39	Outbreak of Disease (emerging infectious disease or pandemic influenza)	MDS & AD	Disease outbreak and infestation resulting in increased risk to the safety of members of the public and site workers	On site: Death or risk of injury to construction personnel.	S106 - Sizewell Health will provide 24/7 first aid on site.	TifALARP (not significant)
C41	Loss or failure of electricity transmission	MDS & AD	<p>Damage to electricity transmission network from other developments or meteorological conditions impacting on service provision for proposed development.</p> <p><u>Not covered within this item:</u> Disruption of utilities can lead to an interruption of communications (covered under risk ID C23 and C44) and services which may increase other MA&D risk</p>	<p>On site: Failure of equipment reliant on mains power. Disruption to construction activity and the operation of AD sites. Limited ability for an emergency response plan to be implemented, if reliant on mains power, and delay to emergency response. Limited ability to implement and effective safety, security and environmental management systems</p>	<p>CoCP - sets out requirements for emergency preparedness. Critical services may require back up power supply or batteries.</p> <p>24/7 on-site emergency response provision.</p>	Tolerable (not significant)
C42	Loss or failure of gas supply	MDS & AD	Damage to gas supply network from other developments or meteorological conditions impacting on service provision for proposed development.	On site: Failure of equipment reliant on gas supply (e.g. CHP plant at accommodation campus).	The loss of utilities is unlikely to result in serious damage as defined for the purposes of this assessment.	Not a MA&D

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
				Disruption to construction activity and the operation of AD sites.		
C43	Loss or failure of water supply	MDS & AD	Damage to water supply network from other developments or meteorological conditions impacting on service provision for proposed development.	<p>On site: Disruption to construction activity and the operation of AD sites.</p> <p>Limited ability for an emergency response plan to be implemented, if reliant on water supply, and delay to emergency response.</p> <p>Limited ability to implement and effective safety and environmental management systems</p>	<p>CoCP - sets out requirements for emergency preparedness.</p> <p>24/7 on-site emergency response provision.</p> <p>Main development site design - includes water resource storage area for the provision of on-site water supply.</p>	TifALARP (not significant)
C44	Loss or failure of telecommunications	MDS & AD	Damage to electricity transmission or telecommunications networks from other developments or meteorological conditions impacting on service provision for proposed development.	<p>On site: Interruption of communications and services which may lead to other MA&D risks;</p> <p>Limited ability of an emergency response plan to be implemented and delay to emergency</p>	<p>CoCP - sets out requirements for emergency preparedness.</p> <p>24/7 on-site emergency response provision.</p>	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
				response Limited ability to implement effective safety, security and environmental management systems		
C45	Food supply contamination	MDS & AD	Contamination of food supply resulting in increased risk to the safety of member of the public and site workers.	On site: Risk of injury to construction personnel.	24/7 on-site emergency response provision. S106 - Sizewell Health will provide 24/7 first aid on site.	Tolerable (not significant)
C46	Local fuel supply failure	MDS & AD	Risk of disruption to construction activities associated with availability of construction workforce	On site: Disruption to construction processes dependent on fuel supply; Limit the ability to implement and effective safety, security and environmental management systems Limited ability for an emergency response plan to be implemented, if reliant on fuel supply, and	Main development site and associated developments design - connection to mains power would be provided at the early stage of the construction programme. CoCP - sets out requirements for emergency preparedness. Critical services may require back up power supply or batteries. 24/7 on-site emergency response provision.	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
				delay to emergency response.		
C48	Cyber-attack and digital data security	MDS & AD	<p>Hackers</p> <p>Security breach of the construction site</p> <p><u>Not covered under this item:</u></p> <p>Could result in the failure or loss of telecommunications (covered under risk IDs C23 and C44).</p> <p>Unauthorised access to the site and risk of vandalism/ crime/ terrorism (covered under risk ID C36).</p>	<p>On site:</p> <p>Loss of sensitive information which can increase the likelihood of crime/ terrorism/ vandalism;</p> <p>Could limit the ability to implement and effective safety, security and environmental management systems</p>	<p>SZC Co. would implement procedures and processes for dealing with sensitive information. Contractors will be required to comply with SZC Co. requirements for data security.</p>	<p>TifALARP (not significant)</p>
C49	Aviation Crash	MDS & AD	<p>Aircraft incident within the construction site</p> <p><u>Not covered under this item:</u></p> <p>Fire and/ or explosion at the main development site or associated development sites (Covered under Risk ID C14 and C15)</p> <p>Fire at neighbouring site (Covered under Risk ID C33)</p>	<p>On site:</p> <p>Risk of injury to construction personnel.</p>	<p>CoCP - sets out requirements for emergency preparedness.</p> <p>24/7 on-site emergency response provision.</p>	<p>Tolerable (not significant)</p>

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
			Explosion or structural collapse at neighbouring site (Covered under Risk ID C34).			
C50	Failure of financial system	MDS & AD	<p>Failure of the financial system resulting in a reduced public services</p> <p>Not covered under this item: Impacts on the ability of an emergency response plan to be implemented (Covered under Risk ID C53)</p>	<p>On site: Limited ability of an emergency response plan to be implemented and delay to emergency response Increased response time or lack of available resources may lead to other MA&D risks</p>	<p>CoCP - sets out requirements for emergency preparedness.</p> <p>24/7 on-site emergency response provision.</p>	Tolerable (not significant)
C51	Radiation releases from foreign nuclear sites	MDS & AD	Exposure of construction staff to radiation from foreign nuclear matter	<p>On site: Risk of harm to the health of construction personnel</p>	<p>24/7 on-site emergency response provision.</p> <p>S106 - Sizewell Health will provide 24/7 first aid on site.</p>	Tolerable (not significant)
C52	Influx of British Nationals	MDS & AD	Displacement of construction staff in local accommodation resulting in disruption to construction activity	No pathway to create a MA&D	Effects are not likely to fall within the scope of the MA&D assessment.	Not a MA&D
<p><i>Construction of the Proposed Development impacting on the vulnerability of a receptor to a MA&D hazard</i></p>						

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of Risk ⁹
C53	Limiting the ability of an emergency response plan to be implemented	MDS & AD	<p>Access for emergency services to construction site being restricted</p> <p>Construction works impeding or obstructing the response of emergency services for another site.</p> <p>Delivery of Abnormal Indivisible Loads (AIL) restricting the response of emergency services</p>	<p>On-site/ off-site</p> <p>Full or partial obstruction to the operation of emergency services, leading to a slow response time and increased number of deaths/ injuries or spread of contamination for risk events described for construction.</p>	<p>CTMP - sets out arrangements for the management, monitoring and review of Sizewell C construction traffic and AILs (e.g. notifications of AILs to be provided to Highways England, SCC and police).</p> <p>Main development site design: Multiple emergency access routes provided to the main development site.</p>	TifALARP (not significant)

c) Operation

i. Potential MA&D hazard sources introduced by the operation of the Sizewell C

27.6.5 As part of the MA&D assessment, consideration is given to new MA&D hazard or threat sources that are introduced as a result of the operation of Sizewell C. The following hazard sources have been identified and are considered within the Environmental Risk Record provided in **Appendix 27A** of this volume:

- Civil nuclear incident or major accident at Sizewell C (including nuclear incidents, internal hazards, aircraft crash, major leaks and spillages etc);
- Marine navigation risks as identified in **Chapter 24** of this volume.
- Ground instability and disturbance of UXO during maintenance works.
- Major leaks and spillages at two village bypass and Sizewell link road resulting in contamination or release of hazardous substances.
- Loss or failure of electricity transmission through contact with unidentified utilities within Sizewell C Project sites during maintenance.
- Loss or failure of gas supply through contact with unidentified utilities within Sizewell C Project sites during maintenance.
- Loss or failure of water supply through contact with unidentified utilities within Sizewell C Project sites during maintenance.
- Loss or failure of telecommunications through contact with unidentified utilities within Sizewell C Project sites during maintenance.
- Impacts on road safety caused by the operational traffic of the proposed development.
- Emergency response activities implemented on the main development site impacting on sensitive receptors.
- Absent or deficient safety/ environmental management systems (e.g. inadequate planning, resource provision, procedures).
- Absent or deficient security provision (e.g. inadequate planning, resource provision, procedures).

ii. Operation risk assessment

- 27.6.6 A summary of the operation phase assessment is provided within **Table 27.6**. Further details of the risk assessment can be found in **Appendix 27A** of this volume.

Table 27.7: Assessment of MA&D risks during operation

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
Vulnerability of the Proposed Development to natural disasters during operation						
O1	Flooding from rivers, surface water, groundwater, reservoirs and sewers	MDS/AD	<p>Extreme rainfall event, subsequent flooding and run-off from the site resulting in damage to on-site and off-site properties, critical infrastructure, built environment receptors, and contamination of groundwater, terrestrial (land), freshwater and marine receptors.</p> <p>Not covered under this item: Release of contaminants into the environment, resulting in a major pollution incident due to run-off from the site (see Risk ID O14 and O17); Disruption to utilities (Covered under risk IDs O18-21 and IDs O34-O37). Malfunctioning of equipment resulting in an accident (see risk ID O14)</p>	<p>On site: Damage to Sizewell C infrastructure and risk of injury to operational personnel due to flooding;</p> <p>Off-site: Damage to and evacuation of affected properties due to flooding; Damage to crops; Physical damage to sensitive environmental receptors;</p>	<p>Main development site design – sea defences incorporated within design and platform height. Discharge of surface water drainage and treated effluent to the sea in compliance with an operational water discharge activity permit. Furthermore, buildings on the main platform would be built with a flood resistant design. Cut off wall would remain in place during operation which will mitigate the risk of groundwater flooding and any underground structures would be designed to be flood resistant.</p> <p>Nuclear Site Licence (NSL) - in compliance with the conditions of the NSL, emergency arrangements would be established, and adequate arrangements implemented for safe operation.</p> <p>Flood risk emergency plan - to identify safe access and escape routes,</p>	Tolerable (not significant)

¹¹ Refer to Volume 1, Appendix 6X for the full assessment criteria.

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
O2	Coastal flooding	MDS	<p>Sea level rise, storm surge and tsunamis flooding the site, resulting in damage to on-site and off-site properties, critical infrastructure, built environment receptors, and contamination of groundwater, terrestrial (land), freshwater and marine receptors.</p> <p>Not covered under this item: Release of contaminants into the environment, resulting in a major pollution incident due to run-off from the site (see Risk ID O14 and O17); Disruption to utilities (Covered under risk IDs O18-21 and IDs O34-O37). Malfunctioning of equipment resulting in an accident (see risk ID O14)</p>	<p>On site: Collapse and subsidence of ground can lead to damage to equipment and death or injury;</p> <p>Off-site: Damage to property and risk of injury to general public; Physical damage to sensitive environmental receptors;</p>	<p>demonstrate free and safe movement of people during a design flood and set out the potential for evacuation before a more extreme event.</p> <p>Generic Design Assessment (GDA) - safety measures embedded within design through the GDA process.</p> <p>Associated developments design - Two village bypass final finished ground levels have been set to be above the fluvial flood levels during a 1 in 100-year with an allowance for climate change. Similarly, the proposed development will not be at risk of surface water flooding due to the highway drainage design. There is very limited risk of flooding of Sizewell link road, and highway improvements sites.</p>	TifALARP (not significant)
O3	Storms and gales	MDS/ AD	<p>Flooding of the site and properties downstream Run-off from site Not covered under this item: Release of contaminants into the environment, resulting in a major</p>	<p>On site: Damage to Sizewell C infrastructure and risk of injury or death of operational personnel and road users;</p>	<p>NSL - in compliance with the conditions of the NSL, emergency arrangements would be established, and adequate arrangements implemented for safe operation.</p>	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			<p>pollution incident due to run-off from the site (see Risk ID O14 and O17);</p> <p>Disruption to utilities (Covered under risk IDs O18-21 and IDs O34-O37).</p> <p>Malfunctioning of equipment resulting in an accident (see risk ID O14)</p>		GDA - safety measures embedded within design through the GDA process	
O4	Drought	MDS/ AD	<p>Prolonged periods of dry weather creating hard and dry surfaces across the site.</p> <p>Potential creation of dust from site due to dry weather</p> <p>Not covered under this item:</p> <p>Heat exhaustion of personnel (considered under risk ID O5);</p> <p>Wildfires (considered under risk ID O12)</p>	<p>On site:</p> <p>Soiling of equipment;</p> <p>Off-site:</p> <p>Dust deposition on properties, agricultural land, and sensitive environmental sites;</p>	The effects are unlikely to result in serious damage as defined for the purposes of the MA&D assessment ¹² . Effects due to dust emissions from the operation of the site and appropriate mitigation have been considered as part of the air quality assessments presented in Volumes 2 to 9 of the ES.	Not a MA&D
O5	Heatwave	MDS/ AD	<p>Extreme heat impacting operational workers</p> <p>Not covered under this item:</p>	<p>On site:</p> <p>Heat exhaustion of operational personnel;</p>	The effects are unlikely to fall within the scope of the MA&D assessment.	Not a MA&D

¹² Serious damage includes the potential loss of life or permanent injury and/or permanent or long-lasting damage to an environmental receptor which cannot be restored through minor clean-up and restoration efforts and requires the use of resources beyond those of SZC Co. or its contractors to manage. MA&D assessment only considers hazards and threats which have the potential to result in serious damage. Refer to Volume 1, Appendix 6X for further information.

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			Malfunctioning of equipment resulting in an accident (see risk ID O14)			
O6	Cold and snow	MDS/ AD	<p>Extreme cold weather resulting in snow and ice on site</p> <p>Not covered under this item: Utilities freezing on-site - see disruption to utilities (Covered under risk IDs O18-21 and IDs O34-O37). Icy surfaces resulting in traffic accidents - see Risk ID O29 Melting snow and ice washing pollutants and contaminants into surrounding areas - see Risk ID O14 and O17 Malfunctioning of equipment resulting in an accident (see risk ID O14)</p>	<p>On site Risk to the health of operational personnel due to freezing temperatures;</p>	<p>NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation. GDA - safety measures embedded within design through the GDA process</p>	Tolerable (not significant)
O7	Lightning and Electrical storms	MDS/ AD	<p>Risk of cloud-to-ground lightning striking within site during operation and maintenance activities</p> <p>Not covered under this item:</p>	<p>On site: Damage to Sizewell C infrastructure and risk of injury or death of operational personnel.</p>	<p>NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation.</p>	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			<p>Fire at the main development site (considered under risk IDs O14).</p> <p>Loss of electricity (considered under risk IDs O18)</p> <p>Loss of telecommunications (considered under risk IDs O21)</p>		GDA - safety measures embedded within design through the GDA process	
O8	Reduced visibility, e.g. due to volcanic ash, dust, sand or fog	MDS/AD	<p>Volcanic eruptions overseas can produce ash clouds which may reach the UK and impact on the construction site.</p> <p>Reduced visibility due to weather.</p> <p>Not covered under this item: Traffic accidents - see risk ID O29</p>	<p>On site: Deposition of ashes and sand on site.</p> <p>Reduced visibility limiting operational activities.</p>	The effects are unlikely to result in serious damage as defined for the purposes of this assessment.	Not a MA&D
O9	Geological hazards, e.g. ground instability, landslides, ground collapse, sinkholes	MDS/AD	Unstable ground conditions, landslides, sinkholes following heavy rainfall.	Risks associated with existing ground conditions (e.g. ground instability) get mitigated during the construction of the proposed development. Therefore during operation, no hazard source - receptor pathway remains	N/A	TifALARP (not significant)
O10	Seismic hazards such as earthquakes or tremors	MDS/AD	<p>Earthquakes, tremors resulting in physical damage</p> <p>Not covered under this item: Traffic accidents - see risk ID O29</p>	<p>On site: Collapse and subsidence of ground can lead to damage to</p>	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established and adequate arrangements implemented for safe	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			Damage to equipment/ structures resulting in a nuclear incident (see risk ID O14)	equipment and risk of injury or death to operational personnel; Off-site: Damage to property and risk of injury to general public; Physical damage to sensitive environmental receptors.	operation. Seismic qualification of safety critical structures. GDA - safety measures embedded within design through the GDA process	
O11	Space weather (e.g. geomagnetic storms, radiation storms and solar flares)	MDS/ AD	Disruption of telecommunications Not covered under this item: Loss of telecommunication (covered under risk ID O21 and O37) Loss of electricity transmission network (covered under risk IDs O18 and O34) Malfunctioning of equipment resulting in an accident (see risk ID O14)	On site: Increase in exposure to radiation resulting in illness	In line with Public Health England guidance, a significant space weather event may cause people on the ground to receive an unusual radiation dose, however it would be far too small to produce an observable health effect	Not a MA&D
O12	Wildfires	MDS/ AD	Risk of cloud-to-ground lightning striking within site during operation and maintenance activities Not covered under this item: Fire at the main development site (considered under risk IDs O14). Loss of electricity (considered under risk IDs O18)	On site: Damage to buildings and equipment and risk of injury or death of operational personnel; Indirect effects on human health, property, heritage assets and wildlife due to smoke and ash deposition.	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation. GDA - safety measures embedded within design through the GDA process	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			Loss of telecommunications (considered under risk IDs O21)	Off-site: Fire spreading from site to a neighbouring site resulting in damage to property and risk of injury or death to the general public; Physical damage to sensitive environmental receptors; Indirect effects on human health, property, heritage assets and wildlife due to smoke and ash deposition.		
O13	Extreme humidity conditions (high and low);	MDS/AD	Periods of high and low humidity impacting the site Not covered under this item: Malfunctioning of equipment resulting in an accident (see risk ID O14)	On site: Risk of illness for operational personnel.	The effects are unlikely to fall within the scope of the MA&D assessment.	Not a MA&D
<i>Vulnerability of the operation of the Proposed Development to major accidents from on-site sources and the potential major accidents resulting from its operation</i>						
O14	Nuclear incident	MDS	Nuclear incident Internal Missiles, explosions, Fire and flooding Internal Explosions Internal Fire Internal Flooding	On-site: Risk of injury or death to workers Off-site: Risk of injury or death to general public Contamination of	GDA - Nuclear safety principles established as part of the Generic Design Assessment process and subsequent detailed safety assessment process.	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			Internal Electromagnetic Interference (EMI) / Radiofrequency interference (RFI) Accidental aircraft crash Malfunctioning of equipment Major leaks and spillages Radiography	sensitive environmental receptors	<p>NSL - Compliance with the requirements of Nuclear Site Licence</p> <p>REPPIR - On-site and off-site emergency arrangements in compliance with REPPIR</p> <p>COMAH and HSC - Compliance with the requirements of operational environmental permits, COMAH consent and Hazardous Substances Consent</p> <p>Environmental permits - discharges will be made in compliance with the requirements of the water discharge activity, combustion activity and radioactive substances regulations permits.</p>	
O15	Marine Navigation	MDS	Risk of collision, disruption to activities and vessel grounding	On-site/ off-site Loss of life or injury Contamination of the marine environment	<p>Main development site design - Intake/outfall structures will be marked with buoys or beacons.</p> <p>Offshore pilings for the BLF will be marked with buoys.</p>	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
					<p>During AIL deliveries, a temporary safety zone or minimum safe passing distances will apply, thereby restricting access to beachfront recreational and fishing activities in immediate area.</p> <p>A delivery and logistics plan will be developed for AIL deliveries.</p> <p>Cooling water intake/outfall headwork positions will be marked on Admiralty charts.</p> <p>Details of the cooling water intake/outfall headwork positions will be included in fishermen's awareness charts issued by Kingfisher.</p> <p>Notice to Mariners to identify presence of infrastructure.</p>	
O16	Ground instability and Unexploded Ordnance	MDS/AD	<p>Collapse of ground during maintenance activities</p> <p>Disturbance of unidentified UXO within the site</p>	Risks associated with existing ground conditions (e.g. ground instability) get mitigated during the construction of the proposed development. Therefore, during operation, no	N/A	Not a MA&D

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
				hazard source - receptor pathway remains.		
O17	Major leaks and spillages at two village bypass and Sizewell link road resulting in contamination or release of hazardous substances	AD	Leaks and spillages from road traffic accidents; Contaminated run-off from site;	On site: Risk of contact with hazardous substances to workforce and general public Off-site: Risk of contact with hazardous substances by general public; Contamination of sensitive environmental receptors and agricultural land.	Outline Drainage Strategy - measures embedded within the drainage design for pollution prevention and control.	Tolerable (not significant)
O18	Loss or failure of electricity transmission	MDS/ AD	Damage to electricity transmission network from meteorological conditions or due to flooding impacting the site Not covered under this item: Disruption of utilities can lead to an interruption of communications (covered under risk ID O21 and O37) and services which may increase other MA&D risk Malfunctioning of equipment resulting in an accident (see risk ID O14)	On site: Failure of equipment reliant on mains power. Limited ability for an emergency response plan to be implemented, if reliant on mains power, and delay to emergency response. Limited ability to implement an effective safety, security and environmental management systems Off-site Disruption to properties	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation.. GDA - safety measures embedded within design through the GDA process REPPiR - On-site and off-site emergency arrangements in compliance with REPPiR	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
				Limited ability for an emergency response plan to be implemented, if reliant on mains power, and delay to emergency response.		
O19	Loss or failure of gas supply	MDS	Damage to gas supply network from meteorological conditions	On-site Failure of back up CHP plant	The loss of gas supply is unlikely to result in serious damage as defined for the purposes of this assessment	Not a MA&D
O20	Loss or failure of water supply	MDS/ AD	Damage to water supply network from meteorological conditions.	On site: Disruption to operation Limited ability for an emergency response plan to be implemented, if reliant on water supply, and delay to emergency response. Limited ability to implement and effective safety and environmental management systems	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation. GDA - safety measures embedded within design through the GDA process REPPPIR - On-site and off-site emergency arrangements in compliance with REPPPIR	TifALARP (not significant)
O21	Loss or failure of telecommunications	MDS/ AD	Cyber Attack Damage to electricity transmission or telecommunications networks from meteorological conditions.	On site: Interruption of communications and services which may lead to other MA&D risks; Limited ability of an emergency response plan to be	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation.	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
				implemented and delay to emergency response Limited ability to implement effective safety, security and environmental management systems	GDA - safety measures embedded within design through the GDA process REPPIR - On-site and off-site emergency arrangements in compliance with REPPIR	
O22	Emergency response activities implemented on the main development site impacting on sensitive receptors	MDS/AD	Water from fire extinguishing draining into environmentally sensitive areas and/ or controlled waters	Off-site: Contamination and pollution of identified sensitive environmental receptors	Outline Drainage Strategy - measures embedded within the drainage strategy for pollution prevention and control. NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation. GDA - safety measures embedded within design through the GDA process	Tolerable (not significant)
O23	Absent or deficient safety/ environmental management systems (e.g. inadequate planning, resource provision, procedures)	MDS/AD	Increased risk of MA&D hazards described within this register.	As described within this register for all hazards relevant to the operation phase.	NSL - Procedures and processes are required and are routinely audited by both internal and external regulators under the Nuclear Site Licence (LC17)	TifALARP (not significant)
O24	Absent or deficient security provision (e.g. inadequate	MDS/AD	Increased risk of vandalism/ crime/ terrorism	On site: Risk of long term injury or death of operational personnel	NSL - Procedures and processes are required and are routinely audited by	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
	planning, resource provision, procedures)			Damage to Sizewell C infrastructure Off-site: Risk of long term injury of death of members of the public	both internal and external regulators under the Nuclear Site Licence (LC17)	
<i>Vulnerability of the Proposed Development to major accidents from off-site sources</i>						
O25	Civil nuclear incident at Sizewell B	MDS	Civil nuclear incident at Sizewell B impacting Sizewell C	On-site: Risk of injury or death to construction workers and damage to equipment/ site	GDA - Nuclear safety principles established as part of the Generic Design Assessment process NSL - Compliance with the requirements of Nuclear Site Licence REPPiR - On-site and off-site emergency arrangements in compliance with REPPiR	TifALARP (not significant)
O26	Fire at a neighbouring site	MDS/AD	Fire at a neighbouring site impacting on the operation of the proposed development Not covered under this item: Potential to result in fire on site (covered under risk ID O14)	On site: Indirect effects on human health and equipment due to smoke and ash deposition.	Effects are not likely to fall within the scope of the MA&D assessment.	Not a MA&D

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			Impeded access to site, limiting the ability to implement emergency response activities (covered under risk ID O45) Malfunctioning of equipment resulting in an accident (see risk ID O14).			
O27	Explosion and structural collapse at neighbouring sites	MDS/ AD	Explosion and structural collapse at a neighbouring site impacting on the operation of the proposed development Not covered under this item: Impeded access to site, limiting the ability to implement emergency response activities (covered under risk ID O45) Malfunctioning of equipment resulting in an accident (see risk ID O14).	On site: Falling debris or collapse of infrastructure within the neighbouring area resulting in damage to equipment and risk of injury of personnel;	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation.	Tolerable (not significant)
O28	Contamination or release of hazardous substances by off-site sources	MDS/ AD	Contamination or release of hazardous substances from off-site sources impacting on the operation of the proposed development.	On site: Risk of contact with hazardous substances to operational personnel	Effects are not likely to fall within the scope of the MA&D assessment.	Not a MA&D

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
O29	Impacts on road safety caused by the operational traffic of the proposed development	MDS/ AD	Increase in road traffic and changes to junction layouts Traffic accident on the wider network involving the carriage of high consequence dangerous goods associated with Sizewell C	On site/ Off-site Death or injury of road users or operational personnel Damage to properties; Risk of contact with hazardous substances by general public; Contamination of sensitive environmental receptors and agricultural land.	Highways have been designed in accordance with the Design Manual for Roads and Bridges and other relevant design standards. Compliance with legislative requirements for the carriage of dangerous goods. See risk ID O17 for pollution prevention.	TifALARP (not significant)
O30	Vandalism/crime/terrorism leading to increased risk to the safety of members of public and site workers	MDS/ AD	Criminal damage/ vandalism; Theft; Terrorist acts; Unauthorised vehicles accessing the construction site; Direct Vehicle Impact; Ionising radiation risk radiation exposure from stolen goods.	On site: Death or risk of injury to operational personnel Damage to Sizewell C infrastructure Off-site: Death or risk of injury to members of the general public	NSL - in compliance with the conditions of the NSL, security arrangements will be established, and adequate arrangements implemented for safe operation. GDA - security measures embedded within design through the GDA process	TifALARP (not significant)
O31	Civil unrest or protest	MDS/ AD	Members of the public protesting; Operational staff industrial action Not covered under this item: Criminal damage or vandalism - see risk ID O30.	On site: Disruption to operation and potential damage to Sizewell C infrastructure.	No effects resulting in serious damage as defined for the purposes of this assessment are considered likely to occur as a result of civil unrest or protest.	Not a MA&D

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
O32	Outbreak of disease (emerging infectious disease or pandemic influenza)	MDS/AD	Disease outbreak or epidemics impacting the workers.	On site: Death or risk of injury to operational personnel.	NSL - in compliance with the conditions of the NSL, security arrangements will be established, and adequate arrangements implemented for safe operation.	TifALARP (not significant)
O33	Animal health – notifiable disease;	MDS/AD	Disease outbreak impacting the movement of operational workers and materials. Not covered under this item: Impacts on limiting emergency response activities are considered under risk ID O45	On site: Restricted access to site impacting on Sizewell C operations which may lead to other hazards	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation.	TifALARP (not significant)
O34	Loss or failure of electricity transmission	MDS/AD	Power shortage in the wider electricity transmission network. Damage to electricity transmission network by other development or meteorological conditions impacting on the service provision for proposed development. Not covered within this item: Disruption of utilities can lead to an interruption of communications (covered under risk ID O21 and O37) and services which may increase other MA&D risks;	On site: Failure of equipment reliant on mains power. Limited ability for an emergency response plan to be implemented, if reliant on mains power, and delay to emergency response. Limited ability to implement an effective safety, security and environmental management systems	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation. GDA - safety measures embedded within design through the GDA process REPPiR - On-site and off-site emergency arrangements in compliance with REPPiR	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			Malfunctioning of equipment resulting in an accident (see risk ID O14)			
O35	Loss or failure of gas supply	MDS	Shortage in the wider gas supply network. Damage to gas supply network by other development or natural disaster.	On-site Failure of back up CHP plant	The loss of gas supply is unlikely to result in serious damage as defined for the purposes of this assessment	Not a MA&D
O36	Loss or failure of water supply	MDS/ AD	Shortage in the wider water supply network. Damage to water supply network by other development or natural disaster.	On site: Disruption to operation Limited ability for an emergency response plan to be implemented, if reliant on water supply, and delay to emergency response. Limited ability to implement and effective safety and environmental management systems	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation. GDA - safety measures embedded within design through the GDA process REPPiR - On-site and off-site emergency arrangements in compliance with REPPiR	TifALARP (not significant)
O37	Loss or failure of telecommunications	MDS/ AD	Power shortage in the wider electricity transmission network. Damage to electricity transmission or telecommunications networks	On site: Interruption of communications and services which may lead to other MA&D risks;	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation.	TifALARP (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			by other development or meteorological conditions.	Limited ability of an emergency response plan to be implemented and delay to emergency response Limited ability to implement effective safety, security and environmental management systems	GDA - safety measures embedded within design through the GDA process REPPIR - On-site and off-site emergency arrangements in compliance with REPPIR	
O38	Food supply contamination	MDS/AD	Pollution incident Large radiation releases from nuclear matter	On site: Death or risk of injury to construction personnel.	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation. REPPIR - On-site and off-site emergency arrangements in compliance with REPPIR	Tolerable (not significant)
O39	Local fuel supply failure	MDS/AD	Risk of disruption to operational activities associated with travel to site and movement of materials	On site: Disruption to operation; May increase another MA&D risk; Could limit the ability to implement and effective safety, security environmental management systems	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation. REPPIR - On-site and off-site emergency arrangements in compliance with REPPIR	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
				Could limit the ability of an emergency response plan to be implemented		
O40	Poor air quality	MDS/AD	Off-site event resulting in the release of particulate matter and hazardous gases into the surrounding environment.	On site: Risk of harm to health to operational personnel	Effects are not likely to fall within the scope of the MA&D assessment.	Not a MA&D
O41	Cyber-attack and digital data security	MDS/AD	Hackers Security breach of at the operational site Not covered under this item: Could result in the failure or loss of telecommunications (covered under risk IDs O21 and O37). Unauthorised access to the site and risk of vandalism/ crime/ terrorism (covered under risk ID O30).	On site: Loss of sensitive information which can increase the likelihood of crime/ terrorism/ vandalism; Could limit the ability to implement and effective safety, security and environmental management systems	NSL - in compliance with the conditions of the NSL, information security arrangements will be established, and adequate arrangements implemented for safe operation.	TifALARP (not significant)
O42	Failure of financial system	MDS/AD	Failure of the financial system resulting in a reduced public services Not covered under this item. Impacts on the ability of an emergency response plan to be	On site: Limited ability of an emergency response plan to be implemented and delay to emergency response	NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation.	Tolerable (not significant)

NOT PROTECTIVELY MARKED

ID	Hazard	Site	Risk Event	Reasonably Foreseeable Worst Case Consequence (unmitigated)	Summary of Primary and Tertiary Mitigation	Tolerability of risk ¹¹
			implemented (Covered under Risk ID O45)	Increased response time or lack of available resources may lead to other MA&D risks	REPPiR - On-site and off-site emergency arrangements in compliance with REPPiR	
O43	Radiation releases from foreign nuclear sites	MDS/AD	Exposure of operational personnel to foreign nuclear matter	On site: Risk of harm to the health of construction personnel	Effects are not likely to fall within the scope of the MA&D assessment. S106 - Sizewell Health will provide 24/7 first aid on site.	Tolerable (not significant)
O44	Influx of British Nationals	MDS/AD	Displacement of operation personnel in local accommodation resulting in disruption to operation	No pathway to create a MA&D	N/A	Not a MA&D
Operation of the proposed development impacting on the vulnerability of a receptor to a MA&D hazard						
O45	Limiting the ability of an emergency response plan to be implemented	MDS/AD	<p>Access for emergency services to site being restricted or disruption to public services</p> <p>Impacts on the ability of an emergency response plan to be implemented</p> <p>Delivery of Abnormal Indivisible Loads (AIL) restricting the response of emergency services</p>	<p>On-site/ Off-site</p> <p>Insufficient access to emergency services, leading to a slow response time and increased number of deaths/ injuries or spread of contamination</p>	<p>NSL - in compliance with the conditions of the NSL, emergency arrangements will be established, and adequate arrangements implemented for safe operation.</p> <p>REPPiR - On-site and off-site emergency arrangements in compliance with REPPiR</p>	TifALARP (not significant)

d) Inter-relationship effects

27.6.7 The MA&D assessment has inherently considered inter-relationship effects with other topics being assessed as part of the EIA which have the potential to lead to a risk event or to affect identified receptors. However, as MA&D are extreme and rare events, they are unlikely to combine with the normal effects of construction or operation of the Sizewell C Project as detailed within the topic assessments presented in **Volumes 2 to 10**.

27.7 Mitigation and monitoring

a) Introduction

27.7.1 Following the identification of the reasonably foreseeable worst-case environmental effects, consideration was given to primary and tertiary mitigation in classifying risks. An iterative approach was adopted for the identification of mitigation measures where a risk event had the potential for long-term or irreversible harm to an environmental resource and/or receptor. With the implementation of primary and tertiary mitigation measures, as set out in **sections 27.5 and 27.6** above, all MA&D risks are considered to have been mitigated to 'not significant'.

27.7.2 However, where reasonably practicable, secondary mitigation measures have been proposed to mitigate these risks further to be ALARP.

b) Secondary mitigation

27.7.3 Table 5.1 in the **Community Safety Management Plan (CSMP)** (Doc Ref. 8.16) sets out a range of measures that will contribute to both worker and community safety, health and wellbeing on the Sizewell C Project. These include 24/7 on site security and fire and rescue capability.

27.7.4 Where appropriate, implementation of the measures set out in the **CSMP** will be secured through obligations in the **Section 106 Agreement** (see draft **Section 106 Heads of Terms**, provided as Appendix J to **Planning Statement** (Doc Ref. 8.4)) or via the **CoCP** Doc Ref. 8.11) (which will itself be secured by requirement).

27.7.5 As detailed in the geology and land quality assessments provided in **Volume 2, Chapter 18** and **Volumes 3 to 9, Chapter 11**, ground investigation would be undertaken to inform the detailed design of the Sizewell C Project and confirm ground conditions, contamination status and other ground related risks, and mitigation required to manage these risks. This would be completed prior to the commencement of construction works. Intrusive ground investigation may also be undertaken post operation of temporary development as part of the removal and reinstatement phase.

27.7.6 Furthermore, where required, an additional assessment of the UXO risk across the site would be undertaken in the form of a detailed UXO desk study and risk assessment. If required, mitigation measures would then be implemented as appropriate.

27.7.7 As detailed in **Chapter 19** of the volume, a flood risk emergency plan in accordance with the standards set out in Appendix D of the Environment Agency and Office for Nuclear Regulation Joint Advice Note (Ref. 27.79) would be developed to identify safe access and escape routes, demonstrate free and safe movement of people during a design flood and set out the potential for evacuation before a more extreme event.

27.7.8 As detailed in the **Chapter 24** of the volume, a number of measures are required to bring assessed impacts to ALARP. These include the provision of buoyed construction zone within the marine environment, to clearly mark construction areas and avoid risks associated with vessels entering the construction area and the use of patrol launch to assist vessels in difficulty.

27.7.9 In addition, as identified in **Chapter 9** of this volume, the socio-economics impact assessment concludes that whilst wider effects on emergency services may be not significant, engagement with emergency service providers has identified that there may be local factors and service-specific factors that contribute to disproportionate demand on a day-to-day basis which will need to be mitigated through financial contributions secured by the section 106 agreement. SZC Co. would provide such financial contributions towards additional resourcing where necessary to address identified net additional levels of effects for the emergency service providers (see **draft Section 106 Heads of Terms** provided as an appendix to the **Planning Statement** (Doc Ref. 8.4)). These contributions would also account as mitigation for MA&D events with less serious consequences. With mitigation in place, as described in this chapter, the risk of significant MA&D events occurring that would require the resource of emergency services over and beyond those assessed in **Chapter 9** of this volume is extremely unlikely to occur over the lifetime of the Sizewell C Project. It is noted that emergency planning provisions for civil nuclear incidents are covered separately under the REPIR requirements.

27.8 Residual effects

27.8.1 The following tables (**Tables 27.8** and **27.9**) present a summary of the MA&D assessment. They identify the receptor/s likely to be impacted, the level of effect and, where the effect is deemed to be significant, the tables include the mitigation proposed and the resulting residual effect.

Table 27.8: Summary of effects for the construction phase

Receptor	Impact	Primary or Tertiary Mitigation	Assessment of Effects	Additional Mitigation	Residual Effects
<p>On site</p> <ul style="list-style-type: none"> Construction personnel and Sizewell C Project infrastructure Sensitive environmental receptors <p>Off-site</p> <ul style="list-style-type: none"> Properties General Public Sensitive environmental receptors 	<p>Vulnerability of the Sizewell C Project to Natural disaster hazards:</p> <ul style="list-style-type: none"> Flooding from rivers, surface water, groundwater, sewers, reservoir Coastal flooding Storms and Gales Drought Heatwave Cold and snow Lightning and Electrical Storms Geological hazards, e.g. ground instability, landslides, ground collapse and sinkholes Seismic hazards such as earthquakes or tremors Space weather (e.g. geomagnetic storms, radiation storms and solar flares) Wildfires Extreme humidity condition (high and low) 	<ul style="list-style-type: none"> Measures embedded within design as set out in section 27.5 Outline Drainage Strategy provided in Volume 2, Appendix 2A CoCP (Doc. Ref. 8.11) Geotechnical Design Compliance with legislation 	<p>Ranging from 'Not a MA&D' to Tolerable or Tolerable if ALARP</p>	<ul style="list-style-type: none"> Section 106 Agreement (see the draft Section 106 Heads of Terms provided as an appendix to the Planning Statement (Doc Ref. 8.4)). Ground Investigation Flood risk emergency plan 	<p>Ranging from 'Not a MA&D' to Tolerable or Tolerable if ALARP</p> <p>(not significant)</p>
<p>On site</p> <ul style="list-style-type: none"> Construction personnel and Sizewell C Project infrastructure 	<p>Vulnerability of Sizewell C Project to Major Accident hazards and other hazards/ threats:</p> <ul style="list-style-type: none"> Fire and/or explosion at the main development site 	<ul style="list-style-type: none"> Measures embedded within design as set out in section 27.5 Outline Drainage Strategy provided in Volume 2, Appendix 2A 	<p>Ranging from 'Not a MA&D' to, Tolerable or Tolerable if ALARP</p>	<ul style="list-style-type: none"> Section 106 Agreement (see the draft Section 106 Heads of Terms provided as an appendix to 	<p>Ranging from 'Not a MA&D' to Tolerable or Tolerable if ALARP</p>

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Receptor	Impact	Primary or Tertiary Mitigation	Assessment of Effects	Additional Mitigation	Residual Effects
<ul style="list-style-type: none"> • Sensitive environmental receptors <p>Off-site</p> <ul style="list-style-type: none"> • Properties • General Public • Agricultural Land • Sensitive environmental receptors 	<ul style="list-style-type: none"> • Fire and/or explosion at the off-site associated development sites • Unexploded Ordnance in the marine and terrestrial environment • Ground collapse during construction • Major leaks and spillages • Loss or failure of electricity transmission • Loss or failure of water supply • Loss or failure of telecommunications • Emergency response activities implemented on a Sizewell C Project site impacting on sensitive receptors • Absent or deficient safety and environmental management systems • Marine Navigation • Construction within the marine environment • Absent or deficient security provision • Ionising radiation risk from radiography during construction • Train derailment or collision • Injury to member of public using level crossing • Civil nuclear incident at Sizewell B • Fire at a neighbouring site • Explosion and structural collapse at neighbouring sites 	<ul style="list-style-type: none"> • CoCP (Doc. Ref. 8.11) • Geotechnical Design • Compliance with legislation • Design features • Compliance with design standards and operational requirements • Section 106 Agreement (see the draft Section 106 Heads of Terms provided as an appendix to the Planning Statement (Doc Ref. 8.4)). • CTMP (Doc. Ref. 8.7) • CWTP (Doc. Ref. 8.8) • TIMP (Doc. Ref. 8.6) • 24/7 on-site emergency response provision. 		<ul style="list-style-type: none"> • the Planning Statement (Doc Ref. 8.4)). • UXO desk study and risk assessment 	<p>(not significant)</p>

Receptor	Impact	Primary or Tertiary Mitigation	Assessment of Effects	Additional Mitigation	Residual Effects
	<ul style="list-style-type: none"> Contamination or release of hazardous substances by off-site sources Vandalism/crime/terrorism Road Traffic Accident on the wider traffic network (including high consequence dangerous goods) Outbreak of disease (emerging infectious disease or pandemic influenza) Food supply contamination Local fuel supply failure Cyber-attack and digital data security Failure of financial system Radiation releases from foreign nuclear sites Influx of British Nationals Impacts on the ability of an emergency response plan to be implemented 				

Table 27.9: Summary of effects for the operational phase

Receptor	Impact	Primary or Tertiary Mitigation	Assessment of Effects	Additional Mitigation	Residual Effects
On site <ul style="list-style-type: none"> Operational personnel and Sizewell C Project infrastructure 	Vulnerability of Sizewell C Project to Natural Disaster hazards: <ul style="list-style-type: none"> Flooding from rivers, surface water, groundwater and sewers 	<ul style="list-style-type: none"> Measures embedded within design as set out in section 27.5 Outline Drainage Strategy provided in Volume 2, Appendix 2A 	Ranging from 'Not a MA&D', to Tolerable or Tolerable if ALARP	<ul style="list-style-type: none"> Flood risk emergency plan 	Ranging from 'Not a MA&D' to Tolerable or

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Receptor	Impact	Primary or Tertiary Mitigation	Assessment of Effects	Additional Mitigation	Residual Effects
<ul style="list-style-type: none"> • Sensitive environmental receptors <p>Off-site</p> <ul style="list-style-type: none"> • Properties • General Public • Sensitive environmental receptors 	<ul style="list-style-type: none"> • Coastal flooding • Storms and Gales • Drought • Heatwave • Cold and snow • Lightning and Electrical Storms • Geological hazards, e.g. ground instability, landslides, ground collapse and sinkholes • Seismic hazards such as earthquakes or tremors • Space weather (e.g. geomagnetic storms, radiation storms and solar flares) • Wildfires • Extreme humidity condition (high and low) 	<ul style="list-style-type: none"> • Nuclear Site Licence • Generic Design Assessment 			Tolerable if ALARP (not significant)
<p>On site</p> <ul style="list-style-type: none"> • Operational personnel and Sizewell C Project infrastructure • Sensitive environmental receptors <p>Off-site</p>	<p>Vulnerability of Sizewell C Project to Major Accident hazards and other hazards and threats:</p> <ul style="list-style-type: none"> • Civil nuclear incident or major accident at Sizewell C • Marine Navigation • Ground instability and Unexploded Ordnance • Major leaks and spillages at two village bypass and Sizewell link road resulting in 	<ul style="list-style-type: none"> • Design features • Outline Drainage Strategy • NSL • GDA • REPPiR • COMAH and HSC • Environmental Permits • Offshore pilings for the BLF will be marked with buoys. 	Not a MA&D, Tolerable or Tolerable if ALARP	None required	Not Significant

NOT PROTECTIVELY MARKED

NOT PROTECTIVELY MARKED

Receptor	Impact	Primary or Tertiary Mitigation	Assessment of Effects	Additional Mitigation	Residual Effects
<ul style="list-style-type: none"> • Properties • General Public • Sensitive environmental receptors 	<ul style="list-style-type: none"> • contamination or release of hazardous substances • Loss or failure of electricity transmission • Loss or failure of gas supply • Loss or failure of water supply • Loss or failure of telecommunications • Emergency response activities implemented on the main development site impacting on sensitive receptors • Absent or deficient safety/ environmental management systems (e.g. inadequate planning, resource provision, procedures) • Absent or deficient security provision (e.g. inadequate planning, resource provision, procedures) • Civil nuclear incident at Sizewell B • Fire at a neighbouring site • Explosion and structural collapse at neighbouring sites • Contamination or release of hazardous substances by off-site sources; • Impacts on road safety caused by the operational traffic of the proposed development 	<ul style="list-style-type: none"> • Marking of Sizewell C infrastructure of Admiralty charts and fisherman’s awareness charts • Notify Mariners of presence of Sizewell C infrastructure 			

Receptor	Impact	Primary or Tertiary Mitigation	Assessment of Effects	Additional Mitigation	Residual Effects
	<ul style="list-style-type: none"> • Vandalism/crime/terrorism leading to increased risk to the safety of members of public and site workers • Civil unrest or protest • Outbreak of disease (emerging infectious disease or pandemic influenza) • Animal health – notifiable disease; • Loss or failure of electricity transmission • Loss or failure of gas supply • Loss or failure of water supply • Loss or failure of telecommunications • Food supply contamination • Local fuel supply failure • Poor air quality • Cyber-attack and digital data security • Failure of financial system • Radiation releases from foreign nuclear sites • Influx of British Nationals • Limiting the ability of an emergency response plan to be implemented 				

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