



Nuclear
Decommissioning
Authority



NDA Strategy (2021)

Integrated Impact Assessment Report

Volume 3: Baseline Report and Policy and Legislative
Context Review

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Baseline Report

1.0 Introduction

1.1 Introduction

This report presents the baseline environmental, health and socio-economic conditions at each of the 17 sites that make up the Nuclear Decommissioning Authority (NDA) estate. The information contained within this report will be used to inform the Integrated Impact Assessment (IIA) of the NDA Strategy, which sets out the NDA's strategic approach to undertaking decommissioning activities across its sites.

Environmental baseline conditions have been established through desk-based research using Geographic Information System applications such as DEFRA's MAGIC application, and from consulting Site Specific Baseline Reports produced by the Site Licence Companies (SLCs) which manage the NDA sites. These reports cover a broad range of environmental aspects and indicators, including topics such as air quality, noise, biodiversity, flora and fauna and the water environment. As these reports have been produced according to the scope of the Strategic Environmental Assessment (SEA) of the previous NDA Strategy (2016), much of the information is relevant for the IIA of the NDA Strategy (2021).

In line with the SEA Directive [1] requirement to consider the likely evolution of the baseline, future environmental baseline conditions have been established, where possible, using the Site-Specific Baseline Reports and local authority development plans and strategies. Information on site end states has also been obtained from the Site-Specific Baselines. Future baseline information covering topics such as air quality and climate change has been obtained from a variety of sources and is presented in Chapter 4.

In addition to environmental baseline conditions, an overview of the demographic, health and socio-economic characteristics of the local communities neighbouring the sites is provided in the form of Community Profiles. These profiles cover issues of importance to Health Impact Assessment (HIA) and Socio-economic Impact Assessment (SeIA) identified through desk-top collection of data at national, regional and local spatial scales. The data sources used to develop these profiles are listed in Section 1.2.

1.2 Sources

1.2.1 Office for National Statistics (ONS)

The ONS is the UK's largest independent producer of official statistics and is the recognised national statistical institute for the UK. Its duties are the collection, compilation, analysis and dissemination of a range of economic, health, social and demographic statistics derived from the 2011 Census.

The geographical scope of the data is predominantly England and Wales, with Scotland's Census Data Explorer providing access to aggregated and anonymised results from the Scottish regional census. As none of the NDA sites considered in this report are located in Northern Ireland, data collection has focused on England, Scotland and Wales.

1.2.2 Indices of Multiple Deprivation (IMD)

Indices of Multiple Deprivation (IMD) indicate the relative deprivation of areas calculated by ranking pre-defined small population areas on the basis of a number of domains. Scores for the small areas can also be combined to provide an analysis of the relative deprivation of different Local Authority or Council Areas; this information is presented in Appendix A.

IMD are calculated for each devolved administration and the approach used in each country is slightly different. In England, the assessed domains are:

- income;
- employment;

- education, skills and training;
- health deprivation and disability
- crime;
- barriers to housing and services;
- living environment.

The Scottish domains are similar, but include geographic access to services and do not include disability, barriers to services or living environment. The Welsh domains do include a measure of access to services, but do not include disability, living environment or geographic access to services.

1.2.3 NOMIS Office Labour Market Statistics

NOMIS is a service provided by the ONS to give access to detailed UK labour market statistics from the 2011 Census. The main advantage of this data source is the uniform coverage of England, Scotland and Wales, allowing for consistent data collection and comparison.

1.2.4 Cancer Incidence

Cancer incidence is reported per 100,000 of the population per year and is age standardised. Cancer Research UK provides cancer incidence data for UK countries for the year 2017 [2]. European Age-Standardised incidence rates per 100,000 population are used. Local statistics were taken from the following sources:

- Macmillan Cancer Support Local Cancer intelligence England [3], which provides the average yearly cancer incidence between 2011 and 2015 in different Clinical Commissioning Groups (CCGs). CCGs were identified using the NHS England website [4], checking whether CCGs had been merged since 2015 to ensure the correct CCG was identified.
- ISD Scotland data, which includes incidence up to 2017 for different health boards [5]; and
- The Welsh Cancer Intelligence and Surveillance Unit data, which includes incidence up to 2017 for different local authorities [6].

1.2.5 British Heart Foundation

Statistics on heart and circulatory disease are available from the British Heart Foundation [7,8,9]. Various health statistics are available, including the average number of deaths in a set period and age-standardised death rates by age, gender and region.

1.2.6 Site Baseline Information

Environmental Management Plans for Magnox sites have been used to inform the site-specific environmental baselines where available [10,11,12,13,14,15,16]. The Strategic Environmental Assessment of the Dounreay site [17] has been used to inform the Dounreay environmental baseline. Documents produced as part of the Low Level Waste Repository (LLWR) Environmental Safety Case (ESC) have been used to inform the LLWR environmental baseline [18,19,20,21].

Employment data for sites was taken from the underpinning data used to produce the Nuclear Skills Strategy Group's Nuclear Workforce Assessment 2019 [22].

Cultural heritage information was taken from the National Heritage List for England [23], Historic Environment Scotland [24] and Historic Wales [25].

2.0 The Nuclear Decommissioning Authority estate

The Nuclear Decommissioning Authority (NDA) estate comprises 17 sites across England, Wales and Scotland (Figure 2-A) [26]. Ten sites have Magnox nuclear power stations that are either planned for or undergoing decommissioning. The other seven sites have performed a variety of operations involved in the nuclear fuel cycle. This includes research, uranium enrichment, fuel fabrication, fuel reprocessing and waste storage. The current status of these sites is outlined below.

2.1 Sellafield (SLC – Sellafield Ltd)

The Sellafield site, located 15 km south of Whitehaven, Cumbria covers an area of approximately 265 hectares [27]. Ongoing operations centre upon a range of nuclear fuel cycle activities undertaken in various facilities across the site. The site also incorporates Calder Hall, a four reactor Magnox nuclear power station (formerly grid-supplying), Windscale Advanced Gas Reactor and the Windscale Piles reactors.

Works at Sellafield commenced in 1947, with Calder Hall becoming operational in 1956 and shutting down in 2003. Commercial reprocessing at Sellafield is expected to run until 2020, at which time the Magnox reprocessing plant, which reprocesses spent Magnox fuel, will be shut down.

Sellafield is the UK's largest and most complex nuclear site. Its history dates back to the earliest days of the UK's defence and civil nuclear programmes and as such many of the decisions taken in the early days of the industry did not focus on the future consequences for clean-up. A prime example of this is the cooling ponds used to store waste cladding and fuel in the 1970s which remain a top management priority for the NDA today.

2.2 Magnox nuclear power stations (SLC – Magnox Ltd)

Ten former grid-supplying nuclear power stations are currently undergoing decommissioning. The sites are managed by Magnox Ltd which manages them on behalf of the NDA. The location and history these sites are detailed in Table 2-A. Magnox became a subsidiary of the NDA on 1 September 2019, and has a new Board and Executive Team. At the time of writing this IIA, the new Executive Team were in the process of assessing the position and reviewing the lifetime plans for Magnox sites.

Table 2-A: Magnox Power Stations in the NDA Estate

Site	Location	Construction & Operation		Defueled
		Built	Generation	
Berkeley	20 km south west of Stroud, South West England	1957	1962 to 1989	1992
Bradwell	17 km south of Colchester, East of England	1957	1962 to 2002	2002
Chapelcross	3.5 km north east of Annan, Scotland West	1955	1959 to 2004	2013
Dungeness A	22.5 km south west of Folkestone, South East England	1960	1965 to 2006	2012
Hinkley Point A	12.5 km north west of Bridgewater, South West England	1957	1965 to 2000	2004
Oldbury	5.5 km north west of Thornbury, Gloucestershire, South West England	1961	1967 to 2012	2016
Hunterston A	7.5 km south of Largs, Scotland West	1957	1964 to 1990	1995
Sizewell A	30 km south of Lowestoft, East of England	1960	1966 to 2006	2014
Trawsfynydd	8 km south of Blaenau Ffestiniog, Wales	1960	1965 to 1991	1995

Site	Location	Construction & Operation		Defueled
		Built	Generation	
Wylfa	16 km north east of Holyhead, Wales	1963	1971 to 2015	2019

2.3 Nuclear research facilities (SLC – Magnox Ltd)

The NDA has two sites in its estate that previously operated experimental reactors during the early stages of nuclear energy research. These are Harwell and Winfrith, both managed by Magnox Ltd.

2.3.1 Harwell

Harwell is an Atomic Energy Research Establishment situated approximately 20 km south of Oxford, Oxfordshire. Operations began in 1946, with a total of five research reactors and other nuclear facilities operational at the site at various times. The last reactor was shut down in 1990.

2.3.2 Winfrith

Winfrith is a nuclear facility that has hosted nine research and development reactors, two of which are still present on site. The site is located approximately 13 km south-east of Dorchester, Dorset. Construction of the site began in 1957 and the SGHWR reactor supplied electricity to the grid from 1968 to 1990. Decommissioning is currently underway, and the interim end state is expected to be reached after demolition of the remaining reactors (SGHWR and Dragon) in 2023 [27]¹.

2.4 Dounreay (SLC – Dounreay Site Restoration Limited)

Dounreay is a nuclear site situated in the Scottish Highlands, 14 km west of Thurso. The facility has operated three experimental test reactors, the first of which, the Materials Test Reactor was constructed in 1955 and operated until 1969. The Dounreay Fast Reactor was operated from 1962 to 1977, until it was eventually replaced by the Prototype Fast Reactor (PFR) in 1975. This was operated until 1994. Defuelling is ongoing and expected to be completed by 2025, with the target for delivering the interim end state between 2032 and 2033 [27].

2.5 Capenhurst uranium enrichment facility (via Capenhurst Nuclear Services)

Capenhurst is a nuclear site located 4 km to the south west of Ellesmere Port in Cheshire. The site contains a former gas diffusion plant used for uranium enrichment built in the early 1950s. Commercial enrichment of uranium in the gas diffusion facility first began in 1961 and ceased in 1982. Enrichment at the Capenhurst site continues today under the ownership of Urenco UK Ltd using centrifuge technology. Capenhurst has also been identified as the site for the UK's long-term uranium storage.

2.6 Springfields nuclear fuel manufacturing facility (via Springfields Fuels Limited)

Springfields, situated 7 km west of Preston, is leased to Westinghouse Electric UK Holdings Ltd. The site manufactures fuel for all major designs of nuclear reactor and provides most of the UK's nuclear fuel. Springfields decommissioning and clean-up operations started in 1990 with the Post Operational Clean Out of the old UKAEA Springfields Nuclear Fuels Laboratories.

¹ This date is subject to change following review by the new Magnox Executive [27].

2.7 Low Level Waste Repository (SLC – LLW Repository Ltd)

The Low Level Waste Repository (LLWR) is a Low Level Radioactive Waste (LLW) disposal facility located adjacent to Drigg in Cumbria. Construction began in 1959 and initial LLW storage comprised seven lined trenches that are now monitored and have been covered with an interim cap to prevent water ingress. Modern LLW storage comprises two vaults where grouted containers of LLW are stored. This storage facility is part of the NDA’s long-term LLW disposal plan. Final site clearance is anticipated to be achieved in 2135 [27].

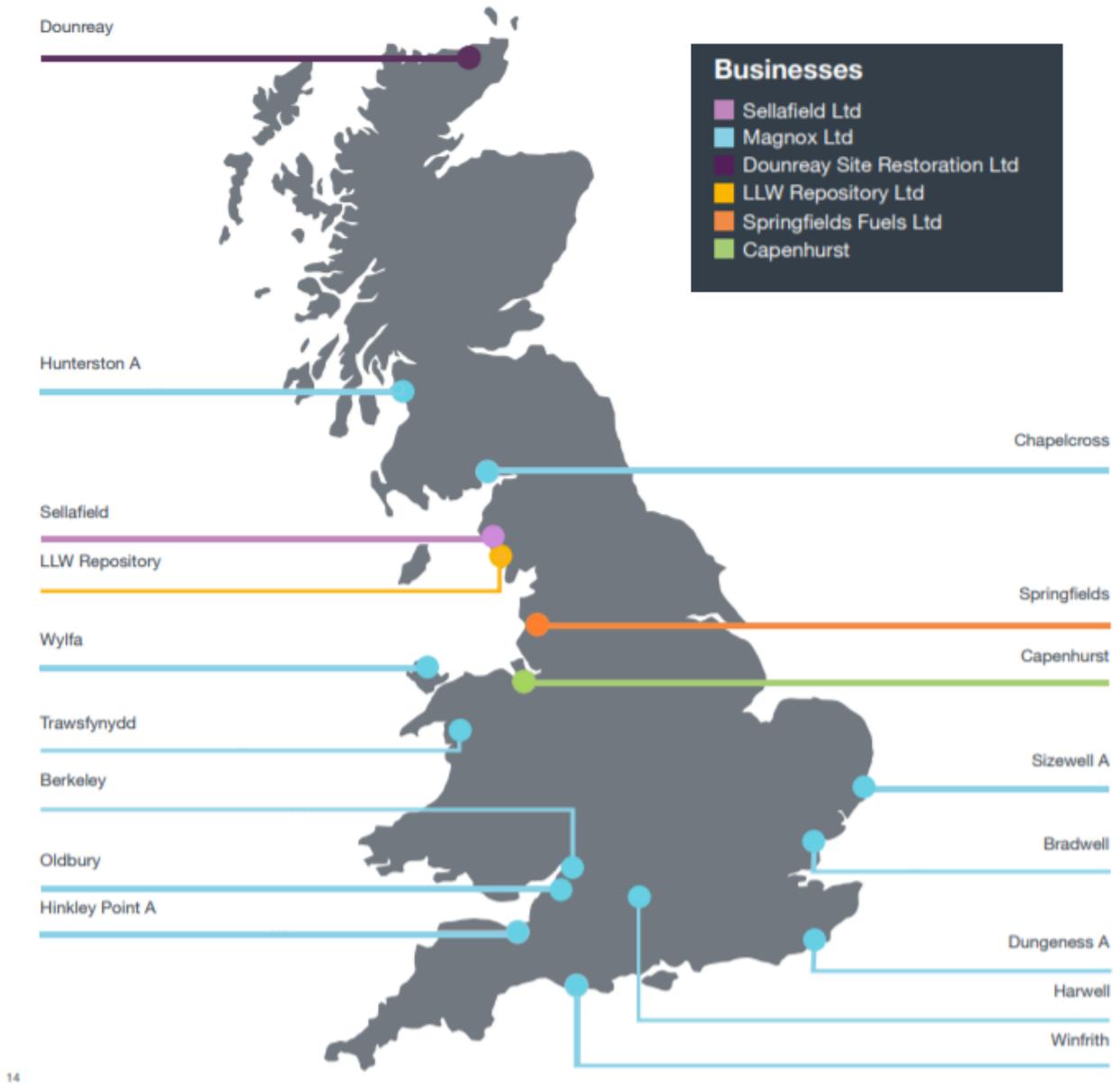


Figure 2-A: The NDA Estate [26]

3.0 Site Specific Baseline / Community Profiles

This chapter outlines baseline conditions at the 17 NDA sites. Further data on a range of health and socio-economic indicators is given in Appendix A.

3.1 Berkeley

Site Overview

The Berkeley Site is a twin reactor Magnox station located close to the town of Berkeley in Gloucestershire, South West England. It is situated on the eastern bank of the River Severn, from which it drew cooling water supplies during its operational phase. The site covers an area of 27 hectares, 11 of which have been de-designated and include the Berkeley Centre (under NDA liability), which is planned for development.

The land surrounding the site is predominantly rural and used primarily for agriculture and recreation. The major settlements within 10 km of the site are Berkeley town to the east, Thornbury to the south, and Lydney to the west on the opposite bank of the Severn.

The site access road connects to the A38 trunk road via Berkeley village. This road links to the national motorway network at Junctions 13 and 14 of the M5. The nearest railhead to the site is located on the Sharpness Branch Line (which is operational but infrequently used). The nearest passenger rail station is Cam and Dursley station approximately 13 km to the north east.

In 2019, the site employed 200 staff [22].

Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>



Community Profile

Employment, Education and Skills

In 2011, the population of Stroud (the local authority in which Berkeley is sited) was 112,779, with a working population of approximately 47,000.

33% of the Stroud population achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in 2011; higher than the England and Wales average of 27%.

The most dominant occupations in 2011 were professional (20%) and administrative and secretarial (12%). Process, plant and machine operatives made up 8% of the workforce in 2011.

In 2013, the most dominant industry was manufacturing (35% of jobs) followed by public admin, education and health (23%). 2.5% of jobs were in energy and water.

Health

In the 2011 Census, 48% of residents in Stroud reported that they were of very good health. This was similar to the UK average (47%). A similar proportion of residents also reported that they were of good health (35% in Stroud compared to 34% UK-wide), and fewer reported having bad or very bad health (3.4% and 0.9% respectively in Stroud compared to 4.2% and 1.3% for the UK).

The Life Expectancy for Stroud Local Authority in 2011 was 79.1 for males and 83.2 for females (UK average: 78.85 for males and 82.72 for females). Between April 2010 and March 2011, 2,996 adults accessed NHS specialist mental health services, approximately 2.7% of the total Stroud population.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 255.3 per 100,000 in Stroud [7] and there was an average of 576 incidences of all types of cancer per 100,000 in the CCG for the area between 2011 and 2015 [3].

Environmental Baseline

Landscape and Visual

The landscape immediately surrounding the site is on the floodplain of the River Severn. The land is flat and open, and consists of arable fields and wet alluvial pastures. Due to the industrial nature of this site, including the reactor and ancillary buildings, it is a prominent feature of the landscape and is highly visible from many locations in the surrounding area. The site is approximately 6 km from the Cotswolds Area of Natural Beauty (AONB)

Geology and Soils

The site has limited amounts of radioactive and chemical land contamination, associated mainly with leaks from the Original Ebb Tide Line, Gravity Active Drain and Cooling Ponds Recirculation Pipe Trench. Chemical land contamination is associated with underground storage tanks, transformers and oil-filled cables.

Climate Change / Flood Risk

An ongoing issue for Berkeley during the care & maintenance phase is the vulnerability of the site to flooding due to raised sea level and more frequent storm surges brought about by the anticipated effects of climate change.

Biodiversity, Flora and Fauna

There are four statutory nature designations in close proximity to the site, all of which apply to the River Severn Estuary, which is adjacent to the site to the west. These designations recognise the fact that the Severn is an internationally important habitat for migratory fish and wintering birds, with the inter-tidal mudflats being of key importance to the migration of several internationally-protected bird species.

Cultural Heritage [23]

There is a Grade II listed building immediately north of the perimeter fence and a Scheduled Ancient Monument near to the site at Lydney Harbour on the western bank of the River Severn. In addition, there are four Grade I, nine Grade II* and over 280 Grade II Listed Buildings located within 5 km.

Water Resources and Quality

The site experiences some limited discharges of radioactivity [51] and groundwater contamination within statutory limits. Aqueous effluent discharges (and cooling discharges during the operational phase) have always been made to the River Severn, the nearest water body to the site.

Air Quality

Discharges of radioactivity to the atmosphere have decreased significantly since power generation ceased. Remaining discharges are within statutory limits [51].

Materials and Waste

A combination of radioactive and conventional waste is produced at the site. The LLW is packaged and sent to the LLWR for disposal. Intermediate Level Waste (ILW) is and has been generated from both operational and decommissioning activities and has accumulated over time at several locations on the site. Volume reduction of non-radioactive and VLLW can be achieved through incineration at licensed commercial incinerators. Disposal of this waste is also possible at licensed commercial landfill sites.

3.2 Bradwell

Site Overview

The Bradwell Site is a twin reactor Magnox station located close to the village of Bradwell-on-Sea on the Dengie Peninsula in Essex, South East England. It is situated on the southern bank of the Blackwater Estuary, from which it drew cooling water during its operational phase. The site covers an area of 20 hectares.

The land surrounding the site is predominantly rural and of agricultural use. There are no major settlements within 10 km of the site. The villages of Southminster, Steeple, St Lawrence, Tillingham and Bradwell-on-Sea all lie to the south and south east. The town of West Mersea lies 4.5 km north of the site on the north bank of the Blackwater Estuary.

The site access road connects to the B1021 via Bradwell-on-Sea. This road provides links to the unclassified C111 and B1018. The A414 and A12 provide the nearest trunk road links. The nearest railhead to the site is on the Crouch Valley Line that runs to Southminster, the nearest passenger rail station.



Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>

Community Profile

Employment, Education and Skills

In 2011, the population of the Maldon (the local authority in which Bradwell is sited) was 61,629, with a working population of approximately 24,000.

24% of the Maldon population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in the same year, slightly below the England and Wales average of 27%.

The most dominant occupations in 2011 were professional (16%) and administrative and secretarial (15%). Process, plant and machine operatives made up 7% of the workforce.

In 2013, the most dominant industry was public administration, education and health (27% of jobs), followed by wholesale and retail. 13% of jobs were in manufacturing and 2% were in energy and water.

Health

In the 2011 Census, 46.2% of residents in Maldon reported that they were of very good health. This was slightly below the UK average of (47.2%). A slightly greater proportion of residents also reported that they were of good health (35.6% in Maldon compared to 34.2% UK-wide), and fewer reported having bad or very bad health (3.7% and 1.1% respectively in Maldon compared to 4.2% and 1.3% UK-wide).

The Life Expectancy for Maldon in 2011 was 78.9 for males and 83.4 for females (UK average: 78.85 for males and 82.72 for females). Between April 2010 and March 2011, 1,361 adults accessed NHS specialist mental health services equating to 2.2% of the total Maldon population.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 242.3 per 100,000 in Maldon [7] and there was an average of 572 incidences of all types of cancer per 100,000 in the CCG for the area between 2011 and 2015 [3].

Environmental Baseline [14]

Landscape and Visual

The immediate surrounding landscape is the Dengie Peninsula, characterised by openness and expansive views. A large proportion of the land adjoining the estuary lies 5 m below sea level. The opposite bank of the estuary is similar topographically. Weather envelopes cover the reactor buildings, which are the most visually dominant structures at Bradwell and in the surrounding area. Other remaining buildings have similar weather envelopes, all designed to be sympathetic to the surrounding environment.

Geology and Soils

The soil in the area surrounding the site is classified as free draining acid soils and peats, and is classified primarily as grade 3 agricultural quality soil, with localised areas of grade 1 and 2 (defined as the best and most versatile) soils. There is some radioactive and non-radioactive land contamination at the site, resulting primarily from historic events.

Climate Change / Flood Risk

An ongoing issue for Bradwell during the care & maintenance phase is the vulnerability of the site to flooding due to raised sea level and more frequent storm surges brought about by the anticipated effects of climate change.

Biodiversity, Flora and Fauna

There are nine statutorily designated nature sites in close proximity to the site, including three SSSIs (Sites of Special Scientific Interest), three NNRs (National Nature Reserves), a Ramsar, SPA (Special Protection Area) and SAC (Special Area of Conservation). This emphasises the importance of the area for its estuarine habitats in general, whilst the SPA and Ramsar designations relate to the various wintering and breeding birds found locally.

Cultural Heritage [23]

There are ten Scheduled Ancient Monuments within 5 km of the site, the nearest being Pewet Island Coastal Fish Weir and the Saxon Shore Fort. There are two Grade I, seven Grade II* and 157 Grade II Listed Buildings within 5 km.

Water Resources and Quality

The site experiences some radioactive and non-radioactive contamination, resulting mainly from historic events. Aqueous discharges have always been made to the Blackwater Estuary, the nearest water body to the site.

Air Quality

As the site is now in C&M, impacts on air quality as a result of dust from traffic movement is likely to be negligible. NOx is no longer being emitted from fuel element debris treatment.

Materials and Waste

Although the site has entered C&M, some residual wastes will be processed. There is an ILW store on site that will be accepting waste from Sizewell A and Dungeness sites, avoiding construction of stores at those sites.

3.3 Chapelcross

Site Overview

Chapelcross is a four reactor Magnox station located close to the town of Annan in South West Scotland. It is situated in open inland countryside on the site of a former RAF airfield, approximately 6 km from the northern coast of the Solway Firth. The site is close to the River Annan, from which it drew cooling water supplies during its operational phase. The site incorporates the Chapelcross Processing Plant (a tritium production facility) which ceased operations soon after the station shut down, and is now being decommissioned. The licensed site covers an area of 96 hectares and the land holding incorporates the extensive former airfield.

The major settlements within 10 km of the site are Annan to the south west, Gretna to the south east, Ecclefechan to the north west, as well as a number of smaller settlements including Eaglesfield, and the hamlet of Creca (to the immediate north east of the site).

The site connects to the A75 trunk road via the B722 (or other unnamed roads). The A75 links to the national motorway network at Junction 22 of the A74 motorway. Although an active railway line runs approximately 4 km to the south of the site through Annan, there is currently no railhead near Chapelcross. The nearest passenger rail stations are located at Annan or Lockerbie.

In 2019, the site employed 208 staff [22].

Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>



Community Profile

Employment, Education and Skills

In 2011, the population of Dumfries and Galloway (the local authority in which Chapelcross is sited) was 151,324, with a working population of around 67,000.

22% of the Dumfries and Galloway population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in the same year (lower than the Scottish average of 26%).

The most dominant occupations in Dumfries and Galloway in 2011 were skilled trade and elementary occupations (each equating to 15% of the total working population), whilst the least dominant occupation was process, plant and machine operatives (8%).

In 2013, the most dominant industry sector was public admin, education and health (35% of jobs) followed by wholesale and retail, including motor trades (18%). 11% of jobs were in manufacturing and 2% of jobs were in energy and water.

Health

In the 2011 Census, 49.1% of residents in Dumfries and Galloway reported that they had very good health. This was almost 2% above the UK average (47.2%). The proportion of residents in Dumfries and Galloway reporting good health was almost 3% less than the UK average (31.4% compared to 34.2%). For residents reporting bad and very bad health, the percentages were marginally higher than the UK average (4.3% and 1.3% respectively compared to 4.2% and 1.2% UK-wide).

The Life Expectancy for Dumfries and Galloway in 2011 was 77.5 for males and 81.9 for females (UK average of 78.85 for males and 82.72 for females). In the same year, 3.7% of the adult population in Dumfries & Galloway were living with a mental illness.

For the period 2015-2017, the age standardised death rate for heart-related conditions was 316.8 per 100,000 in Dumfries & Galloway [7] and in 2017 the Information Services Division found 548.6 incidences of all types of cancer per 100,000 [5].

Environmental Baseline [15]

Landscape and Visual

The area surrounding the site is rural in nature and used primarily for agriculture and recreation. Chapelcross is located at approximately 70 to 80 m Above Ordnance Datum (AOD), at the head of a small valley encompassing Gullielands Burn, which flows directly through the site and is culverted. Other nearby water courses are Kirtle Water, the River Annan and the Solway Firth to the south. Due to the industrial nature of the site it is a prominent feature of the landscape and is highly visible from many surrounding locations.

Geology and Soils

The soil surrounding the site is classified as lowland brown earth soils of high agricultural value. There is some radioactive and non-radioactive land contamination at the site, resulting primarily from historical events during generation, and from land use prior to construction of the power station.

Climate Change / Flood Risk

The inland nature of the site means that it is not vulnerable to increased risk from sea flooding due to climate change-induced sea level rise and more frequent storm surges. It is possible that changing patterns of rainfall during the care & maintenance phase could affect the site through changes to the local hydrology, however, the potential for flooding at the site due to changes in flow rate and course of the River Annan is limited as the site is 2 km away and at an elevation higher by 40 m.

Biodiversity, Flora and Fauna

The site has seven statutorily nature designations in close proximity. These are the Upper Solway Flats and Marshes (SSSI, SPA and Ramsar), the Solway Firth SAC, Raeburn Flow (SSSI and SAC) and the Royal Ordnance Powfoot SSSI.

Cultural Heritage [24]

The western extremity of the Frontiers of the Roman Empire (Hadrian's Wall) World Heritage Site is situated approximately 8 km to the south of the site, across the Solway Firth. There are six Listed buildings within 2 km of the site, and a further 118 in the nearby town of Annan located to the South West of the site. There are 17 Scheduled Ancient Monuments within 5 km.

Water Resources and Quality

A key issue at Chapelcross is surface water management. Concrete rubble from demolition of the cooling towers was used to infill the subsurface basins of the towers. Water ingress into these basins has resulted in the production of alkaline water (due to contact with the concrete infill material), which has overtopped the basins. Treatment of water abstracted from the basins prior to discharge is undertaken to protect Gullielands Burn. Radioactive liquid effluents are discharged to the Solway Firth at levels within statutory limits. A Modular Active Effluent Treatment Plant is currently being manufactured and liquid effluent will be processed through it upon successful active commissioning.

Air Quality

The site has a history of aerial discharges of radioactivity, however these have reduced since power generation ceased. Certain decommissioning activities such as the retrieval, treatment and passivation of wastes and draining of the ponds may result in short-term spikes in aerial discharges of radioactivity but these are anticipated to be well within statutory limits.

Materials and Waste

LLW is generated at the site from a range of routine operational and decommissioning activities and is transferred to a waste permitted person for further treatment or disposal. ILW has accumulated at several locations at the site, the majority of which will be retrieved when an ILW store becomes available. Non-radioactive hazardous wastes and asbestos are also generated and are disposed of in accordance with relevant regulations.

3.4 Dungeness A

Site Overview

Dungeness A is a twin reactor Magnox station located close to the town of Lydd in Kent, South East England. The site itself is on the Dungeness Peninsula, a large expanse of shingle and dunes on the English Channel, from which it drew cooling water during operation. The site covers an area of 20 hectares.

The rural land immediately surrounding the site lies on a bed of shingle and is therefore not used for agriculture, although it is an important ecological site. The major settlements within 10 km of the site are the towns of Lydd to the north west and New Romney to the north. The villages of Lydd-on-Sea and Greatstone also lie to the immediate north.

The site access road, Dungeness Road connects to the A259 via the B2075. The A259 links to A2070 and joins the national motorway network at Junction 10 of the M20. The nearest railhead to the site is the Denge railhead, which is at the head of a dedicated stretch of track to the north of the site. The nearest passenger rail station is at Rye.

In 2019, the site employed 264 staff [22].



Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>

Community Profile

Employment, Education and Skills

In 2011, the population of Shepway (the local authority in which Dungeness A was sited at the time of the census, which has been renamed as Folkestone & Hythe) was 107,969, with a working population of approximately 40,000.

22% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in the same year (lower than the England and Wales average of 27%).

The most dominant occupations in 2011 were professional (14%) and jointly associate professional and technical occupations and caring, leisure and service occupations (13%). Process, plant and machine operatives made up 7% of the workforce.

In 2011 the most dominant industry sector was public admin, education and health (31% of jobs), followed by financial and other business services (21%). 4% of jobs were in manufacturing and 3% in energy and water.

Health

In the 2011 Census, 42.2% of residents in Shepway reported that they were of very good health. This was 5% below the UK average (47.2%). A greater proportion of residents reported that they were of good health and fair health (36.1% and 15.2% respectively for Shepway compared to 34.2% and 13.1% UK-wide). A slightly greater proportion also reported that they were of bad or very bad health (4.9% and 1.5% respectively in Shepway compared to 4.2% and 1.2% UK-wide).

Life Expectancy in 2011 was 78.6 for males and 83.2 for females (UK average of 78.85 for males and 82.72 for females). Between April 2010 and March 2011, 2,571 adults accessed NHS specialist mental health services, equating to 2.4% of the population.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 238.5 per 100,000 in Folkestone & Hythe [7] and there was an average of 637 incidences of all types of cancer per 100,000 in the CCG

Environmental Baseline [11]

Landscape and Visual

The landscape immediately surrounding the site is low-lying shingle foreland, part of the Dungeness Peninsula that extends 10 km into the English Channel. Romney Marsh is situated to the north. Due to the industrial nature of this site, including the reactor and ancillary buildings, it is a prominent feature of the landscape and is highly visible from many nearby locations. The site is adjacent to Dungeness 'B' nuclear power station which creates a greater combined impact on the local landscape.

Geology and Soils

Given the unique coastal nature of the local geology, no fertile topsoil is present on the shingle beach adjacent to the site, so this land has no agricultural value. The reclaimed marshland to the north contains some agricultural soils of marginal value. The site is considered to have the potential for land that is radioactively contaminated, and incorporates some land that is chemically contaminated.

Climate Change / Flood Risk

An ongoing issue for Dungeness A during the C&M phase is the vulnerability of the site to flooding due to raised sea level and higher wave heights brought about by the anticipated effects of climate change. Safety concerns that have arisen in the wake of the 2011 Japanese earthquake and tsunami have led to reinforced coastal defences at the location, a situation that will continue to be monitored over time.

Biodiversity, Flora and Fauna

There are four statutory nature designations in close proximity to the site. These include the Dungeness, Romney Marsh and Rye Bay SSSI, Dungeness SAC, Dungeness NNR and Dungeness to Pett Level SPA.

Cultural Heritage [23]

There are two Scheduled Monuments, a WWII listening device and an 18th century coastal battery, to the north of the site, one Grade II* and nine Grade II Listed Buildings within 5 km .

Water Resources and Quality

The site experiences some limited discharges of radioactivity and chemical contamination, particularly associated with the turbine hall, Reactor 1 pond and the Active Effluent Treatment Plant. Aqueous discharges have always been made to the English Channel, the nearest water body to the site and are well within statutory limits [51].

Air Quality

Discharges to the atmosphere have decreased significantly since power generation ceased. Remaining discharges are within statutory limits [51]. Mitigation measures are in place to reduce the impact of dust emissions both from the site (including as a result of the use of explosives) and from vehicles transporting material to or from the site.

Materials and Waste

A combination of radioactive and conventional waste is produced at the site. LLW is packaged and sent to the LLWR for disposal or diverted to other routes such as Very Low Level Waste (VLLW) disposal facilities. Some waste may be sent to other treatment and disposal sites for melt and incineration. ILW is and has been generated from both operational and decommissioning activities and is stored on-site in numerous locations.

3.5 Trawsfynydd

Site Overview

Trawsfynydd is a twin reactor Magnox station located close to the village of Trawsfynydd, in the Gwynedd Local Authority area, Wales. It is situated on the northern shoreline of Llyn Trawsfynydd, an artificial lake/ reservoir, from which it drew cooling water supplies during operation. The site covers an area of 15 hectares.

The land surrounding the site is rural, and is used primarily for agriculture and recreation. The major settlements within 10 km of the site are the town of Blaenau Ffestiniog to the north and Trawsfynydd to the south east. There are also numerous villages close to the site including Penrhyndeudraeth and Llanfrothen to the west and Llan Ffestiniog and Tanygrisiau to the north.

The site access road connects to the A470, the main north-south trunk road through Wales. It connects directly to the national motorway network at Junction 12 of the M53 and Junction 7 of the M54. The nearest railhead to the site is located on the Trawsfynydd and Blaenau Ffestiniog Branch Line. The nearest passenger rail station is Blaenau Ffestiniog.

In 2019 the site employed 202 staff.[22].



Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>

Community Profile

Employment, Education and Skills

In 2011, the population of Gwynedd (the local authority in which Trawsfynydd is sited) was 121,874, with a working population of approximately 43,000.

26% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in the same year, (slightly lower than the England and Wales average of 27%).

The most dominant occupations in 2011 were professional (18%), elementary (14%) and caring, leisure and other service occupations (13%). Process, plant and machine operatives made up 7% of the workforce.

In the same year, the most dominant industry sector was public admin, education and health (39% of jobs) followed by wholesale and retail, including motor vehicle trades (16%). 6% of jobs were in manufacturing and 2% were in energy and water.

Health

In the 2011 Census, 50.4% of residents in Gwynedd reported that they were of very good health. This was above the UK average (47.2%). A lower proportion of residents in Gwynedd reported that they were of bad health and very bad health (4.1% and 0% respectively for Gwynedd compared to 4.2% and 1.3% UK-wide).

The Life Expectancy for Gwynedd in 2011 was 77.3 for males and 82 for females (UK average of 78.85 for males and 82.72 for females). In 2008, 7% of the adult population (aged 16+) of Gwynedd were identified as having a mental illness (any).

For the period 2015-2017, the age standardised death rate for heart-related conditions was 256.6 per 100,000 in Gwynedd [7] , and in 2017 the Welsh Cancer Intelligence and Surveillance Unit found 571.4 incidences of all types of cancer per 100,000 [6].

Environmental Baseline

Landscape and Visual

The landscape immediately surrounding the site is within the Snowdonia National Park boundary and is largely rural and mountainous. It is described as a ‘High Sensitivity Landscape’. Due to the landscape sensitivity, the height of the reactor buildings is set to be reduced prior to the care & maintenance phase. Due to the industrial nature of the site, it is a prominent feature of the landscape and is highly visible from many surrounding locations.

Geology and Soils

The soils in the area surrounding the site are classified as acidic loams and clays. The site contains known areas of radioactive and non-radioactive land and groundwater contamination, resulting primarily from historical events such as leakage from the ponds during the 1970s and 80s due to a joint weakness in the pond structure.

Climate Change / Flood Risk

Trawsfynydd was the first inland civil Magnox nuclear power station. Located next to Llyn Trawsfynydd Lake, the site is located in Flood Zone 2 according to the Environment Agency’s flood map, meaning there is up to a 0.1 per cent (1 in 1000) chance of flooding occurring each year.

Biodiversity, Flora and Fauna

There are five statutory nature designations in close proximity to the site, including Snowdonia National Park, Coed y Rhygen SSSI and NNR (part of a wider network of sites making up a SAC), the Rhinog SAC, Afon Eden and Cors Goch SAC and Migneint-Arenig-Dduallt SAC.

Cultural Heritage [25]

There are three Scheduled Ancient Monuments near to the site, with the Tomen y Mur located within 1.5 km. There are also around 110 Listed Buildings within 5 km of the site and one entry in the Register of Landscapes, Parks and Gardens of Special Historic Interest.

Water Resources and Quality

The site experiences some limited discharges of radioactivity and chemical contamination, including historic leakage from the cooling ponds during the 1970s and 80s. Aqueous discharges have always been made to the Llyn Trawsfynydd Lake and are well within statutory limits [51]. Active effluent originating from the site is extensively treated and diluted to remove radioactivity more thoroughly than at other Magnox Sites. This requirement arises from the closed-system nature of the lake, which restricts effective dispersal.

Air Quality

Discharges of radioactivity to the atmosphere have decreased significantly since power generation ceased. Remaining discharges are well within statutory limits [51].

Materials and Waste

A combination of radioactive and conventional waste is produced at the site. The LLW is packaged and sent to the LLWR. Some waste may be sent to other treatment and disposal sites for melt and incineration. ILW is and has been generated from both operational and decommissioning activities and is stored in numerous locations on the site.

3.6 Sizewell A

Site Overview

Sizewell A is a twin reactor Magnox station located close to the town of Leiston in Suffolk, East Anglia. It lies on the North Sea coast, from which it drew cooling water supplies during its operational phase, and is immediately adjacent to EDF's Sizewell B Power Station. The site covers an area of 14 hectares and consists of one combined reactor building, turbine hall, various ancillary buildings, access roads, shingle areas, a small amount of grassed ground, and areas of hardstanding.

The area surrounding the site is rural in nature and primarily used for agriculture and recreation. The major settlements within 10 km of the site are Leiston and Saxmundham to the west and Aldeburgh to the south.

The site access road connects to the B1122 via Lover's Land and the C228. This road links to the A12, which gives access to the national motorway network at Junction 28 of the M25 to the south, and at Junction 17 of the A1 via the A47 and A1139 to the north. The nearest railhead to the site is located on the Aldeburgh Branch Line (which is used almost exclusively by nuclear flask trains servicing the power station). The nearest passenger rail station is located at Saxmundham.

In 2010 the site employed 400 staff (2001



Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>

Community Profile

Employment, Education and Skills

In 2011, the population of Suffolk Coastal (the local authority in which Sizewell A was located at the time of the census, which has now been subsumed in to East Suffolk) was 124,298, with a working population of approximately 48,000.

29% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in that year, (greater than the England and Wales average of 27%).

The most dominant occupations registered in the 2011 census were professional (18%) and administrative and secretarial (14%). Process, plant and machine operatives made up the smallest proportion of the workforce (7%).

In the same year, the most dominant industry sector was public admin, education and health (25% of jobs), followed by wholesale and retail, including motor trades (16%). 6% of jobs were in manufacturing and 2% were in energy and water.

Health

In the 2011 Census, 46.3% of residents in Suffolk Coastal Local Authority area reported having very good health. This was slightly below the UK average (47.2%). Those reporting good health in Suffolk Coastal was slightly above the UK average (35.5% compared to 34.2%), whilst those reportedly with bad and very bad health made up a smaller percentage (3.6% and 0.8% respectively for Suffolk Coastal compared to 4.2% and 1.2% UK-wide).

The Life Expectancy in 2011 was 80.6 for males and 83.8 for females (UK average of 78.85 for males and 82.72 for females). Between April 2010 and March 2011, 1,266 adults in Suffolk Coastal accessed NHS specialist mental health services, equating to 1% of the total population.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 207.5 per 100,000 in the area of Suffolk Coastal [7] and there was an average of 582 incidences of all types of cancer per 100,000 in the

Environmental Baseline [12]*Landscape and Visual*

The site is located on the coastal plain of the Suffolk North Sea coast, on a low plateau several metres above sea level. The surrounding landscape is open and very gently undulating, with several small estuaries interspersed along with coastal plain. Sizewell A and B are screened from all but the closest inland viewpoints in most directions by the landscape and existing trees and hedgerows. The Heritage Coast designation in the vicinity of Sizewell (part of the AONB) is a landscape designation of national importance. The nearest water course to the site is Leiston Brook, a tributary of the Minsmere River.

Geology and Soils

The site does not contain any contaminated land as defined by Part IIA of the Environmental Protection Act 1990. There are however several minor areas of potential concern that have arisen from historic events, as well as very limited areas of known contamination (radioactive and chemical).

Climate Change / Flood Risk

An ongoing issue for Sizewell A is the vulnerability of the site to flooding due to raised sea level, higher waves, and more frequent storm surges brought about by the anticipated effects of climate change.

Biodiversity, Flora and Fauna

There are eight statutory nature designations in close proximity to the site, including four at Minsmere-Walberswick and Marshes (SSSI, SAC, SPA and Ramsar), Sizewell Marshes SSSI, Leiston-Aldeburgh SSSI, Sandlings SPA and Alde-Ore Estuary SPA. Off-site structures, the cooling water intake and outflow rigs are designated a County Wildlife Site as they support a breeding Kittiwake colony.

Cultural Heritage [23]

There are four Scheduled Ancient Monuments within 5 km of the site; Leiston Abbey and Moat and Bowl Barrows at Aldringham Green, Aldringham Common and Square Plantation. There are 87 Listed Buildings within 5 km.

Water Resources and Quality

Aqueous effluent discharges are made to the North Sea. Active aqueous effluent is discharged from the site via a dedicated pipeline combined with a spray bar dispersion head that was installed following the shutdown of the cooling water system, which had been the route for all liquid effluents previously. Total liquid discharges are within statutory limits [51].

Air Quality

Discharges of radioactivity to the atmosphere have decreased significantly since cessation of power generation. Certain decommissioning activities such as the retrieval, treatment and passivation of wastes and draining of the pond may result in short-term spikes in aerial discharges of radioactivity, but these are anticipated to be well within statutory limits. Mitigation measures are in place to reduce the impact of dust emissions both from the site (including as a result of the use of explosives) and from vehicles transporting material to or from the site.

Materials and Waste

A combination of radioactive and conventional waste is produced at the site. LLW is packaged and sent to the LLWR or disposed via alternative routes where possible. ILW is and has been generated from both operational and decommissioning activities and has accumulated over time at several locations on the site. ILW will either be managed to enable disposal as LLW or packaged for interim storage at Bradwell or Hinkley Point A sites. Some hazardous non-radioactive waste and asbestos will also arise during decommissioning.

3.7 Dounreay

Site Overview

The Dounreay site is located close to the town of Thurso, Caithness, in the Highlands of Scotland. It is situated on the coast and has historically drawn cooling water from the North Sea. The site covers an area of 60 hectares and has housed three reactors during its operational period, the Dounreay Materials Test Reactor (DMTR), Dounreay Fast Reactor (DFR) and the Prototype Fast Reactor (PFR). A Fuel Cycling Area and experimental laboratories were also previously operational on the site. In addition, 12 hectares are designated but not licensed for a LLW facility that takes LLW from Dounreay decommissioning.

The land surrounding the site is rural and is in an area of 'Open, Intensive Farmland'. The town of Thurso is 11 km east of the site. The only other settlement in close proximity to the site is Reay, a small hamlet immediately south east. There are numerous farms and hamlets in the wider area.

The site access road connects to the A836, which is the main trunk road across the north coast of Caithness. The A836 joins the A9 at Thurso, which is the main north-south trunk road through Scotland, joining the national motorway network at Junction 12 of the M90 at Perth, more than 220 miles away. The nearest railway serves Thurso.

In 2019 the site employed 1,127 staff [22].

Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>



Community Profile

Employment, Education and Skills

In 2011, the population of Highland (the local authority in which Dounreay is sited) was 232,131, with 26,486 in the Caithness area. The approximate working population of Highland Local Authority area was 111,000 in 2013.

26% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in 2011 (equal to the average for Scotland).

The most dominant occupations in 2011 were professional (17%) and skilled trades (16%). Process, plant and machine operatives made up 6% of the workforce.

In 2013, the most dominant industry sector was public admin, health and education (32% of jobs) followed by wholesale and retail, including motor trades (15%). 6% of jobs were in manufacturing and 1% were in energy and water.

Health

In the 2011 Census, 54.1% of residents in Highland reported that they were of very good health. This was above the UK average (47.2%). A lower proportion of residents reported that they were of good health, bad health and very bad health (29.9%, 3.4% and 1% respectively for Highland compared to 34.2%, 4.2% and 1.2% UK-wide).

The Life Expectancy for Highland in 2011 was 77.2 for males and 81.9 for females (UK average of 78.85 for males and 82.72 for females). In the same year 3.6% of the adult population were living with a mental illness.

For the period 2015-2017, the age standardised death rate for heart-related conditions was 303.7 per 100,000 in the area of Highland [7] and in 2017 the Information Services Division found 557.4 incidences of all types of cancer per 100,000 [5].

Environmental Baseline [17]

Landscape and Visual

The Dounreay site divides a strip of 'Open, Intensive Farmland.' The landscape surrounding the site is largely flat and open, with rolling hills to the south and west. Due to the industrial nature of this site, including the reactor and ancillary buildings, it is a prominent feature of the landscape and is highly visible from many nearby locations.

Geology and Soils

The Scottish Soil Framework indicates that there are a number of soil types in the area, notably mineral gleys. Historic hydrocarbon contamination of the ground associated with diesel generator operation as part of the Dounreay Fast Reactor has since been recovered, treated and disposed of.

Climate Change / Flood Risk

The site itself is situated approximately 20 m above sea level and is therefore at little risk from sea-level rise. The local coastline has estimated recession rates of 1-2 m every 200-300 years.

Biodiversity, Flora and Fauna

The Sandside Bay SSSI is located within NDA-owned land. There are also SACs, SPAs and Ramsar and Ancient Woodland Inventory sites in the surrounding area.

Cultural Heritage [24]

There are over 20 Listed Buildings and 15 Scheduled Monuments within 5 km of the site. Of particular note is the ruin of Dounreay Castle that lies within the site boundary.

Water Resources and Quality

The site experiences some discharges of radioactivity and chemical land contamination, particularly of groundwater. Aqueous effluent discharges have always been made to the sea to the north of the site and are within statutory limits [51].

Air Quality

Discharges of radioactivity to the atmosphere are ongoing but remain well within statutory discharge limits [51].

Materials and Waste

A combination of radioactive and conventional waste has and continues to be produced at the site. The LLW is currently stored on-site, however this is planned to be retrieved and moved to a new off-site facility. ILW is also stored on-site and will continue indefinitely until other facilities become available.

3.8 Sellafield

Site Overview

The Sellafield Site is located in the Copeland Local Authority of Cumbria, North West England. The site has and continues to operate a range of nuclear facilities. The Calder Hall power station and Windscale Piles are currently undergoing decommissioning and the Windscale Advanced Gas Cooled Reactor is used as a decommissioning demonstration project (the reactor was decommissioned in 2011). Operations are expected to continue at many facilities in the short to medium-term. The site covers an area of 265 hectares.

The land surrounding the site is predominantly rural and agricultural, however the site dominates the landscape. The major settlements within 10 km of the site are the town of Egremont to the north, the village of Gosforth to the east and the villages of Seascale, Holmrook and Drigg to the south. The larger town of Whitehaven lies 11 km to the north.

The site access roads join the A595 trunk road, which links to the A5092 and A590 before joining the national motorway network at Junction 36 of the M6.

In 2019 Sellafield employed 10,909 people (including in off-site locations) [22].



Image sourced from:
Nuclear Management
Partners (2015)

<http://nuclearmanagementpartners.com/sellafield/>

Community Profile

Employment, Education and Skills

In 2011, the population of Copeland (the local authority in which Sellafield is sited) was 70,603, with a working population of approximately 29,000.

21% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in the same year (lower than the England and Wales average of 27%).

The most dominant occupations in 2011 were professional (15%) and jointly Skilled trades and elementary occupations (13%). Process, plant and machine operatives made up 12% of the workforce.

In 2013, the most dominant industry sector was manufacturing (35% of jobs) followed by public admin, education and health (24%). 1% of jobs were in energy and water.

Health

In the 2011 Census, 44.4% of residents in Copeland reported that they were of very good health. This was below the UK average (47.2%). A lower proportion in Copeland reported good health, 33.9% compared to 34.2%. A higher proportion reported bad and very bad health (5.3% and 1.4% respectively in Copeland compared to 4.2% and 1.2% UK-wide).

The Life Expectancy in the Copeland Local Authority area in 2011 was 77.6 for males and 80.4 for females (UK average: 78.85 for males, 82.72 for females). In the same year, 1,422 or 2% of the adult population accessed NHS Specialist Mental Health Services.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 279.9 per 100,000 in Copeland [7] and there was an average of 613 incidences of all types of cancer per 100,000 in the CCG for the area between 2011 and 2015 [3].

Environmental Baseline

Landscape and Visual

The landscape surrounding the site is the West Cumbria Coastal Plain and is identified as an area of varied open coastline with mudflats, shingle and pebble beaches with localised sections of dunes, sandy beaches and sandstone cliffs. The Sellafield site is approximately 1 km from the Lake District National Park. Due to the industrial nature of this site, its footprint and the range of facilities on-site it is a prominent feature of the landscape and is highly visible from many surrounding locations. The demolition of the Calder Hall cooling towers has had a minor improvement on the visual impact of the site.

Geology and Soils

The site experiences frequent discharges of radioactivity and chemical land contamination, particularly contamination to an aquifer in the underlying sandstone geology. Such discharges are within statutory limits. There is both LLW and ILW-contaminated soil on site.

Climate Change / Flood Risk

An ongoing issue for Sellafield is the vulnerability of the site to flooding due to raised sea level, higher waves, and more frequent storm surges brought about by the anticipated effects of climate change.

Biodiversity, Flora and Fauna

There is one statutory nature designation within 2 km of the site. This is Low Church Moss, a SSSI approximately 1.4 km to the north west. The upper reaches of the River Ehen, which flows through the site, is a SAC supporting freshwater pearl mussels. To the south and west of the site lies the Cumbria Coast, designated as a Marine Conservation Zone.

Cultural Heritage [23]

There is one Scheduled Monument to the south east and three Grade II Listed Buildings to the east and north within 500 m of the site. Within a 5 km radius there are four further Scheduled Monuments, in addition to over 50 more Listed Buildings.

Water Resources and Quality

The groundwater at the site is considered to be good chemical status and good quantitative status in accordance with the Water Framework Directive. Aqueous discharges have been made to a number of watercourses that pass through or close to the site, including the River Calder and are within statutory limits [51].

Air Quality

Discharges of radioactivity to the atmosphere are ongoing and were estimated to be around 1% of the public dose limit in 2011. There is a relatively high level of background radiation in some parts of the site.

Materials and Waste

All of the UK's HLW is produced and stored at Sellafield. Approximately 74% of the estimated total radioactive waste inventory, by volume, will come from Sellafield [103]. Much of this inventory will be retrieved and temporarily stored until an off-site repository is established or until LLW is disposed of at the LLWR.

3.9 Oldbury

Site Overview

The Oldbury site is a twin reactor Magnox station located close to the town of Thornbury in Gloucestershire, South West England. It is situated on the eastern bank of the River Severn, from which it drew cooling water supplies during its operational phase. The site covers an area of 47 hectares, of which 32 have been de-designated.

The land surrounding the site is predominantly rural and is used primarily for agriculture and recreation. The major settlements within 10 km of the site are Berkeley town to the north east, Thornbury to the south east, and on the opposite bank of the Severn, Lydney to the north and Bulwark to the west. There are numerous small villages and settlements in the area in addition to these larger towns.

The site access road connects to the national motorway network via a network of B class and C class rural roads. The nearest motorway access points are junction 1 of the M48 and junctions 14 and 15 of the M5. There is no railway station within 10 km of the site that is on the same bank of the Severn.

In 2019 the site employed 134 staff [22].

Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>



Community Profile

Employment, Education and Skills

In 2011, the population of South Gloucestershire (the local authority in which Oldbury is sited) was 262,767, with a working population of 120,000.

27% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in the same year (equal to the England and Wales average).

The most dominant occupations in 2011 were professional (18%) and administrative and secretarial (15%). Process, plant and machine operatives made up 6% of the workforce.

In 2013, the most dominant industry sector was public admin, health and education (27% of jobs) followed by financial and other business services (21%). 12% of jobs were in manufacturing and 1% were in energy and water.

Health

In the 2011 Census, 49.1% of residents in South Gloucestershire reported that they were of very good health. This was above the UK average (47.2%). A greater proportion of residents also reported that they were of good health (34.9% compared to 34.2%, the UK average), and thus fewer reported bad or very bad health (3.3% and 0.9% respectively compared to 4.2% and 1.2% for the UK).

The Life Expectancy at birth for South Gloucestershire in 2011 was 80.4 for males and 83.5 for females (UK average of 78.85 for males and 82.72 for females). Between April 2010 and March 2011, 3,574 adults accessed NHS specialist mental health services, equating to 1.4% of the total population, which falls below the average for England of 2.4%.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 212.2 per 100,000 in South Gloucestershire [7] and there was an average of 613 incidences of all types of cancer per 100,000 in the CCG for the area between 2011 and 2015 [3].

Environmental Baseline [13]*Landscape and Visual*

The landscape immediately surrounding the site lies on the floodplain of the River Severn and is characterised as a semi-open and flat estuarine flood plain environment. Higher ground is found to the east (Severn Ridges Character Area) and to the west on the opposite bank of the River Severn. The site is a prominent feature in the local landscape, and is highly visible from many locations including nearby villages and from the Severn Bridge.

Geology and Soils

The site is considered to have some limited radioactive and non-radioactive land contamination. The soils in the area surrounding the site are classified as loamy / clay, characteristic of coastal flats. Much of the soil is classified as grade 3 agricultural quality (grade 1 is regarded as the highest quality).

Climate Change / Flood Risk

There is a relatively low risk of coastal flooding up to 2020. The defences (a 10.2 m sea wall) should offer protection against anticipated changes in sea level linked to climate change, but may be less effective beyond this period.

Biodiversity, Flora and Fauna

The site has five designated nature sites in close proximity, all relating to the Severn Estuary (SSSI, SAC, SPA, SINC and Ramsar). These designations recognise the fact that the Severn is an important habitat for migratory fish and birds, with the inter-tidal mudflats being of key importance to the migration of several internationally-protected bird species.

Cultural Heritage [23]

There are seven Scheduled Ancient Monuments within 5 km of the site, including an Iron Age fort at Oldbury-on-Severn, in addition to over 190 Listed Buildings.

Water Resources and Quality

The nearest major water body to the site is the River Severn. Oldbury Pill discharges to the Severn approximately 1.5 km to the south of the site at levels well within statutory limits [51]. Aqueous effluent and cooling water discharges are made to the River Severn via a culvert that runs underneath the tidal reservoir to the central part of the river channel (to attain maximum dispersion of radioactivity). These are also within statutory limits.

Air Quality

Discharges of radioactivity to the atmosphere have decreased significantly since power generation ceased. Remaining discharges are well within statutory limits [51]. Mitigation measures are in place to reduce the impact of dust emissions both from the site and from vehicles transporting material to or from the site.

Materials and Waste

A combination of radioactive and conventional waste is produced at the site. LLW is packaged and sent to the LLWR for disposal or diverted where possible, for example via metal recycling. ILW is and has been generated from both operational and decommissioning activities and it will either be stored on site or at Berkeley or Hinkley sites. Some hazardous non-radioactive waste and asbestos also arises during decommissioning.

3.10 Hinkley Point A

Site Overview

Hinkley Point A is a twin reactor Magnox station located in Somerset, South West England. It is situated on the southern shore of the Bristol Channel, from which it drew cooling water supplies during its operational phase. EDF's Hinkley Point B power station lies adjacent to the site to the east. The Hinkley Point A site covers an area of approximately 20 hectares.

The land surrounding the site is predominantly rural and used primarily for agriculture and recreation. The nearest major settlement is Bridgewater 12.5 km south east of the site. There are a number of small villages and settlements within a 10 km radius of the site.

The site access road connects to the national motorway network via a network of B class and C class rural roads. The nearest motorway access points are junctions 23 and 24 of the M5. The nearest railway station is in Bridgewater.

In 2019 the site employed 216 staff [22].



Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>

Community Profile

Employment, Education and Skills

In 2011, the population of West Somerset (the local authority in which Hinkley Point A was sited at the time of the census, which has now been subsumed into Somerset West and Taunton) was 34,675, with a working population of 11,000.

25% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in that year (lower than the England and Wales average of 27%).

The most dominant occupations in 2011 were elementary occupations (17%) and caring, leisure and other services (15%). Process, plant and machine operatives made up 7% of the workforce.

In 2013, the most dominant industry sector was public admin, health and education (26% of jobs) followed by accommodation and food services (23%). 6% of jobs were in manufacturing and 8% were in energy and Water.

Health

In the 2011 Census, 40.6% of residents in West Somerset reported that they were of very good health. This falls below the UK average of 47.2%. 36.4% of residents reported that they were of good health compared to the UK average (34.2%), and more reported bad or very bad health (5.1% and 1.4% respectively in West Somerset, compared to 4.2% and 1.2% for the UK).

The Life Expectancy at birth for West Somerset in 2011 was 79.8 for males and 84 for females (UK average of 78.85 for males and 82.72 for females). Between April 2010 and March 2011, 905 adults accessed NHS specialist mental health services, equating to 2.6% of the total population, which is above the average for England at 2.4%.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 235.1 per 100,000 in West Somerset [7] and there was an average of 589 incidences of all types of cancer per 100,000 in the CCG for the area between 2011 and 2015 [3].

Environmental Baseline [16]*Landscape and Visual*

The site is located on the north Somerset Coast, facing Bridgwater Bay in the Bristol Channel. The main features in the immediately surrounding area are marshlands to the south and east, a double ridge and valley structure running along the coast to a shallow sea cliff, and the extensive mudflats and rocky outcrops of Bridgwater Bay. The Quantock Hills Area of Outstanding Natural Beauty (AONB) is situated within 7 km to the south west of the site. Combined with the Hinkley Point B Site and Hinkley Point C construction site, the site is a prominent feature in the local landscape.

Geology and Soils

Some limited radioactive contamination is present at the site, and is primarily associated with soil surrounding the Active Effluent. Non-radioactive contamination is also present at a number of locations on site.

Climate Change / Flood Risk

An ongoing issue for Hinkley during the care & maintenance phase is the vulnerability of the site to flooding due to raised sea level and more frequent storm surges brought about by the anticipated effects of climate change.

Biodiversity, Flora and Fauna

There are five statutory nature designations in close proximity to the site, which all apply to the River Severn Estuary and Bridgwater Bay. In addition, the Hinkley Point Western Local Wildlife Site is situated immediately adjacent to the site, and the Lilstock SSSI is situated approximately 3 km to the west. A new nature reserve opened in 2015 in the Steart Peninsula, 10 km from the site. The site is also classified as part of the Severn Estuary European Marine Site.

Cultural Heritage [23]

There is one Scheduled Ancient Monument, the Pixies Mound, a Bronze Age tumulus to the south of the site substation. Within 5 km of the site there are a further three Scheduled Ancient Monuments and 89 Listed Buildings.

Water Resources and Quality

Some tritium (a radioactive isotope of hydrogen) has been detected in groundwater. The groundwater that is chemically contaminated is associated with the site's diesel generator building, the turbine hall and the blower houses in both reactor buildings. An ongoing groundwater monitoring programme continues to closely monitor the distribution of existing contamination to ensure it is not migrating beyond the site boundary.

Air Quality

Discharges of radioactivity to the atmosphere have decreased significantly since power generation ceased. Remaining discharges are well within statutory limits [51]. Mitigation measures are in place to reduce the impact of dust emissions both from the site and from vehicles transporting material to or from the site.

Materials and Waste

A combination of radioactive and conventional waste is produced at the site. LLW is packaged and sent to the LLWR for disposal or via alternative routes where possible. ILW is and has been generated from both operational and decommissioning activities and will be stored in purpose-built stores on site or at Bradwell.

3.11 Hunterston A

Site Overview

The Hunterston site is a twin reactor Magnox station located close to the town of Largs and approximately 40 km south west of the City of Glasgow, Scotland. It is situated on the west coast of the Firth of Clyde, from which it drew cooling water supplies during its operational phase. The site covers an area of 15 hectares.

The land surrounding the site is predominantly rural, and is used primarily for agriculture and forestry. The major settlements within 10 km of the site are the town of Largs and village of Fairlie to the north, and the villages of West Kilbride, Seamill and Ardrossan to the south. The town of Millport is situated 4 km north west of the site on the island of Great Cumbrae.

The site access road connects to the national motorway network at junction 29 of the M8 via the A78, A760 and A737 to the north, or to junction 8 of the M77 via the A78, A71 and A77 to the south. The nearest railhead to the site is located approximately 2.5 km north east of the site adjacent to the Hunterston Ore Terminal. The line is operated for both freight and passenger services and the nearest passenger rail stations are located at either West Kilbride or Fairlie.

In 2019 the site employed 156 staff [22].

Community Profile

Employment, Education and Skills

In 2011, the population of North Ayrshire (the local authority in which Hunterston A is sited) was 138,146, with a working population of approximately 57,000.

20% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in the same year (below the Scottish average of 26%).

The most dominant occupations in 2011 were elementary (15%) and jointly associate professional and technical and skilled trades occupations (13%). Process, plant and machine operatives made up 7% of the workforce.

In 2013, the most dominant industry sector was public admin, health and education (30% of jobs) followed by wholesale and retail, including motor trades (17%). 11% of jobs were in manufacturing and 3% in energy and water.

Health

In the 2011 Census, 48.9% of residents in North Ayrshire reported that they were of very good health. This was above the UK average (47.2%). A fewer proportion of residents reported that they were of good health (30.2% compared to 34.2%, the UK average), and a greater proportion reported bad and very bad health (5.2% and 1.6% respectively, compared to 4.2% and 1.2% for the UK).

The Life Expectancy at birth for North Ayrshire in 2011 was 76 for males and 83.5 for females (UK average of 78.85 for males and 82.72 for females). In 2011, 6631 (or 4.8% of the population of North Ayrshire) were reported to have a mental health condition.

For the period 2015-2017, the age standardised death rate for heart-related conditions was 320.0 per 100,000 in North Ayrshire [7] and in 2017 the Information Services Division found 598.4 incidences of all types of cancer per 100,000 [5].

Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>



Environmental Baseline

Landscape and Visual

The landscape surrounding the site is part of the Ayrshire coast. This is characterised by raised beaches and long cliffs set back from the present-day coastline. The islands of Great Cumbrae and Little Cumbrae to the east are visible from the shoreline, and the site is visible from multiple locations in the area to the north and south, and also further west from the Isle of Bute. The site is adjacent to the Hunterston ‘B’ nuclear power station which adds to the visual impact of the site on the landscape.

Geology and Soils

The site has some limited radioactive and non-radioactive land contamination. This is primarily associated with the CP7 Compound and associated drainage, however minor contamination has also been detected at several other locations. The soils in the area surrounding the site are classified as Peaty Podzols and Brown Forest Soils.

Climate Change / Flood Risk

An ongoing issue for Hunterston A during the care & maintenance phase is the vulnerability of the site to flooding due to raised sea level and more frequent storm surges brought about by the anticipated effects of climate change.

Biodiversity, Flora and Fauna

The site has one designated nature area in close proximity, the Portencross Woods SSSI. The Kames Bay and Ballochmartin SSSIs on Great Cumbrae are separated from the site by the Fairlie Roads (a deep water channel in the Firth of Clyde).

Cultural Heritage [24]

There are nine Scheduled Ancient Monuments within 5 km of the site, including Portencross Castle, which is also a Listed Building. Hunterston House is also a Listed Building located adjacent to the site. There are a further four Listed Buildings within 2 km of the site.

Water Resources and Quality

The nearest water body to the site is the Firth of Clyde. Water quality in the Clyde adjacent to the site is classified as ‘excellent’ (Class A) under the Scottish Environment Protection Agency (SEPA) Coastal Scheme. Aqueous effluent is discharged via the Hunterston B station cooling water outfall to the Firth of Clyde, where the effluent is diluted by the B station cooling discharge waters. Radioactive discharges are well within statutory limits [51].

Air Quality

Discharges of radioactivity to the atmosphere have decreased significantly since power generation ceased. Remaining discharges are well within statutory limits [51].

Materials and Waste

A combination of radioactive and conventional waste is produced at the site. The LLW is packaged and sent to the LLWR for disposal. ILW is and has been generated from both operational and decommissioning activities, and this will be retrieved during care & maintenance (with the exception of some Miscellaneous Activated Components that will be retrieved during final site clearance). There are also several waste streams that are unique to the site, including graphite Fuel

3.12 Wylfa

Site Overview

The Wylfa Site is a twin reactor Magnox station that ceased power generation in December 2015, with decommissioning due to commence in 2016. Wylfa is located close to the village of Cemaes in Anglesey, Wales and is on the Irish Sea coast, from which it draws cooling water supplies. The site covers an area of 21 hectares.

The land surrounding the site is predominantly rural and used for agriculture and recreation. The major settlements within 10 km are the town of Amlwch and the village of Cemaes, both to the east of the site. There are also numerous hamlets closer to the site.

The site access road connects to the national motorway at junction 12 of the M53 via the A5025 and A55 (North Wales Expressway) trunk roads. The nearest railhead is located on the North Wales Coast Line, near to Valley Railway Station. This is an operational line with freight and passenger services and the nearest passenger rail stations are Holyhead and Valley.

In 2019 the site employed 104 staff [22].

Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>



Community Profile

Employment, Education and Skills

In 2011, the population of Anglesey (the local authority in which Wylfa is sited) was 69,751 with a working population of approximately 25,000.

26% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above (lower than the England and Wales average of 27%).

The most dominant occupations in 2011 were professional (17%) and caring, leisure and other service occupations (13%). Process, plant and machine operatives made up 8% of the total workforce.

In 2013, the most dominant industry sector was public administration, health and education (26% of jobs) followed by wholesale and retail, including motor trades (18%). 10% of jobs were in manufacturing and 3% were in energy and water.

Health

In the 2011 Census, 48% of residents in Anglesey reported that they were of very good health. This was above the UK average (47.2%). A lesser proportion of residents reported that they were of good health (30.6% compared to 34.2%, the UK average), and a greater number reported bad or very bad health (4.9% and 1.4% respectively compared to the UK averages of 4.2% and 1.2%).

The Life Expectancy at birth in Anglesey in 2011 was 76.7 for males and 81.9 for females (UK average of 78.85 for males and 82.72 for females). In 2008, 7% of the adult (16+) population of Anglesey were reported to be living with a mental health illness

For the period 2015-2017, the age standardised death rate for heart-related conditions was 270.2 per 100,000 on the Isle of Anglesey [7], and in 2017 the Welsh Cancer Intelligence and Surveillance Unit found 523.6 incidences of all types of cancer per 100,000 [6].

Environmental Baseline [10]

Landscape and Visual

The landscape surrounding the site forms the north coastline of the Isle of Anglesey, and is characterised as generally undulating or flat and semi-open with areas of woodland and small flat agricultural fields. The shoreline to the east and west of the site is comprised of rocky outcrops forming small cliffs up to 15 m above sea level. Much of the coastline is included in the Isle of Anglesey Area of Outstanding Natural Beauty (AONB) designation. The Wylfa site is highly visible throughout the surrounding countryside and along the coastline at short distances.

Geology and Soils

The site is considered to have some limited radioactive and non-radioactive land contamination. Sampling has confirmed that contamination is not widespread. Some areas exhibit organic and inorganic contamination which is below guideline levels. Some hydrocarbon pollution exists in soils to the rear of the gas turbine fuel tanks.

Climate Change / Flood Risk

An ongoing issue for Wylfa is the vulnerability of the site to flooding due to raised sea level, higher waves, and more frequent storm surges brought about by the anticipated effects of climate change.

Biodiversity, Flora and Fauna

The site is situated in a predominately rural setting and has nine nature designations in close proximity, including the Tre'r Gof SSSI, Cemlyn Bay SSSI & SAC, Cae Gwyn SSSI, Llyn Llygeirian SSSI, Henborth SSSI and Ynys Feurig, Cemlyn Bay and The Skerries SSSI & SPA. The adjacent coastline is also a European Marine Site.

Cultural Heritage [25]

There is one Scheduled Ancient Monument, Standing Stones, near to the site at Llanfechell. Within 5 km of the site there are five further Scheduled Ancient Monuments and 36 Listed Buildings.

Water Resources and Quality

The nearest water body to the site is the Irish Sea, to the immediate north. Liquid radioactive effluent requiring disposal is transferred to the Active Effluent Treatment plant, which will be one of the last items of plant to be decommissioned during C&M preparations. There are no significant surface fresh watercourses at or within the immediate area of the Wylfa site. Small springs and drainage ditches feed the Tre'r Gof SSSI located to the north-east of the station. There are two major reservoirs on Anglesey that provide drinking water to local populations: Llyn Alaw lies 7.3km to the south-south-east of the power station and Llyn Cefni lies 20.9km to the south-south-east.

Air Quality

Discharges to the atmosphere have decreased significantly since power generation ceased. Remaining discharges are within statutory limits [51]. Mitigation measures are in place to reduce the impact of dust emissions both from the site and from vehicles transporting material to or from the site.

Materials and Waste

A combination of radioactive and conventional waste is produced at the site. LLW is packaged and sent to the LLWR for disposal or diverted to other routes such as metal recycling where possible. The majority of operational ILW will be left in voids in the reactor building until Final Site Clearance. Some of the operational ILW will be retrieved and packaged during C&M Preparations and stored on site in a radioactive waste storage facility until an offsite disposal route becomes available. Some low-level radioactive waste and debris will be retrieved during decommissioning.

3.13 Capenhurst

Site Overview

The Capenhurst Site is located close to Ellesmere Port in Cheshire, England and is currently owned and operated by URENCO. The Urenco Nuclear Stewardship (UNS) is responsible for management of uranium and carrying out remediation work on behalf of NDA [26]. The site was home to a uranium gaseous diffusion enrichment plant and associated facilities that ceased operation in 1982. It currently stores the UK's inventory of depleted uranium and uranium hexafluoride. UNS have an agreement with NDA covering the processing of Government-owned by-product and legacy material. The site covers 31 hectares of land, of which 17 hectares has been de-designated.

The land surrounding the site is mixed-use, with the town of Ellesmere Port 4 km to north east and agricultural land to the south west. The major settlements within 10 km are Chester to the south east, Deeside to the south and Bebington to the north west. There are numerous smaller towns and villages in the vicinity and the City of Liverpool is within 15 km to the north across the River Mersey.

The site access road connects via a series of minor roads, which in turn connect to either the A540 (west), A550 (north) and A41 (east), all of which connect to the M56 motorway. Capenhurst Railway station, on the Liverpool to Chester Line, is immediately adjacent to the site.

Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>



Community Profile

Employment, Education and Skills

In 2011, the population of Cheshire West and Chester (the local authority in which Capenhurst is sited) was 329,608, with a working population of approximately 139,000.

29% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in the same year (above the England and Wales average of 27%).

The most dominant occupations in 2011 were professional (18%) followed by associate professional and technical occupations, administrative and secretarial occupations and elementary occupations. Process, plant and machine operatives accounted for 7% of the workforce.

In 2013, the most dominant industry sector was public admin, health and education (25% of jobs) followed by financial and other business services (24%). 9% were in manufacturing and 1% were in energy and water.

Health

In the 2011 Census, 48.5% of residents in Cheshire West and Chester reported that they were of very good health. This was above the UK average (47.2%). A lower proportion reported good health (33% compared to 34.2% UK-wide) and a slightly greater proportion of residents described themselves as having bad or very bad health compared to the UK average (4.3% and 1.3% compared to 4.2% and 1.2% UK-wide).

The Life Expectancy at birth in 2011 in Cheshire West and Chester was 78.8 for males and 82 for females (UK average of 78.85 for males and 82.72 for females). Between April 2010 and March 2011, 1.5% of the total population accessed NHS specialist mental health services, lower than the average for England of 2.4%.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 242.5 per 100,000 in Cheshire West and Chester [7] and there was an average of 651 incidences of all types of cancer per 100,000 in the CCG for the area between 2011 and 2015 [3].

Environmental Baseline

Landscape and Visual

To the south and west of the site is predominantly mixed agricultural land, with areas of improved pasture, arable farming and market gardens interspersed with residential development. Due to the low heights of facilities at this site, it is not as visually obtrusive as other sites in the NDA estate.

Geology and Soils

Following de-conversion of part of the uranium inventory at the site, there is anticipated to be around 1,000 m³ of soil contaminated with radioactive material which will require treatment as LLW.

Climate Change / Flood Risk

The site is located approximately 40 m above sea level and is situated sufficiently away from water bodies that changes in flood risk and landscape induced by climate change are likely to be minimal.

Biodiversity, Flora and Fauna

The site is located approximately 5 km from the bank of the River Mersey which is designated as a SSSI, Ramsar and SAC.

Cultural Heritage [23]

There are no archaeological or historical features identified within 2 km of the site. Within 5 km of the site there are four Scheduled Ancient Monuments and over 180 Listed Buildings.

Water Resources and Quality

The nearest water body monitored by the Environmental Agency is Rivacre Brook between Capenhurst and the A41. Between 2004 and 2006 the water quality was compliant with set quality targets.

Air Quality

Non-radioactive pollutant emissions are generated through vehicle and plant machinery activity, but these have not significantly affected air quality at the site. Discharges of radioactivity to the atmosphere are well within statutory limits.

Materials and Waste

A combination of radioactive and conventional waste is produced at the site. Capenhurst also receives and safely stores Magnox Depleted Uranium from Sellafield. It is the UK's primary safe and secure storage facility for depleted uranium and uranium hexafluoride.

3.14 LLWR

Site Overview

The LLWR is a LLW disposal facility located in Cumbria, North West England. Operational activities, including receipt, treatment and disposal of LLW, are due to end in 2050 with final site clearance expected to be in 2080. The site covers 99 hectares.

The land surrounding the site is predominantly rural and agricultural. The nearest settlement is Drigg, which lies immediately adjacent to the site boundary across the railway line. Larger settlements within 10 km of the site include Gosford to the north and Seascale to the north-west.

The site access roads join the A595 trunk road, which links to the A5092 and A590 before joining the national motorway network at Junction 36 of the M6. The site itself has direct access to the national railway network on the southern extent of the site. The nearest passenger rail station is Drigg.

In 2019, the site employed 360 staff [22].

Community Profile

Employment, Education and Skills

In 2011, the population of Copeland (the local authority in which the LLWR is sited) was 70,603, with a working population of approximately 29,000.

21% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in that year (lower than the England and Wales average of 27%).

The most dominant occupations in 2011 were professional (15%). Skilled trades and elementary occupations were jointly the second most dominant occupation at 13%. Process, plant and machine operatives made up 12% of the workforce.

In 2013, the most dominant industry sector was manufacturing (35% of jobs) followed by public admin, education and health (24%). 1% of jobs were in energy and water.

Health

According to the 2011 Census, 44.4% of residents in Copeland reported that they were of very good health. This was below the UK average of 47.2%. A slightly lower proportion in Copeland reported good health, 33.9% compared to 34.2% and a higher proportion reported bad and very bad health (5.3% and 1.4% respectively in Copeland compared to 4.2% and 1.2% UK-wide).

The Life Expectancy in the Copeland Local Authority area in 2011 was 77.6 for males and 80.4 for females (UK average of 78.85 for males and 82.72 for females). In the same year, 2% of the adult population accessed NHS Specialist Mental Health Services.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 279.9 per 100,000 in Copeland [7] and there was an average of 613 incidences of all types of cancer per 100,000 in the CCG for the area between 2011 and 2015 [3].



Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>

Environmental Baseline

Landscape and Visual

The landscape to the south and west of the site is part of the West Cumbria Coastal Plain, identified as an area of varied open coastline with mudflats, shingle and pebble beaches with localised sections of dunes and sandy beaches. To the north and east of the site is predominantly mixed agricultural land, with areas of improved pasture, arable farming and market gardens interspersed with residential development. Due to the low heights of all facilities at the LLWR, the visual impact of the site on the landscape is minimal.

Geology and Soils

Two areas, each approximately 200 m² in size, located within the site boundary (referred to as “slabs”) are known to have some contamination. The agricultural land surrounding the site is classified as grade 3 (of moderate quality).

Climate Change / Flood Risk

The site is located close to the coast and is anticipated to be subject to coastal erosion around 1,000 – 6,000 years in the future [18]. The site is currently protected by natural coastal defences and is not anticipated to be affected by coastal erosion or flooding within the timescale of the IIA.

Biodiversity, Flora and Fauna

The LLWR site is situated adjacent to the Drigg Coast SAC. Around 1,400 hectares of the Drigg Coast SAC is also designated as a SSSI. Other designated nature conservation sites in the wider surrounding area include Hallsennia Moor SSSI (also designated an NNR), over 1.5 km north east of the site, and Drighgolme SSSI, over 1 km to the east.

Cultural Heritage [23]

There are no designated Conservation Areas, Listed Buildings or Scheduled Ancient Monuments within 1 km of the site. Cultural heritage features in the wider surrounding area include Muncaster Castle Grade I Listed Building and Scheduled Monument (to the south east), and its Grade II Listed Registered Historic Parks and Gardens, and Ravenglass Conservation Area. Within 5 km there are a further six Scheduled Ancient Monuments and over 50 Listed Buildings.

Water Resources and Quality

The site is about 3 km from the Ravenglass Estuary where the Rivers Irt, Mite and Esk converge. LLW Repository Ltd undertake a monitoring programme including monitoring of surface water and groundwater quality [19].

Air Quality

The 2006 air quality review undertaken by Copeland Borough Council confirmed that all of the measured air pollutants at the site were well below national air quality objectives. The exposure to the public from discharges to the atmosphere is well within statutory limits.

Materials and Waste

There is currently a substantial amount of LLW disposal space onsite (approximately 1 million cubic metres [20]). The 2011 Environmental Safety Case Inventory Report anticipated raw arisings to be around 570,000 cubic metres from April 2008 to the end of LLW generation [21]. This covers a broad spectrum of activity levels and materials including concrete, rubble, soils, plastics, ferrous and nonferrous metals, and cellulosic materials.

3.15 Springfields

Site Overview

Springfields is an NDA nuclear fuel manufacturing facility situated west of Preston in Lancashire. The land surrounding the site is rural, and is used primarily for agriculture and recreation. The major settlements within 10 km of the site are the town of Clifton to the south, Newton with Scales to the south west, Kirkam to the west and Preston to the east. There are also numerous small settlements within the surrounding area.

The site access road connects to the A583, which links directly to the national motorway network at Junction 3 of the M3. The site itself has direct access to the national railway network on the northern extent of the site. The nearest passenger rail station is Salwick.



Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>

Community Profile

Employment, Education and Skills

In 2011, the population of Fylde (the local authority in which Springfields is sited) was 75,757, with a working population of 29,000.

30% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in that year (above the England and Wales average of 27%).

The most dominant occupations in 2011 were professional (22%) and administrative and secretarial (14%). Process, plant and machine operatives made up 5% of the workforce.

In 2013, the most dominant industry sector was financial and other business services (26% of jobs) followed by manufacturing (23%). 1% of jobs were in energy and water.

Health

In the 2011 Census, 44.6% of residents in Fylde reported that they were of very good health and 33.8% reported they were of good health. This was below the UK averages of 47.2% and 34.2% respectively. A greater proportion of residents reported that they were of bad health and very bad health (4.9% and 1.4% compared to 4.2% and 1.3% UK-wide).

The Life Expectancy at birth for Fylde in 2011 was 78.9 for males and 82.5 for females (UK average of 78.85 for males and 82.72 for females). In 2011, 3% of the adult population (aged 18+) of Fylde were identified as having accessed NHS specialist mental health services.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 246.2 per 100,000 in Fylde [7] and there was an average of 636 incidences of all types of cancer per 100,000 in the CCG for the area between 2011 and 2015 [3].

Environmental Baseline

Landscape and Visual

The area surrounding the site is predominantly mixed agricultural land, with areas of improved pasture, arable farming and market gardens interspersed with residential development. Due to the low heights of buildings across the site, impacts on view of the landscape from the surrounding area are minimal.

Geology and Soils

In 2004, there was an estimated 82,000 m² of radiologically contaminated soil on the site, most of which is classed as LLW. Hydrocarbons and solvents also exist at detectable levels in some areas. The agricultural land surrounding the site is classified as grade 1 (excellent quality) and grade 2 (very good quality).

Climate Change / Flood Risk

A small part of the site is designated as floodplain (along the channel of Deepdale Brook), in addition to a large area to the south of the site. As the site is around 20 m above sea level, changes brought about by the anticipated effects of climate change are unlikely to alter flood risk.

Biodiversity, Flora and Fauna

Deepdale Wood, running through the central part of the site, is designated a Biological Heritage Site (important non-statutory wildlife sites in Lancashire). In addition, the ponds within the north east corner of the site (known as Springfields Ponds) are also a Biological Heritage Site, as is the Lancaster Canal to the north. Other designated nature conservation sites in the wider area include Newton Marsh SSSI, located 2.3 km to the south west and the Ribble and Alt Estuaries SPA, Ramsar and Important Bird Area, the Ribble Marshes NNR and the Ribble Estuary SSSI, all of which are located around 2.5 km to the south west of the site.

Cultural Heritage [23]

Within 1 km of the site there are eight Grade II Listed Buildings, two of which are located on Lea Lane, and four of which are bridges over the river to the north of the site. Within 5 km there are over 80 additional Listed Buildings.

Water Resources and Quality

The site discharges to the sea via the Ribble Estuary at levels well within statutory limits [51].

Air Quality

The Springfields site is one of the most substantial sources of non-radioactive discharges to the atmosphere across the NDA estate as a result of the operation of the Combined Heat and Power (CHP) plant on site.

Materials and Waste

It is anticipated that Springfields will only generate LLW. The bulk of UK uranium (produced as a result of fuel cycle operations) is stored on the Springfields and Capenhurst sites as a nil value asset.

3.16 Winfrith

Site Overview

The Winfrith nuclear facility is located close to the village of Winfrith Newburgh in Dorset, South West England. The site contains two reactors (the SGHWR and the High Temperature Gas Cooled Reactor – the Dragon reactor) and associated ancillary facilities, which cover an area of 95 hectares, of which 10 have been de-designated.

Winfrith is near the south coast of Dorset in a flat lying, mainly rural area at around 25 m above sea level. The area surrounding the site is predominantly heathland and agricultural land, with the settlements of Blacknoll (1.1 km to the south west), East Knighton (1.5 km to the south), East Burton and Braytown (1.3 km to the east), Wool (2.7 km to the east) and Winfrith Newburgh (2.3 km to the south) situated nearby.

The site is located to the north west of the A352. Access to the site is via the A352 Burton Road Gatemore Road off the A352 to the south. Gatemore Road runs along the western side of the site through Winfrith Heath SSSI. The main rail service between Weymouth and London runs immediately to the north of the site.

The site employed 168 staff in 2019 [22].

The eastern part of the site has already been decommissioned and now comprises Winfrith Technology Centre. The centre is a well-established location for business, employing over 4,000 people.

Image sourced from: Office for Nuclear Regulation (ONR) 2015

<http://www.onr.org.uk/sites/>



Community Profile

Employment, Education and Skills

In 2011, the population of Purbeck (the local authority in which Winfrith is sited) was 44, 973, with a working population of 18,000.

26% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in that year (lower than the England and Wales average of 27%).

The most dominant occupations in 2011 were professional (14%) and jointly associate professional and technical and administrative and secretarial (each making up 13% of the workforce).

In 2013, the most dominant industry sector was public admin, health and education (25% of jobs) followed by accommodation and food services (15%). 14% of jobs were in manufacturing and 2% were in energy and water.

Health

In the 2011 Census, 45% of residents in Purbeck reported that they were of very good health. This was below the UK average of 47.2%. A greater proportion of residents reported that they were of good health (35.9% compared to 34.2% UK-wide), and slightly fewer reported having bad or very bad health (4% and 1% compared to 4.2% and 1.3% UK-wide).

The Life Expectancy for Purbeck Local Authority in 2011 was 80.8 for males and 84.3 for females (UK average of 78.85 for males and 82.72 for females). Between April 2010 and March 2011, 785 adults accessed NHS specialist mental health services, equating to 1.7% of the total population. This was below the UK average of 2.4%.

For the period 2014-2016, the age standardised death rate for heart-related conditions was 223.7 per 100,000 in Purbeck [7] and there was an average of 637 incidences of all types of cancer per 100,000 in the CCG for the area between 2011 and 2015 [3].

Environmental Baseline

Landscape and Visual

The Winfrith site falls within the Dorset Heaths landscape character area, described as a generally exposed, open, broad scale landscape comprising undulating lowland heath with tracts of heather, stunted pines and gorse scrub. The chalk ridges and downs south of the site are designated as an Area of Outstanding Natural Beauty (AONB) (Dorset AONB). The low height of many of the facilities at the site and the presence of vegetation that screens some of the taller buildings makes the visual impact of the site on the landscape minimal.

Geology and Soils

Some areas of the site have been subject to radioactive contamination in the past, but the radioactivity (principally tritium) has now undergone natural attenuation and the levels are well below the World Health Organisation (WHO) Guideline Value.

Climate Change / Flood Risk

After a flood risk assessment of the site in late 2009, it was concluded that there is limited risk of flooding at Winfrith regardless of changes brought about by climate change. In 2011, the assessment was revised to include an assessment of extreme weather conditions and its potential to cause flooding. The conclusion from this exercise was that the site drainage systems, both man-made and natural, are capable of coping with such events.

Biodiversity, Flora and Fauna

Nearly two thirds of the site falls within the Winfrith Heath SSSI, which is one of the major lowland heathland areas in Britain. In addition, part of the site is designated a SAC (Dorset Heaths), a SPA and a Ramsar (Dorset Heathlands). The Winfrith pipeline in the English Channel is designated as a Marine Area of Conservation. Other designated sites in the area include the Dorset Heaths (Purbeck and Wareham) and Studland Dunes SAC and Poole Harbour SPA, both of which are situated to the east of Winfrith. Winfrith Heath NNR and Tadmole NNR are located to the west of the site.

Cultural Heritage [23]

There are over 40 Scheduled Monuments within 5 km of the site, mostly consisting of bowl barrows. One of these is adjacent to the site, comprising six bowl barrows upon a ridge known as Blacknoll Hill. The town of Winfrith Newburgh, about 1.6 km south of the site, is designated a Conservation Area within which there are over 35 Grade II Listed Buildings and three Grade II* Listed buildings.

Water Resources and Quality

Elevated radiation levels close to the WHO guideline value for drinking water have been persistent in the borehole adjacent to the External Active Sludge Tanks (EAST) for several years. These elevated levels could be due to natural processes such as high natural background uranium decay or due to anthropogenic activities. All other groundwater samples remain below WHO guideline values and discharges are within statutory limits [51].

Air Quality

It is anticipated that radioactive discharges to the atmosphere will fluctuate during decommissioning but remain within statutory discharge limits [51].

Materials and Waste

A combination of LLW and inert waste is generated at the site. Of the waste produced, the crushed concrete from decommissioning is temporarily stored on site and used to fill voids, whilst soil from site remediation is used for landscaping. Decommissioning activities on the site will generate large volumes of waste, including radioactive wastes, as a result of historic reactor operations and experiments.

3.17 Harwell

Site Overview

Harwell is located in Oxfordshire and covers approximately 108 hectares, of which 86 hectares comprise the licensed site. The site has begun decommissioning and waste management operations that will run through to 2028 and involve the retrieval and repackaging of legacy ILW from a number of facilities.

The closest settlements are Chilton (0.5 km to the south east), Harwell (1.5 km to the north east) and East Hendred (1.5 km to the north west). The land surrounding the site is predominantly arable farmland.

The site is located adjacent to the A34 which provides links to the national motorway network via the M4.

In 2019 the site employed 210 staff [22].

Community Profile

Employment, Education and Skills

Image sourced from: Office for Nuclear Regulation (ONR) 2015

In 2011, the population of the Vale of White Horse (the local authority in which Harwell is sited) was 120,988, with a working population of 54,000.

<http://www.onr.org.uk/sites/>

87% of the population had achieved qualifications of NVQ4 level (degree e.g. BA or BSc) or above in that year (far greater than the England and Wales average of 27%).

The most dominant occupations in 2011 were professional (24%) and associate professional (14%). Process, plant and machine operatives made up 5% of the workforce.

In 2013, the most dominant industry sector was financial and other business services (28% of jobs) followed by public admin, health and education (22%). 6% of jobs were in manufacturing and 1% in energy and water.

Health

In the 2011 Census, 51.9% of residents in the Vale of White Horse reported that they were in good health, compared to 48.8% in the UK. This is above the UK average. The Vale of White Horse reported that there were considerably fewer deaths in the Vale of White Horse than in the UK.

The Life Expectancy in 2011 was 81 for men and 82.72 for women. For every 100,000 of the total population, 100 deaths were expected.

For the first time, there were more heart-related deaths in the Vale of White Horse [7] and more than 100,000 in the UK.



Environmental Baseline*Landscape and Visual*

The Harwell site occupies 96 hectares of rural Chalk down land in Oxfordshire and borders the North Wessex Area of Outstanding Natural Beauty (AONB). The site is surrounded by agricultural land and the nearest watercourse to the site is the Lydebank Brook, located to the north. As many of the buildings on the site are low in height visual impacts of the site upon the surrounding landscape are minimal.

Geology and Soils

Baseline information on geology and soils at the site could not be obtained at this time. This will be addressed during the course of the assessment if required.

Climate Change / Flood Risk

After a flood risk assessment in late 2009, it was concluded that there is limited risk of flooding at Harwell, taking into account future anticipated effects of climate change. In 2011, the assessment was revised to include an assessment of extreme weather conditions and its potential to cause flooding. The conclusion from this exercise was that the site drainage systems, both man-made and natural, are capable of coping with such events.

Biodiversity, Flora and Fauna

The site is within a Nitrate Vulnerable zone and borders the North Wessex Downs AONB, which includes downland habitat and ancient woodland. There are no specific designated areas close to the site. The nearest nature designation is a SSSI located approximately 7 km to the south east.

Cultural Heritage [23]

There are 14 Scheduled Ancient Monuments within a 5 km radius of the site, none of which are within 1 km. The area has been settled since 3,000 BC and has a wealth of archaeological features ranging from prehistoric barrows to Roman roads and chalk hill carvings. There are around 300 Listed Buildings within 5 km of the site.

Water Resources and Quality

After many years Harwell ceased routine operational discharges to the River Thames in June 2012. Occasional permitted discharges are well within statutory limits [51]. The ecological quality of the River is considered to be poor, whilst the chemical water quality is considered to be good in accordance with the Water Framework Directive.

Air Quality

Non-radioactive discharges to air are predominantly heating-related and include carbon dioxide at levels below those requiring permits. Some emissions of NO_x (Oxides of Nitrogen) and Particulate Matter are also generated by vehicle and plant machinery.

Materials and Waste

The site produces LLW and inert waste, both of which are likely to increase during decommissioning. ILW may be interim stored on-site until such a time that a national repository is available for permanent off-site disposal, although transfer of waste to suitable off site locations may occur before then. Large volumes of LLW will be disposed of to a licensed landfill.

4.0 Future baseline

4.1 Introduction

In line with the SEA Regulations requirement to consider the likely evolution of the baseline, future environmental, health and socio-economic baseline conditions have been established, where possible, using the annual Site-Specific Baseline Reports and local authority development plans and strategies.

Where possible, the baseline information obtained covers the timescale over which the NDA Strategy applies - i.e. from today until the final site in the NDA estate achieves its end state. This is anticipated to be Sellafield around the year 2120.

4.2 Future health and socio-economic baseline

4.2.1 Population

National

A key factor which determines the future health and socio-economic characteristics of communities is population. The general anticipated trend up until 2033 is for an increase in population across England, Scotland and Wales of 14%, 7%, and 6% respectively, and for a total UK population of 69.1 million by 2033 (this represents an increase of approximately 13% on 2011 census figures) [28,29,30].

Regional

Population projections are not uniform at a local authority level². Table 4-A indicates population projections up to 2027 and 2033.

Table 4-A: Population Projections by local authority up to 2033 [28,29,30]

Site	Country / Local Authority	Population 2011	Projected Population 2027	Percentage Change (since 2011)	Projected Population 2033	Percentage Change (since 2011)
-	England	53,012,456	58,778,674	10.9%	60,251,545	13.7%
-	Scotland	5,295,000	5,591,471	5.6%	5,651,785	6.7%
-	Wales	3,063,436	3,200,884	4.5%	3,236,805	5.7%
Berkeley	Stroud	112,779	126,986	12.6%	131,301	16.4%
Bradwell	Maldon	61,629	67,042	8.8%	68,964	11.9%
Capenhurst	Cheshire West & Chester	329,608	347,148	5.3%	351,670	6.7%
Chapelcross	Dumfries & Galloway	151,324	146,947	-2.9%	144,963	-4.2%
Dounreay	Highland	232,131	238,975	2.9%	239,155	3.0%
Dungeness A	Folkestone and Hythe	107,969	118,184	9.5%	121,970	13.0%
Harwell	Vale of White Horse	120,988	138,454	14.4%	141,579	17.0%
Hinkley Point A	West Somerset	34,675	35,016	1.0%	35,588	2.6%
Hunterston A	North Ayrshire	138,146	132,677	-4.0%	130,223	-5.7%

² These values are based on 2016 data and therefore do not account for any implications of COVID-19.

Site	Country / Local Authority	Population 2011	Projected Population 2027	Percentage Change (since 2011)	Projected Population 2033	Percentage Change (since 2011)
Oldbury	South Gloucestershire	262,767	304,838	16.0%	318,507	21.2%
Sellafield / LLWR	Copeland	70,603	66,103	-6.4%	64,316	-8.9%
Sizewell A	Suffolk Coastal	124,298	134,071	7.9%	137,150	10.3%
Springfields	Fylde	75,757	81,679	7.8%	82,848	9.4%
Trawsfynydd	Gwynedd	121,874	127,551	4.7%	130,191	6.8%
Winfrith	Purbeck	44,973	47,937	6.6%	48,653	8.2%
Wylfa	Isle of Anglesey	69,751	69,908	0.2%	69,231	-0.7%

4.2.2 Development and Economic Growth

National

There are inherent complexities involved in projecting future changes in development and economic growth at a national scale, as they are dependent on a wide range of factors. However, large-scale investment in nationally significant infrastructure projects such as Crossrail, HS2, and new nuclear build will continue throughout the short to medium-term. The Department for Business, Energy and Industrial Strategy (BEIS) published a National Policy Statement for Geological Disposal Infrastructure in 2019 [31]. As such a geological disposal facility is considered to be nationally significant infrastructure project.

Regional and Local

At a local scale, future investment can be better projected, as strategic local development plans are produced for every local and unitary authority in the UK. Table 4-B summarises some of the planned future developments in the local authorities within which sites are located.

In terms of future development at the sites themselves, the NDA has considered some potential land use opportunities following site closure and possible delicensing. These include:

- Business parks;
- New nuclear power stations;
- Science and Technology centres; and
- Other business related developments.

Table 4-B: Planned future developments at a regional and local level

Site (Local / Unitary Authority)	Other relevant future development in Local Authority
Berkeley (Stroud) [32]	Stroud Valleys Project improvement of natural environment, allowance for 450 homes, and intensification of underused employment resources. Sharpness Docks regeneration including up to 300 homes and improved employment opportunities. The Hunts Grove Extension project. Development of North East Cam to provide 450 homes and up to 1,500 new jobs by 2031, whilst conserving and enhancing the high quality natural landscape Provision of 1,350 homes and up to 2,000 jobs to the west of Stonehouse
Bradwell (Maldon) [33]	South Maldon Garden Suburb - 1,428 houses by 2029. North Heybridge Garden Suburb 1,383 houses by 2029. Maldon & Heybridge and Burnham-on-Crouch 682 Strategic Allocation houses by 2029. 94.21 ha existing employment space reserved for employment development and approximately 11.4 ha allocated for new employment development.
Dungeness A (Folkestone & Hythe) [34]	Development proposed for Folkestone Seafront (commercial and residential), Shorncliffe Garrison (residential), Martello Lakes/Nickolls Quarry (residential, community and commercial), urban sports park in Folkestone.
Hinkley Point A (West Somerset) ³ [35]	Hinkley Point C. 2,900 new dwellings by 2032, with 1,450 of these being provided on key strategic sites at Minehead/Alcombe, Watchet and Williton.
Oldbury (South Gloucestershire) [36]	Completion of developments at Patchway/Cribbs causeway, Harry Stoke, Emersons Green, North Yate, Thornbury, and Severnside. Large-scale development in Charfield, Thornbury, Yate, Coalpit Heath and Buckover Maximisation of brownfield land within urban areas for residential and employment uses.
Sellafield & LLWR (Copeland) [37]	Areas of development proposed in Whitehaven, including the Westlakes Science and Technology Park and various areas of regeneration.
Harwell (Vale of White Horse) [38]	Botley Central Area development.

³ The local district of West Somerset was merged with the neighbouring Taunton Deane district in 2019, but the most recent local plan relates to West Somerset.

Site (Local / Unitary Authority)	Other relevant future development in Local Authority
	<p>The 'Science Vale UK' project incorporating Harwell, Milton Park, Culham Science Centre, Didcot and Wantage & Grove.</p> <p>New homes within existing built areas of Market Towns, Local Service Centres and Larger Villages.</p> <p>Redevelopment of surplus land at Didcot A Power Station</p> <p>Employment and business development at Monks Farm, Grove and Faringdon.</p>
Winfrith (Purbeck) [39]	<p>Strategic housing sites in Wool, Moreton Station, Swanage, Wareham, Upton, Lytchett Matravers and Bere Regis.</p> <p>Employment site at Holton Heath.</p>
Capenhurst (Cheshire West & Chester) [40]	<p>The Chester Renaissance Programme and Ellesmere Port Developments</p> <p>Additional developments at Northwich, Winsford, and Middlewich.</p>
Springfields (Fylde) [41]	<p>Strategic locations for development identified in Lytham and St Annes, the Blackpool Periphery, Warton and Kirkham and Wesham.</p>
Sizewell A (East Suffolk) [42]	<p>Expansion and development of the Port of Felixstowe</p> <p>Garden neighbourhoods at Felixstowe and Saxmundham</p> <p>Sizewell C</p>
Chapelcross (Dumfries & Galloway) [43]	<p>Regeneration projects are underway in Dumfries and the Gretna-Lockerbie-Annan corridor.</p> <p>Stranraer waterfront extension on Loch Ryan</p>
Dounreay (Highland) [44]	<p>Development of the Energy Hub– Area for Co-ordinated Action in the Pentland Firth and Orkney Waters</p> <p>Development of a High Voltage Energy Transmission Network</p> <p>Reuse of vacant land at town centres, including Brora, Dornoch, Golspie, Thurso and Wick</p> <p>Supported growth of the marine renewables sector</p>
Hunterston A (North Ayrshire) [45]	<p>Development of the i3 business location in Irvine</p> <p>Redevelopment of the North Shore site at Ardrossan harbour.</p> <p>The Montgomerie park development.</p> <p>Possible new power station adjacent to existing site.</p>
Trawsfynydd (Gwynedd) [46]	<p>The Anglesey Energy Island Programme</p>

Site (Local / Unitary Authority)	Other relevant future development in Local Authority
	Opportunities associated with the Snowdonia Enterprise Zone Development of an employment site at Y Ffor
Wylfa (Isle of Anglesey) [46]	The Anglesey Energy Island Programme Development of the Grwp Llandrillo Menai campus Bangor University Science Park at Gaerwen

4.2.3 Radiological safety

National

The UK national and European public dose limit for authorised/ permitted releases of radiation is 1 millisievert (mSv) per year as set by the Ionising Radiation Regulations 2017 [47]. The actual dose experienced by the public is dependent on variations in natural background radiation, man-made discharge concentrations and individual habits such as diet. Over time there has been a general declining trend in radiation exposure from man-made discharges across many of the NDA sites.

Regional

Natural background radiation is influenced by three key sources; cosmic radiation at ground level, radon and thoron gas and terrestrial gamma radiation. The greatest degree of regional variation is attributable to radon and thoron gas exposure [48]. Cornwall experiences the highest levels of overall background radiation, followed by Devon and Somerset [49].

Local

Local trends in radiation exposure can be influenced by gaseous and liquid discharges from activities at the sites, however it should be noted that radioactive discharges at all sites are within statutory limits. Table 4-C indicates doses from gaseous and liquid discharges in 2013 and 2018 at each of the sites in the NDA estate.

Table 4-C: Total doses from radiation sources integrated across pathways in 2013 and 2018 [50,51]

Site	2013 doses (mSv)			2018 doses (mSv)		
	Gaseous releases and direct radiation	Liquid releases and direct radiation	Total doses	Gaseous releases and direct radiation	Liquid releases and direct radiation	Total doses
Statutory Limit			1			1
Berkeley and Oldbury	0.008	0.010	0.010	<0.005	<0.005	<0.005
Bradwell	<0.005	<0.005	<0.005	0.011	<0.005	0.011
Dungeness (A & B)	0.021	0.006	0.021	0.022	<0.005	0.022
Hinkley Point (A & B)	0.014	0.022	0.022	0.006	0.041	0.041
Sellafield	0.012	0.076	0.076	0.006	0.034 ⁴	0.034
LLWR	0.037	0.061	0.061	0.053	0.034 ⁴	0.034
Harwell	0.010	<0.005	0.010	0.028	<0.005	0.028
Winfrith	<0.005	<0.005	<0.005	0.027	0.009	0.027
Capenhurst	0.080	0.008	0.080	0.16	<0.005	0.16
Springfields	0.024	0.060	0.060	0.075	0.033	0.075
Sizewell (A & B)	0.021	0.018	0.021	0.026	0.008	0.026
Chapelcross	0.024	0.014	0.024	0.019	0.008	0.019
Downreay	0.012	0.011	0.012	0.035	0.005	0.035
Hunterston (A & B)	0.021	<0.005	0.021	<0.005	<0.005	<0.005

⁴ The effects of liquid discharges from Sellafield, Whitehaven and LLWR near Drigg are considered together in the RIFE study. The total dose from all pathways was 0.37 mSv, however 0.33 mSv were as a result of naturally occurring radionuclides from a phosphate processing works at Whitehaven, hence the man-made radionuclide contribution of 0.034 mSv is reported here, attributed to Sellafield and LLWR.

Site	2013 doses (mSv)			2018 doses (mSv)		
	Gaseous releases and direct radiation	Liquid releases and direct radiation	Total doses	Gaseous releases and direct radiation	Liquid releases and direct radiation	Total doses
Trawsfynydd	0.017	0.012	0.017	<0.005	0.017	0.017
Wylfa	<0.005	<0.005	<0.005	<0.005	0.006	0.006

Discharges of aqueous and aerial radioactivity have decreased significantly in the sites that have ceased power generation. As decommissioning continues, radioactive discharges are broadly likely to remain steady or decrease, however certain activities such as waste retrieval and treatment, and pond decommissioning may result in temporary spikes. Such increases are anticipated to be well within statutory limits.

4.3 Future environmental baseline

4.3.1 Air quality

National

UK emissions of air pollutants are anticipated to reduce steadily over time, as shown in Table 4-D. This trend is attributed to several factors which include but are not limited to:

- legislation specifically aimed at reducing the emissions of certain pollutants (Pollution Prevention and Control Act 1999, Clean Air Strategy 2019, see Section 2.3 of the Policy and Legislative Context Review for more details);
- technology developments, increased efficiency and abatement measures;
- changes in activity; e.g. the increased use of natural gas instead of coal for power generation and the switch from diesel to petrol in the transport sector; and
- fiscal measures that encourage positive behaviours.

Table 4-D: Anticipated future changes in UK air pollutants between 2016 and 2030 [52]

Pollutant	Current emissions (kt)	Projected emissions without the new strategy (kt)			Emissions ceiling (kt)	
	2016	2020	2030	2020	2030	
Oxides of Nitrogen (NO _x)	886	735	558	771	463	
Sulphur Dioxide (SO ₂)	179	126	97	317	93	
Non-methane volatile organic compounds (NMVOCs)	701	686	719	709	636	
Particulate Matter (PM _{2.5})	108	103	100	89	69	
Ammonia (NH ₃)	279	279	277	265	242	

If no action is taken, the UK is likely to be above our emission ceilings for PM_{2.5} and NH₃ in 2020 and all 5 pollutants in 2030. If the policies set out in the 2019 Clean Air Strategy are implemented, Government analysis indicates that all emissions ceilings should be met [52].

Regional

The Environment Agency publishes a pollution inventory each year providing information about releases as a result of industrial activities they regulate [53], and SEPA publish a similar inventory [54]. NRW collect the same data, but it is not publicly available.

Table 4-E: Quantities of pollutants released to air in regions in England [53] and Scotland [54] in 2017

Region	Site(s)	Quantity Released (kg)					
		NH ₃	NO _x	PM ₁₀	NMVOCS	SO _x	PM _{2.5}
Cumbria and Lancashire	Sellafield, LLWR	4.70E+05	1.83E+06	2.68E+05	2.92E+05	3.10E+05	1.51E+04
Wessex	Oldbury, Berkeley, Hinkley Point A	6.52E+05	1.83E+06	4.11E+05	3.72E+05	0.00E+00	0.00E+00
East Anglia	Sizewell, Bradwell	2.34E+06	5.27E+06	2.17E+06	3.18E+06	7.44E+06	1.13E+05
Kent, South London and East Sussex	Dungeness	1.14E+05	5.01E+06	4.42E+04	2.67E+05	1.47E+05	1.08E+03
Solent and South Downs	Winfrith	1.41E+05	4.48E+06	3.18E+05	3.35E+06	7.46E+06	1.66E+05
Greater Manchester Merseyside and Cheshire	Capenhurst	1.75E+06	1.51E+07	4.29E+05	8.58E+06	1.03E+07	1.60E+05
Thames	Harwell	2.50E+05	2.93E+06	8.88E+04	1.47E+05	4.16E+04	1.41E+02
Highland	Dounreay	1.77E+04	2.86E+05	3.16E+05	1.65E+05	6.53E+05	0.00E+00
Dumfries & Galloway	Chapelcross	3.72E+04	3.45E+05	1.24E+04	7.17E+04	0.00E+00	2.25E+03
North Ayrshire	Hunterston A	1.01E+04	4.66E+05	0.00E+00	1.10E+06	2.69E+05	0.00E+00
Anglesey	Wylfa	-	-	-	-	-	-
Gwynedd	Trawsfynydd	-	-	-	-	-	-

Local

At a local level, vehicles and diesel generators are used at the sites which can generate pollutant emissions. Such emissions are likely to remain steady throughout each site’s care & maintenance preparation phase and will decline substantially during care & maintenance. Dust will be generated by various construction and demolition activities undertaken as part of care & maintenance preparation and final site clearance.

Currently none of the sites in the NDA estate are located in designated Air Quality Management Areas (AQMA), and this is expected to remain the case due to the remote locations of the sites and the reduction in emissions anticipated as sites progress through their respective decommissioning programmes.

Data for Sellafield, Springfields and Capenhurst are available for 2018. Emissions of pollutants covered by the clean air strategy are presented in Table 4-F for these sites. In the majority of cases, the quantity of pollutants released were below the reporting threshold. Capenhurst did not emit any pollutants covered in the clean air strategy. Data is not available for the other NDA sites.

Table 4-F: emissions of pollutants from NDA sites [53]

Site	Pollutant	Quantity Released (kg)	Reporting Threshold
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			(kg)
Springfields	NH3	Below Reporting Threshold	1000
Sellafield	NH3	Below Reporting Threshold	1000
Springfields	NOx	Below Reporting Threshold	100000
Sellafield	NOx	332,000.00	100000
Springfields	NMVOCs	Below Reporting Threshold	10000
Sellafield	NMVOCs	62,600.00	10000
Sellafield	PM10	Below Reporting Threshold	1000
Sellafield	PM2.5	Below Reporting Threshold	1000
Springfields	SO2	Below Reporting Threshold	100000
Sellafield	SO2	Below Reporting Threshold	100000

4.3.2 Climate change

National

The UK Climate Projections 2018 (UKCP18) [55] provides the most up-to-date assessment of how the climate of the UK may change over the 21st century. It contains information to help with climate change risk assessments and adaptation plans. The Environment Agency, Office for Nuclear Regulation and Natural Resources Wales expect operators of nuclear licensed sites and disposal sites for radioactive waste to use UKCP18 projections when assessing the impacts of climate change. The regulators have produced a position statement on how the UKCP18 projections should be used when carrying out climate change assessments for nuclear safety cases or for planning purposes [56].

In central England, temperatures have risen by about one degree Celsius since the 1960s, with 2014 being the warmest year on record [57,58]. The anticipated general trend in UK climate is towards drier summers and wetter winters [59]. Higher summer temperatures are expected to result in a rise in energy demand for cooling, although this may be balanced by a lower demand for energy if temperatures are higher during winter months. It is too early to assess impacts of drought and subsidence on NDA Strategy, but it may be considered in future IIAs for future NDA Strategies.

The key driver of climate change is an increase in atmospheric concentrations of greenhouse gases (GHG), predominantly attributed to increased usage of fossil fuels since the beginning of the industrial revolution. Carbon dioxide (CO₂) accounted for 81% of UK GHG emissions in 2017 [60].

Total UK CO₂ emissions decreased by an estimated 33.1% between 2005 (the earliest year for which data are available at Local Authority level) and 2017 [61]. Whilst the overarching trend has been a reduction, there were year-on-year increases in both 2010 and 2012; linked to the cold winters experienced in those years.

It is anticipated that UK CO₂ emissions will continue to decrease in line with its international commitments. The government signed up to the Paris agreement in 2015 and this came into force in November 2016. In 2019 the government made an additional commitment to reduce emissions further than the Paris agreement required [62]. The commitment is that the UK will cut emissions to 'net zero' by 2050 i.e. 'net zero above the 1990 baseline for the 6 Kyoto protocol gases. Scotland has committed to 'net zero' by 2045 [63] and has declared a climate emergency [64]. On 29th April 2019, the Welsh Government declared a climate emergency [65].

Regional

Regional climate change trends vary significantly, with the greatest increases in mean temperature expected in the South East and East of England, and the lowest increase in mean temperature expected in North Scotland.

Table 4-G: Regional trends in carbon dioxide emissions [66]

Country or Local / Unitary Authority	Site	Regional Contribution to UK total (Tonnes per capita)		
		2005	2012	2017
UK	N/A	100% (8.72)	100% (7.05)	100% (5.32)
England	N/A	81.6% (8.5)	81.5% (6.84)	81.1% (5.12)
Maldon	Bradwell	0.1% (6.87)	0.1% (5.52)	0.1% (3.93)
Suffolk Coastal	Sizewell	0.2% (6.85)	0.2% (6)	0.2% (4.52)
Copeland	Sellafield	0.1% (6.69)	0.1% (6.28)	0.1% (4.58)
	LLWR			
Cheshire West and Chester	Capenhurst	1.1% (18.05)	1.1% (15.57)	1.2% (12.13)
Fylde	Springfields	0.1% (9.5)	0.1% (7.84)	0.1% (5.86)
Folkestone & Hythe	Dungeness	0.1% (7.78)	0.1% (5.53)	0.1% (4.24)
Vale of White Horse	Harwell	0.2% (9.73)	0.2% (8.49)	0.2% (6.51)
Stroud	Berkeley	0.2% (8.97)	0.2% (8)	0.2% (6.38)
West Somerset	Hinkley	0.1% (9.74)	0.1% (7.7)	0% (4.63)
South Gloucestershire	Oldbury	0.5% (10.86)	0.5% (7.81)	0.5% (6.32)
Purbeck	Winfrith	0.1% (10.26)	0.1% (8.56)	0.1% (6.37)
Scotland	N/A	8.3% (8.6)	8.6% (7.27)	8.2% (5.32)
Dumfries & Galloway	Chapelcross	0.2% (5.75)	0.2% (6.25)	0.1% (3.21)
Highland	Dounreay	0.2% (4.79)	0.2% (4.14)	0% (0.59)
North Ayrshire	Hunterston	0.3% (10.46)	0.2% (7.9)	0.2% (5.83)
Wales	N/A	6.3% (11.15)	6.1% (8.93)	7% (7.91)
Gwynedd	Trawsfynydd	0.2% (7.7)	0.2% (7.03)	0.2% (5.46)
Anglesey	Wylfa	0.2% (11.69)	0.1% (7.46)	0.1% (5.77)

Regional trends in CO₂ emissions vary significantly, as shown in Table 4-G. Such variation is expected to continue, but the overall trend in all regions is that emissions are decreasing per capita, as shown in Table 4-H.

Table 4-H: Regional trends in UK CO₂ emissions 2005-2017 [67]

Change in emissions since 2005	Number of Local Authorities in UK
Decrease of more than 40%	37
Decrease of 35%-40%	81
Decrease of 30%-35%	113
Decrease of 25%-30%	93
Decrease of 20%-25%	41
Decrease of 0% to 20%	26
Increase	0

Site-specific energy consumption is expected to change over time and is dependent on the activities being undertaken. In general, all sites will draw power from the grid and operate plant and vehicles for decommissioning works such as ILW processing and for general domestic needs until the completion of their decommissioning programmes.

During a care & maintenance phase, if decommissioning is deferred, site power requirements reduce considerably, although periodic inspections and maintenance can result in very small spikes in energy use. Retrieval of waste packages from ILW storage might also result in intermittent vehicle movements to and from the sites. Energy use and vehicle movements will then increase substantially during final site clearance.

Future changes in the climate could affect baseline conditions across a number of environmental topics. Links between climate change and other aspects of the environment are identified below.

Links to air quality

Variations in energy use can have a direct impact on air quality at the sites, especially after nuclear reactors are shut down and sites switch to using fossil fuels. Diesel generators and fossil fuel-powered vehicles can lead to emissions of air pollutants and particulate matter.

Links to flood risk and coastal erosion

One anticipated impact of climate change is its influence upon surface water, fluvial and coastal flooding (including coastal erosion). Changes may result from increased precipitation, flash floods as a result of drier ground conditions and higher sea levels with associated changes in extreme wave and tidal events.

Links to biodiversity, flora and fauna

There is strong evidence that climate change is affecting UK biodiversity. Impacts are expected to increase as the magnitude of climate change increases [68]. Regional differences in the impact of climate change on biodiversity are apparent [68]. The impact on flora and fauna also varies depending on species and generation times [68]. Some habitats are recognised as being particularly vulnerable to climate change, e.g. montane habitats (from increased temperatures), wetlands (from changes in water availability) and coastal habitats (from sea-level rise) [68].

Link to geology and soils

Hotter drier summers and warmer wetter winters, coupled with increased frequency of extreme weather occurrences such as heat waves, dry spells, heavy rain and flooding, has the potential to substantially affect soils and increase the risk of their degradation. Risk of soil erosion will increase if trends for wetter winters and heavier rainfall continue, whilst drier soils in the summer could accelerate runoff.

Links to water resources and quality

Climate change may have long-term effects on water quality for a variety of reasons. Increases in mean air temperature will result in increased water temperatures as heat is transferred between them. This may lead

to a decline in water quality due to deoxygenation (warmer water holds less oxygen) and increased rates of pollutant dissolution. Increased precipitation and flooding can also result in deterioration in water quality due to increased diffuse pollution from runoff derived from agriculture and industry.

4.3.3 Flood risk and coastal erosion

National

The future baseline for climate change and energy is intrinsically linked to flood risk and coastal erosion. Changes to mean temperature, precipitation and sea level associated with climate change are predicted to exacerbate existing risks posed by flooding and coastal erosion.

It is likely that the number of people in the UK exposed to river and coastal flooding, taking into account population growth, will rise to between 2.3 million and 3.6 million by the 2080s (0.7 - 2 million higher than the 2004 figure of 1.6 million) [69]. Surface water flooding is expected to increase significantly up to the year 2100 [70].

Regional and local

Regional changes in flood risk are likely to be linked to regional changes in mean temperature and precipitation, whereas the impact of sea level rise will have a more localised effect. Therefore, future trends in coastal erosion can be considered largely site-specific. Changes in erosion would be dependent on a combination of factors, including the extent of sea level rise, changes in surges and wave strength and the geology of coastal rock formations.

As impacts from fluvial and pluvial flooding are likely to increase as a result of climate change, it is broadly assumed that sites currently at risk of fluvial or pluvial flooding (as indicated by flood zones in Table 4-I) will remain at risk throughout the Strategy period in the absence of intervention.

Anticipated future changes in coastal erosion and sea level rise risk at the NDA sites are outlined in Table 4-I, with a description of current coastal defences and any erosion predictions provided from information in the Site-Specific Baseline reports.

Table 4-I: Anticipated flood risk changes and existing coastal defences at NDA sites

Site	Flood Zone [71, 72, 73]	Risk from Sea-Level Rise	Current coastal defences
Berkeley	2,3	Yes	Continuous embankment along shoreline, Minimum height of these defences is 9.72 m above sea level.
Bradwell	1	Yes	Continuous 4.8 – 5 m high sea wall and gully.
Dungeness A	1,3	Yes	Continuous 20 m wide, 11 m high man-made shingle embankment along the shoreline.
Hinkley Point A	1,3	Yes	Elevation of 11 m above sea level. Continuous concrete sea wall founded on the shoreline rock platform (crest height 8.5 m) and a secondary gabion wall (crest 12 m) behind the main sea wall.
Oldbury	1,3	Yes	Elevation of 10 m above sea level. Grass covered embankment up to 2 m high above the adjacent natural ground level, with stone pitching (to withstand erosion).
Sellafield	1,2,3	Yes	Elevation around 5 m to 50 m above sea level. Generally protected from coastal flooding by cliffs, Ehen shingle spit and a railway embankment. Southern end of the site vulnerable within the next 100 years if existing defences are not maintained.
LLW Repository	1	Yes	10-15 m headland and natural dune spit.
Harwell	1	No	N/A Inland.

Site	Flood Zone [71, 72, 73]	Risk from Sea-Level Rise	Current coastal defences
Winfrith	1	No	N/A Inland.
Capenhurst	1	No	N/A Inland.
Springfields	1	No	N/A Inland.
Sizewell A	1	Yes	Elevation around 9 m above sea level and is protected from flooding and erosion by soft defences comprising a line of relict, vegetated sand dunes which were remodelled to provide a two-layered defence, consisting of an inner ridge (10 m above sea level) and 5 m high outer ridge.
Chapelcross	Low risk surface water	No	N/A Inland
Dounreay	Some areas with high river and surface water flood risk	No	Elevation approximately 20 m above sea level. Coastline recession rates of around 1-2 m in 20 to 30 years have been estimated, considering sea level rise.
Hunterston A	High surface water flood risk, nearby high coastal flooding risk	Yes	Average elevation of approximately 4.5 m above sea level. Engineered rock and crushed concrete bunds that were built during the construction phase. Projections of coastal change by 2050 suggest that the only access road to the site is vulnerable to coastal erosion and requires management attention [74].
Trawsfynydd	Risk of flooding from reservoir, risk of surface water flooding in some areas of the site ranging from high to low risk in different areas.	No	N/A Inland.
Wylfa	Low surface water flood risk	No	Shallow gradient rock foreshore which is topped off by a sea wall in localised areas. The high integrity of the cliffs at Wylfa Head generally negates the need for additional defences.

4.3.4 Biodiversity, flora and fauna

The great majority of indicators of ecosystems and biodiversity across the globe are showing rapid decline [75]. Evidence on the changes in extent and condition of natural and semi-natural habitats in the UK is incomplete [76]. Data from State of Nature Report for the UK shows that on average the abundance and distribution of the UK’s species has declined since 1970, with many metrics suggesting this decline has continued in the most recent decade [77]. In particular, there was a decline in average species abundance of

13%, a 5% decline in average species distribution and 41% of species have decreased in abundance since 1970 [77].

Reductions in ecosystem services are associated with declines in habitat extent or condition and changes in biodiversity, though the exact relationships are not well understood. Generally, the rate of loss and degradation of natural habitats in the UK has slowed or stabilised following extensive loss and fragmentation during the 20th century, based on data on the condition of key protected habitats and recent trends in the extent of terrestrial broad habitats [76]. Positive trends in the extent of some terrestrial broad habitats shows some evidence of recovery and positive results have also arisen from targeted restoration programmes [76].

England [78]

- The percentage of habitats of European importance in favourable or improving conservation status has declined between 2007 and 2019. The percentage of habitats of European importance in favourable conservation status remains at 6%, but the percentage of habitats in improving conservation status decreased from 49% in 2007 to 21% in 2019.
- The percentage of species of European importance in favourable conservation status has improved from 28% in 2007 to 37% 2019, although this is a decrease compared to 2013, when the percentage was 41%. The percentage of species of European importance in improving conservation status has declined from 19% in 2007 to 5% in 2019.
- Marine ecosystem integrity declined overall between 1983 and 2017, however there were improvements between 2012 and 2017.
- Environmental pressure on biodiversity from air pollution improved between 1996 and 2016.
- Marine pollution (combined input of hazardous substances) improved between 1990 and 2017.
- Pressures on terrestrial, freshwater and marine species from invasive species increased between 1960 and 2018.

Scotland

- 71% of notified species monitored on protected sites in Scotland were in favourable condition and a further 3% were in a recovering condition in 2016 [79]. 63% of notified habitats monitored on protected sites in Scotland were in favourable condition and a further 9% were in a recovering condition in 2016 [80].
- According to the State of Nature Report Scotland 2019 [81], the abundance and distribution of Scotland's species has on average declined over recent decades and most measures indicate this decline has continued in the most recent decade. In particular, there has been a 24% decline in average species' abundance since 1994, a 14% decline in average species' distribution since 1970 and 49% of species have decreased in abundance [81].

Wales [82]

55% of species and 75% of habitats were assessed as being in an unfavourable condition in Wales' terrestrial and freshwater Special Areas of Conservation and Special Protection Areas in July 2018, and the trend of many species and habitat types is one of continuing decline.

Regional and Local

There is currently no assessment of spatial indicators of ecosystem health at a regional or local level.

It is not possible to accurately predict future changes in biodiversity, flora and fauna at the sites. Changes may be caused by external alterations in other topic areas such as climate change and air quality or by changes in the activities undertaken at the sites themselves. Generally, impacts upon biodiversity, flora and fauna will reduce over time as the sites move through the decommissioning process and are eventually delicensed following final site clearance.

4.3.5 Cultural heritage

The historic environment can be considered a finite resource. It cannot be replaced and is susceptible to decline over time as historic features experience degradation and decay. However, cultural heritage as a whole can evolve and change, and features which are not currently considered a valued part of the historic environment may become so in the future, either due to their uniqueness, past use or historic or cultural significance.

England

The Historic Buildings and Monuments Commission for England, commonly known as Historic England, have the statutory purposes to:

- “Secure the preservation of ancient monuments and historic buildings;
- Promote the preservation and enhancement of the character and appearance of conservation areas; and
- Promote the public’s enjoyment of, and advance their knowledge of, ancient monuments and historic buildings.”

Historic England’s Three-Year Corporate Plan (2019-2022) [83] sets out their aims and key outputs over the three-year period. The 2017 Note by Historic England [84] sets out guidance, against the background of the National Planning Policy Framework (NPPF) and the related guidance given in the Planning Practice Guide (PPG), on managing change within the settings of heritage assets, including archaeological remains and historic buildings, sites, areas, and landscapes.

Scotland

Scotland’s first ever Historic Environment Strategy is a high-level framework which sets out a 10-year vision for the historic environment. The key outcome is to ensure that the cultural, social, environmental and economic value of Scotland’s historic environment continues to make a strong contribution to the well-being of the nation and its people [85]. The Historic Environment Policy for Scotland was updated in 2019 [86]. It supports good decision making for Scotland’s historic environment.

Wales

The Planning Policy Wales [87] provides the national planning policy framework for the consideration of the historic environment in Wales. A Technical Advice Note [88] provides guidance on how the planning system considers the historic environment. Priorities for the Historic Environment of Wales [89] sets out the Welsh Government’s aims to care for the historic environment, ensure that skills are in place to enable conservation and to ensure enjoyment and economic benefits can be gained from the historic environment.

Regional and local

It is not possible to accurately predict future trends in cultural heritage and the historic environment. Some features may become statutorily protected over time, whilst others may experience degradation and decay. At regional to local scales, infrastructure, development and environmental pressures such as extreme weather and flooding present the greatest risk to cultural heritage assets.

4.3.6 Geology and soils

Soil is a finite natural resource on which life depends. It regenerates only over extremely long geological timescales and provides many essential services on which humans rely, including food production, water management and support for valuable biodiversity and ecosystems. As a large store of carbon, it also plays a vital role in preventing adverse climate change.

The UK Agriculture Bill introduced in January 2020 (as amended March 2020) [90] contains provisions regarding the improvement of soil quality.

England and Wales

It is intended that by 2030 [91], all of England's soils will be managed sustainably and degradation threats tackled successfully. This will improve the quality of soils and safeguard their ability to provide essential services for future generations.

Soils in England have degraded over the last 200 years due to intensive agricultural production and industrial pollution. Soils continue to face three main threats:

- Soil erosion by wind and rain - erosion affects both the productivity of soils but also water quality and aquatic ecosystems.
- Compaction of soil reduces agricultural productivity and water infiltration, and increases flood risk through higher levels of run off.
- Organic matter decline - the loss of organic matter reduces soil quality, affecting the supply of nutrients and making it more difficult for plants to grow, as well as increasing emissions to the atmosphere.

The gradual build-up of pollutants in soil over many decades is a serious threat to soil function. The presence of pollutants can adversely affect soil biota that is needed for healthy functioning soil, as well as to support plants and other animals. Soil pollutants also have the potential to adversely affect human health if they enter into the food chain or drinking water sources.

Scotland

Due largely to the sustainable management employed by land managers over a prolonged period, Scotland's soils are generally in good health. However, compared with air or water quality, for which national long-term datasets exists, for soils there is a lack of national trend data from which evidence of change or damage to soils might be determined [92].

According to recently published research, climate change and loss of organic matter are the most significant threats to Scottish soils [92].

Links to biodiversity, flora and fauna

The biodiversity of soil organisms plays a vital but poorly understood role in maintaining healthy soils. Many semi-natural habitats in England and Wales are suffering from soil-related problems, including nutrient over-enrichment, acidification and erosion.

Links to water resources and quality

Underlying geology and soil type have a significant impact upon water quality and the capacity of surface waters to dilute or buffer the impacts of pollutants. Alkalinity of surface waters determines their capability of maintaining pH in response to acidic pollutants and is often governed by underlying geology.

Geological features

Important geological features of conservation value can also be subject to impacts from climate change and development, the trends for which are discussed above. For example, impacts may include direct loss from land-take or effects caused by changes to the water table or air quality.

4.3.7 Landscape and visual impacts

Landscape consists of an overall pattern of elements which together determine the landscape character and local or regional distinctiveness. It can be impacted by alterations to designated landscapes, conservation sites and cultural associations and is sensitive to changes in perceived characteristics. Impacts will involve two receptor groups: people seeking to enjoy the landscape and the physical fabric of the landscape itself.

Many sites within the NDA estate are in a rural setting and as such tranquillity and remoteness are valued in these areas. Many changing trends can influence the landscape, which also includes townscape and seascape. Population growth and increasing demand for development heightens pressure on undeveloped land and can lead to changes in the way that the built environment interacts with the natural. Climate

change is also likely to have an influence on the future of landscapes via changes in agriculture and development.

Landscape is best defined at a regional to local scale. Future regional and local scale changes in landscape are set out in the short to medium-term in local authority strategic plans and local development plans. These documents have been used to inform the assessment.

4.3.8 Water resources and quality

National

Water quality is influenced by a wide range of internal and external factors, including climate change, geology and soils, human consumption (including population change) and pollution from human activities such as industry and agriculture.

In 2018 the Environment Agency review of water resources [93] concluded that impacts of pressures on water resources are evident and will increase with a growing population, changing climate and changes to how we use land. In 2021 the Environment Agency will reclassify water bodies to show where environmental improvements have been made, where improvements are still required before 2027 and where impacts are not yet confirmed. In the period 2004-2015, 34% of natural surface water bodies in the UK were assessed to be of 'Good' or 'High' ecological status and 96% were of 'Good' chemical status. The majority of surface water bodies are expected to have good ecological status by 2027, apart from around 7% of lakes and 4% of rivers. All surface water bodies are expected to have good chemical status by 2027, except of for 10% of rivers. [94]

Regional

Regional water quality changes are highly variable and monitored regularly by river basin district. These regional variations are expected to continue through to 2027 and beyond, however the general trend is for water quality to improve in line with the WFD. Table 4-J indicates variation in surface water bodies of Good ecological and chemical status or better in 2015, and expected changes by the default deadline of 2021 and the extended deadline of 2027.

Table 4-J: Anticipated future changes in surface water quality by River Basin District

River Basin District	Total number of water bodies in region	2015 status is good or better	Expected to achieve good or better status by 2021	Expected to achieve good or better status by 2027
Scotland (Dounreay, Hunterston A) [95]	3169	Overall - 2092	Overall - 2282	Overall - 2789
Solway Tweed (Chapelcross) [96]	624	Overall - 300	Overall - 356	Overall - 562
North West (Sellafeld, LLWR, Springfields, Capenhurst) [97]	613	Ecological - 133 Chemical - 598	Ecological - 156 Chemical - 598	Ecological - 535 Chemical - 609
Western Wales (Trawsfynydd, Wylfa) [98]	543	Ecological - 231 Chemical - 474	Overall - 425	Overall - 520
Severn (Oldbury, Berkeley) [99]	755	Ecological - 151 Chemical - 720	Ecological - 346 Chemical - 740	Ecological - 664 Chemical - 754
South West (Hinkley Point A [100]	697	Ecological - 162 Chemical - 667	Ecological - 206 Chemical - 667	Ecological - 598 Chemical - 694

River Basin District	Total number of water bodies in region	2015 status is good or better	Expected to achieve good or better status by 2021	Expected to achieve good or better status by 2027
Anglian (Bradwell, Sizewell A) [101]	603	Ecological - 65 Chemical - 596	Ecological - 79 Chemical - 596	Ecological - 255 Chemical - 602
South East (Dungeness A) [102]	282	Ecological - 44 Chemical - 277	Ecological - 53 Chemical - 277	Ecological - 231 Chemical - 280

Local

The WFD timescales conclude in 2027, at which point all water bodies are expected to be of Good status or better. Site activities will depend on decommissioning plans. Aqueous discharges would generally be low. Certain activities such as the retrieval, treatment and passivation of wastes may result in short-term spikes in aqueous discharges, but these would be within statutory limits.

4.3.9 Materials and waste

National

In the UK, the total amount of radioactive waste (including radioactive waste forecast to arise from existing nuclear facilities) is approximately 4.56 million m³. Of this, approximately 95% is LLW and VLLW, 5% is ILW and less than 0.1% is classed as HLW [103]. Although the volume of HLW is relatively small, it makes up around 95% of the total inventory up to 2019 in terms of radioactivity [104].

Regional and local

A combination of radioactive and conventional waste is produced at all sites. LLW is disposed of according to the waste hierarchy, being reused or recycled where possible, treated, disposed of to a licenced landfill site if appropriate or packaged and sent to the LLWR near Drigg in Cumbria for disposal if there is no suitable alternative and LLWR Waste Acceptance Criteria are met. Dounreay Site Restoration Ltd also have an LLW disposal facility similar to the LLWR for LLW from Dounreay. ILW is and has been generated from both operational and decommissioning activities. Decommissioning activities do not generate HLW, which is produced from the reprocessing of spent nuclear fuels.

Table 4-K below shows the amount of UK radioactive waste reported in April 2019 and the estimated lifetime arisings for each site.

Please note that the lifetime total volume of HLW is less than that reported in April 2019. There are two reasons for this:

1. HLW is initially stored in a liquid form and when the HLW is treated to produce vitrified glass blocks, the blocks take up roughly one-third of the volume of the original liquid; and
2. The future arisings of HLW are the net total following export of waste returns to overseas reprocessing customers.

Table 4-K: UK Radioactive Waste Volumes reported in April 2019 and estimated total lifetime arisings for each site [103]

Site	HLW	ILW	LLW	VLLW	Total	HLW	ILW	LLW	VLLW	Total
	Reported April 2019 (m ³)					Estimated Lifetime Total (m ³)				
UK	2,150	102,000	27,400	1,040	133,000	1,390	247,000	1,480,000	2,830,000	4,560,000
Berkeley	0	1,550	0.88	0	1,550	0	5,080	33,500	0	38,600
Bradwell	0	261 ⁵	269	0	530	0	3,870	41,200	0	45,000
Dungeness A	0	307 ⁶	269	0	577	0	4,350	34,000	1,770	40,100
Hinkley Point A	0	1,280	66.8	415	1,760	0	5,350	40,800	415	46,500
Oldbury	0	651 ^{5,7}	177	0	828	0	4,550	68,900	0	73,500
Sellafield	2,150	76,100 ⁵	3,010 ⁸	40	81,300	1,390	148,000	453,000	2,760,000	3,370,000
LLW Repository	0	395	413	17.4	508	0	395	1,280	26	1,700
Harwell	0	1,240	1,330	472	3,040	0	1,970	7,240	30,900	40,100
Winfrith	0	4.07	836	0	840	0	66.1	8,350	1,270	9,680
Capenhurst	0	0.66	186	0	187	0	14.7	14,100	30,200	44,300
Springfields	0	0	30	0	30	0	0	249,000	0	249,000
Sizewell A	0	548 ⁵	485	0	1,030	0	4,600	34,700	56	39,300
Chapelcross	0	338 ⁵	367	0	705	0	4,900	57,500	1,030	63,400
Dounreay	0	5,070	15,700	0	20,800	0	7,740	93,700	0	101,000
Hunterston A	0	2,760	0.005	0	2,760	0	6,510	41,900	0	48,400
Trawsfynydd	0	2,170	86	0	2,250	0	6,840	48,100	0	54,900

⁵ Some packaged ILW will be disposed of as LLW

⁶ 17.4 m³ reported volume is stored at Bradwell.

⁷ 0.85 m³ reported volume is stored at Berkeley

⁸ In addition there is 390 m³ reported volume from Magnox fuel flasks and flatrolls and 446 m³ reported volume from AGR fuel flasks and flatrolls stored at Sellafield.

Site	HLW	ILW	LLW	VLLW	Total	HLW	ILW	LLW	VLLW	Total
	Reported April 2019 (m ³)					Estimated Lifetime Total (m ³)				
Wylfa	0	849	123	0	972	0	7,240	68,600	0	75,800

4.4 Assumptions / Limitations

4.4.1 Data gathering

The different data gathering and processing approaches used by the sources described in Section 1.2 causes some complexities for comparison and analysis. For example, data forms tend to vary between countries, with different indicators used by England compared to Scotland and Wales. For this reason, direct comparison of certain datasets across all sites has not been possible. This limitation will be considered during the assessment.

4.4.2 Site activities

Due to the sensitivity of some information pertaining to activities at nuclear sites, information has been gathered solely from documents in the public domain. It is expected that the information provided in these documents is accurate and sufficient in detail to meet the requirements of the assessment.

It is acknowledged that for all sites any indicative timescales given for decommissioning activities and achievement of site interim and end states are subject to change based on ongoing developments to the sites' lifetime plans. It is assumed that the LLWR and other suitable facilities to manage LLW will continue to be available through most of the timescale to which the Strategy applies (i.e. up to 2120). It is recognised that decommissioning milestones are not fixed and can be influenced by external factors. This will be considered in the course of the assessment.

4.4.3 Health and socio-economic baseline conditions

All data has been gathered using official government sources. It is assumed that the indicators used are comparable (unless otherwise stated), reliable (without error), and where appropriate, valid throughout the timescale to which the NDA Strategy applies.

It is assumed that all legally set limits relating to radioactive discharges and sources of background radiation will remain constant throughout this period and that, in the absence of new technological developments, fossil fuels will continue to be the dominant form of energy provision. This particular assumption also has implications for the environmental baseline.

4.4.4 Environmental baseline conditions

It is assumed that nature conservation features in the vicinity of the sites will remain into the long-term, and that their composition will have broadly the same characteristics/ sensitivities. In addition, currently statutorily designated nature sites are assumed to remain so throughout the timescale to which the Strategy applies.

A similar assumption has been made that all currently statutorily designated cultural heritage features within close proximity of the NDA sites will remain so over this timeframe. Other features may become statutorily protected during this time, however as this cannot be predicted at this stage, consideration of effects on such features is beyond the scope of the assessment.

It is deemed reasonable to assume that superficial and bedrock geology and aquifers will remain unchanged throughout the timescale to which the Strategy applies, and that surface waters and groundwater will continue to be regulated under the Water Framework Directive (WFD) in the UK until the final reporting date after the year 2027.

Appendix A Socio-economic and health indicators

i) Population by Age Group [105]

Site	Country	Local/Unitary Authority	Total Population	0-14	15-24	25-44	45-59	60-74	75+	Mean Age	
-	-	UK	63,185,000	18%	13%	27%	20%	15%	8%	N/A	
Berkeley	England	Stroud	112,779	17%	11%	23%	22%	18%	9%	42.3	
Bradwell		Maldon	61,629	16%	11%	27%	22%	20%	9%	43.0	
Dungeness A		Folkestone & Hythe	107,969	17%	12%	23%	20%	18%	10%	42.4	
Hinkley Point A		West Somerset	34,675	13%	10%	18%	21%	24%	14%	47.7	
Oldbury		South Gloucestershire	262,767	18%	13%	26%	20%	15%	8%	39.8	
Sellafield		Copeland		70,603	16%	11%	24%	22%	18%	8%	42.1
LLW Repository											
Harwell		Vale of White Horse		120,988	18%	11%	26%	21%	16%	9%	40.8
Winfrith		Purbeck		44,973	15%	11%	21%	21%	21%	12%	44.9
Capenhurst		Cheshire West and Chester		329,608	17%	12%	25%	21%	17%	9%	41.3
Springfields		Fylde		75,757	15%	10%	22%	22%	20%	12%	44.9
 Sizewell		East Suffolk		124,298	16%	10%	21%	21%	20%	11%	44.2
Chapelcross	Scotland	Dumfries & Galloway	151,324	17%	15%	17%	22%	20%	10%	N/A	
Dounreay		Highland	232,131	18%	15%	19%	23%	18%	8%	N/A	
Hunterston		North Ayrshire	138,146	18%	16%	19%	22%	18%	8%	N/A	
Trawsfynydd	Wales	Gwynedd	121,874	16%	15%	22%	19%	18%	10%	41.6	
Wylfa		Isle of Anglesey	69,751	16%	11%	23%	20%	20%	10%	43.4	

ii) Education, Skills and Training [105]

Site	Country	Local/Unitary Authority	All persons over 16	% with highest qualification	Distribution by age				
					16 to 24	25 to 34	35 to 49	50 to 64	65 and over
-	-	England and Wales	45,496,780	27.2%	7.3%	24.5%	32.4%	22.7%	13.1%
-	-	Scotland	4,379,072	26.1	-	-	-	-	-
Berkeley	England	Stroud	92,251	32.9%	3.8%	13.3%	34.3%	30.4%	18.2%
Bradwell		Maldon	50,804	23.6%	4.8%	12.5%	32.9%	31.3%	18.5%
Dungeness A		Folkestone & Hythe	88,760	21.8%	5.4%	15.7%	29.9%	28.9%	20.2%
Hinkley Point A		West Somerset	29,844	24.8%	4.2%	10.1%	21.2%	32.5%	32.0%
Oldbury		South Gloucestershire	212,837	26.7%	5.6%	21.3%	36.1%	23.8%	13.2%
Sellafield		Copeland	58,613	21.0%	5.4%	18.2%	31.9%	28.4%	16.2%
LLW Repository									
Harwell		Vale of White Horse	97,867	37.2%	4.5%	18.7%	33.7%	26.3%	16.9%
Winfrith		Purbeck	37,678	25.7%	3.8%	12.1%	26.9%	31.0%	26.2%
Capenhurst		Cheshire West and Chester	271,473	29.4%	5.7%	18.4%	33.7%	26.4%	15.8%
Springfields		Fylde	63,757	29.8%	4.6%	14.2%	32.0%	28.5%	20.7%
Sizewell		East Suffolk	102,401	29.0%	3.8%	12.1%	30.4%	30.5%	23.3%
Chapelcross		Scotland	Dumfries & Galloway	126,160	21.5%	4.9%	13.4%	27.0%	31.5%
Dounreay	Highland		190,734	26.4%	4.0%	15.5%	29.2%	31.1%	20.3%
Hunterston	North Ayrshire		113,663	19.6%	5.9%	16.4%	30.5%	28.7%	18.5%
Trawsfynydd	Wales	Gwynedd	100,923	26.4%	7.6%	17.5%	27.2%	26.7%	20.9%
Wylfa		Isle of Anglesey	57,890	26.1%	6.1%	15.7%	26.0%	28.2%	24.0%

iii) Employment and Income⁹

Economic Activity			Active						Inactive					
Site	Country	Local / Unitary Authority	All	Part Time	Full time	Self-employed	Unemployed	Full time student	Retired	Student	looking after home or family	Long-term sick or disabled	Other	
-	-	England and Wales	41,126k	5,646k	15,815k	3987k	1,799k	1,410k	5,682k	2,389k	1,781k	1,714k	898k	
Berkeley	England [105]	Stroud	81,955	12,899	31,910	10780	2,306	2,085	12,806	2,929	2,866	2,275	1,099	
Bradwell		Maldon	45,406	6,640	16,765	6108	1,381	962	8,148	1,353	2,122	1,293	634	
Dungeness A		Folkestone & Hythe	77,938	11,151	27,386	11265	2,277	25,551	13,794	2,869	3,486	3,785	1,617	
Hinkley Point A		West Somerset	24,918	3,626	7,290	4618	445	8,800	5,764	754	844	1,047	391	
Oldbury		South Gloucestershire	192,468	31,453	82,489	21917	6,755	49,270	27,390	7,885	6,244	4,872	2,879	
Sellafield		Copeland		52,702	7,984	20,525	5750	916	17,367	9,657	1,596	1,922	2,872	1,320
LLW Repository														
Harwell		Vale of White Horse	87,477	12,547	39,197	9441	2,190	2,335	12,150	3,400	3,374	1,682	1,161	
Winfrith		Purbeck	32,379	5,222	11,568	3953	899	758	6,493	909	1,131	952	494	
Capenhurst		Cheshire West and Chester	243,155	36,206	95,642	21856	8,949	8,125	39,893	10,746	8,620	9,574	3,544	
Springfields		Fylde	54,544	7,374	20,222	5689	1,687	1,475	11,262	1,785	1,699	2,161	1,190	
Sizewell		East Suffolk	88,250	14,036	31,974	12370	2,145	27,244	17,161	2,817	3,423	2,328	1,515	
Chapelcross		Scotland [106]	Dumfries & Galloway	126160	19134	38822	12652	5119	5641	35761	3549	3684	5422	2017
Dounreay	Highland		190734	28216	68401	19388	7387	8411	45418	5517	6506	6776	3125	
Hunterston	North Ayrshire		113663	13000	24800	7200	6400	7338	4200	4300	4400	6600	1600	
Trawsfynydd	Wales [105]	Gwynedd	88,913	12,300	27,834	13732	3,756	30,918	14,561	7,814	3,062	3,867	1,614	
Wylfa		Isle of Anglesey	50,818	6,949	17,274	5200	2,381	1,219	10,150	2,266	1,891	2,592	896	

⁹ The ONS dataset includes usual residents aged 16 to 74

iv) Industry Sectors [105]

Site	Country	Local/ Unitary Authority	All usual residents aged 16 to 74 in employment the week before the census	UK SIC 2007 Industry Sectors by economic activity (%)														
				A, B, D, E	C	F	G	H	I	J	K	L	M	N	O	P	Q	R, S, T, U, other
-	-	UK	26,681,568	2.3	8.9	7.7	15.9	4.9	5.6	4	4.3	1.5	6.6	4.9	6	9.9	12.5	5
Berkeley	England	Stroud	57,342	4.0	12.6	8.6	14.1	3.1	4.5	4.0	3.3	1.3	7.5	4.2	5.1	10.7	12.3	4.7
Bradwell		Maldon	30,292	3.5	10.9	11.6	15.7	4.6	3.8	2.4	5.8	1.4	6.7	4.5	4.8	9.1	10.3	4.9
Dungeness A		Shepway	48,280	3.8	5.2	9.7	15.4	6.4	6.0	2.0	4.9	1.1	4.4	6.1	7.6	8.9	14.1	4.4
Hinkley Point A		West Somerset	15,355	7.6	6.3	7.5	15.3	3.0	14.5	1.7	1.5	1.6	4.3	4.7	4.1	8.9	13.0	6.2
Oldbury		South Gloucestershire	136,531	2.2	9.8	8.6	16.3	4.9	4.1	4.3	6.4	1.2	5.8	4.4	7.6	8.4	12.3	3.9
Sellafield		Copeland	32,891	9.4	20.0	9.2	11.4	2.9	6.4	1.3	0.9	0.9	4.5	4.1	5.5	7.4	12.3	3.8
LLW Repository																		
Harwell		Vale of White Horse	63,181	2.7	7.6	7.8	13.7	3.1	4.0	6.4	2.1	1.4	11.0	4.2	7.7	13.7	9.8	5.0
Winfrith		Purbeck	21,419	4.1	8.9	8.6	13.7	3.4	8.3	2.4	3.0	1.6	5.1	4.1	9.5	9.0	12.1	6.2
Capenhurst		Cheshire West and Chester	160,138	2.9	11.5	6.4	17.1	4.2	5.9	3.1	4.9	1.3	7.1	4.7	4.9	9.6	11.8	4.4
Springfields		Fylde	34,510	1.9	12.5	6.3	13.3	3.1	7.4	3.7	4.3	1.5	5.9	3.7	9.7	9.4	12.6	4.7
Sizewell		Suffolk Coastal	58,257	4.5	5.7	7.1	14.1	9.7	5.6	5.2	3.6	1.4	5.1	4.1	6.8	9.7	12.2	5.4
Chapelcross		Scotland	Dumfries & Galloway	N/A														
Dounreay	Highland																	
Hunterston A	North Ayrshire																	
Trawsfynydd	Wales	Gwynedd	53,961	6.2	5.8	9.6	14.5	3.4	9.8	2.0	1.1	1.2	3.7	3.5	6.4	12.6	14.7	5.6
Wylfa		Isle of Anglesey	30,431	7.1	7.7	8.8	14.4	5.2	6.9	1.5	1.1	1.1	3.6	3.2	9.0	11.2	15.0	4.2

UK Standard Industrial Classification 2007 (UK SIC 2007) Industry sectors:	
A	Agriculture, Forestry and Fishing
B	Mining and Quarrying
C	Manufacturing
D	Electricity, Gas, Steam and Air Conditioning Supply
E	Water Supply; Sewerage, Waste Management and Remediation Activities
F	Construction
G	Wholesale and Retail Trade; Repair Of Motor Vehicles and Motorcycles
H	Transportation and Storage
I	Accommodation and Food Service Activities
J	Information and Communication
K	Financial and Insurance Activities
L	Real Estate Activities
M	Professional, Scientific and Technical Activities
N	Administrative and Support Service Activities
O	Public Administration and Defence; Compulsory Social Security
P	Education
Q	Human Health and Social Work Activities
R	Arts, Entertainment and Recreation
S	Other Service Activities
T	Activities of Households As Employers; Undifferentiated Goods-And Services-Producing Activities of Households for Own Use
U	Activities of Extraterritorial Organisations and Bodies

v) Occupation by economic activity [105]

Site	Country	Local/Unitary Authority	All categories: Occupation (aged 16+)	Managers, directors and senior officials	Professional occupations	Associate professional and technical occupations	Administrative and secretarial occupations	Skilled trades occupations	Caring, leisure and other service occupations	Sales and customer service occupations	Process, plant and machine operatives	Elementary occupations
-	-	UK	29,886k	10%	20%	14%	11%	11%	9%	8%	6%	10%
Berkeley	England	Stroud	47k	11%	20%	11%	12%	10%	10%	7%	8%	10%
Bradwell		Maldon	24k	13%	16%	13%	15%	10%	9%	8%	7%	10%
Dungeness A		Folkestone & Hythe	40k	10%	14%	13%	12%	9%	13%	11%	7%	12%
Hinkley Point A		West Somerset	11k	10%	13%	8%	11%	11%	15%	9%	7%	17%
Oldbury		South Gloucestershire	120k	10%	18%	12%	15%	9%	9%	10%	6%	10%
Sellafield		Copeland	29k	7%	15%	12%	10%	13%	10%	8%	12%	13%
LLW Repository												
Harwell		Vale of White Horse	54k	12%	24%	14%	12%	8%	8%	7%	5%	9%
Winfrith		Purbeck	18k	11%	14%	13%	13%	12%	11%	9%	6%	12%
Capenhurst		Cheshire West and Chester	139k	11%	18%	12%	12%	8%	9%	10%	7%	12%
Springfields		Fylde	29k	10%	22%	13%	14%	8%	10%	8%	5%	10%
Sizevell		East Suffolk	48k	11%	18%	12%	14%	8%	10%	8%	7%	12%
Chapelcross		Scotland	Dumfries & Galloway	67k	9%	12%	10%	10%	15%	11%	9%	8%
Dounreay	Highland		111k	9%	17%	13%	12%	16%	9%	7%	6%	11%
Hunterston	North Ayrshire		57k	7%	12%	13%	10%	13%	11%	10%	7%	15%
Trawsfynydd	Wales	Gwynedd	43k	8%	18%	9%	11%	11%	13%	9%	7%	14%
Wylfa		Isle of Anglesey	25k	8%	17%	10%	12%	12%	13%	9%	8%	12%

vi) Business Births and Deaths^{10, 11}

Site	Country	Region	Active enterprises	No. of births	Birth rate (%)	No. of deaths ^{2,4}	Death rate ^{2,3,4}	Active enterprises	No. of births	Birth rate (%)	No. of deaths ⁴	Death rate ^{3,4}
			2015 [107]					2018 [108]				
-	-	United Kingdom	2,672k	383k	14.3	252k	9.4	2,940k	381k	12.9	336k	11.4
Berkeley	England	South West	222k	26k	11.8	19k	8.7	232k	24k	10.4	22k	9.5
Hinkley												
Oldbury												
Winfrith												
Sellafield		North West	260k	37k	14.1	26k	9.9	301k	43k	14.3	41k	13.5
LLW Repository												
Springfields												
Capenhurst												
Harwell												
Dungeness A		South East	420k	56k	13.2	38k	9.0	450k	53k	11.7	45k	10.0
Bradwell												
Sizewell												
Chapelcross												
Dounreay	Scotland	Scotland	173k	22k	12.6	16k	9.4	186k	21k	11.1	22k	11.8
Hunterston												
Trawsfynydd	Wales	Wales	95k	12k	12.1	9k	9.1	105k	14k	13.3	11k	10.4
Wylfa												

¹⁰ Enterprises are businesses registered for VAT and/or PAYE.

¹¹ Birth and Death rates are expressed as a percentage of Active enterprises.

vii) Economic Productivity [105]¹²

Site	Country	NUTS3* Local Area	GVA (Gross Value Added)** per hour worked ¹³ 2006 (UK = 100)	GVA per hour worked 2011 (UK = 100)	Workplace based GVA ¹⁴ NUTS3 at current basic prices 2012 (£million) ^{***}
-	-	UK	£1,360,925 million		1,383,082
Berkeley	England	Gloucestershire	101.3	94.3	12,685
Bradwell		Essex CC	102.4	99.1	25,563
Dungeness A		Kent CC	97.0	96.7	26,509
Hinkley Point A		Somerset	86.7	85.6	8,727
Oldbury		Gloucestershire	101.3	94.3	12,685
Sellafield		West Cumbria			
LLW Repository				81.1	81.5
Harwell		Oxfordshire	99.9	103.2	16,450
Winfrith		Dorset CC	88.7	85.0	6,524
Capenhurst		Cheshire West and Chester	105.4	105.3	7,419
Springfields		Lancashire CC	86.4	83.2	19,761
Sizewell		Suffolk	93.4	91.7	13,021
Chapelcross		Scotland	Dumfries & Galloway	80.7	81.9
Dounreay	Caithness & Sutherland and Ross & Cromarty		72.0	75.2	1,146
Hunterston	East Ayrshire and North Ayrshire mainland		92.7	91.4	1,146
Trawsfynydd	Wales	Gwynedd	74.6	68.0	1,876
Wylfa		Isle of Anglesey / Ynys Môn	77.8	87.6	726

*Nomenclature of Territorial Units for Statistics (NUTS) – 3 at small regional level
 **Gross Value Added is a measure in economics of the value of goods and services produced in an area, industry or sector of an economy.
 *** Components may not sum to totals as a result of rounding.

¹² 5-year moving averages. Data for the UK, countries and regions are available in the Labour Productivity table. Note that the above data are smoothed and are therefore not comparable with the data in the Labour Productivity table.

¹³ The annual hours figure used is an average of the four quarters and includes employees, self-employed and Government-supported trainees.

¹⁴ Estimates of workplace based GVA allocate income to the region in which the economic activity takes place.

viii) General Health of the Community

Site	Country	Local/Unitary Authority	All Usual Residents	Very Good Health	Good Health	Fair Health	Bad Health	Very Bad Health		
-	-	UK	63,182,315	47.2%	34.2%	13.1%	4.2%	1.2%		
Berkeley	England [105]	Stroud	112,779	47.7%	35.2%	12.8%	3.4%	0.9%		
Bradwell		Maldon	61629	46.2%	35.6%	13.4%	3.7%	1.1%		
Dungeness A		Folkestone & Hythe	107969	42.2%	36.1%	15.2%	4.9%	1.5%		
Hinkley Point A		West Somerset	34675	40.6%	36.4%	16.6%	5.1%	1.4%		
Oldbury		South Gloucestershire	262767	49.1%	34.9%	11.8%	3.3%	0.9%		
Sellafield		Copeland	70603	44.4%	33.9%	14.9%	5.3%	1.5%		
LLW Repository			Vale of White Horse	120988	51.9%	34.0%	10.8%	2.6%	0.7%	
Harwell			Purbeck	44973	45.0%	35.9%	14.1%	4.0%	1.0%	
Winfrith			Cheshire West and Chester	329608	48.5%	33.0%	12.9%	4.3%	1.2%	
Capenhurst			Fylde	75757	44.6%	33.8%	15.3%	4.9%	1.4%	
Springfields			East Suffolk	124298	46.3%	35.5%	13.8%	3.6%	0.8%	
Sizewell			Scotland [106]	Dumfries & Galloway	151324	49.1%	31.4%	13.8%	4.3%	1.3%
Chapelcross				Highland	232132	54.1%	29.9%	11.6%	3.4%	1.0%
Dounreay	North Ayrshire	138146		48.9%	30.4%	13.9%	5.2%	1.6%		
Hunterston	Wales [105]	Gwynedd	121874	50.4%	30.7%	13.6%	4.1%	0.0%		
Trawsfynydd		Isle of Anglesey	69751	48.0%	30.6%	15.1%	4.9%	1.4%		
Wylfa										

ix) Incidence of Cancer

Site	Country	Local/Unitary Authority or health board	Cancer incidence per 100,000 people per year ¹⁵
-	-	England [2]	588.5
		Scotland [2]	612.7
		Wales [2]	587.5
		UK [2]	590.4
Berkeley	England [3]	Gloucestershire CCG	576
Bradwell		Mid Essex CCG	572
Dungeness A		South Kent Coast CCG	637
Hinkley Point A		Somerset CCG	589
Oldbury		South Gloucestershire CCG	613
Sellafield		North Cumbria CCG	613
LLW Repository			
Harwell		Oxfordshire CCG	599
Winfrith		Dorset CCG	637
Capenhurst		West Cheshire CCG	651
Springfields		Fylde & Wyre CCG	636
 Sizewell		Ipswich and East Suffolk	582
Chapelcross		Scotland [5]	Dumfries & Galloway
Dounreay	Highland & Argyll		557.4
Hunterston	Ayrshire & Arran		598.4
Trawsfynydd	Wales [6]	Gwynedd	571.4
Wylfa		Isle of Anglesey	523.6

¹⁵ English health board data are average incidence rates between 2011 and 2015. All other data are for the year 2017.

x) Life Expectancy at Birth (2016-2018) [109]

Site	Country	Local area	Males	Females	
-	-	UK	79.3	82.9	
Berkeley	England	Gloucestershire ¹⁶	80.2	83.7	
Bradwell		Essex	80.2	83.3	
Dungeness A		Kent	79.9	83.4	
Hinkley Point A		Somerset ¹⁶	80.4	84.1	
Oldbury		South Gloucestershire	81.2	84.5	
Sellafield		Cumbria ¹⁶		79.4	82.9
LLW Repository					
Harwell		Oxfordshire ¹⁶	81.6	84.7	
Winfrith		Dorset ¹⁶	80.9	84.6	
Capenhurst		Cheshire West and Chester	79.9	83.0	
Springfields		Lancashire ¹⁶	78.5	82.2	
Sizewell		Suffolk ¹⁶	80.7	84.2	
Chapelcross		Scotland	Dumfries & Galloway	77.9	81.8
Dounreay	Highland		77.8	82.4	
Hunterston	North Ayrshire		76.3	79.9	
Trawsfynydd	Wales	Gwynedd	79.2	83.3	
Wylfa		Isle of Anglesey	79.0	83.2	

¹⁶ Local/unitary authority data is not available, so county data is presented.

xi) Long-Term Health Problem or Disability [105]

Site	Country	Area	All categories	Day-to-day activities limited a lot	Day-to-day activities limited a little	Day-to-day activities not limited	
-	-	England and Wales	56,075,912	8.5%	9.4%	82.1%	
Berkeley	England	Stroud	112,779	7.2%	9.6%	83.3%	
Bradwell		Maldon	61,629	7.6%	9.8%	82.6%	
Dungeness A		Folkestone & Hythe	107,969	10.0%	11.1%	79.0%	
Hinkley Point A		West Somerset	34,675	10.6%	13.2%	76.2%	
Oldbury		South Gloucestershire	262,767	6.8%	8.8%	84.4%	
Sellafield		Copeland		70,603	10.7%	10.7%	78.7%
LLW Repository							
Harwell		Vale of White Horse	120,988	5.8%	8.4%	85.8%	
Winfrith		Purbeck	44,973	8.2%	11.2%	80.5%	
Capenhurst		Cheshire West and Chester	329,608	8.8%	9.7%	81.5%	
Springfields		Fylde	75,757	10.4%	11.5%	78.1%	
Sizewell		East Suffolk	124,298	7.9%	10.6%	81.5%	
Chapelcross		Scotland	Dumfries & Galloway	N/A	N/A	N/A	N/A
Dounreay			Highland	N/A	N/A	N/A	N/A
Hunterston	North Ayrshire		N/A	N/A	N/A	N/A	
Trawsfynydd	Wales	Gwynedd	121,874	9.7%	10.8%	79.5%	
Wylfa		Isle of Anglesey	69,751	11.4%	11.7%	76.9%	

xii) Deaths from Coronary Heart Disease (CHD) [7,8]¹⁷

Site	Country	Local/Unitary Authority	Males		Females		
			Average number of annual deaths	Age-standardised death rate/100,000	Average number of annual deaths	Age-standardised death rate/100,000	
-	-	UK	40,974	154	25,367	70	
Berkeley	England	Stroud	88	169.5	55	68.5	
Bradwell		Maldon	44	150.0	27	59.6	
Dungeness A		Folkestone & Hythe	78	133.5	52	59.1	
Hinkley Point A		West Somerset	33	139.6	23	57.5	
Oldbury		South Gloucestershire	146	131.8	80	52.7	
Sellafield		Copeland	59	171.8	39	89.2	
LLW Repository			Vale of White Horse	69	121.9	47	53.2
Harwell		Purbeck	38	146.0	28	70.0	
Winfrith		Cheshire West and Chester	218	147.7	152	73.5	
Capenhurst		Fylde	62	136.5	49	73.6	
Springfields		East Suffolk	85	118.3	69	63.9	
Sizewell		Scotland	Dumfries & Galloway	157	206.6	111	108.4
Chapelcross			Highland	191	187.4	112	80.0
Dounreay	North Ayrshire		128	225.1	92	112.5	
Hunterston	Wales	Gwynedd	89	153.2	65	72.8	
Trawsfynydd		Isle of Anglesey	56	164.3	39	71.4	
Wylfa							

¹⁷ For England, mortality data is from 2014-2016. For Scotland and Wales, mortality data is from 2015-2017. UK mortality data is for 2017.

xiii) Radiation - approximate variation of exposure to natural background radiation by region [110]

Site	Country	Local/Unitary Authority	Cosmic radiation at ground level (mSv)	Terrestrial gamma radiation (mSv)	Internal sources (mSv)	Radon & Thoron (mSv)	
-	-	UK	0.3	0.35	0.27	2.2	
Berkeley	England	Gloucestershire	0.3	0.25	0.27	2	
Bradwell		Essex	0.3	0.25	0.27	1.1	
Dungeness A		Kent	0.3	0.25	0.27	1.65	
Hinkley Point A		Somerset	0.3	0.25	0.27	3.25	
Oldbury		Gloucestershire	0.3	0.25	0.27	2	
Sellafield		Cumbria		0.3	0.25	0.27	1.25
LLW Repository							
Harwell		Oxfordshire		0.3		0.27	2
Winfrith		Dorset		0.3	0.15	0.27	1.1
Capenhurst		Cheshire		0.3	0.3	0.27	1
Springfields		Lancashire		0.3	0.3	0.27	1
Sizewell		Suffolk		0.3	0.25	0.27	1.25
Chapelcross		Scotland	Dumfries & Galloway	0.3	0.3	0.27	2
Dounreay			Highland	0.3	0.4	0.27	1.75
Hunterston	North Ayrshire		0.3	0.3	0.27	0.8	
Trawsfynydd	Wales	Gwynedd	0.3	0.2	0.27	2	
Wylfa			0.3	0.2	0.27	2	

xiv) Transport - method of travel to work [105]¹⁸ (%)

Site	Country	Local/ Unitary Authority	Total	Work mainly at home	Underground, metro, light rail, or tram	Train	Bus, minibus or coach	Taxi	Passenger in a car or van	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other	Not in employment	
-	-	England and Wales	41,126,000	3.5	2.5	3.3	4.7	0.3	0.5	37.1	3.3	1.9	6.9	0.4	35.5	
Berkeley	England	Stroud	81,955	6.0	0.1	1.0	1.5	0.1	0.6	48.9	3.6	1.5	6.3	0.4	30.0	
Bradwell		Maldon	45,406	4.9	0.1	5.2	1.0	0.2	0.4	44.9	2.9	1.2	5.4	0.4	33.3	
Dungeness A		Folkestone & Hythe	77,938	3.5	0.1	2.4	3.0	0.3	0.5	39.0	3.4	1.1	8.0	0.5	38.1	
Hinkley Point A		West Somerset	24,918	7.9	0.1	0.3	1.3	0.2	0.4	33.8	2.7	1.7	12.6	0.6	38.4	
Oldbury		South Gloucestershire	192,468	3.4	0.1	0.9	3.5	0.1	1.0	49.5	3.6	2.8	5.8	0.3	29.1	
Sellafield		Copeland		52,702	2.5	0.0	1.0	3.0	0.3	0.5	41.2	6.0	1.1	6.5	0.4	37.6
LLW Repository																
Harwell		Vale of White Horse	87,477	5.1	0.1	1.7	4.2	0.1	0.7	45.5	3.0	4.6	6.8	0.4	27.8	
Winfrith		Purbeck	32,379	5.2	0.1	1.3	1.2	0.1	0.9	42.9	3.2	2.0	8.7	0.6	33.8	
Capenhurst		Cheshire West and Chester	243,155	3.9	0.1	1.3	2.3	0.4	0.4	45.0	3.7	1.8	6.6	0.4	34.1	
Springfields		Fylde	54,544	3.9	0.1	0.8	2.5	0.3	0.4	43.1	3.2	1.8	6.8	0.4	36.7	
Sizewell	East Suffolk	88,250	5.3	0.1	1.4	1.6	0.2	0.7	44.1	2.8	3.1	6.3	0.4	34.0		
Chapelcross	Scotland	Dumfries & Galloway	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Dounreay		Highland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Hunterston		North Ayrshire	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Trawsfynydd	Wales	Gwynedd	88,913	5.1	0.0	0.4	2.7	0.1	0.3	38.2	3.6	0.8	8.8	0.5	39.3	
Wylfa		Isle of Anglesey	50,818	4.1	0.0	0.4	1.6	0.2	0.4	42.2	3.7	0.9	5.7	0.6	40.1	

¹⁸ This data is for usual residents aged 16 to 74

xv) Housing - accommodation type by household spaces [105]

Site	Country	Local/Unitary Authority	Unshared dwelling						Shared dwelling
			All Accommodation	House or bungalow: Detached	House or bungalow: Semi-detached	Terraced house / bungalow	Flat, maisonette or apartment	Other	All types
-	-	England and Wales	23,366,044	22.7%	31.3%	24.6%	20.7%	0.4%	0.3%
Berkeley	England	Stroud	49,983	36.5%	32.5%	19.0%	8.5%	3.4%	0.1%
Bradwell		Maldon	27,212	44.3%	29.4%	15.7%	7.0%	3.6%	0.0%
Dungeness A		Folkestone & Hythe	49,873	27.0%	24.1%	22.1%	15.5%	10.6%	0.8%
Hinkley Point A		West Somerset	17,594	36.1%	29.4%	18.3%	8.5%	7.5%	0.2%
Oldbury		South Gloucestershire	110,024	26.4%	34.1%	27.4%	9.3%	2.8%	0.1%
Sellafield		Copeland	32,450	23.3%	37.5%	31.0%	5.4%	2.7%	0.1%
LLW Repository									
Harwell		Vale of White Horse	51,036	36.4%	30.3%	18.8%	10.8%	3.6%	0.0%
Winfrith		Purbeck	22,140	38.2%	24.2%	18.7%	12.0%	7.0%	0.1%
Capenhurst		Cheshire West and Chester	147,746	29.6%	35.8%	21.7%	9.9%	2.8%	0.2%
Springfields		Fylde	37,435	26.2%	31.6%	17.4%	15.2%	9.3%	0.3%
Sizewell		East Suffolk	58,385	43.5%	29.1%	16.9%	6.9%	3.4%	0.1%
Chapelcross		Scotland	Dumfries & Galloway	N/A	N/A	N/A	N/A	N/A	N/A
Dounreay	Highland		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hunterston	North Ayrshire		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Trawsfynydd	Wales	Gwynedd	61,075	34.9%	22.9%	31.0%	6.2%	4.8%	0.2%
Wylfa		Isle of Anglesey	34,183	47.9%	21.3%	22.3%	4.9%	3.6%	0.1%

xvi) Indices of Multiple Deprivation (IMD) [111, 112, 113]

The Indices of Multiple Deprivation are calculated by ranking pre-defined small population areas on the basis of a number of domains. These domains are then combined with appropriate weighting to create an overall index. This analysis is undertaken by each of the devolved administrations of England, Scotland and Wales. Scores for the small areas can also be combined to provide an analysis of the relative deprivation of different Local Authority or Council Areas. This information is provided in the table below for each of the Local Authorities or Council Areas containing NDA sites. A rank is provided indicating how deprived each Local Authority or Council Area is compared to other Local Authority or Council Areas within the country, where a value of 1 indicates the most deprived. For example, on the basis of this ranking, Stroud is the 279th most deprived Local Authority in England out of 317 Local Authorities and Gwynedd is the 5th most deprived Local Authority in Wales out of 22 Local Authorities. The worst performing domain for each Local Authority is also identified. Further details of the Index of Multiple Deprivation methodology and the indicators to derive the domains used can be found in references [111,112,113] and references contained therein.

Site	Country	Local/Unitary Authority	Number of Local Authority Districts (England & Wales) or Council Areas (Scotland) in country	Local Authority or Council Area Rank	Worst performing domain for Local Authority or Council Area
Berkeley	England	Stroud	317	279	Living Environment
Bradwell		Maldon		211	Education
Dungeness A		Folkestone & Hythe		84	Employment
Hinkley Point A		Somerset West and Taunton		142	Barriers to Housing & Services
Oldbury		South Gloucestershire		267	Education
Sellafield		Copeland		78	Health
LLW Repository		Vale of White Horse		305	Barriers to Housing & Services
Harwell		Dorset		197	Barriers to Housing & Services
Winfrith					

Capenhurst		Cheshire West and Chester		183	Health
Springfields		Fylde		198	Health
Sizewell		East Suffolk		158	Education
Chapelcross	Scotland	Dumfries & Galloway	32	14	Not available.
Dounreay		Highland		19	Not available.
Hunterston		North Ayrshire		3	Not available.
Trawsfynydd	Wales	Gwynedd	22	5*	Not available.
Wylfa		Isle of Anglesey		7*	Not available.

• For England and Scotland, ranks for the Local Authority and Council Areas are based on population-weighted averages of the ranks of the small areas. For Wales, population numbers for the small areas are not readily available and so a simple average is used.

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Policy and Legislative Context Review

1.0 Introduction

1.1 Purpose of the review

This document presents a review of international, national and local legislation, plans, policies and strategies relevant to the decommissioning of sites in the NDA's estate. Since there are no NDA sites in Northern Ireland, the scope of the review at the national level has focused on England, Scotland and Wales. However, the key messages drawn from this review (particularly at the international level) are broadly reflective of environmental policy direction of the entire UK, including Northern Ireland.

The purpose of this review is, as relevant to the objectives of legislation and policy, to inform the scope of the Integrated Impact Assessment (IIA) (incorporating Strategic Environmental Assessment – SEA) by identifying:

- environmental matters which must be considered for possible relevance to the Strategy in accordance with legislation and international / national policy;
- environmental matters which should be considered for possible relevance to the Strategy in accordance with other plans, strategies and policy;
- development and environmental objectives which are relevant to the Strategy, such that the IIA seeks to avoid hindering the achievement of those objectives, and to maximise contribution towards achievement;
- sources of baseline information, including:
 - information developed in support of plans and strategies (e.g. landscape characterisation or water resource management / resource availability assessments), and
 - Proposed levels of development, schemes, interventions and other actions which may alter the future baseline.

Sources of baseline information identified are reflected in the IIA Baseline Report.

1.2 Review structure

Chapters 2 and 3 of this review set out the key objectives and targets of relevant legislation, plans, policies and strategies and provide analysis in the context of the NDA Strategy.

Understanding of this context will be used to inform the IIA of the NDA's Strategy. This will help to ensure that the IIA is compliant with requirements of legislation, and that national and local policy objectives can be considered during the assessment process, with particular relevance to the scope of the IIA agreed with statutory stakeholders.

A reference list of the legislation, plans, policies and strategies covered in the review is given in Chapter 4.

1.3 Brexit

At the time of writing this review, the UK was in a transition period having left the European Union. The exact impact of Brexit will depend on the details of the future relationship, which was being negotiated during the transition period. The European Union (Withdrawal) Act 2018 enables the transposition of directly applicable already-existing EU law into UK law and so creates a new category of domestic law for the United Kingdom: "retained EU law". It also gives the government some restricted power to adapt and

remove laws that are no longer relevant. The Policy and Legislative Context Review reflects the position in April 2020, and it is subject to change.

2.0 Relevant legislation and policy

This chapter outlines legislation, policies, plans and strategies relevant to the environmental, health and socio-economic issues that apply to the NDA’s sites. This legislative and policy context will be used to inform the Integrated Impact Assessment (IIA) of the NDA Strategy.

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<h3>2.1 The NDA Strategy</h3>	
<p>The Energy Act (2004) requires the NDA to develop and publish a strategy which must be reviewed at least every five years. Specifically, it commits the NDA to:</p> <ul style="list-style-type: none"> include the NDA’s strategy for decommissioning and cleaning up the UK’s civil nuclear legacy; set out the priorities the NDA has adopted to discharge its responsibilities; set out how it proposes to promote effective competition for contracts; set out its proposals for ensuring the adoption of what it considers to be good practice; outline how it proposes to support activities which benefit the social or economic life of communities living near its sites or that produce other environmental benefits; and explain how and why it arrived at the decisions and proposals which are set out in the strategy. 	<p>65, 203, 208</p>
<h3>2.2 Radioactive emissions and discharges</h3>	
<p>UK radioactive substances regulation and policy is influenced by a number of international agreements and is underpinned by the <i>1957 Euratom Treaty</i> and subsequent European Union (EU) Directives. EU Member States are responsible for putting in place national policies which:</p> <ul style="list-style-type: none"> protect workers and the public from ionising radiation; keep the generation of radioactive waste to the minimum practicable; ensure the interdependence of the different steps in spent fuel and radioactive waste generation and management; safely manage spent fuel and radioactive waste, including in the long-term; 	<p>13, 21, 46, 49, 51, 66, 68, 67, 199</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<ul style="list-style-type: none"> • implement appropriate measures following a graded approach; and • govern all stages of the management of spent fuel and radioactive waste. <p>Member States are required to dispose of waste within their own territory unless they have agreements with other Member States for the use of their disposal facilities.</p> <p>Post Brexit, things may change depending on the future relationship agreed with EU. UK will remain aligned with EU directives during the transition period. IAEA Basic Safety Standards will still apply.</p>	
<p>The UK government’s vision for nuclear energy is to have a nuclear sector that:</p> <ul style="list-style-type: none"> • has safety and security as its highest priorities; • continues to contribute to a low carbon and secure energy future, with nuclear energy competing successfully with other low carbon technologies; • leads the way in successfully decommissioning redundant nuclear facilities; • contributes to employment and prosperity in the UK; • continues to command public confidence, by operating safely, securely, sustainably and transparently; and • continues to operate post Brexit. <p>In line with the UK Industrial strategy, the 2018 vision is for a UK nuclear sector that generates reliable, secure, low-carbon power, but that also targets significant cost reduction to ensure it remains cost competitive with other sources of low-carbon technology (<i>The Nuclear Sector Deal</i>).</p>	144, 66, 67, 149, 150, 192
<p>The Nuclear Installations (Liability for Damage) Order 2016 UK Statutory Instruments 2016 No. 562 amends the Nuclear Installations Act 1965 in order to implement changes to the Paris Convention on nuclear third party liability and the Brussels Supplementary Convention agreed in 2004. These Conventions establish an international regime governing liability to pay compensation for damage following a nuclear incident. The changes to the Paris Convention bring nuclear waste disposal facilities into the liability regime. The amendments to the Act create a new class of operator – those who operate a disposal site but do not require a nuclear site licence – to whom the 1965 Act liability regime (but not the licensing regime) is applied.</p>	
<p>BEIS issued a policy paper on the regulations of nuclear sites in the final stages of decommissioning in 2018. Following consultation, government intends to legislate to amend the Nuclear Installations Act 1965 when parliamentary time allows. If approved by Parliament, this legislation would allow a nuclear site to exit the nuclear third-party liability regime when internationally agreed standards have been met. The nuclear site operator would subsequently be able to apply to the Office for Nuclear Regulation (ONR) to exit the nuclear licensing regime.</p> <p>After the end of the nuclear site licence, the site would remain under regulation by the relevant environment agency and the Health and Safety Executive (HSE). When the nuclear liability regime ceases to apply, third party liability (under ordinary law) would</p>	23, 24, 165, 215

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>then apply to the site, providing an alternative but still robust legal regime for third party damage or injury.</p> <p>The proposal is to:</p> <ul style="list-style-type: none"> • Adopt the 2014 Paris Convention Decommissioning Exclusion thereby allowing ONR to end the period of responsibility for nuclear third-party liability, if content that the criteria in this decision have been met. • Adopt the 2016 Paris Convention Low Level Waste Exclusion, thereby allowing Low Level Waste disposal facilities that meet this criterion to exit the nuclear third-party liability regime. • Introduce a new surrender mechanism in the NIA65 whereby the licensee must apply to ONR if it wishes to surrender its licence. 	
<p>The government considers that the unnecessary introduction of radioactivity into the environment is undesirable, even at levels where the doses to both human and non-human species are low and, on the basis of current knowledge, unlikely to cause harm.</p> <p>Activities involving ionising radiation are subject to the following controls:</p> <ul style="list-style-type: none"> • justification of practices by the government to ensure that the environmental, social and economic benefits they provide to society exceed the potential detriment resulting from them; • optimisation of protection on the basis that radiological doses and risks to workers and members of the public from a source of exposure should be kept as low as reasonably achievable (ALARA), considering social and economic factors; and • application of limits and conditions to control discharges from justified activities to ensure that individuals (workers and members of the public) and sensitive environmental receptors are not exposed to unacceptable radiation risks from these practices. 	145, 146, 147, 194, 195
<p>REPPiR 2019 is part of the Government’s implementation of the emergency planning requirements of the Basic Safety Standards Directive 2013 made under the Euratom Treaty. Duty holders have until 22 May 2020 to comply with the new regulations.</p>	196
<p>The <i>UK Strategy for Radioactive Discharges</i> is based on the principles of sustainable development and the use of Best Available Techniques (BAT) in England and Wales, and Best Practicable Means (BPM) and Best Practicable Environmental Option (BPEO) in Scotland, to prevent and, where that is not practicable, minimise waste generation and discharges to the environment.</p>	145, 199
<p>The UK policy for low Level Radioactive waste is to apply the waste hierarchy, which includes reduce, recycle and disposal in existing near surface disposal facilities.</p> <p>The UK government’s policy for the long-term, safe and secure management of Higher Activity Radioactive Waste (HAW) (which includes some Low Level Waste (LLW) that is not suitable for near surface disposal in current facilities) is to place it</p>	146, 147, 148, 151, 152, 158, 158, 189

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>deep underground in a geological disposal facility (GDF), sited and developed in partnership with a willing UK community. The two key requirements in the disposal programme are a willing host community and suitable geology. The UK policy on the long-term management of HAW (e.g. graphite) recognises that it is appropriate to investigate alternative options to a GDF for some of the inventory where there could be the potential to improve the overall management of HAW.</p> <p>The Welsh Government has adopted the UK’s policy for geological disposal.</p> <p>In Scotland, the preference is for long-term management of HAW in near-surface facilities. These facilities should also be as near to the waste generating sites as possible.</p>	
<h3>2.3 Air quality</h3>	
<p>Action to manage and improve air quality is largely driven by European legislation. The <i>Ambient Air Quality Directive (2008/50/EC)</i> sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health, such as particulate matter and nitrogen dioxide (N₂O). The <i>Fourth Daughter Directive (2004/107/EC)</i> sets limits for arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.</p> <p>The directive became law in the UK through the <i>Air Quality Standards Regulations 2010</i>, and equivalent regulations in Scotland and Wales.</p>	<p>1, 26, 69, 70, 71, 75, 76</p>
<p>Separate legislation exists for emissions of air pollutants, with the main legislation being the <i>UNECE Gothenburg Protocol</i> which sets national emission limits (ceilings) for sulphur dioxide (SO₂), oxides of nitrogen (NO_x), ammonia and volatile organic compounds (VOCs). The revised Gothenburg Protocol (2012) sets out new emission reduction commitments for sulphur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia and fine particulate matter, taking the year 2005 as a base year. Similar ceilings have also been set in European law under the <i>National Emission Ceilings Directive (2016/2284)</i>, which was subsequently transposed into UK law as the <i>National Emission Ceilings Regulations 2018</i>.</p> <p>Persistent Organic Pollutants (POPs) are chemical substances which stay in the environment, migrate into, and accumulate in the food chain and threaten human health and the environment. Regulation (EU) 2019/1021 on persistent organic pollutants protects the environment and human health from POPs by prohibiting, phasing out, or restricting the manufacturing, placing on the market, and use of specified substances.</p>	<p>1, 27, 48, 69, 70, 71, 72, 75, 76</p>
<p>The <i>Clean Air Strategy 2019</i> sets out air quality objectives and policy options to improve air quality in the UK. As well as direct benefits to public health, these options are intended to provide important benefits to quality of life and help to protect the environment.</p> <p><i>Part IV of the Environment Act 1995</i> requires local authorities in the UK to review air quality in their area and designate Air Quality Management Areas (AQMAs) if</p>	<p>73, 74, 76, 77, 78, 79, 177</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
targeted improvements are necessary.	
<p>In 2017 Defra published a new air quality plan for nitrogen dioxide (NO₂). This is the UK air quality plan for bringing NO₂ air pollution within statutory limits in the shortest possible time. Among the measures in the plan is promotion of the use of electric vehicles, cycling and walking, updating the government procurement standards for vehicles, and issuing Directions to specified city councils that have not met the legal limits.</p>	76
<h2>2.4 Climate change</h2>	
<p>Under the <i>Kyoto Protocol (1997)</i> many of the world’s developed countries agreed to reduce collective emissions of greenhouse gases (GHG) by 5.2% from 1990 levels by 2012. The Doha amendment adds a second commitment period, in which parties must reduce emissions by at least 18% below 1990 levels between 2013 and 2020.</p> <p>The <i>Paris agreement (2015)</i> adopted at the 21st Conference of the Parties to the <i>UN Framework Convention (1992)</i> is a legally binding global climate change agreement that strengthens the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty. The EU formally ratified the agreement on 5 October 2016. This agreement follows recommendations from the UN Intergovernmental Panel on Climate Change (IPCC).</p> <p>The emissions reductions are designed, specifically, to hold the increase in the global average temperature to well below 2°C above pre-industrial levels with the aspiration of pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels. It applies to all greenhouse gases not controlled by the Montreal Protocol: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃). At least 40% domestic reduction in greenhouse gas emissions is required by 2030, compared to 1990 levels.</p> <p>To meet the EU’s energy and climate targets for 2030, EU Member States need to establish a 10-year integrated national energy and climate plan (NECP) for the period from 2021 to 2030 (<i>Regulation on the governance of the energy union and climate action EU/2018/1999</i>). The UK submitted a draft NECP in 2018 and a final version will be published in 2020.</p>	2, 14, 15, 30, 197
<p>Other international objectives include:</p> <ul style="list-style-type: none"> • eliminating or reducing the release of Persistent Organic Pollutants (POPs) into the environment; • setting ceilings for emissions of ammonia, oxides of nitrogen, sulphur dioxide and volatile organic compounds for EU member states; and • setting a target of 6% reduction in the lifecycle of GHG emissions from fuels by 2020. 	2,16, 27, 29, 31

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>The EU is committed to providing 20% of energy from renewable sources by 2020 and a mandatory 10% minimum target should be achieved by all Member States for the share of biofuels in transport petrol and diesel consumption.</p> <p>The UK is legally committed to meeting 15% of the UK's energy demand by renewable sources by 2020 (this can be further broken down into 30% electricity; 12% heat; and 10% transport fuels).</p> <p>The Scottish government has set a target to source 30% of energy demand from renewables by 2020 including 100% electricity, 11% heat and 10% transport.</p> <p>Increasing the amount of energy produced from low-carbon technologies such as renewable and nuclear will help the UK to:</p> <ul style="list-style-type: none"> • secure domestic energy supply; • reduce GHG emissions to slow down climate change; and • stimulate investment in new jobs and businesses. 	<p>14, 28, 77, 78, 79, 80, 81, 82, 89</p>
<p>The <i>Climate Change Act (2008)</i> as amended 2019 and <i>Climate Change (Scotland) Act (2009)</i> as amended by 2019 emissions act outline the UK's legally binding climate change target. The latest UK policy aims to reduce the UK's GHG emissions to 'net zero' (i.e. by 100%, from the 1990 baseline) by 2050 through moving to a more energy efficient, low-carbon economy. This will help the UK become less reliant on imported fossil fuels.</p> <p>UK <i>Climate Change Risk Assessment (2017)</i> sets out the 6 priority risk areas requiring further action in the UK over the next 5 years. The priority areas are: flooding and coastal change risk to communities, businesses and infrastructure; risks to health, well-being and productivity from high temperatures; risks of shortages in the public water supply, and for agriculture, energy generation and industry, with impacts on freshwater ecology; risks to natural capital, including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity; risks to domestic and international food production and trade; new and emerging pests and diseases, and invasive non-native species, affecting people, plants and animals.</p> <p>In 2019, Scotland committed to reduce Scotland's emissions of all greenhouse gases to net-zero by 2045 at the latest, with interim targets for reductions of at least 56% by 2020, 75% by 2030, 90% by 2040.</p> <p>In Wales, the Welsh government accepts the Committee on Climate Change (CCC) recommendation for a 95% reduction in greenhouse gas emissions by 2050 and aims to go further with an ambition to reach net-zero The current legislation (Environment (Wales) Act 2016) includes at least an 80% reduction in emissions by 2050.</p>	<p>77, 81, 83, 84, 85, 87, 88, 89, 200</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<h2>2.5 Biodiversity, flora and fauna</h2>	
<p>The EU has agreed to an ambitious conservation plan to protect global biodiversity. The EU vision for biodiversity centres upon protecting biodiversity and the ecosystem services it provides, valuing them appropriately and restoring biodiversity’s intrinsic value for human well-being and economic prosperity.</p> <p>The European Commission adopted a new <i>EU Biodiversity Strategy</i> in 2011 to help meet this goal. The strategy provides a framework for action over the next decade and covers the following key areas:</p> <ol style="list-style-type: none"> 1. ensuring the sustainability of agriculture, forestry and fisheries; 2. combating invasive alien species; and 3. addressing the global biodiversity crisis. 	<p>3, 4, 5, 6, 7, 8, 9, 32, 33, 34, 35, 36</p>
<p><i>Biodiversity 2020: A Strategy for England’s Wildlife and Ecosystem Services</i> provides a comprehensive picture of how England is implementing the international and EU commitments. The mission for this strategy over the next decade is:</p> <p>“to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.”</p> <p>The Scottish biodiversity strategy; <i>The 2020 Challenge for Scotland’s Biodiversity: It’s in your Hands</i> sets out how Scotland is implementing international and EU commitments. It envisages that by 2030 Scotland will be recognised as a world leader in biodiversity conservation.</p> <p>One of the key challenges set out in the Environment Strategy for Wales is the identification of pressures on biodiversity and halting its decline. This is supported by the <i>2016 Environment Act</i>.</p> <p>Individual national strategies for biodiversity and the environment in England, Scotland, Wales and Northern Ireland underpin the new <i>UK Post-2010 Biodiversity Framework</i>. The strategies set out priorities, measures and indicators that reflect the countries’ different responsibilities, needs and views. Consistent themes across the strategies include:</p> <ul style="list-style-type: none"> • halting the loss of biodiversity and continuing to reverse previous losses; • increasing awareness, understanding and enjoyment of biodiversity, and engaging more people in conservation and enhancement; and • restoring and enhancing biodiversity in urban, rural and marine environments through better planning, design and management. 	<p>90, 91, 92, 93, 94, 95, 96, 97</p>
<p>The Environment Bill 2020 sets out how UK government plans to protect and improve the natural environment in the UK. It introduces a mandatory requirement for</p>	<p>211, 212, 214</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>biodiversity net gain in the planning system, to ensure that new developments enhance biodiversity and create new green spaces for local communities to enjoy. The Bill provides a framework of measures to support nature’s recovery in line with the ambition set out in the UK government’s 25 Year Environment Plan, which sets out government action to help the natural world regain and retain good health including protecting threatened species and providing richer wildlife habitats. Natural England have produced a Nature Network Evidence Handbook to help meet one of the key areas of the 25 Year Environmental Plan: establishing a nature recovery network.</p>	
<p>A number of designated nature sites are provided protection at an international level, including:</p> <ul style="list-style-type: none"> • Ramsar Sites – wetlands of international importance. • Special Protection Areas (SPAs) – a network of sites protected for rare and vulnerable birds as well as regularly occurring migratory species. • Special Areas of Conservation (SACs) – high quality conservation sites. <p>In addition to these habitats, a number of species are also protected by international legislation.</p> <p>In the UK, Sites of Special Scientific Interest (SSSIs) designations protect a range of habitats for fauna and flora.</p>	<p>4, 10, 32, 33, 34, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 167</p>
<h2>2.6 Landscape and visual impacts</h2>	
<p>Public authorities are encouraged to adopt policies and measures at appropriate levels to protect, manage and plan landscapes throughout Europe under <i>the European Landscape Convention</i>.</p>	<p>37</p>
<p>In England and Wales, nationally important landscapes are protected by the <i>National Parks and Access to the Countryside Act 1949</i>. This Act sets out to conserve and enhance certain areas for their natural beauty, with areas designated either as National Parks or Areas of Outstanding Natural Beauty (AONBs). The National Parks and Access to the Countryside Act (provision also inserted in the Environment Act 1995) and the Countryside and Rights of Way Act 2000 gives public bodies such as NDA a duty to ‘have regard’ to the statutory purposes of National Parks and AONBs. The statutory purpose shared by both designations is to ‘<i>conserve and enhance the area’s natural beauty, wildlife and cultural heritage</i>’. The National Parks have a second statutory purpose to promote opportunities for understanding and enjoying the special qualities of National Parks by the public (generally referred to as their ‘recreation’ purpose). The duty of regard applies also to activities outside but within the ‘setting’ of a NP or AONB which may nonetheless impact on the designated area itself.</p> <p>In England, the <i>National Planning Policy Framework</i> states that the planning system should contribute to and enhance the natural environment by protecting and</p>	<p>95, 97, 111, 112, 113, 114, 115, 116</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>enhancing valued landscapes.</p> <p>In Scotland, National Parks are designated under <i>the National Parks (Scotland) Act 2000</i> with the aim of conserving and enhancing the natural and cultural heritage of the area. The character and appearance of National Scenic Areas are also safeguarded under the <i>Planning (Scotland) Act 2006</i>.</p> <p><i>Scotland's Landscape Policy Framework</i> also seeks to safeguard and enhance the distinct identity, the diverse character and the special qualities of Scotland's landscapes as a whole, so as to ensure tomorrow's landscapes contribute positively to the human environment and are at least as attractive and valued as they are today.</p>	
<h2>2.7 Cultural heritage</h2>	
<p>At the international level, protection is provided for cultural and natural heritage of outstanding interest by the <i>European Convention on the Protection of Archaeological Heritage</i> and the <i>Convention Concerning the Protection of the World Cultural and Natural Heritage</i>.</p>	3, 38
<p>In the UK, the historic environment should be protected and sustained, and provision made for investigation, preservation and recording of matters of archaeological or historic value. This is reflected in the policies of England, Scotland, and Wales. In England, the <i>National Heritage Protection Plan (2013)</i> sets out the approach for considering the historic environment in Strategic Environmental Assessment (SEA) and Sustainability Appraisal (SA) at each stage of the assessment process. Heritage 2020 and Culture 2020 set out the policy for access to cultural heritage.</p>	95, 97, 98, 99, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130
<h2>2.8 Water resources and quality</h2>	
<p>The <i>OSPAR Convention</i> aims to prevent pollution of the marine environment by discharges from land based activities and the <i>OSPAR Radioactive Substances Strategy</i> specifically sets the objective of preventing pollution of the maritime area from ionising radiation through the reduction of discharges, emissions and losses of radioactive substances.</p> <p>The ultimate aim is to reduce concentrations in the environment to near background values for naturally occurring radioactive substances and close to zero for other radioactive substances.</p> <p>Targets include that by 2020 OSPAR will ensure that discharges, emissions and losses of radioactive substances are reduced to levels where the additional concentrations in the marine environment above historic levels, resulting from such discharges, emissions and losses are close to zero.</p>	8, 11, 12
<p>The <i>EC (1996) Directive on Pollution Prevention and Control (96/61/EC)</i> stipulates that there is a need for planning authorities to contribute to a high quality of life for</p>	39, 40, 79, 131, 132, 133, 134,

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>citizens by providing an environment where levels of pollution do not give rise to harmful effects on human health and the environment.</p> <p>UK legislation on Pollution prevention and control (PPC, 1999) was updated in 2017 to link to the 2013 BSS and in 2019 to link to 26 EU directives. The 2017 legislation was repealed when UK exited the EU on 31st January 2020.</p>	135
<p>The European <i>Water Framework Directive (WFD) (2000/60/EC)</i>, as amended in 2013, and the <i>Groundwater Daughter Directive (GWD)</i>, as amended in 2014, were translated into UK legislation through the Water framework regulations and the Environmental Permitting Regulations (Schedule 22) and the Scottish equivalent.</p> <p>The WFD applies to all surface freshwater bodies (including lakes, streams and rivers), ground waters and associated ecosystems, estuaries and coastal waters out to one mile from low-water. It aims to:</p> <ul style="list-style-type: none"> • prevent further deterioration and protect and enhance the status of aquatic ecosystems; • promote sustainable water use based on a long-term projection of available water resources; and • enhance protection and improve the aquatic environment through specific measures for the progressive reduction of discharges, emissions and losses of priority substances. <p>The GWD complements the WFD by setting groundwater quality standards and introducing measures to prevent or limit inputs of pollutants into groundwater. The presumption in relation to groundwater is broadly that it should not be polluted at all.</p> <p>The WFD’s approach to water management is consistently reflected in UK-wide and regional strategies and plans.</p> <p>The Environment Bill 2020 will bring into UK law environmental protections and recovery, including UK stewardship of water in the environment.</p>	41, 43, 134, 135, 193, 194, 195, 211
<h2>2.9 Coastal change and flood risk</h2>	
<p>All EU Member States are required to assess the risk of flooding from water courses and around coast lines, to map flood extent, assets and humans at risk from flooding in these areas, and to take measures to reduce flood risk.</p>	42
<p>In England and Wales, <i>The Flood & Water Management Act 2010</i> aims to provide better, more sustainable management of flood risk for people, homes and businesses, help safeguard community groups from unaffordable rises in surface water drainage charges and protect water supplies to the consumer.</p> <p>In Scotland, the <i>Flood Risk Management (Scotland) Act 2009</i> introduced a more sustainable approach to flood risk management in order to consider all sources of flooding including river, coastal and ground waters.</p>	136, 137, 138, 139

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>Specific policy on how to take flood risk into account in development schemes can be found in the <i>NPPF</i> (England), <i>TAN15</i> (Wales), <i>Scottish Planning Policy</i>. The environment agencies specify use of the Met Office 2018 climate predictions UKCP18.</p>	<p>95, 97, 98, 139, 140, 141</p>
<p>In 2010/11, councils published <i>Shoreline Management Plans</i> (SMPs) covering the entire coast of England and Wales and set the ‘direction of travel’ for future coastal management. Four potential policies were identified for each stretch of coast, ‘hold the line’, ‘advance the line’, ‘managed retreat’ and ‘no active intervention’. The management policies have since been collated and included in the Environment Agency’s online mapping services.</p>	
<p>In 2013, the UK government published the policy <i>Reducing the threats of flooding and coastal change</i> that updated the way in which flood risks would be managed and funded. This was subsequently updated in 2014 in response to widespread flooding, by the environmental management policy paper <i>Programme of flood and coastal erosion risk management schemes</i>.</p> <p>The Met Office climate projections 2018 are used to determine flooding risk.</p>	<p>140</p>
<h2>2.10 Geology and soils</h2>	
<p>The <i>Environmental Liability Directive (99/31/EC)</i> focuses on prevention and remediation of environmental damage, including land contamination, which presents a threat to human health. The Directive is based on the polluter pays principle, where polluters are responsible for remediating damage they cause to the environment.</p> <p>The Directive provides specific criteria to determine when damage is significant, although damage from nuclear and maritime accidents falls outside the scope of the regime. Annex I of the Directive includes criteria for determining whether effects are significant, and this can be used to inform the SEA process.</p> <p>Specifically relating to landfill waste, the <i>Landfill Directive (99/31/EC)</i> is also intended to reduce and prevent the adverse effects of waste on the environment, including soil.</p> <p>The <i>EC’s Thematic Strategy for Soil Protection</i> identifies eight main threats to soil, including erosion, contamination, compaction and salinization. The Strategy advocates higher levels of protection to the soil resource than is currently in place.</p>	<p>44, 45, 47, 48, 95, 97</p>
<p>Little statutory protection exists specifically for soils in the UK, although they are indirectly protected by other legislation such as that covering the prevention of pollution and contamination, and for land use planning. In England, the Department for Environment, Food and Rural Affairs (DEFRA) aims for all England’s soils to be managed sustainably and degradation threats tackled successfully by 2030. The Government’s 25 Year Environment Plan aims to improve our approach to soil management; and by 2030 all of England’s soils will be managed sustainably, using natural capital thinking to develop appropriate soil metric and management</p>	<p>131, 142, 143, 212, 213</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>approaches. The emphasis is on improving the health of soils and the wider environment, by addressing factors in soil degradation such as erosion, compaction and decline in organic matter. This will improve the quality of England’s soils and safeguard their ability to provide essential services for future generations. The Environment Agency also seeks to protect water, air and soil from pollution by promoting good soil management.</p> <p>The UK Agriculture Bill introduced in January 2020 contains provisions regarding the improvement of soil quality.</p>	
<h2>2.11 Materials and waste</h2>	
<p>The <i>EU Waste Framework Directive 2008/98/EC</i> as amended requires all member states to take necessary measures to ensure waste is recovered or disposed of without endangering human health or causing harm to the environment and includes permitting, registration and inspection requirements.</p> <p>The directive also requires member states to take appropriate measures to encourage firstly the prevention or reduction of waste production and its harmfulness and secondly the recovery of waste by means of recycling, reuse or reclamation or any other process with a view to extracting secondary raw materials; or the use of waste as a source of energy. This system is known as the ‘waste hierarchy’.</p> <p>Other directives address specific wastes.</p>	<p>52, 53, 54, 55, 62, 63, 64</p>
<p>Separate regulations exist transposing the <i>Waste Framework Directive (2008/98/EC)</i> into law in England and Wales, and Scotland, and the principle of the waste hierarchy is reflected in each nation’s policies.</p> <p>The Welsh government’s overarching waste strategy aims to reduce the impact of waste to within their environmental limits (which is defined as roughly 65% less waste than was being produced in 2010), aiming to phase out residual waste through enhanced actions on waste prevention and sustainable consumption and production and ensuring that all waste that is produced is reused or recycled by 2050. The Scottish government published a <i>Circular Economy Strategy for Scotland</i> in 2016 and aims for 70% of all waste to be recycled by 2025. No specific targets are currently set for England.</p> <p>In England, the resources and waste strategy sets out the government’s vision for a new approach to waste, the revaluing of our limited resources, and steps to take us towards a more circular economy where things are reused, recycled and repaired, instead of thrown away. The government says it will transfer the full costs of recycling and waste management away from councils and, onto those who produce, and profit from, the production of packaging.</p>	<p>44, 95, 97, 153, 154, 155, 156, 157, 158, 158, 160, 161, 162, 163, 164</p>
<p>The waste hierarchy is at the heart of the regulation of radioactive waste. Operators are expected to reduce quantities of waste and its impact on the environment by careful planning and design and re-using or recycling the materials they use. The</p>	<p>145, 147, 158, 158, 207</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>energy and materials within waste that cannot be reused or recycled should be recovered, for instance by generating energy.</p>	
<p>Environment agencies' Management of radioactive waste from the decommissioning of nuclear sites: guidance on the requirements for release from radioactive substances regulation (GRR) was published in 2018. The guidance requires operators to:</p> <ul style="list-style-type: none"> • produce a waste management plan (WMP); • produce a site-wide environmental safety case (SWESC); • make sure the condition of their site meets standards for protection of people and the environment, now and into the future. <p>WMPs must be optimised to each site's individual circumstances. This means that at different nuclear sites it might be optimal to use one of these approaches or a mix of both:</p> <ul style="list-style-type: none"> • remove all radioactive waste and contamination from that site and transport it for disposal at some other suitable site(s) • dispose of all radioactive waste and leave all radioactive contamination on that site (disposal in-situ or disposal for a purpose) <p>The regulators will only authorise disposal of radioactive waste on a site when they are satisfied the operator has developed an optimal WMP.</p> <p>The regulators will only release a site from regulation when they are satisfied that the operator has:</p> <ul style="list-style-type: none"> • completed all work involving radioactive substances; • met all safety standards and can demonstrate this in their SWESC. <p>Environmental regulators are issuing revised site permits specifying the preparation of waste management plans and SWESCs. All nuclear sites have to prepare these over the next few years.</p> <p>The implications of leaving contaminated structures (containing hazardous substances) in contact with groundwater with respect to the protection of groundwater are still being worked out. The environment agencies are developing their position.</p>	<p>165</p>
<h2>2.12 Noise and vibration</h2>	
<p>Harmful effects from noise, including annoyance, should be avoided, prevented and reduced. Each EU Member State is expected to determine exposure to environmental noise through noise mapping, ensure that information on environmental noise and its effects is made available to the public, and to adopt action plans based on noise mapping results with a view to preventing and reducing environmental noise where necessary (particularly where exposure effects could induce harmful effects on human health). Noise maps are available for England, Wales and Scotland.</p> <p><i>The Noise Policy Statement</i> for England (2010) clarifies current policies and practices relating to noise management and provides guidance for practitioners.</p>	<p>56, 95, 97, 175, 209</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<h2>2.13 Socio-economics</h2>	
<p>The <i>2002 World Summit on Sustainable Development</i> reaffirmed the international commitment to sustainable development. The 2030 Agenda for Sustainable Development, including its 17 Sustainable Development Goals (SDGs) and 169 targets, were adopted on 25 September 2015 by Heads of State and Government at a special UN summit. The Agenda are a commitment to eradicate poverty and achieve sustainable development by 2030 world-wide, ensuring that no one is left behind. The UK has reviewed its progress towards the Sustainable Development Goals and prepared a voluntary report in 2019.</p> <p>In the UK, sustainable development is about positive growth; making economic, environmental and social progress for current and future generations. These sustainable development principles are reflected in UK legislation and policies across England, Wales and Scotland.</p>	<p>17, 57, 77, 91, 95, 166, 168, 169, 170, 171, 174,172, 173, 187</p>
<p>The UK government set out its plans for the economy in the policy <i>Achieving strong and sustainable economic growth (2013)</i>. These included investing heavily in infrastructure development and science and technology, encouraging investment and creating a more educated workforce.</p> <p>In Scotland, the 2011 government <i>Economic Strategy</i> reaffirms the commitment to delivering fast sustainable economic growth by focussing on six strategic priorities:</p> <ul style="list-style-type: none"> • supportive business environment; • learning, skills and well-being; • effective government; • transition to a low-carbon economy; • infrastructure, development and place; and • equity. <p>Other relevant policies include the 2005 <i>People and Place – Regeneration Policy Statement</i> and <i>Scottish Planning Policy</i>, which encourages better transport and connectivity, and sustainable social and economic development of communities.</p> <p>In Wales, <i>Economic Renewal: A new direction</i> sets out priorities for delivering the vision of the Welsh economy.</p>	<p>169, 187, 188, 189, 201</p>
<p>Sustainability appraisal and strategic environmental assessment are tools used at the plan-making stage to assess the likely effects of the plan when judged against reasonable alternatives. Environmental Impact Assessment is applied to individual projects which are likely to have significant environmental effects.</p>	<p>58, 59, 61, 180, 181, 182, 183, 184, 185, 186, 202, 204, 206, 210</p>
<p>The Environment Bill 2020 sets out how UK government plans to protect and improve</p>	<p>211</p>

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<p>the natural environment in the UK. It introduces a mandatory requirement for biodiversity net gain in the planning system, to ensure that new developments enhance biodiversity and create new green spaces for local communities to enjoy.</p>	
<h2>2.14 Health</h2>	
<p><i>The 1994 International Atomic Energy Agency (IAEA) Convention on Nuclear Safety</i> aims to legally commit participating states operating land-based nuclear power stations to maintain a high level of safety by setting international benchmarks. The convention is an incentive instrument designed to achieve higher levels of safety. The IAEA Basic Safety Standards set standards for protection of human health from ionising radiation.</p> <p>The <i>UK Strategy for Radioactive Discharges</i> states that there should be progressive reductions in human exposure to ionising radiation resulting from radioactive discharges. There are two groups of people who may be considered to be the most exposed to radiation from artificial sources; those who work with radioactivity (site workers) and members of the public who are likely to receive the highest radiation dose as a result of a given artificial radiation source (known as the representative person, formerly known as the critical group).</p>	<p>13, 18, 21, 145, 147, 68</p>
<p><i>Health 2020</i> is the new European health policy framework. It aims to support action across government and society to “significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health and ensure people-centred health systems that are universal, equitable, sustainable and of high quality”.</p>	<p>60</p>
<p>A number of health and safety objectives for the workplace have been identified in governmental strategies for the UK. These include:</p> <ul style="list-style-type: none"> • identify new approaches to reduce rates of accidents and ill health caused by work; • ensure that the approach to health and safety regulation remains relevant for the changing world of work and address new and emerging work-related health issues; • use the work environment to help people maintain or improve their health; and • ensure those that fail their health and safety duties are held to account. 	<p>178, 205</p>
<p><i>The Health and Social Care Act 2012</i> creates a duty on the Secretary of State, NHS England and Directors of Public Health (DsPH) to secure continuous improvement in the quality of services provided to individuals for or in connection with ‘protection or improvement of public health’. The Act sets out the statutory responsibilities which local authorities have for public health services.</p> <p>From 1st April 2013 local authorities have had a new duty to take such steps as they consider appropriate for improving the health of the people in their areas. The DsPH are responsible for the local authority’s contribution to health protection matters, including the local authority’s roles in planning for, and responding to, incidents that present a threat to the public’s health. These local Health and Wellbeing Strategies</p>	<p>95, 179, 189, 190, 198</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>are outlined in the Local Policy section of this review under the relevant site sections.</p> <p>The National Planning Policy Framework (NPPF) supports the role of planning to create healthy, inclusive communities by supporting local strategies to improve health, social and cultural well-being for all and by working with public health leads and health organisations.</p> <p><i>Healthy Lives, Healthy People: Our Strategy for Public Health in England (2010)</i> sets out the government’s long-term vision for the future of public health in England. It aims to create a “wellness” service (Public Health England) and to strengthen both national and local leadership.</p> <p>In Scotland, there are a number of strategies to address inequalities in health, specifically <i>Equally Well: Report of the Ministerial Task Force on Health Inequalities (2008)</i>, which was reviewed in 2010.</p> <p><i>Our Healthy Future</i> is the strategic framework for Public Health in Wales. It sets the context and direction for action to protect and improve health in Wales by 2020. It is supported by ‘<i>Together for Health</i>’, which outlines the challenges facing the health service and the actions necessary to ensure it is capable of world-class performance.</p>	

3.0 Site-specific local policy and development strategies

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>Site: Berkeley</p> <p>Local/ Unitary Authority: Stroud District Council</p> <p>The <i>Stroud District Local Plan</i> sets out numerous policies to protect the environment, including noise, odour, air, light, and water pollution, as well as increased flood risk and adverse impacts on contaminated land (Policy ES3).</p> <p>The council also has specific policies to ensure that development will not cause unacceptable levels of pollution on water resources, quality and flood risk (Policy ES4); air quality (Policy ES5); biodiversity and geodiversity (Policy ES6); landscape character (Policy ES7); and the historic environment and assets (Policy ES10).</p> <p><i>Stroud District Council Health & Wellbeing Plan 2019 – 2021</i>. The plan sets out the Council’s main actions and focus, which includes improving health, reducing poverty and inequality among the district’s population, and protecting the public and the environment.</p>	<p>216, 217</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>Site: Bradwell</p> <p>Local/ Unitary Authority: Maldon District Council</p> <p>Maldon District Council’s local development plan includes several policies to safeguard the environment. Policy D2 ensures that developments minimise adverse impacts on the environment by protecting the water environment, minimising air, land, water, odour, noise and light pollution, as well as minimising energy demand and greenhouse gas emissions.</p> <p>Additionally, the council requires developers to either include mitigation measures in proposals to preserve and enhance heritage assets or provide a Heritage Statement (Policy D3). The council encourages developers to improve the existing ecological conditions, deliver net biodiversity gain, and requires mitigation against any adverse impacts on the natural environment (Policy N2).</p> <p>Maldon District Council also has policies regarding socio-economics and human health. The council has a policy to encourage employment generating development and investment in the District (Policy E1). Additionally, the council requires any detrimental impacts and potential risks to human health from a development to be either avoided, alleviated or mitigated (Policy D2).</p> <p>Bradwell was identified by the UK government as potentially suitable for the deployment of a new nuclear power station before the end of 2025.</p>	<p>218</p>
<p>Site: Chapelcross</p> <p>Local/ Unitary Authority: Dumfries and Galloway Council</p> <p><i>The Dumfries and Galloway Council Local Development Plan 2</i> has an overarching policy that environmental impacts from developments, including noise and vibration, odour and fumes, loss of daylight / sunlight, emissions and light pollution, should be assessed and mitigated appropriately. Additionally, developments should protect or enhance the historic environment, landscape, biodiversity and geodiversity, and water environment (Policy OP1).</p> <p>The Council’s specific policies to protect habitats, landscape, species, the natural environment and cultural heritage include:</p> <ul style="list-style-type: none"> • Policy NE1: National Scenic Areas; • Policy NE2: Regional Scenic Areas; • Policy NE3: Areas of Wild Land; • Policy NE4: Sites of International Importance for Biodiversity; • Policy NE5: Species of International Importance; • Policy NE6: Sites of National Importance for Biodiversity and Geodiversity; and • Policy HE3: Archaeology. <p>Protection of the water environment from pollution, flood risk management and</p>	<p>219, 220</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>drainage are underpinned by the following policies:</p> <ul style="list-style-type: none"> • Policy NE11: Supporting the Water Environment; • Policy NE12: Protection of Water Margins; • Policy IN7: Flooding and Development; • Policy IN8: Surface Water Drainage and Sustainable Drainage Systems (SuDS); and • Policy IN9: Waste Water Drainage. <p>A key element of the plan’s vision is sustainable economic growth. Policy OP1 encourages and supports the development of the local economy through sustainable economic growth. The Council has housing targets based on the Housing Need and Demand Assessment (HNDA).</p> <p>The Building Healthy Communities in Dumfries and Galloway Strategy (2008 – 2013) sets out the strategy for improving health and wellbeing, as well as enabling individuals to manage stress and influence their social environment in the area.</p>	
<p>Site: Dounreay</p> <p>Local/ Unitary Authority: The Highland Council</p> <p>The <i>Caithness and Sutherland Local Development Plan</i> sets out the main issues in Caithness and Sutherland and the approaches for tackling them. The Highland Council’s approach to resolving environmental issues is to appreciate, protect and enhance the natural, built and cultural heritage in Caithness and Sutherland. This includes protecting all natural environments from nationally and internationally recognised sites, species and habitats to locally valued sites and landscapes.</p> <p>The Council aims to strengthen and support communities, which includes providing access to employment and training.</p> <p>The Council has proposed specific economic and settlement areas for accommodating and managing future growth. The six economic development areas in Caithness and Sutherland are Dounreay, Gills Harbour Forss Business and Energy Park, Janetstown Industrial Estate, Georgemas Junction, and Seater Waste Management Facility. <i>Highlands and Islands Enterprise 2019-2022 Strategy</i> sets out aims for the region, including an increase in working age population and employment opportunities, and making sustainable use of the region’s natural assets.</p>	221, 222
<p>Site: Dungeness A</p> <p>Local/ Unitary Authority: Folkestone & Hythe District Council</p> <p><i>Folkestone & Hythe District Council are in the process of reviewing and updating their Core Strategy, which includes their Places and Policies Local Plan.</i> The core strategy states that development should contribute to sustainable water resource management that maintains or improves the quality and quantity of surface and groundwater bodies, as well as the quality of the coastal environment (Policy CSD5). The council ensures that developments avoid net biodiversity loss, as well as protect</p>	223, 224

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>and enhance the natural environment (for example of sites of international nature conservation importance, nationally designated sites, and Areas of Natural Beauty (Policy CSD4).</p> <p>The <i>Joint Health and Wellbeing Strategy</i> outlines Kent County Council’s strategy to improve health outcomes, deliver better coordinated quality care, and improve the public’s experience of integrated health and social care services.</p>	
<p>Site: Harwell</p> <p>Local/ Unitary Authority: Vale of White Horse Council</p> <p>The <i>Vale of White Horse Local Plan 2031 Part 1</i> contains policies designed to ensure that a balance is met between addressing local housing needs, supporting economic growth and protecting the Vale’s high quality natural and built environment, and the quality of life in existing settlements. The Council encourages developers to make provision for the effective use of natural resources where applicable and requires that contaminated land should be remediated before reuse where necessary, (Core Policy 43). The key features that contribute to the nature and quality of the Vale of White Horse District’s landscape will be protected from harmful development and where possible enhanced. (Core Policy 44). Opportunities for biodiversity gain, including the connection of sites, large-scale habitat restoration, enhancement and habitat re-creation will be actively sought. A net loss of biodiversity will be avoided (Core Policy 46).</p> <p>The council supports economic and employment growth through the <i>Local Plan 20231: Part 1 Strategic Sites and Policies</i>, including in the Science Vale UK (SVUK) area. The Council has a Spatial Strategy which makes provision for growth of around 15,850 new jobs in the SVUK area and 20,560 new homes during the plan period (2011 to 2031), almost 75% of which is allocated to areas around the SVUK area.</p>	225, 226
<p>Site: Hinkley Point A</p> <p>Local/ Unitary Authority: West Somerset Council</p> <p><i>The West Somerset Local Plan to 2032</i> contains policies to ensure that proposals mitigate against flood risk and avoid any increase in risk (Policy CC2). Proposals that negatively impact on the existing water table and water resources must incorporate suitable protection and mitigation measures into the design (Policy CC6). The council aims to safeguard the built and archaeological environment (Policy NH1), as well as minimise adverse impacts on the landscape (Policy NH5). Proposals should also protect and enhance biodiversity (Policy NH6). Impacts on air quality, noise pollution, and human health are required to be minimised and mitigated (Policy NH9).</p> <p>The council encourages all types of employment-generating developments in the area (Policy EC1). Additionally, proposals which will provide training and educational opportunities will be supported by the Council (Policy EC7).</p>	227, 228

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>Proposals in close proximity to land that is known or likely to be contaminated must include mitigation measures to prevent adverse impacts on public health (Policy NH9).</p> <p>Hinkley Point was proposed as a potential site for a new nuclear station in the National Policy Statement for Nuclear Power Generation (now Hinkley Point 'C'). The council has a policy to mitigate any adverse cultural, economic, environmental and social impacts of proposed developments at Hinkley Point (Policy EN1).</p>	
<p>Site: Hunterston A</p> <p>Local/ Unitary Authority: North Ayrshire Council</p> <p>North Ayrshire Council have numerous policies in their Local Development Plan to protect and enhance the natural environment, including Special Landscape Areas (Policy 15) as well as international, national, and local designated areas (Policy 16), during and post-development. The council also have a policy to protect both the environmental and recreational value of coastal zones (Policy ENV 8), policies to protect cultural heritage, including archaeological sites (Policy 13), cultural conservation areas (Policy 9), and historic landscapes (Policy 11).</p> <p>Additionally, the council has a policy to ensure proposals do not increase flood risk and that developers manage changes in the water environment and drainage to an acceptable level (Policy 23).</p> <p>North Ayrshire Council's overarching policy for employment includes a target to create 13,000 new jobs in North Ayrshire by 2020). The council has several policies on employment growth and development, as well as specific areas designated as employment land. Development for radioactive waste storage will be restricted to materials accumulated through Hunterston A and Hunterston B Stations only.</p>	229
<p>Sites: Low Level Waste Repository and Sellafield</p> <p>Local/ Unitary Authority: Copeland Borough Council</p> <p><i>Copeland Local Plan 2013-2028</i> has a suite of policies relating to nuclear planning (policy ER1) and development (policies DM1, DM5). The council will support new nuclear, construction of a GDF (if there is community support), opportunities for decommissioning knowledge and skills development and new reprocessing facilities within the Sellafield site (subject to safety case).</p> <p>The Council will not permit developments that would increase flood risk, (Policies ENV1 and DM24). The council seek to protect and enhance biodiversity and habitats (Policy ENV3) and protect and enhance landscapes (Policy ENV5). Mitigation measures are required for air noise and light pollution (Policy ST1). Conservation of the built environment is protected through policies on cultural conservation areas (Policies ENV4 and DM27), designated or potential local archaeological and historical sites of importance (Policy DM27). Investigation and remediation works will be</p>	230, 231

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>required for developments proposed on land known to be contaminated (Policy ST1).</p> <p>Moorside has been identified by the UK government as potentially suitable for the deployment of a new nuclear power station by 2025.</p> <p>Four key themes have been identified by the Cumbria Health and Wellbeing Board: protecting the health of the population as a whole, providing high quality, integrated, person-centred care; tackling wider determinants of health and wellbeing; improving health and wellbeing throughout the life course. The <i>Cumbria Joint Health and Well-being Strategy 2019-2029</i> sets out priorities for each of these key themes.</p>	
<p>Site: Springfields</p> <p>Local/ Unitary Authority: Fylde Council, Lancashire County Council</p> <p>The Fylde <i>Local Plan to 2032</i> contains a number of policies related to environmental effects of development. Specific policies are in place to ensure that developments consider and are appropriate to landscape (ENV1), biodiversity (ENV2) green spaces (ENV3-4), heritage assets (ENV5), and flood alleviation and water efficiency (Policy CL1).</p> <p>Policy HW1 Health and Wellbeing aims to integrate public health principles and reduce health inequalities.</p> <p>The Fylde <i>Local Plan to 2032</i> contains policies relating to the maintenance of existing employment land use for sites (Policy EC2), and developer contributions to mitigate the effects of development on the community (Policy INF2).</p> <p>The <i>Lancashire Climate Change Strategy</i> sets out the vision for mitigating and adapting to climate change across the county.</p> <p><i>Lancashire County Council off-site emergency plan</i> is designed to protect the public and environment from any radiation emergency which may have off-site consequences. This is a requirement under the radiation (emergency preparedness and public information) regulations (REPPiR) 2001.</p>	232, 233, 234
<p>Site: Capenhurst</p> <p>Local/ Unitary Authority: Cheshire West and Cheshire</p> <p>The <i>Cheshire West and Chester Local Plan</i> contains policies relating to open space and green infrastructure (SOC6 and ENV3), flood risk and water management (ENV1), landscape (ENV2), biodiversity and geodiversity (ENV4), and the historic environment (ENV5). It also sets out policies for the encouragement of business growth and investment in the borough (ECON1). Through the health and well-being policy of the Local Plan (SOC5), development that gives rise to significant adverse impacts on health and quality of life e (e.g. soil, noise, water, air or light pollution, and land instability, etc.) including residential amenity, will not be supported.</p>	235, 236, 237

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p><i>The Health and Well-being Strategy 2015-2020</i> sets out the strategic framework for improving health and reducing inequalities across the borough.</p> <p><i>West Cheshire Sustainable Community Strategy</i> is a partnership plan which sets out a vision for the borough which includes healthier lifestyles, addressing disadvantage and deprivation and encouraging a thriving economy supported by skills.</p>	
<p>Site: Wylfa</p> <p>Local/ Unitary Authority: Isle of Anglesey Council</p> <p>The <i>Anglesey and Gwynedd Joint Local Development Plan 2011 - 2026</i> contains policies related to developmental effects on the environment, namely to conserve and enhance the natural environment (PS 19), protect and enhance biodiversity (AMG 5), protect and enhance cultural and heritage assets (PCYFF 3 and 4, PS 20) and related to alleviating and adapting to the effects of climate change (PS 6). There is also a policy on nuclear related development at Wylfa (PS 9 - 12) including integrating the new build into the decommissioning of the existing nuclear site.</p> <p>Developments will not be permitted if they would have unacceptable adverse impact on health of local residences due to increased activity, disturbance, vibration, noise, dust, fumes, litter, drainage, light pollution, or other forms of pollution or nuisance (Policy PCYFF 2).</p> <p>The Joint Local Development Plan contains policies relating to infrastructure and developer contributions (PS52), and focussed on providing opportunities for a flourishing economy (PS 13).</p> <p>The <i>Gwynedd & Anglesey Well-being Plan</i> has been developed by the Gwynedd and Anglesey Public Services Board identifies priority areas to improve well-being in the area, including: protecting the natural environment; health and care; affordable housing; poverty and education.</p>	238, 239
<p>Site: Winfrith</p> <p>Local/ Unitary Authority: Purbeck District Council</p> <p>The Purbeck Local Plan is currently under review, and the proposed updated plan is <i>Purbeck Local Plan 2018 – 2034</i>. It sets out a number of policies related to environmental impacts from development, including; respect the landscape character (Policies E1 and E7); protect, manage and enhance biodiversity (Policy BIO); flood risk (Policy E4); groundwater protection (Policy E5); and conserve the integrity of landscape and heritage assets (Policy E2). With regards to socio-economic impacts, the plan promotes employment through safeguarding employment land (Policy EE1).</p> <p>The <i>Dorset Joint Health and Well-being Strategy (2016-2019)</i> aims to improve the health and well-being of people in Dorset and reduce inequalities in health.</p> <p>Through the <i>Purbeck District Council Economic Development Strategy (2013-2027)</i></p>	240, 241, 242

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p><i>the Local Authority</i> aims to improve the local economy and infrastructure through attracting resources and investment to the area.</p>	
<p>Site: Trawsfynydd</p> <p>Local/ Unitary Authority: Gwynedd Council / Snowdonia National Park Authority</p> <p>The <i>Anglesey and Gwynedd Joint Local Development Plan 2011 - 2026</i> contains policies related to developmental effects on the environment, namely to conserve and enhance the natural environment (PS 19), protect and enhance biodiversity (AMG 5), protect and enhance cultural and heritage assets (PCYFF 3 and 4, PS 20) and related to alleviating and adapting to the effects of climate change (PS 6). There is also a policy on nuclear related development at Wylfa (PS 9 - 12) including integrating the new build into the decommissioning of the existing nuclear site.</p> <p>Developments will not be permitted if they would have unacceptable adverse impact on health of local residences due to increased activity, disturbance, vibration, noise, dust, fumes, litter, drainage, light pollution, or other forms of pollution or nuisance (Policy PCYFF 2).</p> <p>The Joint Local Development Plan contains policies relating to infrastructure and developer contributions (PS52), and focussed on providing opportunities for a flourishing economy (PS 13).</p> <p>The <i>Gwynedd & Anglesey Well-being Plan</i> has been developed by the Gwynedd and Anglesey Public Services Board identifies priority areas to improve well-being in the area, including: protecting the natural environment; health and care; affordable housing; poverty and education. The <i>Eryri Local Development Plan 2016-2031</i> sets out the planning framework for the Snowdonia National Park. Policies cover (among others) the natural environment (D), climate change (D_D), the historic environment (F_F) and sustainable rural economy (H).</p> <p>The <i>Snowdonia Local Biodiversity Action Plan</i> includes action plans for species and habitats of local importance to contribute to the delivery of national targets.</p>	<p>238, 239, 243</p>
<p>Site: Sizewell</p> <p>Local/ Unitary Authority: East Suffolk District Council</p> <p>Within the <i>Suffolk Coastal Local Plan – Final Draft Plan</i> submitted in 2019, there are a number of policies which aim to restrict the environmental impacts of development. These include: protecting and enhancing biodiversity and geodiversity (SCLP10.1); constructing developments in a sustainable manner (SCLP9.2), including sustainable drainage systems (SCLP9.6); ensuring water management infrastructure can be in place (SCLP9.7); minimising all forms of pollution and contamination to protect the environmental quality (SCLP10.3); and residential amenity (SCLP11.2). There are also areas to be protected from development (SCLP11.9).</p> <p>The <i>Joint Health and Wellbeing Strategy for Suffolk (2013)</i> sets out the priorities for</p>	<p>246, 247</p>

Legislation / Policy / Plan / Strategy	Document reference (click to follow link or see Chapter 4)
<p>Suffolk, including improving health and narrowing health inequalities between affluent and poorer areas.</p> <p>The National Policy Position Statement for Nuclear Generation identifies Sizewell as potentially suitable for the deployment of a new nuclear power station before the end of 2025.</p>	
<p>Site: Oldbury</p> <p>Local/ Unitary Authority: South Gloucestershire Council</p> <p>The <i>South Gloucestershire Local Plan: Core Strategy</i> sets out a number of policies relating the environment including: green infrastructure (CS2), the natural and historic environment (CS9) and minerals (CS10). Policy CS6 states that the Council will work with developers to improve sustainability and mitigate impacts to communities. The plan also has a policy for nuclear related developments (CS37) including minimising impact on the landscape.</p> <p>The <i>South Gloucestershire Biodiversity Action Plan</i> aims to contribute towards safeguarding and benefitting the 20 habitats and over 150 species identified as being of principal importance in the Natural Environment and Rural Communities Act 2006 Section 41.</p> <p>The <i>South Gloucestershire Sustainable Community Strategy</i> was written by private, public, voluntary and community groups to identify and tackle local issues relating to the environment, the economy and health. Priorities include:</p> <ul style="list-style-type: none"> • conserving and enhancing the natural and built environment; • creating a balanced economy, a well-trained workforce and sustainable jobs for all; • supporting communities and improving access to services; and • promoting personal well-being and reducing inequalities. <p>The Local Authority sets out its priorities for health in the <i>South Gloucestershire Joint Health and Wellbeing Strategy</i>. These include improving the wellbeing and aspirations of young people, promoting and enabling positive mental health, promoting and enabling healthy lifestyles and utilising the built and natural environment for these priorities.</p>	<p>248, 249, 250, 251</p>

4.0 Reference list of legislation, plans, policies and strategies

4.1 International level

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225. Vale of Horse District Council (2011) Assessment of Saved Local Plan policies for consistency with the National Planning Policy Framework
226. Vale of Horse District Council (2016) Local Plan 2031: Part 1 Strategic Sites and Policies
227. West Somerset Council (2016) The West Somerset Local Plan to 2032
228. Somerset County Council (2013) Health and Wellbeing Strategy for Somerset 2013 – 2018
229. North Ayrshire (2019) North Ayrshire Council Local Development Plan 2
230. Copeland Borough Council (2013) Copeland Local Plan 2013-2028: Core Strategy and Development Management Policies DPD
231. Cumbria County Council (2019) Cumbria Joint Health and Wellbeing Strategy 2019-2029
232. Fylde Council (2018) Fylde Local Plan to 2032

233. Lancashire County Council off-site Emergency Plan [Not in the public domain due to security protocols]
234. Lancashire County Council (2009) Lancashire Climate Change Strategy 2009-2020
235. Cheshire West and Chester Council (2015) Cheshire West and Chester Council Local Plan: Part One Strategic Policies
236. Cheshire West and Chester Council (2013) Draft Health and Well-being Strategy
237. West Cheshire Together (2010) Sustainable Community Strategy 2010-2026
238. Isle of Anglesey County Council and Gwynedd Council (2017) Anglesey and Gwynedd Joint Local Development Plan 2011-2026
239. Public Services Board (2018) Gwynedd & Anglesey Well-being Plan
240. Purbeck District Council (2019) Purbeck Local Plan (2018 – 2034)
241. Dorset Health and Well-being Board (2016) Dorset Joint Health and Wellbeing Strategy (2016-2019)
242. Purbeck District Council (2013) Purbeck District Council Economic Development Strategy
243. Snowdonia National Park Authority (2019) Eryri Local Development Plan 2016-2031
244. Snowdonia National Park Authority (1997) Snowdonia Local Biodiversity Action Plan
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246. East Suffolk District Council (2019) Suffolk Coastal Local Plan – Final Draft Plan
247. Suffolk Health and Well-being Board (2013) Joint Health and Wellbeing Strategy for Suffolk
248. South Gloucestershire Council (2013) South Gloucestershire Local Plan: Core Strategy
249. South Gloucestershire Council (2016) South Gloucestershire Biodiversity Action Plan 2016-2026
250. South Gloucestershire Partnership (2016) South Gloucestershire's Sustainable Community Strategy 2016
251. South Gloucestershire Health and Wellbeing Board (2017) South Gloucestershire Joint Health and Wellbeing Strategy 2017-2021