# The NDA group
# **Draft Strategy**

## Integrated Impact Assessment Report
## Volume 1: Main Report
## July 2025

# Summary

TÜV SÜD Nuclear Technologies (TÜV SÜD) has been commissioned by the Nuclear Decommissioning Authority (NDA) to support the review and update the Integrated Impact Assessment (IIA) which accompanies NDA's Strategy (2026) [76]. The assessment forms part of the NDA's requirement, under the Energy Act 2004 [1], to publish a Strategy that sets out the strategic direction for activities across its estate. The NDA is undertaking its fifth five-year review of the Strategy.

This report sets out the scope of the IIA for the NDA Strategy (2026) [76] as required by the EU's Strategic Environmental Assessment (SEA) Directive and transposing UK SEA Regulations. This IIA comprises an SEA, Health Impact Assessment (HIA) and Socio-Economic Impact Assessment (SeIA).

Significant changes have been made to the NDA group since the previous Strategy (2021) [2] and associated IIA were produced, moving to the One NDA group model. The NDA group now comprises the NDA, Sellafield, Nuclear Restoration Services (NRS), NRS Magnox, NRS Dounreay, Nuclear Waste Services (NWS) and Nuclear Transport Solutions (NTS).

TÜV SÜD have reviewed and updated the IIA for NDA Strategy (2021) [2] to align with Strategy 5 (2026) [76] and the latest NDA Business Plan (2024-2027). Baseline data and the legislative context review have been updated (Volume 3 of the IIA) and credible options have been revised and reassessed in line with updates to the NDA Strategy in Volumes 1 and 2. The four Strategic Themes have remained the same:

- Site Decommissioning and Remediation
- Spent Fuel
- Nuclear Materials
- Integrated Waste Management

However, the Critical Enabler of Transport has also been included in the assessment.

There have been legislative and policy updates that have directed the Strategy 5 (2026) [76] update, for example the 'UK policy framework for radioactive substances and nuclear decommissioning' published in 2024. Baseline information and conditions have also been updated and reconsidered as part of the assessment.

The methodology of the IIA has not changed from the 2021 iteration. The topics for the environmental, health and socio-economic assessments have been refined. Sustainability is now regarded as an overarching subject/principle and is hardwired into the assessment rather assessed as a singular topic.

For the purposes of the assessment, the potential significant impacts of the NDA Strategy (2026) [76] are split into generic activities involved in implementing the preferred

strategic options. These are Land – either an increase or decrease in land utilised by NDA for mission progress; Construction; Operation and maintenance; and Transport – either an increase or decrease in transport of NDA assets or liabilities.

The assessment concluded that the most significant impacts were in relation to the increase in land utilised by NDA for mission progress and for the construction, operation and maintenance of new facilities. These generic activities will be required for development and construction of new assets for Safe Stewardship (Site Decommissioning and Remediation); all options for the consolidation and interim storage of spent fuels (Spent Fuels); new facilities for plutonium and uranium storage (Nuclear Materials); and additional facilities for the treatment, packaging and storage of waste (Integrated Waste Management).

A change in transport requirements associated with the location and number of new facilities, described above, could offset some of the significant impacts because of reduced construction, operation and maintenance activities.

An assessment of the cumulative effects of strategic themes concluded that the two strategic themes with the highest probability for cumulative effects are Site Decommissioning and Remediation and Integrated Waste Management, and that Spent Fuels and Nuclear Materials themes may also interact at certain sites. The timing of implementation of the DNO's Nuclear Liabilities, the New Nuclear Programme and advanced nuclear technologies relative to implementation of the NDA Strategy is uncertain, consequently making it difficult to accurately predict potential cumulative effects.

A new framework of monitoring for Strategy 5 (2026) [76] has been proposed, recognising that the NDA and Government bodies collate relevant information. These include the NDA's Mission Reporting and Sustainability Review, and relevant environment agencies data regarding water resources and pollution releases.

# Glossary

| | |
|---|---|
| AGR | Advanced Gas-Cooled Reactor |
| ALARA | As low as reasonably achievable |
| ALARP | As low as reasonably practicable |
| BAT | Best Available Technique |
| BPM | Best Practicable Means |
| C&M | Care and Maintenance |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| DESNZ | Department for Energy Security & Net Zero |
| DNO | Defence Nuclear Organisation |
| EA | Environment Agency |
| EDF | EDF Energy |
| EIA | Environmental Impact Assessment |
| EU | European Union |
| GDF | Geological Disposal Facility |
| GVA | Gross Value Added |
| ha | Hectare |
| HAW | Higher Activity Waste |
| HEU | Highly Enriched Uranium |
| Hex | Uranium Hexafluoride |
| HIA | Health Impact Assessment |
| IAEA | International Atomic Energy Agency |
| IIA | Integrated Impact Assessment |
| ILW | Intermediate Level Waste |
| LEU | Low Enriched Uranium |
| LLW | Low Level Waste |
| LLWR | Low Level Waste Repository Ltd |
| MDU | Magnox Depleted Uranium |
| MOD | Ministry of Defence |
| MOP | Magnox Operating Programme |
| NDA | Nuclear Decommissioning Authority |
| $NO_x$ | Oxides of nitrogen |
| NSD | Near Surface Disposal |
| NTS | Nuclear Transport Solutions |
| NWS | Nuclear Waste Services |
| ONR | Office for Nuclear Regulation |
| PFFF | Plutonium Fuel Fabrication Facility |
| POCO | Post Operational Clean Out |
| PM | Particulate Matter |
| RIFE | Radioactivity in Food and the Environment |
| SDG | Sustainable Development Goal |
| SDR | Site Decommissioning and Remediation |
| SEA | Strategic Environmental Assessment |
| SeIA | Socio-Economic Impact Assessment |

| | |
|---|---|
| SEPA | Scottish Environment Protection Agency |
| SLC | Site Licence Company |
| SMR | Small Modular Reactor |
| $SO_2$ | Sulphur dioxide |
| TMF | Tails Management Facility |
| TPU | THORP-Product Uranium |
| $UF_6$ | Uranium Hexafluoride |
| UK | United Kingdom |

# Contents

# 1. Introduction

Under the Energy Act 2004 [1], the Nuclear Decommissioning Authority (NDA) is required to publish a Strategy setting out its strategic direction for activities across its estate. This Strategy is subject to periodic review, formal public consultation and approval by government ministers. The first Strategy was published in 2006 with updates published in 2011, 2016 and 2021. This Integrated Impact Assessment (IIA) accompanies the NDA Strategy (2026) document [76], and provides an overview of its potential environmental, socio-economic and health effects.

The NDA develops nuclear decommissioning plans and implements them through an estate-wide Strategy. This Strategy sets the pace and priority of decommissioning activities across the estate, and ensures the safe management of spent fuels, nuclear materials and radioactive wastes. The Strategy is based on a process of identifying and selecting preferred strategies which balance safety, cost and security with achieving benefits for the environment and society.

The Strategy reviews the NDA's strategic position, establishing and maintaining its strategic direction on activities across the sites which comprise its estate. The strategies that have been selected are carried out and implemented by Site Licence Companies (SLCs), which manage the sites on the NDA's behalf and under its strategic guidance.

The NDA is required to ensure that the development of its Strategy is in accordance with the requirements of the European Union's (EU) Strategic Environmental Assessment (SEA) Directive [3] and transposing United Kingdom (UK) SEA Regulations [4]. As part of the process of updating the IIA, the NDA are required to review the environmental baseline information and legislative/policy context required by the SEA Directive, and the transposing UK Regulations.

A Health Impact Assessment and Socio-economic Impact Assessment have been included and reporting on as part of the IIA, to complement to the Environmental Assessment that fulfils the requirements of the SEA Regulations.

This report details the findings of the IIA of the NDA Strategy 5 (2026) [76] to be used in statutory consultation alongside the Strategy document. The report will also serve as a guide for future assessment work undertaken by the NDA, SLCs and other relevant parties. The assessment methodology will inform future selection of preferred options.

To achieve these objectives, the assessment methodology is aimed to be repeatable and easily auditable. The methodology is also intended to be adaptable to meet future IIA guidance and requirements.

The findings of the IIA provide an indicative overview of environmental, socio-economic and health effects of the Strategy. This will help to define the overall context for future decisions, which will also be based on site-specific factors and other important aspects such as cost, affordability and feasibility.

Site-based factors, future government policy and international agreements may influence which options are ultimately implemented. Where possible, these factors have been taken into account, recognising that such factors will be considered in the course of future assessment work.

## 1.1 Objectives of the IIA

In order to guide the approach taken for conducting the IIA, two key objectives have been identified:

- To robustly and transparently assess the potential environmental, health and socio-economic effects of strategic options set out in the Strategy; and
- Where appropriate, inform development of strategy and provide a suitable methodology for future assessment work.

## 1.2 NDA group

Significant changes have been made to the NDA Group since the last Strategy (2021) [2] and associated IIA, moving to the OneNDA Group model.

In mid-2020, the NDA adopted Dounreay Site Restoration Ltd (DSRL) and LLW Repository Ltd (LLWR) within its group structure. In early 2022 the NDA announced the formation of Nuclear Waste Services (NWS), integrating LLWR, Radioactive Waste Management (RWM), and the NDA group's Integrated Waste Management Programme (IWMP). Then, in October 2023, Magnox Ltd rebranded to become Nuclear Restoration Services, also incorporating Dounreay as a separate division.

Following these changes, the NDA Group is now made up of the following:

- NDA
- Sellafield
- Nuclear Restoration Services (NRS)
  - NRS Dounreay
  - NRS Magnox
- Nuclear Waste Services (NWS)
- Nuclear Transport Solutions (NTS)

In addition, the NDA was previously sponsored by the UK government Department for Business, Energy and Industrial Strategy (BEIS). In 2023, this department was split, and NDA are now sponsored by the Department for Energy Security and Net Zero (DESNZ).

## 1.3 NDA Estate

The NDA is a non-departmental public body established under the Energy Act 2004 [1]. The NDA mission is to deliver safe, sustainable and publicly acceptable solutions to the challenge of nuclear clean-up and waste management.

The NDA estate includes reactors, chemical plants, research and development facilities, fuel fabrication and reprocessing facilities, waste treatment facilities and waste stores. Some plants date from the 1940s and 1950s, including a number of the Legacy Ponds and Silos at Sellafield. These facilities are ageing and contain significant quantities of spent fuels, presenting some of the highest risk and one of the NDA's greatest decommissioning challenges.

Some facilities across the estate continue to form an essential part of the nation's nuclear infrastructure, which means they must continue to be operated safely and effectively until they have fulfilled their purpose.

The NDA has responsibility to oversee the clean-up and decommissioning of 17 of the UK's civil public sector nuclear sites, shown in Figure 1. These range from Sellafield, a complex operational site, to previously operational nuclear power stations and nuclear research facilities.


Figure 1 Locations of NDA sites in the UK

Radioactive waste is material that has no further use and is above a certain (very low) level of radioactivity. Over the years the UK has accumulated a substantial legacy of radioactive waste from various civil nuclear and defence programmes. Waste also arises in non-nuclear industries, for example where radioactive materials are used for medical and industrial purposes.

## 1.4 Geographic and temporal scope of the IIA

### 1.4.1 Geographic Scope

The geographic scope of the 2026 IIA is consistent with previous editions. The assessment covers the UK, as the 17 sites which comprise the NDA estate are spread across England, Scotland and Wales. There are no NDA sites located in Northern Ireland. As this assessment is undertaken at a strategic level, Northern Ireland is not considered to be within the Zone of Influence (ZOI) at the time of this report. Therefore, baseline information has not been collated for Northern Ireland and impacts on Northern Ireland have not been considered. Impacts on Northern Ireland may be assessed at a site-specific level, for example through the undertaking of an Environmental Impact Assessment (EIA).

As well as the 17 sites, non-nuclear liabilities are included, for example the Advanced Gas-Cooled Reactor (AGR) at Hunterston B, as well as other sites that may be transferred during the timescale (temporal scope) covered by Strategy 5.

Where the policy of the UK government or the Scottish or Welsh devolved administrations may influence the geographic scope of a particular option, the assessment follows the Strategy in adhering to government policy. For example, the management of Higher Activity Waste (HAW) using international facilities is not assessed.

### 1.4.2 Temporal Scope

The temporal scope of the assessment reflects the period of time for which the Strategy applies. The 2026 IIA assumes that the NDA Strategy will be in operation until the final site in the NDA estate achieves its stated End State, the current target of which is 2135. However, it is also assumed that the Strategy will be reviewed and updated on a 5-year cycle within this period.

Potential intergenerational impacts of the Strategy were considered in the previous IIA and will continue to be considered. The risk of, or opportunity for, significant effects were categorised into those which are expected to occur or be experienced in the short-term (within 10 years of an option being implemented), medium-term (10-25 years) and those which may occur, be experienced or extend into the long-term (25 years and beyond). These categories remain appropriate.

Decommissioning timescales have changed compared to those quoted in the previous IIA [5]. These have been discussed in Volume 3 of this IIA.

## 1.5 IIA report structure

The IIA report is split into three volumes:

- Volume 1: consists of an introduction, a summary of the NDA Strategy (2026) and associated credible options, a summary of baseline conditions, the approach to assessment and methodology, a summary of the results of the assessment, the measures identified to mitigate possible risks and enhance possible opportunities, and conclusions.
- Volume 2: provides the results of the assessment of the credible options.
- Volume 3: consists of baseline conditions and a review of policy and legislation.

# 2. NDA Strategy

The NDA Strategy (2026) [76] identifies and selects a path which balances safety, cost and security with achieving benefits for the environment and society. There are four driving strategic themes under which the NDA's core activities are grouped, these are Site Decommissioning and Remediation, Spent Fuels, Nuclear Materials and Integrated Waste Management. Within each theme activities are broken down into topic strategies, such as consolidation, interim storage and disposition within Spent Fuels.

The four driving themes are supported by Critical Enablers. The Critical Enablers cover other aspects of the NDA's activities, such as transport, environment, people and health, safety and wellbeing which support the delivery of the NDA mission.

## 2.1 Site Decommissioning and Remediation

The NDA recognises site decommissioning and remediation (SDR) as its primary focus, and all other strategic themes support or enable its delivery. SDR relies on having effective solutions for managing spent fuels, nuclear materials and waste, as well as suitable land and infrastructure such as security, office accommodation and logistics arrangements.

### 2.1.1 Safe Stewardship

The NDA's strategy acknowledges that it cannot deliver decommissioning and remediation without first having in place the appropriate infrastructure and arrangements for the management of the NDA estate. The NDA owns the majority of land and assets at the sites, whilst Operating Companies use them to deliver the mission. The NDA, as the liability owner, is responsible for ensuring the through-life stewardship and safe management of those liabilities. This includes not only ensuring the proper management of the assets themselves but also compliance with relevant statutory and other legal obligations, for example, to ensure that sites are safe and secure.

The following have been outlined as credible options for Safe Stewardship:

#### *2.1.1.1 Utilise existing assets to manage and maintain the estate*

Utilising existing assets to manage and maintain the estate may only be suitable in certain situations. Where considered appropriate, existing assets would be used to manage risk, with controls in place to ensure the risks do not increase.

#### *2.1.1.2 Develop/construct new assets to manage and maintain the estate.*

Developing and constructing new assets to manage and maintain aspects of the estate may be appropriate where it is not possible to utilise existing assets. In such instances new assets would be constructed at existing NDA sites.

### 2.1.2 Decommissioning

Decommissioning is defined in government policy [6] as those actions that would result in the release of a facility from regulatory control. In practice these actions include decontamination, dismantling, demolition and remediation., In addition, all or part of a facility might be reused rather than demolished. Remediation relates to managing land, including contamination, in such ways that it is safe and suitable for reuse.

The NDA's preferred strategy is for decommissioning to be undertaken as soon as possible. However, the updated Strategy (2026) [76] recognises that there are clear benefits to slowing or deferring decommissioning, for example to allow for radioactive decay, to adopt a 'lead and learn' approach, or to realise an opportunity for reusing a facility. The preferred strategy for a site will be case-specific and will consider the benefits and disbenefits of credible options in line with the UK policy framework for managing radioactive substances and nuclear decommissioning strategies [6] and the NDA Value Framework [7].

The following have been outlined as credible options for decommissioning of NDA sites:

#### *2.1.2.1 Immediate dismantling – either accelerated, parallel or sequential*

Dismantling includes both the dismantling (removal of building contents) and demolition phases to achieve an interim or end state. Immediate dismantling is where there is no significant delay between cessation of operations and the completion of the transition phase, including post operational clean out (POCO) and commencement of decommissioning to chosen end state [8]. When implementing immediate dismantling, buildings would be dismantled, decontaminated and in some cases demolished, with the majority of activity occurring over the short-term.

#### *2.1.2.2 Deferred dismantling – Minimal interventions during Care and Maintenance (C&M)*

Deferral for a short, medium or long C&M period with minimal interventions involves preparing the site or facility for deferral such that minimal maintenance or other activities are required during the deferral period. This approach requires significantly more effort during the preparatory phase than where planned interventions are implemented [8]. For NDA the preferred strategy is for the dismantling phase of decommissioning to be undertaken as soon as possible after cessation of operations as this generally represents the cheapest option in real terms, particularly when decommissioning has been considered at the design stage. However, UK policy and international practice also recognises that the deferral of decommissioning can be an appropriate choice.

#### *2.1.2.3 Deferred dismantling – Planned interventions during C&M*

This option is defined as deferral for a short, medium or long C&M period with planned interventions. This assumes a significant maintenance programme of work being required during the deferral period itself offset by much less work being required during the preparatory phase [8]. A short or medium period of deferral with planned interventions could be equated to a continuous decommissioning strategy at a much-reduced pace.

With the implementation of deferred dismantling with planned interventions, there may be periods of care and maintenance with no active dismantling. During such periods, programmes are implemented to ensure that the required level of safety and asset management is maintained. Dismantling would still be completed, but activity may peak during the short and long-term. Deferred dismantling may apply only to particular buildings or structures in a facility or at a site, whilst everything else around it is cleared without interruption.

#### *2.1.2.4 Combined strategy including interim state(s)*

Any preferred strategy for a site will be case-specific and will consider the advantages and disadvantages of credible options in line with the code of practice for the selection of decommissioning strategies [8] and the NDA Value Framework [7]. It may be that some sites require a combination of strategies, starting with a pause at an interim state to consider and review performance, with a judgement made at that time to either change the timing of dismantling or to accelerate or slow down the rate of progress. An example would be to accelerate progress to realise a specific benefit such as reusing the site earlier.

### 2.1.3 Site End States

The NDA owns significant quantities of land (circa 5,000 hectares [ha]), of which around one quarter is designated, i.e. land that has been assigned by the UK government for decommissioning and remediation. The site end state describes the condition which the site (including land, infrastructure and natural capital) will take at the end of the decommissioning and remediation process. The NDA is required by government to propose the end state for designated land at each of their sites.

Historically within the UK and internationally it was assumed that, upon completion of nuclear decommissioning and remediation, sites would be returned to their previous state or 'greenfield'. Today it is recognised that this is not always possible nor necessarily desirable and so the aim is to determine what end states are appropriate on a site-by-site basis.

The following have been outlined as credible options for Site End States:

#### *2.1.3.1 Leave the hazard where it is and prevent use*

The option of leaving the hazard where it is and preventing use would not involve physical activity to improve the condition of the site, but may involve minimal activity to maintain,

stabilise or prevent migration of contamination. For the most part, it would rely on controls (legal or administrative tools or actions such as restrictions on land use, environmental monitoring requirements, and site access and security measures) to manage risks to people and the environment.

Such a strategy is only suitable in extreme cases where remediation is very difficult and turning the site into a disposal site, which needs to be managed by preventing use, is preferable to attempting extensive and costly remediation in order to create a new facility or alternative land use.

#### *2.1.3.2 Make land suitable for next planned use*

Where land is made suitable for its next planned use, sites would be remediated only as far as is required to be suitable for their next planned use. Where the next planned use does not need a nuclear site licence, the licence will be surrendered, with any residual radioactive or non-radioactive contamination subject to appropriate permit, planning and institutional controls.

Making land suitable for next planned use ensures that the level of intervention and the volume of waste generated are appropriate to meet the requirements of the site's next planned use.

#### *2.1.3.3 Remove the hazard completely so that the risk does not need to be controlled*

Removing a hazard completely so that the risk does not need to be controlled would enable sites to be restored to a condition where they can be used for any foreseeable use without the need for additional remediation or management controls. The level of intervention required to achieve this would likely be high.

### 2.1.4 Operational Estate Use

Operational Estate Use is the NDA's approach to ensuring the best use of land and assets during the delivery of its mission, as well as once its mission is complete.

The NDA's operational estate comprises the land on which liabilities exist, where new facilities are developed to help decommissioning and management of waste, and land that is utilised in support of net-zero aspirations. It also comprises significant natural capital. Some of this estate is licensed and other parts are not.

Options for credible uses will be made on a site-by-site basis and will explore all opportunities to achieve the best use of NDA land and assets, whether that is reuse by the NDA or by others. The following have been outlined as credible options for Operational Estate Use:

#### *2.1.4.1 Retain land as an NDA asset or liability*

The alternative to divesting the land for socio-economic or environmental benefit is to either retain the land as an NDA asset or liability, or on behalf of the government as a national asset. Such an option would only be preferred in the event that a more suitable use could not be identified.

#### *2.1.4.2 Divest the land (leasehold) for social, environmental or economic benefit*

Divesting the land as leasehold gives opportunities for reusing the land to support other government priorities such as national infrastructure projects, and in particular, for nuclear new build. This could include Small Modular Reactors (SMRs) as part of the Great British Nuclear competition. Land could also be divested for agriculture, or industrial businesses that would benefit from being adjacent to a nuclear site.

#### *2.1.4.3 Divest the land (freehold) for social, environmental or economic benefit*

A sites future use will be defined by NDA, UK Government, or a future owner in accordance with local planning regimes and incorporating consultation with stakeholders as appropriate. Suitable potential land uses may vary from site to site and could range from anything as simple as a recreation area to a nuclear new build site, or a business and technology park. The aim of all the varying potential uses will be to provide opportunities for positive environmental, social or economic impacts.

## 2.2 Spent Fuel

The Strategy aims to ensure the safe, secure and cost-effective lifecycle management of the NDA's spent fuels. The inventory of spent fuels consists of large quantities of oxide fuels, along with smaller quantities of Magnox fuel and diverse non-standard fuel types that are referred to as exotic fuels.

The vast majority of spent oxide fuel that the NDA manages has come from the AGRs owned and operated by EDF Energy (EDF). The Magnox spent fuel has come from the first generation of Magnox reactors in the UK. Most of the Magnox material is degraded fuel that is in, or has been recovered from, the legacy ponds, with a smaller amount of fuel that was not reprocessed following completion of the Magnox Operating Programme (MOP). The exotic fuels tend to have come from prototype, experimental or research reactors as part of the development of the nuclear power industry during the last century.

Reprocessing operations ceased in the UK in July 2022 and UK Government policy has changed to reflect this, stating that the decisions regarding if or when to reprocess spent fuel rests with the spent fuel's owner [6].

The credible options for spent fuels have changed since the 2021 Strategy [2], and are now split into the stages of their lifecycle. These are: Consolidation, Interim Storage, and Disposition. The NDA's spent fuel inventory is at varying stages along this lifecycle.

### 2.2.1 Consolidation

The current baseline is for NDA to consolidate all spent fuels that they are contracted to manage at Sellafield. Removing the remaining spent fuels from reactor sites, including Dounreay, and consolidating them at Sellafield significantly reduces the radioactivity and hazard at reactor sites and enables decommissioning and remediation.

This strategy of consolidation enables sites to be transferred to NDA and decommissioned. This approach also enables NDA to optimise the use of suitable facilities, skills and capability already in existence at Sellafield to treat and manage spent fuels.

The following have been outlined as credible options for consolidation of spent fuel:

#### *2.2.1.1 Only consolidate AGR spent fuel at Sellafield and store spent fuel from Dounreay at Dounreay until a disposition option becomes available*

Currently, spent fuels from AGR stations and Dounreay are consolidated at Sellafield. This option would see spent fuel remaining at Dounreay until a disposition option, such as a Geological Disposal Facility (GDF), becomes available. Due to contractual obligation, spent fuel from AGRs would still be consolidated at Sellafield. With spent fuel remaining at Dounreay, this option would remove the transportation of spent fuel between Dounreay and Sellafield. Storing spent fuel from Dounreay at Dounreay rather than at Sellafield would require the spent fuel to be interim stored in newly built facilities pending the long-term aim of treatment and packaging prior to disposal in a GDF. New storage at Dounreay would need to be built in the short- to medium-term, and spent fuel would be moved to these storage facilities when they are available.

#### *2.2.1.2 Stop all consolidation activities and leave spent fuels on reactor sites until a disposition option becomes available*

This option proposes leaving spent fuels from AGR stations and Dounreay, which are currently consolidated at Sellafield, on the reactor sites until a disposition option, such as a GDF, becomes available. This is a credible option but would break currently existing contractual obligations. This is not currently considered a viable option, but circumstances may lead to it becoming one in the future. Stopping consolidation would create a number of issues to consider, such as non-optimal storage conditions at the reactor sites and the difficulty of packaging for GDF created by storing spent fuel on different sites for long time periods.

### 2.2.2 Interim Storage

The Strategy for interim storage is to store spent fuel inventories, maintaining their condition in line with regulatory requirements until the packaging and treatment options for GDF are fully underpinned. While spent fuels are in interim storage, they will be managed in a way that does not foreclose future options.

The NDA's spent fuels have a diverse range of physical and chemical characteristics which impacts their storage requirements. The Strategy takes into account how the spent fuels are expected to evolve in storage and the timescales and nature of geological disposal.

The current strategy for interim storage of spent fuels is that existing assets are used where they are appropriate, for example pond storage for oxides, and new storage solutions are developed for smaller inventories coming through, for example self-shielded boxes and interim storage facilities for Magnox fuel.

The following have been outlined as credible options for interim of spent fuel:

*2.2.2.1 Treat and package all spent fuels now ready for disposal in a GDF, including drying spent oxide fuels and storing in disposal containers.*

This option ensures that all spent fuels that are appropriate for disposal in a GDF are treated and packaged ready for disposal.

The treatment and packaging of spent fuels that have not been reprocessed following closure of the reprocessing plants will require significant investment in infrastructure.

*2.2.2.2 Minimise new storage solutions and use existing packages and facilities for all fuels.*

This option uses existing packages and facilities to store all spent fuels and removes the development of new storage solutions.

### 2.2.3 Disposition

The NDA's strategy is to provide safe and secure life-cycle management of spent fuels through storage and then disposal. The current strategy for disposition is to store spent fuels pending a decision to declare them as waste for disposal in a GDF. The NDA continue to manage spent fuels as potential assets and are working alongside stakeholders to understand how and when spent fuels should be categorised as waste.

*2.2.3.1 Declare all fuels as waste today*

A decision by the NDA, the UK government and regulators has not yet been made to declare all spent fuels as waste. Regardless of whether spent fuels are classed as waste there is a continued need for them to be stored appropriately due to the nature of the inventory. The NDA and NWS's current plans for Sellafield are for all spent fuel to ultimately go to a GDF, and spent fuels are included on the planned inventory.

*2.2.3.2 Store fuels indefinitely*

Although the NDA has no plans to restart reprocessing, spent fuels continue to be managed as potential assets. The NDA strategy is for spent fuels to be managed during storage so as not to foreclose future options. Spent fuels have a diverse range of physical and chemical characteristics and this impacts their storage requirements. The approach taken towards storage of spent fuels takes into account their expected evolution during in storage, and the timescales and nature of geological disposal.

## 2.3 Nuclear Materials

The NDA owns large quantities of civil uranium and plutonium from nuclear fuel enrichment, fabrication and reprocessing. These nuclear materials have a wide range of properties. Managing nuclear materials is essential to enable decommissioning of NDA sites.

The focus of the Strategy is to support SLCs to safely and securely store nuclear materials in line with regulatory requirements effective while life-cycle solutions for their management, in accordance with UK government policy and international good practice, are developed and implemented.

The majority of the nuclear materials managed on NDA sites are owned by the NDA, whilst also supporting SLCs to safely and securely store and manage materials on behalf of customers, including EDF, overseas utilities and the Ministry of Defence (MOD), in line with contractual commitments and customer requirements.

The priority for the UK government is to put nuclear material beyond reach in order to reduce long-term security risks and management requirements for future generations.

### 2.3.1 Plutonium

All the NDAs plutonium inventory is stored at the Sellafield site. Plutonium is highly radioactive, chemotoxic and fissile, requiring specialised skills and facilities for handling. Stringent safety and security arrangements are required to store and account for plutonium.

Civil plutonium can only be used for peaceful purposes. It is managed strictly in accordance with the UK's voluntary International Safeguards agreements with the International Atomic Energy Agency (IAEA) and the Office for Nuclear Regulation (ONR) safeguards requirements

Building facilities to make fuel to enable use in a third-party reactor prior to storage and disposal to a GDF is no longer considered a credible option following the UK Government's policy decision to immobilise the UK's inventory of civil separated plutonium at Sellafield in January 2025 [9]. Reuse would produce plutonium in a disposable form and require plutonium fuel to be fabricated in the UK prior to transport to the reactor in which it is to be used. Plutonium reuse as fuel would require design and

construction of a new Plutonium Fuel Fabrication Facility (PFFF) and possibly reactors which can use plutonium as fuel.

There are two credible options for management of the NDA inventory of civil plutonium, one of which is the continuation of the current baseline of continued safe and secure storage of plutonium, renovating and replacing stores as required.

The following has been outlined as an additional credible option for the NDA's plutonium inventory:

#### *2.3.1.1 Build facilities to condition and treat plutonium prior to storage and disposal to a GDF*

This option considers the most direct path to disposal, via conditioning and treatment. There are a number of potential technologies that could be used to condition the material ahead of disposal. Conditioning and treatment would take place at Sellafield. The material would then need to be placed in interim storage pending transfer to a GDF.

### 2.3.2 Uranium

The NDA's strategy is to continue safe and secure storage of the uranium inventory, to support its reuse where cost-effective and to ensure its final disposition. The NDA's uranium has been produced from fuel cycle operations such as enrichment, fuel fabrication and reprocessing since the 1950s. Uranium is a nuclear material and is not classed as waste as all uranium has the potential to be reused in nuclear fuel to generate electricity.

The two main types of uranium considered in this assessment, which are owned and strategically managed by the NDA, are Depleted Uranium Hexafluoride ($UF_6$), also known as "Hex" or "Tails", and Magnox Depleted Uranium (MDU), a product of spent fuel reprocessing. Both $UF_6$ and MDU are forms of depleted uranium.

Other types of uranium managed by NDA include Highly Enriched Uranium (HEU), Low Enriched Uranium (LEU) and THORP-Product Uranium (TPU).

The NDA manages significant stocks of uranium which are held safely and securely at several locations. The NDA owns the majority of the uranium on its sites, while the remainder is managed by the NDA on behalf of others, such as the MOD, EDF and overseas utilities.

The NDA's uranium stocks are currently held as a nil value asset pending reuse or development and implementation of disposition options.

The NDA continues to develop disposition options for uranium, for sale and reuse or disposal as waste. The NDA is factoring in the possible inclusion of uranium into the design and development of a GDF. Although uranium is not currently classified as a waste, all or

part of the uranium inventory may be declared as waste if it were decided at some point that there was to be no future use for it.

The following have been outlined as credible options for the NDA's uranium inventory:

#### *2.3.2.1 Continued safe and secure storage pending sale for reuse, where economically and/or technically practicable*

The NDA has updated its strategy to acknowledge that the selling of uranium for reuse, which remains the baseline, must be economically and/or technically viable, otherwise it does not reflect the NDA's mission nor present value for the government or taxpayers.

Under this option, the assets used to store uranium, including the storage buildings and containers, require ongoing maintenance. The maintenance regime includes regular inspections to ensure the packaging meets the required containment standards and to identify potential degradation in advance.

#### *2.3.2.2 Continued safe and secure storage pending disposal*

Approximately 50% of the NDA's uranium stocks of uranium is already in a form suitable for disposal without any further treatment or conditioning. Materials in oxide powder form are considered to be sufficiently stable to be disposed of. In the future, other forms of uranium, if they are not sold for reuse, will require conditioning prior to disposal. An example of this is $UF_6$ which is being de-converted to an oxide ($U_3O_8$) powder at the Capenhurst Tails Management Facility (TMF).

The ultimate disposal route and any prior conditioning for these materials have yet to be developed. Moreover, the case for whether large volumes of uranium should be committed to a GDF has not yet been evaluated. Disposal in an alternative manner could be preferable.

#### *2.3.2.3 Continued safe and secure storage pending conditioning to an appropriate form for disposal*

The remaining approximately 50% of the NDA's uranium stocks which are yet to be treated or conditioned to enable safe and secure disposal require storage pending conditioning to an appropriate form for disposal. For example, Hex, a by-product of uranium enrichment is stored in cylinders held predominantly at Capenhurst with some at Springfields, many of which are several decades old and showing signs of corrosion.

## 2.4 Integrated Waste Management

The management of solid radioactive waste is a lifecycle from, planning and preparation through retrieval, treatment and packaging, storage, and finally disposal. The NDA is employing a systems approach to waste management, looking at the overall capability

of the NDA's waste management system rather than for individual projects and sites. This system is not a linear process, and the strategy demonstrates a circular view of waste.

A variety of wastes arise from the NDA estate which are considered on a case-by-case basis in accordance with Best Applicable Techniques (BAT) or Best Practicable Means (BPM) (in Scotland) and as low as reasonably practicable (ALARP) requirements. The Waste Hierarchy continues to be an important part of the strategy, through the prevention and minimisation of waste from existing and new facilities.

### 2.4.1 Treatment, Packaging and Storage

The current baseline involves treatment, packaging and storage at currently open facilities. In practice, there is likely to be a combination of the below credible options in line with the updated Strategy which will likely be influenced by the SDR Strategy and programmes for decommissioning.

The following have been outlined as credible options for treatment, packaging and storage of waste:

#### *2.4.1.1 Treatment, packaging and storage at local (on or near site) facilities*

The treatment and packaging of waste at local facilities will involve the construction of new facilities that are on or near to sites where waste continues to be produced. There is the potential for these to be modular in nature, or even mobile, however, are likely to significantly impact the environment, health and socio-economics both positively and negatively around the sites chosen.

#### *2.4.1.2 Treatment, packaging and storage at regional facilities*

Storage and treatment of waste at regional facilities would involve the construction of a number of regional hubs. These facilities would likely be located at or in close proximity to the site with the highest volume of waste in a particular area.

#### *2.4.1.3 Treatment, packaging and storage at national facilities*

Treatment, packaging and storage of waste at national facilities would involve establishing individual facilities at national locations that would serve all NDA sites for specific purposes. The implementation of this credible option would be dependent on the availability of sufficient transport infrastructure.

### 2.4.2 Disposal

The current baseline is for the disposal of waste to currently open appropriate facilities e.g., very low level and low-active low level waste to licensed landfills, on site disposal at a facility on the Sellafield site for the least hazardous low level waste (LLW), and the

current LLW facilities in West Cumbria at the Low Level Waste Repository (LLWR) and the NWS operated disposal facility adjacent to Dounreay in Caithness.

It is recognised that there are significant constraints associated with the disposal of radioactive waste at LLWR, such as the potential risk of coastal erosion of the site. Therefore, to get the full benefits afforded by the updated policy framework for managing radioactive substances [6], NDA is investigating alternative capabilities for the disposal of all radioactive waste that does not require disposal in a GDF.

The following have been outlined as credible options for the disposal of waste:

#### *2.4.2.1 On-site or in situ disposal at additional sites*

This credible option allows for on-site or *in situ* disposal at additional sites. This would decrease transport of waste between producer to disposal sites. Additional facilities would likely have to be constructed at these additional sites to allow for the safe disposal of waste.

#### *2.4.2.2 Disposal to Near Surface Disposal (NSD) at LLWR subject to permitting and planning*

The new policy framework for managing radioactive substances [6] enables implementation of near surface disposal of less hazardous Intermediate Level Waste (ILW) in England and Wales. The first phase of NSD has been planned at the LLWR in West Cumbria, though permitting and planning in accordance with relevant policy and legislation is still required before it can receive less hazardous ILW. This option would divert some waste away from other facilities or from waste being stored long-term prior to the construction of a GDF.

#### *2.4.2.3 Disposal to GDF subject to ongoing consultation and investigation*

This credible option sees waste being stored until the time a GDF is constructed.

The strategy for radioactive waste disposal has devolved significantly since the previous IIA (2021) [5] due to the implementation of the new policy framework [6]. The policy continues the implementation of geological disposal for the most hazardous radioactive waste and reaffirms the UK and Welsh Governments' position on implementing geological disposal and their commitment to working in partnership with communities that are willing to participate in the siting process.

This credible option is not being assessed as part of this IIA as it is a Nationally Significant Infrastructure Project (NSIP) that will require significant environmental, health and other assessments beyond the scope of this assessment.

## 2.5 Critical Enablers

Critical Enablers undertake the important activities needed to support the delivery of the NDA mission. The Critical Enabler strategies do not themselves comprise options that can be assessed from an environment, health or socio-economic perspective, except for Transport. Several Critical Enablers relate directly to the impact assessment topics (for example, Environment, People) and their corresponding strategies can be considered as supporting means to enhance benefits or mitigate negative effects of the Strategy (2026) [76]. These are discussed in the Mitigation and Enhancement section of this report (Section 7).

### 2.5.1 Transport

The strategy of the transport critical enabler is to ensure the effective, safe and secure transportation of materials to enable the successful delivery of the NDA mission. NTS is recognised as the NDA Group's expert in transporting radioactive and nuclear materials. Additionally, the NDA aims to minimise the environmental, economic, and social impacts of its transport operations.

The effective delivery of the Strategy relies on the NDA's ability to transport radioactive and bulk materials safely and effectively to and from sites. SLCs have the infrastructure, assets, systems, processes and skilled people to deliver safe, secure and reliable transport solutions.

The increased use of rail transportation is a desirable and preferred option to reduce the impacts associated with the distribution of materials, such as construction products and soil from NDA sites. The NDA also intends to support the UK Government's efforts in transporting radioactive and nuclear materials by developing a new National Focal Point for nuclear transport.

# 3. Topics

The topics included in this IIA have been through discussion with the NDA and consideration of the baseline conditions and activities that are taking place at the NDA sites.

Key environmental issues across NDA sites were identified in the 2016 and 2021 IIA based on the SEA Directive and UK legislation. Where the 2021 IIA grouped some of these topics, in the 2026 IIA they have been split to ensure the full breadth of each topic is considered. These topics are discussed in further detail below.

Assessment of health and socio-economic topics is not a statutory requirement, but a health impact assessment is recommended within the SEA Directive, and a socio-economic impact assessment demonstrates good practice. Health topics focus on a range of health issues relevant to the NDA strategy. Taking into account previous IIA's and in discussion with the NDA, health and well-being determinants have been identified and, where appropriate, combined to form five topics, against which the potential beneficial and adverse health effects of the Strategy have been assessed.

## 3.1 Sustainability

Sustainability centres around meeting the needs of the present without compromising the ability of future generations to meet their own needs. This concept can be divided into three components, or pillars, which relate to social, environmental, and economic considerations.

Sustainability is defined by NDA as creating value through nuclear decommissioning – at pace, affordably, with participation and creatively.

- At pace – Keep safety and security paramount, optimise progress in decommissioning.
- Affordably – Consider the long-term value for money alongside short-term financing, optimising investment decisions.
- With participation – Seek and support the opinions, plans and aspirations of our workforce, community, and stakeholders.
- Creatively – Clean up our legacy nuclear sites, enhancing the environment and achieving net carbon zero.

Sustainable development aims to balance the present and future social and economic needs while preserving and preventing undue damage to the natural environment. The United Nations published 17 Sustainable Development Goals (SDGs) in 2015 which provide an outline for future prosperity for people and the planet. There are environmental considerations in the goals such as Goal 14 Life below water and Goal 15 life on land while economic and social issues are targeted in goals such as Goal 3 good health and wellbeing and Goal 4 quality education. These goals were formulated to encourage a better world by the year 2030.

NDA published 'Sustainability at the NDA group in 2024' [10] in September 2024. This document outlines the previous and future actions being taken by the NDA group that relate to the organisations vision of sustainability. NDA's mission to decommission nuclear sites and to provide sustainable waste management of nuclear materials from its sites and other industries such as nuclear power plants, defence, and medicine relates closely to all 17 of the SDGs both directly and indirectly [10]. These SDGs can be broadly grouped into categories based upon the outcome focus. These categories link to the three components of sustainability (social, economic, and environmental) and the IIA.

Several socially related areas of NDA's sustainability strategy link to the SDGs. The safe disposal of radionuclides used in the medical sector to treat and diagnose illness as well as the protection of staff and the public from radiological risks directly links to Goal 3 good health and wellbeing. The funding of academic research and provision of skilled apprenticeships across NDA directly links to Goal 4 quality education. By performing NDA's mission safely and securely, Goal 11 sustainable cities and communities is directly impacted.

Economically focused SDGs are also relevant to a variety of NDA's activity. They are a significant employer with approximately 17,000 staff across the UK this employment links to Goal 8 decent work and economic growth. There has been significant investment by NDA in a variety of infrastructure projects in proximity to their sites such as the £3 million investment into Sutherland Spaceport. This investment contributes to Goal 9 industry innovation and infrastructure. The transport and management of spent fuel alongside sustainable waste management from the UK's nuclear power plants related to Goal 7 affordable and clean energy.

Environmental sustainably is the final key component of sustainability and is a key focus in the NDA's sustainability strategy. The minimisation and monitoring of discharge impacts as well as the enhancement of biodiversity on NDA sites directly links to Goal 14 life below the water and Goal 15 life on land. NDA is committed to net zero and have reduced scope 1 and 2 emissions by a third since 2019/20 through the adoption of new practises across the organisation. This proactive activity on climate change ties with Goal 13 action on climate change.

It is recognised that sustainability, once a critical enabler and seen as an individual topic in the previous IIA, is now key to NDA's mission. The NDA strategy on sustainability is hardwired into the entire organisation with regards to its priorities, actions, and impacts. Sustainability is no longer an individual factor NDA consider in decision making but is rather an all-encompassing core driver of the activities of the organisation. Sustainability will not be singled out within the IIA; however, aspects of sustainability and the SDGs will be used as broader support tools to undertake the environmental, socio-economic and health impact assessments.

## 3.2 Environmental

### 3.2.1 Air quality

Air quality is defined as the condition of the air with respect to the presence (or absence) of pollutants. Emissions from plant and machinery used in nuclear decommissioning and operational activities can contain a number of pollutants, including oxides of nitrogen ($NO_x$), carbon monoxide (CO), hydrocarbons, carbon dioxide ($CO_2$) and particulate matter (PM). The quantity of each pollutant emitted depends upon the technology used and the period of time over which activity is taking place. The presence of such pollutants in the air can have wide ranging consequences from an environmental and health perspective. Air with a high concentration of pollutants can exacerbate respiratory conditions such as asthma and bronchitis.

Pollutants such as $NO_x$, CO and $CO_2$ can have significant global warming potential, thereby contributing towards climate change if present in high concentrations. In sufficient concentrations, $NO_x$ can also lead to deposition of nitrogen in sensitive habitats, contributing to eutrophication or otherwise degrading the habitat.

### 3.2.2 Biodiversity

Biodiversity is 'The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic
ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems [11]. It performs a number of important roles, from maintaining the function of the biosphere as a whole, to providing food and medicine ingredients and enhancing health and well-being. Nature conservation is concerned with maintaining a viable population of the country's characteristic fauna, flora and wildlife communities. Impacts on nature conservation are broadly split into two categories: habitats and species. The 'species' category can include both fauna and flora species. Activities across the NDA estate could have the potential to affect biodiversity directly through land-take, which results in loss of, severance from or damage to habitats and declines in populations of species, or indirectly through changes in air quality, noise and other forms of pollution.

The Environment Act 2021 [12] sets out how UK government will protect and enhance the environment for future generations. The Act 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. The Act includes a new legally binding target on species abundance for 2030 and 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 2023 [13], which aims to halt the decline in our biodiversity in order to achieve thriving plants and wildlife.

### 3.2.3 Climate change

Climate change is one of the key challenges facing the UK and the world today and refers to long-term shifts in temperatures and weather patterns [14]. Such temperature changes

can be natural, due to changes in the sun's activity or large volcanic eruptions. However, is considered that human activity has been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas. The burning of fossil fuels generates greenhouse gas emissions that trap the sun's heat, contributing to a rise in temperatures.

The main greenhouse gases that are causing climate change include carbon dioxide and methane. These come from using gasoline for driving a car or coal for heating a building, for example. Clearing land and cutting down forests can also release carbon dioxide. Agriculture, oil and gas operations are major sources of methane emissions. Energy, industry, transport, buildings, agriculture and land use are among the main sectors causing greenhouse gases.

The UK Climate Risk Assessment (2022) [15] sets out the priority risk areas requiring further action in the UK over the next 5 years. Scotland has committed to reduce its emissions of all greenhouse gases to net-zero by 2045, with interim targets for reductions of at least 56% by 2020, 75% by 2030, 90% by 2040 [16]. 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 Welsh Government has targeted at least an 80% reduction in emissions by 2050 [17].

### 3.2.4 Coastal change and flood risk

Coastal change refers to changes which may affect the coastal environment, including coastal waters and shores. Potential changes to the coastal environment might include changes in rates of erosion, sea level and wave frequency and strength. The rate and intensity of these changes are all likely to increase as a result of climate change.

Flood risk is a combination of the probability and the potential consequences of flooding from all sources. This includes flooding from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources. Flooding is being experienced with greater frequency and more impact as a result of climate change and other factors such as deficiencies in infrastructure [18].

Coastal change and flood risk is a relevant topic to the Strategy because, 13 out of 17 NDA sites are directly on the coast, and an additional two are on low-lying land near the coast. They may therefore be susceptible to potential impacts from coastal change and flooding. Secondly, the timescales over which the sites are likely to be operational or undergoing decommissioning may mean that they become increasingly sensitive to changes brought about by climate change.

### 3.2.5 Cultural heritage

Assessment of cultural heritage generally considers potential impacts under three sub-topics:

- archaeological remains – the material remains of human activity from the earliest periods of human evolution to the present, which may be buried traces of human activities, sites visible above ground, or moveable artefacts;
- historic buildings – architectural or designed or other structures with a significant 'historical value', which may include structures that have no aesthetic appeal or structures not usually thought of as buildings', such as milestones or bridges; and
- historic landscape – the current landscape, whose character is the result of the action and interaction of natural and human factors, and includes evidence of past human activities, which is a significant part of the historic landscape, and may derive both from archaeological remains and historic buildings within it.

Historic features or archaeological remains may be affected by activities across the NDA's estate. This could be effects to the integrity of cultural heritage receptors in the form of damage or degradation caused by land acquisition or through noise and vibration, or, as is more likely the case, effects on their setting from changes in the landscape. Some buildings on NDA sites are valued as a result of their iconic design or appearance, such as the Dounreay Fast Reactor 'golf ball'.

### 3.2.6 Geology and soils

This topic considers potential effects of the Strategy on soil resources and quality (including contamination and the potential for activities to disturb historic contamination). The potential for effects on protected or important geological features such as designated geological sites has also been considered.

Soils may be used, damaged or removed during construction and decommissioning activities. The quality of land (including agricultural) at, and in proximity to, the NDA sites may also be influenced by the implementation of specific techniques to reduce or remove contamination.

### 3.2.7 Landscape and visual impacts

The landscape takes its character from a combination of elements, including topography, watercourses, land use and pattern, vegetation, public open space and cultural heritage features. Landscapes vary considerably in character and quality, and are often considered a key component of the distinctiveness of any local area or region. Impacts on landscape 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. The majority of the sites comprising the NDA estate are large and industrial, containing multiple facilities and structures which may affect the local landscape. As decommissioning of sites progresses, the visual impact of the sites

may reduce. There may be temporary landscape and visual impacts during decommissioning or care and maintenance phases, for example cladding, construction or lighting impacts.

### 3.2.8 Materials and waste

Wastes are substances or objects which are disposed of, are intended to be disposed of, or are required to be disposed of by the provisions of national law. Radioactive waste is any waste that contains radioactive material above certain low levels of radioactivity defined in legislation. Any small amounts of radioactivity in the materials below these levels are similar to background levels of radiation found in the natural environment.

Not everything that is radioactive is a radioactive waste. Some materials are potentially useful or continue to have value. These are usually described as radioactive materials. Radioactive materials include uranium and plutonium, which can be used to manufacture nuclear fuel, and spent fuels, which can be reprocessed to produce plutonium and uranium.

Most radioactive waste produced in the UK is solid and made from a variety of materials and items, including discarded protective clothing used by workers, redundant tools and equipment, or concrete and steel from dismantled buildings. Some radioactive wastes are liquids or sludges but these are usually turned into solids by drying them or incorporating them into a solid matrix (usually cement or glass) to make them more stable and easier to manage.

Across the NDA estate, large quantities of radioactive and non-radioactive materials and wastes are generated, stored, treated and where appropriate disposed of. Some materials are used in the construction of new facilities or maintenance of existing facilities. Certain wastes are produced during the course of operational activities such as reprocessing, whilst other forms of waste are produced as a result of decommissioning.

### 3.2.9 Noise and vibration

Noise in its widest sense can be defined as 'unwanted sound'. It can come from industrial, agricultural, domestic, transportation or natural sources, and if experienced at high levels, may cause disturbance to people and wildlife.

Vibration is a low frequency disturbance which, at high levels, can produce physical movement in buildings and their occupants. Vibration can be affected by the use of plant and machinery, and changes in traffic flows and the types of vehicles on the road network. Piling during construction is the most likely source of vibration problems, especially driven piles. Increased levels of vibration have the potential to cause nuisance and physical damage.

Many of the activities undertaken at NDA sites have the potential to generate noise and vibration.

### 3.2.10 Radiological emissions and discharges

During the course of a nuclear site's operation and decommissioning, emissions and discharges of radioactivity may be made to the environment in accordance with legislation. Radiological emissions and discharges are associated with the materials used and the processes involved with, for example nuclear power generation using reactors. Discharges of radioactivity to the environment are controlled through strict authorisations granted to operators. Emission limits are set well below the levels at which adverse effects might be experienced by humans, flora and fauna and are regulated by the Environment Agency (EA) and the ONR.

As the NDA Strategy (2026) [76] covers the management of radioactive materials and wastes. The potential for changes in radioactive emissions and discharges is considered in strategic assessment and decision-making.

### 3.2.11 Water resources and quality

The water environment provides a number of vital functions to support communities. From providing drinking supplies to serving as recreational facilities, water bodies of all types are fundamental for maintaining a healthy and active population. The conservation and sustainable use of oceans, seas and marine resources for sustainable development is a UN sustainable development goal (SDG) [19].

Maintaining water resources and quality, including minimising pollution and abstraction, is a key consideration for the Strategy. Abstractions from surface and ground water, and discharges to the water environment are generally an ongoing occurrence at nuclear sites. Water abstractions and discharges are undertaken under the terms of an Environmental Permit and are regulated by the EA.

## 3.3 Health

This IIA takes into account a range of health issues relevant to the NDA strategy. As part of this process a range of determinants of physical and mental health have been assessment. Determinants of health include the social and economic environment, the physical environment and a person's individual characteristics and behaviours [20]. A number of factors combine together to affect the health of individuals and communities. Health can be determined by circumstances and environment. Where a person lives, the state of their environment and education level have considerable impacts on their health.

Taking into account a wide variety of available guidance, five topics have been identified against which the potential beneficial and adverse health effects of the Strategy have been assessed. The impact of specific actions on individual communities is outside the scope of this assessment and is assessed at a site specific level when these actions are undertaken.

### 3.3.1 General Health

The definition of health given by the World Health Organization is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity [21]. The UK census requests respondents to give an assessment of their perceived health status, with options ranging from very good to very bad health. Results are presented nationally and by each local authority [22].

As the NDA strategy may result in activities which can effect on physical, mental and social well-being there is potential for this to lead to a change in the perceived general health of the local population.

### 3.3.2 Life Expectancy

Life expectancy at birth is the average lifespan a newborn can be expected to live, assuming that age-specific mortality levels remain constant [23]. Life expectancy at birth is one of the most frequently used health status indicators.

Gains in life expectancy at birth can be attributed to several factors, including rising living standards, improved lifestyle and better education, as well as greater access to quality health services. These all have the potential to be influenced positively and negatively by the NDA strategy.

### 3.3.3 Mental Health

Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community. It is an integral component of health and well-being that underpins our individual and collective abilities to make decisions, build relationships and shape the world we live in. Mental health is a basic human right. And it is crucial to personal, community and socio-economic development [24].

The mental health and well-being of a population may be influenced by a number of factors. This includes changes to the physical environment such as through changes in air and water quality, noise and vibration, the landscape and the availability and accessibility of recreational, amenity and community facilities, as well as changes in socio-economic aspects such as employment, income and opportunities for education and personal development.

Changes in employment and income can have a number of effects on people's mental health, including happiness and self-confidence, sense of control, and stress levels. Employment has been shown to lower the probability of suffering impaired mental health [25].

The NDA strategy has the potential to affect the mental health and well-being of the local population in a number of ways.

- increased pollution from construction, operational and decommissioning activities that may lead to changes in air, water and land quality or increased disturbance and annoyance from noise and vibration. Although these would generally be captured as physical health effects, there are strong links between physical and mental health.
- Loss of or changes to recreational facilities and areas of amenity. This could come from changes to the local landscape or from loss of nature sites or biodiversity.
- Rapid demographic change as sites are closed and some employees choose to leave the local area to seek new employment. These changes can affect the social health and support networks of the local population, as well as general happiness and satisfaction with the area.
- Employment opportunities created to implement strategic options could provide income for workers and enable them to develop knowledge and skills.
- Economic development locally, community investment and potential future development at sites may provide a range of benefits which positively influence mental health and well-being.
- Gradual loss of jobs that would otherwise be maintained in the long-term, for example those associated with storage of nuclear materials. The loss of these jobs can affect people's self-confidence levels, happiness, stress levels, and increase the likelihood of risk behaviours such as smoking and drinking.

### 3.3.4 Radioactivity

All people are exposed to a low level of radiation in everyday life, due to natural levels of radioactivity in the environment around us, particularly rocks and soils. Some radioactive particles also reach Earth from outer space. In the UK, any radioactive exposure that is imposed on the public that is above natural background levels is subject to regulation, based upon EU standards and international recommendations on radiological protection. The treatment, storage, transport and disposal of radioactive materials is heavily regulated by the ONR and EA, and has very strict requirements in management and design.

Health and well-being effects related to radiological safety includes fear of exposure, and the effect this has on physical and mental health and well-being. For example, the stress and anxiety that may be associated with living near to, or routinely undertaking activities close to, a nuclear facility.

The public dose limit for radiological discharges to air and water is set at 1 millisievert per year. At this level discharges do not pose a significant health risk to human health or populations of fauna. Current aerial discharges from the nuclear industry and waste management facilities are well below the public dose limit. Strategic options contained in the Strategy occur within these limits, but there may be variation in terms of the risk associated with hazards, and the nature of intervention, if any, required to maintain safety.

### 3.3.5 Respiratory Disease

Incidences of respiratory disease are strongly linked to air quality. Of the pollutants considered under air quality, concentrations of PM and $NO_x$ are a primary concern from a health perspective. Studies have shown that it is possible to make an association between respiratory conditions such as asthma and residential proximity to traffic [26].

As the NDA strategy may result in activities which can affect air quality, including construction, operation, decommissioning works and traffic, there is potential for this to lead to a change in the risk of respiratory and cardiovascular conditions amongst the local population.

## 3.4 Socio-economic

### 3.4.1 Diversity

Diversity can be defined as the range of human differences, including (but not limited to) differences in race, gender, religion, and age. In the UK the Equality Act [27] legally protects people from discrimination in the workplace and in wider society.

NDA strategy recognises the necessity of attracting and retaining talented and committed individuals from across society. The NDA Equality Diversity and Inclusion Strategy has been in place since 2018 and was updated in 2021 [28], it seeks to improve the diversity of the NDA workforce in order to become representative of modern Britain, while aspiring to meet external commitments under the Nuclear Sector Deal [29] to improve gender balance in the sector.

Due to the importance of NDA sites as a source of employment in their local communities the Strategy may have impacts on the Diversity of these areas and as such has been included as a topic of the IIA.

### 3.4.2 Employment

Employment is an important socio-economic consideration. The creation and maintenance of employment opportunities can help to reduce poverty and facilitate sustainable economic and social development in communities. Job-creation is considered a core element in national strategies relating to growth, poverty and social equality.

Employment is important in the context of the NDA strategy as the strategic options contained within it may differ in terms of the opportunities they provide. Some options may result in losses or changes in employment that need to be factored into decision-making and require appropriate mitigation.

### 3.4.3 Economy

For the purpose of this assessment, the Economy topic is more specifically defined as a consideration of the potential for the Strategy to deliver gross value added (GVA). GVA is an economic productivity metric that measures the contribution of a company to an economy or region, and is considered to be an important measurement of the contribution of strategic options to the national economy. GVA is also an indicator of the wider benefits of improving and stimulating local economies in areas where strategic options are implemented.

The options contained in the Strategy may vary in their different potential for creating employment and economic opportunities. It is important that this is factored into strategic decision-making.

### 3.4.4 Local and National Assets

Local assets are defined within this assessment as infrastructure designed to meet the needs of the local community at a local or regional level. This includes health and community facilities, emergency services and transport infrastructure which enables accessibility and connectivity.

National assets are defined as facilities or infrastructure that provide services of national importance, for example spent nuclear fuel reprocessing or radioactive waste treatment. Their importance is linked to the availability of alternative facilities or infrastructure which serves the same purpose.

The NDA strategy and the strategic options identified in it may have the potential to result in changes to local and national assets. This could involve development of new or maintenance or loss of existing assets.

### 3.4.5 Population

Population is defined for the purpose of this assessment as all the inhabitants of the areas local to NDA sites. Socio-economic factors that can effect the population of an area include factors such as income, education, employment, community safety and social support, all of which can be influenced or effected by the NDA strategy.

# 4. Summary of Baseline Conditions

To inform the assessment, information was collected on the baseline environmental, health and socio-economic conditions for the UK, the devolved administrations and, where possible, for each of the NDA sites. This information covers both existing conditions and future conditions that would be likely to evolve assuming there are no further changes to the NDA Strategy. The results of this exercise are presented in Volume 3 of the IIA Report, which includes a description of the 17 sites comprising the NDA estate.

Understanding the baseline at each of the NDA sites is important, both for determining the nature and extent of potential impacts of the Strategy and for identifying options which may improve environmental, social and health conditions. The key issues and accompanying sources highlighted by the baseline data gathering exercise are outlined below. Site-specific data is presented in Volume 3.

## 4.1 Environmental

The air quality baseline is derived from Air Pollution in the UK 2023 [30], which showed that the UK background concentrations for air pollutants were compliant with authorised limits set out in The Air Quality Standards Regulations (2010) [31], as well as site-specific data from the Radioactivity in Food and the Environment (RIFE) 29 Report [32] and the EA and Scottish Environment Protection Agency (SEPA) Pollution Inventory's [33] [34]. These show that radioactive discharges to air from all NDA sites were below legal limits in 2023.

The UK's biodiversity indicators were assessed in 2024 [35], which demonstrated a short term improvement in 25% of indicators, and a long term improvement trend in 40% of indicators. The climate change baseline includes greenhouse gas emissions shown as carbon dioxide equivalent ($CO_{2e}$) emissions. The 2022 UK Greenhouse Gas Emissions demonstrate a 3.5% decrease in net territorial greenhouse gas emissions, in comparison to 2021 [36].

The coastal change and flood risk baseline includes site-specific data from the EA [37] [38] and SEPA [39] flood maps.

Site-specific data for England and Wales was obtained from DEFRA Magic Maps [40]; this was used to provide data for the cultural heritage, landscape and visual impacts and geology and soils baselines. Other sources for these baselines include Historic Wales [41] and Historic Environment Scotland [42]; the UK Soil Observatory [43]; and DataMapWales [44].

Data for the materials and waste baseline has been taken from the UK Radioactive Waste Inventory [45], the NDA Business Plan 2023-2026 [46], and the 2022 UK Radioactive Waste Detailed Data [47].

The water resources and quality baseline is comprised of site-specific data from the RIFE 29 Report [32], EA Catchment Data Explorer [48], EA Pollution Inventory [33], SEPA's Water Classification Hub [49], SEPA Pollution Release Inventory [34], and DataMapWales [44].

No data was available for the noise and vibration baseline.

## 4.2 Health

The general health baseline consists of data from Census 2021 [22] and the Scottish Health Survey [50]. 45.1% of respondents from England, 44.5% of respondents from Wales, and 30% of respondents from Scotland reported their general health as 'very good'.

The health and circulatory disease baseline includes data from the British Heart Foundation Circulatory Disease Statistics 2024 report [51]. This report indicates that death rates from all heart and circulatory diseases (per 100,000 people) have decreased by 48% in England, 42% in Scotland, and 48% in Wales, between 2001 and 2022.

The cancer baseline comprises of data from the Cancer Registration Statistics 2022 [52], Cancer Incidence in Wales [53], and the Cancer Incidence in Scotland report [54].

The radioactivity baseline uses data from the RIFE 29 report [32]. In 2023, England's highest exposure was 23% of the legal limit, Scotland's highest was 2% of the legal limit, and Wales's highest was 3% of the legal limit.

The life expectancy at birth baseline is derived from the Healthy Life Expectancy in England and Wales [55], and the Healthy Life Expectancy 2019-2021 [56]. England's life expectancy at birth in 2021-2023 is estimated to be 81.08 years. For Scotland, this is 78.78 years, and for Wales, this is 80.01 years.

The mental health baseline is comprised of data from the Mental Health Bulletin 2022-2023 Annual Report [57], Mental Well-being (National Survey for Wales) [58] and the Scottish Health Survey 2023 Volume 1 [50]. In England, an estimated 3.58 million people interacted with NHS-funded secondary mental health, learning disability and autism services during 2022-2023. Scotland and Wales utilised the Warwick-Edinburgh Mental-Wellbeing scale (WEMWBS). Scotland reported a mean WEMWBS score of 48.9 in 2023, and Wales scored 48.2.

## 4.3 Socio-economic

The population baseline uses data from the Office for National Statistics Estimates of the Population for the UK [59]. This report shows that the 2023 estimated population for England is 57,690,323, Scotland is 5,490,100, and Wales is 3,164,404.

The current workforce in nuclear baseline includes data from the NIA Job Maps [60]. This report shows that in 2024, 86,908 people were employed in the nuclear industry, which is an increase of 11% from 2023.

The dominant occupation baseline comprises of data from the Office for National Statistics Census Maps [61], and the Scotland's Census Maps [62]. The residents aged 16 and above in employment baseline includes data from the Office for National Statistics 'Employment in Local Authorities, England and Wales's Census 2021 [63], and the Scottish Government 'Scotland's labour market: People, Places and Regions' [64]. The indices of multiple deprivation baseline encompasses data from the Office for National Statistics Census Maps [61], and the Scottish Index of Multiple Deprivation [65]. The business demography baseline is derived from Office for National Statistics 'Business Demography, UK' [66]. The diversity baseline is comprised of data from the NDA Inclusion Strategy 2021-2025 [28].

## 4.4 Legislative and policy baseline

Changes to the legislative context relevant to the NDA strategy have occurred mainly at a national and local government level within the UK since the previous strategy in 2021. An evaluation undertaken by the EU of the SEA Directive determined that it remains fit for purpose in its current guise.

At an international level, the OSPAR North-East Atlantic Environment Strategy 2030 [67] was adopted on 1 October 2021, extending the targets of the previous incarnations. OSPAR aimed to prevent pollution of the marine environment by discharges from land-based activities and the OSPAR Radioactive Substances Strategy specifically sets the objective of preventing pollution of the maritime area from ionising radiation.

The UK ceased to be a member of the EU on 31st January 2020. The EU requested that the UK keep in step with EU environmental standards post-Brexit. This idea was rejected by the UK and replaced with provisions to maintain a level playing field. The level playing field is dealt with in the UK/EU TCA [68]. This covers areas of law, including environment and climate, applying to industrial emissions, air, nature and biodiversity, waste management, and the aquatic and marine environments.

Structural changes to local government in England took place between 2019 and 2023. Some of these changes saw new unitary authorities being created from other types of local government districts. Sellafield, LLWR, Dungeness A and Hinkley Point A Sites have been in new or renamed local authorities since 2021. The majority of local authority plans that were in place in 2021 have been superseded or replaced in the meantime, and others are currently being rewritten.

In May 2024, the UK Government issued the 'UK policy framework for managing radioactive substances and nuclear decommissioning' [6] with a purpose to provide a coherent UK-wide policy framework for managing radioactive substances and nuclear

decommissioning. This policy statement includes the managing of radioactive waste, which is a devolved matter.

In January 2025, the UK Government released a statement regarding the policy decision to immobilise the UK's inventory of civil separated plutonium at Sellafield in January 2025 [9]. This results in an update to the credible options for plutonium, currently removing the option to build facilities to make fuel to enable plutonium use in a third-party reactor, prior to storage and disposal.

# 5. Summary of Methodology

The methodology of the assessment has been reviewed and, as directed by NDA, will remain the same as that in the 2021 IIA [5] to allow for consistency across the implementation of the strategies.

The following assessment methodology was carried out in the 2021 IIA [5] and has been applied in the 2026 IIA. The wording has been updated to balance the potential for both positive and negative effects.

1. Identify the risks of adverse or opportunities for beneficial effects of the credible options identified in the Strategy, and how they might occur.
2. Identify any existing legislative requirements and forms of mitigation which may already address the risks.
3. Where the risk of or opportunity for an effect remains, assess the potential significance (based on the magnitude of the effect and the sensitivity of receptors), where possible considering uncertainties and factors which may cause the significance to vary.
4. Recommend further mitigation and enhancement measures.
5. Recommend monitoring and response mechanisms.

Guiding assessment questions were developed for the 2016 and 2021 IIA to cover the range of environmental, health and socio-economic issues relevant to the assessment of the strategy and have been used in this IIA (Appendix A).

Detailed assessment identified whether or not a risk or opportunity exists. If a risk or opportunity was found to exist (i.e., the option could have a significant impact upon a receptor), the next stage considered the significance of such an impact. This involved determining the potential magnitude of the impact and the sensitivity of potential receptors.

The sensitivity of a receptor considers the vulnerability of the receptor to change, whether the receptor can recover from change and how important the receptor is.

The uncertainty of the assessment results has been categorised using the below descriptions.

- Result is considered highly uncertain and will almost certainly require further detailed assessment at a later stage, for example as part of a detailed Environmental Impact Assessment (EIA) at a project level.
- Result is considered uncertain and may require further detailed assessment at a later stage.
- Result is considered fairly certain and is unlikely to vary enough to require further assessment.

The uncertainty is based on the reliability of the baseline information, the confidence of the magnitude and sensitivity identified in the assessment and the potential for the strategy to change in the future.

# 6. Summary of Assessment

This chapter presents a summary of the findings of the IIA.

The credible options for the four strategy themes, Site Decommissioning and Remediation, Spent Fuels, Nuclear Materials, and Integrated Waste Management, and the Critical Enabler of Transport, are described in Section 2. The majority of these credible options require generic, or common activities to implement them. Detailed assessments have been carried out for these generic activities, presented Volume 2 of the IIA. Significant impacts for each credible option have then been discussed separately. Where a credible option may require additional activities, the impacts of these are also discussed.

## 6.1 Generic Activities

The four generic activities required across the credible options are:

- Land – either acquired or released as short term (ST) or long term (LT) activities
- Construction
- Maintenance
- Transport of NDA assets or liabilities – either increasing or decreasing

A summary of the assessment for each of the generic activities is presented in Table 1. The potential significance of impact on each of the topics was determined in accordance with Figure 2 below.

**Figure 2: Impact Significance Matrix**

| Magnitude of Impact | | Sensitivity of Receptor / Indicator | | | | | |
|---|---|---|---|---|---|---|---|
| | | Low | | Medium | | High | |
| | High | Moderate | | Major | | Major | |
| | | + + | – – | + + + | – – – | + + + | – – – |
| | Medium | Minor | | Moderate | | Major | |
| | | + | – | + + | – – | + + + | – – – |
| | Low | Minor | | Minor | | Moderate | |
| | | + | – | + | – | + + | – – |

## Table 1 Summary of assessment for generic activities

| | Topic | Land Increase | | Land Decrease | | Construction | | Operation and Maintenance | | Transport Increase | | Transport Decrease | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | +ve | -ve | +ve | -ve | +ve | -ve | +ve | -ve | +ve | -ve | +ve | -ve |
| Environment | Air Quality | 0 | 0 | + | 0 | 0 | - | 0 | - | 0 | - | + | 0 |
| | Biodiversity | 0 | - | ++ | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| | Climate Change | 0 | - | ++ | - | 0 | -- | 0 | - | 0 | - | + | 0 |
| | Coastal Change and Flood Risk | + | - | + | - | 0 | - | 0 | 0 | + | 0 | 0 | 0 |
| | Cultural Heritage | + | - | + | 0 | 0 | - | 0 | - | 0 | 0 | 0 | 0 |
| | Geology and Soils | + | - | + | 0 | + | - | 0 | 0 | 0 | - | 0 | 0 |
| | Landscape and Visual Impacts | + | - | + | 0 | 0 | - | 0 | - | 0 | - | + | 0 |
| | Materials and Waste | 0 | - | 0 | 0 | + | --- | 0 | - | 0 | - | 0 | 0 |
| | Noise and Vibration | 0 | 0 | + | 0 | 0 | - | 0 | - | 0 | - | + | 0 |
| | Radiological Emissions and Discharges | 0 | 0 | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Water Resources and Quality | 0 | - | ++ | 0 | 0 | -- | 0 | - | 0 | - | + | 0 |
| Health | General Health | 0 | - | + | 0 | 0 | - | 0 | 0 | 0 | - | + | 0 |
| | Life Expectancy | 0 | 0 | 0 | 0 | + | -- | 0 | 0 | 0 | - | + | 0 |
| | Mental Health | + | - | + | - | + | - | + | 0 | 0 | - | + | 0 |
| | Radioactivity | 0 | 0 | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Respiratory Disease | 0 | 0 | + | 0 | 0 | - | 0 | 0 | 0 | - | + | 0 |
| Socio-E | Diversity | 0 | 0 | 0 | - | ++ | 0 | ++ | 0 | + | 0 | 0 | 0 |
| | Employment | 0 | 0 | + | - | ++ | 0 | + | 0 | + | 0 | 0 | - |
| | Economy | ++ | -- | + | - | + | 0 | ++ | 0 | + | - | + | - |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Local and National Assets | 0 | 0 | 0 | - | 0 | 0 | + | 0 | + | - | + | 0 |
| | Population | + | - | + | - | + | - | + | - | + | - | + | - |

## 6.2 Site Decommissioning and Remediation (SDR)

### 6.2.1 Safe Stewardship

#### *6.2.1.1 Utilise existing assets to manage and maintain the estate*

Utilising existing assets to manage and maintain the estate may only be suitable in certain situations. Where considered appropriate, existing assets would be used to manage risk, with controls in place to ensure the risks do not increase.

There are relatively few environmental risks associated with utilising existing assets to manage and maintain the estate due to activity only requiring operation and maintenance. There may be reduced environmental opportunities in terms of improving biodiversity as existing assets and land will continue to be used for industrial purposes.

From a socio-economic perspective, this option offers opportunities through maintaining jobs over a sustained period of time, though employment may largely be restricted to operation, maintenance, and monitoring activities. This option would also provide opportunities to enhance knowledge and skills and provide education and training. There would also be potential socio-economic benefits in terms of continued investment in the local economy, and improvement in road and rail infrastructure.

#### *6.2.1.2 Develop / construct new assets to manage and maintain the estate*

Developing and constructing new assets to manage and maintain aspects of the estate may be appropriate where it is not possible to utilise existing assets. As such there would be both potential opportunities and risks associated with land increase and construction in the short term, as well as additional operation and maintenance in the long term.

There are a relatively large number of potential environmental risks associated with this option. During these stages waste generation, vehicle movements and impacts in terms of pollution to air and water would potentially be high, as well as potential reductions in biodiversity where land is increased. These risks can be mitigated if they are correctly understood through assessments so that pollution risks can be anticipated and preventative measures put in place. The significance of the impacts will also depend on the current baseline, for example the biodiversity of the site and surrounding land prior to construction and current air and water quality. Impacts could be reduced where land already used for industrial processes can be reused.

Where construction is undertaken there is the potential for risks from a health perspective, for example the risk of respiratory illnesses associated with pollution of air and water, while increased traffic might influence the risk of road accidents on the local transport network.

This option offers socio-economic opportunities due to the creation of employment in the short term through construction, and over the long term through operation and

maintenance. As a wide range of employment opportunities would be maintained over a long period of time there would also be opportunities to enhance knowledge and skills and provide education and training on a similarly wide range of subjects. There would also be potential socio-economic benefits in terms of continued, and potentially increased, investment in the local economy.

### 6.2.2 Decommissioning

#### *6.2.2.1 Immediate dismantling – either accelerated, parallel or sequential*

It is considered likely that immediate dismantling will pose the greatest risk of impact through its requirements for land to be increased in the short term and in the construction of waste management and storage facilities to enable decommissioning. Opportunities will also be provided associated with the release of NDA land in the long term.

Immediate dismantling enables sooner access, and more efficient management subsurface contamination. This provides the opportunity for improving the landscape, and air and water quality, quicker.

Immediate dismantling would provide an environmental and/or socio-economic opportunity for land to become available for alternative uses earlier. A key socio-economic risk associated with immediate dismantling is the potential for skills and the workforce to be 'locked up' on a particular site or area of a site.

Negative impact on workers' and their families' mental health and well-being could occur as a result of immediate dismantling, as once a site is decommissioned the workforce are no longer required.

#### *6.2.2.2 Deferred dismantling - Minimal interventions during C&M*

In certain cases, deferring dismantling can provide an opportunity to allow natural decay, which reduces the radiological risk to the public and the environment, and may reduce the level of physical activity required to clean up a site or facility. If there are short-lived radionuclides, then deferred dismantling may reduce the waste management burden, with potential knock-on implications in terms of reduced transport.

Deferred dismantling has the potential to allow access, and efficient management of subsurface contamination. This provides the opportunity for improving the landscape, and air and water quality. However, these opportunities (and associated health impacts) would be realised over a longer time frame than immediate dismantling.

Deferred dismantling presents the opportunity of maintaining a skilled workforce and jobs in the supply chain. However, it can also mean that land becomes available for alternative uses more slowly. The opportunity to maintain jobs over a longer time period through deferred dismantling could offer mental health and well-being benefits, although there would be a decline in jobs during periods of deferral under that option. This may enable attention, in terms of resources, skills and workforce, to be diverted to sites and facilities where health risks are higher.

#### *6.2.2.3 Deferred dismantling – Planned interventions during C&M*

This option assumes a significant maintenance programme of work being required during the deferral period itself offset by much less work being required during the preparatory phase [8]. During this option, there may be periods with no active dismantling, in which programmes are implemented to ensure that the required level of safety and asset management is maintained. Deferred dismantling may apply only to particular buildings or structures in a facility or at a site, whilst everything else around it is cleared without interruption.

As deferring dismantling allows time for radioactive decay, doses received by workers may be lower. However, due to the requirement for personnel to carry out interventions, and the significant amount of maintenance work required, overall exposure may be higher in the long term than for deferred dismantling with minimal interventions.

The maintenance programme required for deferred dismantling with planned interventions will provide opportunities to maintain jobs over a sustained, longer period of time. This provides benefits to the local economy as well as mental health and well-being benefits. There may also be short term opportunities to move resources (in terms of skills and workforce) to sites and facilities where risks are higher. This could be considered an additional health opportunity of deferred dismantling with planned interventions.

#### *6.2.2.4 Combined strategy including interim state(s)*

Any preferred strategy for a site will be case-specific and will consider the advantages and disadvantages of credible options in line with the code of practice for the selection of decommissioning strategies [8] and the NDA Value Framework [7]. It may be that some sites require a combination of strategies, starting with a pause at an interim state to consider and review performance, with a judgement made at that time to either change the timing of dismantling or to accelerate or slow down the rate of progress.

### 6.2.3 Site end-states

#### *6.2.3.1 Leave the hazard where it is and prevent use*

The option of leaving the hazard where it is and preventing use would not involve physical activity to improve the condition of the site, but may involve minimal activity to maintain, stabilise or prevent migration of contamination. For the most part, it would rely on controls (legal or administrative tools or actions such as restrictions on land use, environmental monitoring requirements, and site access and security measures) to manage risks to people and the environment. Such a strategy is only suitable in extreme cases where remediation is very difficult.

Managing the risk through leaving the hazard where it is and preventing use using controls could offer some opportunities from an environmental perspective in terms of reducing the physical activity needed in the short and medium-term. This would present opportunities to keep impacts to changes in air, water and soil quality to a minimum by avoiding pollution-generating activities such as excavation or demolition, vehicle

movements and energy use. However, this option offers no environmental opportunities in terms of improving water and soil quality at the site as the hazard would continue to exist in largely unaltered form.

Preventing the site from being reused would limit socio-economic opportunities but may lead to some employment opportunities to undertake monitoring activities whilst also potentially ensuring continued NDA investment in the local community.

#### *6.2.3.2 Make land suitable for new planned use*

Where land is made suitable for its next planned use, sites would be remediated only as far as is required to be suitable for their next planned use. Where the next planned use does not need a nuclear site licence, the licence will be surrendered, with any residual radioactive or non-radioactive contamination subject to appropriate permit, planning and institutional controls.

Activities required to make land suitable for a next planned use, including construction and on-going maintenance, are likely to generate a range of short to long-term environmental impacts, including changes in air, water and soil quality, the generation of carbon emissions and wastes, and changes to habitats or landscape. However, there would also be various environmental opportunities, including mitigation of contamination, improvement of long-term air, water and soil quality at the site, enhancement of biodiversity and removal structures or facilities which have adverse landscape and visual impacts. The exact extent of such impacts and whether they were a risk or opportunity would depend on the next planned use and the current state of the land.

The main health opportunity associated with making land suitable for its next planned use is the removal of hazards which may be affecting the health of workers and the local population through their impact on land, water and air quality.

Making land suitable for its next planned use presents opportunities to generate employment and enhance knowledge and develop skills in the local community. A further socio-economic opportunity is the potential for reuse or divestment of the land which, following remediation, may become a local or national asset. Making land suitable can also offer opportunities to facilitate dialogue with stakeholders, which can have a positive effect on community cohesion and may lead to mental health and well-being benefits.

#### *6.2.3.3 Remove the hazard completely so that the risk does not need to be controlled*

Removing a hazard completely so that the risk does not need to be controlled would enable sites to be restored to a condition where they can be used for any foreseeable use without the need for additional remediation or management controls. The level of intervention required to achieve this would likely be high.

Removal of a hazard completely would likely lead to higher magnitude adverse environmental impacts in terms of air quality, noise and vibration, carbon emissions and energy use in the short to medium-term, when compared to the other credible options, but may result in long-term improvements in air, water and soil quality. It is also likely that greater volumes of waste would be generated which may then need to be removed from the site. However, it could present opportunities for positive impacts on habitat for biodiversity, landscape and the visual environment.

From a health perspective, removing the hazard completely would offer considerable long-term health opportunities, such as physical health improvements should the land be used for recreation. However, there is the risk of impact in the short-term, for example works to excavate contaminated material and transport it off-site could lead to changes in air quality which may influence the risk of respiratory illnesses. Increased traffic might increase the risk of road accidents.

Due to the increased level of intervention required to make the land suitable for any foreseeable use, there may be a range of socio-economic opportunities provided, including employment, development of skills and opportunities for education and training.

### 6.2.4 Operational Estate use

#### *6.2.4.1 Divest the land (leasehold or freehold) for social, environmental or economic benefit*

Future site use will be defined by the NDA, UK Government, or a future owner in accordance with local planning regimes and incorporating consultation with stakeholders as appropriate. The aim of all the varying potential uses will be to provide opportunities for positive environmental, social or economic impacts.

The decommissioning and clean-up of existing NDA sites may allow for those sites to be divested for nuclear new build. This could offer several environmental opportunities, including the avoidance of the extensive environmental impacts associated with land increase for and development of new sites. Such development at existing sites would also offer opportunities by providing a low carbon form of power generation, which could have a positive impact from a climate change perspective. Alternatively, there may be substantial opportunities for positive environmental impacts if sites are converted into nature conservation sites or habitats having been divested by the NDA. This could lead to potentially significant benefits in helping to promote biodiversity and improve local landscapes.

The creation of a recreational or amenity space or some other form of community facility could lead to health opportunities from improvements in mental health and well-being, as well as having positive physical health implications, such as reduced obesity in the local community, if it leads to increased levels of physical activity. This is on top of the health benefits associated with reduced air, water, visual and noise pollution as a result of the land no longer being used for industrial processes. However, intensive demolition or

excavation works can lead to negative health impacts, such as increased risks of cardiovascular or respiratory illnesses, caused by a decline in air quality.

A nuclear new build site could offer potentially large positive impacts for the socio-economics of the local community through the creation of long-term employment, education and training. A key socio-economic risk associated with divesting NDA land is the potential for skills and the workforce to be 'locked up' on a particular site or area of a site.

#### *6.2.4.2 Retain land as an NDA asset or liability*

The alternative to divesting the land for socio-economic or environmental benefit is to either retain the land as an NDA asset or liability, or on behalf of the government as a national asset. Such options would offer reduced opportunities for environmental and socio-economic benefits and would only be preferred in the event that a more suitable use could not be identified.

Divesting land may require intensive works in the short term for the land to be divested in a suitable state. In certain cases there are opportunities for benefits through slowing or deferring this process, such as taking benefit from radioactive decay. Through maintaining land as an NDA asset or liability there would be the opportunity to spread environmental impacts (and associated health impacts) over time, though with the risk of incurring negative effects on mental health and well-being due to extending impacts on the landscape and land use. Additionally, there are a number of constraints to immediately preparing a site for divestment that would not need to be overcome, such as access restrictions, a lack of waste management infrastructure, and potentially limited resources including supply chain capacity.

Retaining land as an NDA asset may present the opportunity of maintaining a skilled workforce and jobs in the supply chain, particularly in maintenance roles. There may also be the opportunity of reusing facilities, which could be more economical and offer more environmental benefits than having to acquire and construct new sites, with the potential for impacts through pollution that this entails.

#### *6.2.4.3 Retain land on behalf of government as a national asset*

Retaining land on behalf of the government gives the opportunities for reusing the land to support other government priorities such as national infrastructure projects, and in particular, for nuclear new build. This could include Small Modular Reactors (SMRs) as part of the Great British Nuclear competition.

It is possible that a higher level of decommissioning and remediation may be required if land is to be leased by the NDA. As such, there is the potential for environmental risks associated with this work in the short term, such as discharges to air and land.

Depending on the future use of the land once it has been transferred to a government asset there is the possibility that there will the opportunity to maintain, or possibly increase, employment and investment in the local area. This could have knock on positive effects on mental health and diversity.

## 6.3 Spent Fuel

### 6.3.1 Consolidation

In recent years, the NDA has been contractually committed to receiving and managing all of the spent fuel arising from the seven currently operating EDF AGR power stations in England and Scotland, and spent fuel from Dounreay, at Sellafield. This strategy of consolidation enables sites to be decommissioned then transferred to the NDA. This approach also enables the NDA to optimise the use of suitable facilities, skills and capability already in existence at Sellafield to treat and manage spent fuels. The long-term objective is for spent fuel to be disposed of in a GDF following their consolidation.

#### *6.3.1.1 Only consolidate AGR spent fuels at Sellafield and store spent fuels from Dounreay at Dounreay until a disposition option becomes available*

This option would require the spent fuel to be interim stored in newly built facilities at Dounreay pending the long-term aim of treatment and packaging prior to disposal in a GDF. New storage at Dounreay would need to be built in the short- to medium-term, and spent fuel would be moved to these storage facilities when they are available.

Constructing new storage facilities at Dounreay would present a risk of short-term negative impacts to air and water quality and the local landscape. Construction would require a large number of resources, and likely lead to the generation of additional waste. However, as the facility would be designed with decommissioning and the waste hierarchy in mind, the impact of this would be minimised as far as reasonably possible. There would also be the risk that vehicle movements and the use of plant may generate noise, would require energy and generate carbon emissions.

The spent fuel would not be transported to Sellafield prior to transfer to a GDF, providing opportunities for better environmental and health impacts from a decrease in transport overall.

The construction of new stores at Dounreay would provide the opportunity to generate more construction jobs in the local area and benefit the local economy during this period, in addition to jobs for the operation and maintenance of the facility and upskilling in the local area through appropriate education and training. The loss of these employment, education and training opportunities at the Sellafield site may be considered as having a negative socio-economic impact on Cumberland.

Due to mitigation measures including the requirement for BAT and as low as reasonably achievable (ALARA), there is an insignificant risk of increased impacts on health as a

result of the construction and operation and future maintenance of new storage facilities. However, nuisance and road traffic impacts will be greater during the construction period. That annoyance and road traffic impacts would likely not be felt in Cumberland could be considered an opportunity, especially as road traffic impacts associated with Sellafield are already high.

#### *6.3.1.2 Stop all consolidation activities and leave spent fuels on reactor sites until a disposition option becomes available*

Stopping consolidation activities and leaving spent fuels at reactor sites until such time as a disposition option becomes available is not currently considered a viable option, but circumstances may lead to it becoming one in the future. Stopping consolidation would create a number of issues to consider, such as non-optimal storage conditions at the reactor sites and the difficulty of packaging for GDF created by storing spent fuel on different sites for long time periods.

### 6.3.2 Interim Storage

#### *6.3.2.1 Treat and package all spent fuels now ready for disposal in a GDF, including drying spent oxide fuels and storing in disposal containers*

The treatment, packaging and storage of spent fuels that have not been reprocessed following closure of the reprocessing plants will require significant investment in infrastructure, as such there needs to be considered the impact of constructing new storage compared to using or modifying an existing store.

Constructing new storage facilities presents a risk of short-term negative impacts to air and water quality and the local landscape. Construction would require a large number of resources, and likely lead to the generation of additional waste. However, as the facility would be designed with decommissioning and the waste hierarchy in mind, the impact of this would be minimised as far as reasonably possible. There would also be the risk that vehicle movements and the use of plant may generate noise, would require energy and generate carbon emissions.

Air quality and associated health impacts, such as increased risks of cardiovascular and respiratory illness amongst the local population, are likely to be increased during the construction of new facilities as a result of the likelihood of increased pollution of air and water. Nuisance and road traffic impacts will also be greater. The increase in construction, operation and maintenance of work, and increased opportunities for education and training, over a longer period of time, would likely offer mental health and well-being benefits locally.

Construction of new facilities would provide an opportunity for the generation of construction jobs in the short-term that would be a considerable boost to the local economy during this period. There would also be a long-term requirement for personnel to operate and maintain the stores and transport waste to a GDF when it becomes

available. Appropriate education and training, and maintenance of knowledge and skills would be required for both short term construction jobs and the longer-term operational employment. Finally, treating and packaging all spent fuels in new facilities would potentially provide an opportunity to reduce the dose to workers through the avoidance of contact with radioactive material already in place in an existing store.

#### *6.3.2.2 Minimise new storage solutions and use existing packages and facilities for all fuels*

Managing the spent fuel inventory through existing storage facilities avoids most of the short, medium and long-term environmental impacts associated with construction, operation and decommissioning of a new facility to store the inventory. These impacts may include emissions of air pollutants, noise and vibration, landscape and visual impacts, energy use and consumption of raw materials. Some construction will still be required to maintain existing stores. Operation of the packaging plant could generate a number of environmental impacts, particularly from a materials and waste perspective, as several thousand tonnes of spent fuel would be packaged to produce a waste product.

Managing spent fuel in existing facilities may lead to slightly greater volumes of water abstraction, given the current wet storage of some spent fuels. However, any reduction in water abstraction as a result of constructing new facilities is likely to be small compared to water abstraction volumes for the site as whole. Managing spent fuel in existing facilities may also lead to slightly greater radiological discharges and operational waste volumes compared to newer facilities, because newer facilities would be optimised to reduce these risks. There may be additional increased risk of corrosion of spent fuel stored in current storage facilities, which could lead to releases to the ground or water environments.

Minimising new storage solutions and use existing packages and facilities for all fuels may offer some health opportunities by avoiding the additional movement of spent fuel to a new facility prior to packaging and disposal to a GDF. These risks would include conventional risks associated with transport movement and air quality, but also the small radiological risk associated with movement of radioactive waste. Avoiding the construction of new facilities may have mental health benefits through the avoidance of environmental effects, including reduced air quality, noise and vibration generation, and visual and landscape effects. Overall, the effects on mental health of storing spent fuel in existing facilities is likely to be small.

Management of the spent fuels using existing facilities offers limited opportunities for developing new knowledge and skills, with the exception of the knowledge and skills that might be gained from implementing techniques to prolong the life of existing interim stores. This might lead to some minor opportunities for education and training.

### 6.3.3 Disposition

The current baseline for disposition is to store spent fuels pending a decision to declare them as waste for disposal in a GDF.

#### *6.3.3.2 Declare all fuels as waste today*

A decision by the NDA, the UK government and regulators to declare all spent fuels as waste today will not present any additional risks or opportunities for impact than the current baseline. Regardless of whether spent fuels are classed as waste there is a continued need for them to be stored appropriately due to the nature of the inventory. The NDA and NWS's current plans for Sellafield are for all spent fuel to ultimately go to a GDF, and spent fuels are included on the planned inventory.

#### *6.3.3.3 Store fuels indefinitely*

If fuel were to be stored for an indefinite amount of time, then any storage facility would require ongoing operation and maintenance for that indefinite period. The spent fuel itself would similarly require management indefinitely.

Managing spent fuel indefinitely would lead to an ongoing risk of radiological discharges and operational waste generation. Indefinite storage of spent fuels without construction of new stores would increase the risk of corrosion of spent fuel stores, which may potentially lead to radiological releases to the ground or water environments. Indefinite storage of AGR fuel risks a greater amount of effluent from wet storage in ponds needing to be treated, with a consequent increased risk of impact on the water environment and health. However, where newer facilities are utilised, these risks may be reduced due to improvements in design.

Storing spent fuels indefinitely presents the opportunity of maintaining a skilled workforce and jobs in the supply chain, potentially in construction and certainly in operation and maintenance. The opportunity to maintain jobs over a longer period of time through indefinite storage of spent fuel could offer mental health and well-being benefits.

## 6.4 Nuclear Materials

### 6.4.1 Uranium

#### *6.4.1.1 Continued safe and secure storage pending sale for reuse, where economically and/or technically practicable*

Environmental risks include the landscape and visual impacts of existing uranium stores, and any pollution generated from maintenance activities required to repackage the material or replace the stores. Sale for reuse would offer the opportunity of improving the landscapes and visual impacts by facilitating the closure of existing facilities.

Opportunities through sale for reuse may not be realised for many years, during which time the environmental impacts associated with continued storage would apply. The sale of uranium for reuse, would ultimately lead to the generation of waste depleted uranium.

The storage of the NDA's uranium inventory presents the risk that the land that the stores are built on cannot be reused by the local community. However, uranium maintenance and repackaging activities support ongoing employment opportunities.

The sale of uranium for would lead to the loss of jobs involved in managing and maintaining existing uranium stores when the stores close.

#### *6.4.1.2 Continued safe and secure storage pending disposal*

The disposal of uranium would involve the construction of new facilities and the generation of materials and waste, which would have environmental impacts.

There is a risk that opportunities for employment would be lost should disposal options be implemented though this could be offset by operational jobs created to manage conditioning and interim storage facilities. In addition, there would be short-term employment opportunities created during construction of the any new facilities.

#### *6.4.1.3 Continued safe and secure storage pending conditioning to an appropriate form for disposal*

The continued safe and secure storage of uranium pending conditioning to an appropriate form for disposal may offer opportunities to enhance knowledge and skills in uranium conditioning, which could then be applied to the management of other radioactive materials.

There are a relatively large number of environmental risks associated with developing and constructing new assets to condition uranium prior to disposal. During these stages waste generation, vehicle movements and impacts in terms of pollution to air and water would be increased, as well as potential reductions in biodiversity where land is acquired.

Developing and constructing new assets to condition uranium offers socio-economic opportunities through the creation of employment through construction, operation and maintenance, enhanced knowledge and skills, education and training, and investment in the local economy.

### 6.4.2 Plutonium

There are two credible options for management of the NDA inventory of civil plutonium, one of which is the continuation of the current baseline of continued safe and secure storage of plutonium, renovating and replacing stores as required.

#### *6.4.2.1 Build facilities to condition and treat plutonium prior to storage and disposal to a GDF*

This option considers the most direct path to disposal. There are a number of potential technologies that could be used to condition the material ahead of disposal. Conditioning and treatment would take place at Sellafield. The material would then need to be placed in interim storage pending transfer to a GDF.

The potential conditioning technologies would each involve construction of facilities. The extent of construction would likely be a single treatment plant and one or more interim stores. Effects associated with operation would vary depending on the conditioning technology used, as would the duration of this phase. In the medium and long-term there could be positive effects associated with avoiding activities to repackage the plutonium.

Conditioning the plutonium would generate substantial volumes of waste during operation. Conditioning and treatment prior to disposal may require classifying material as waste, and the nature of plutonium is such that the waste would be hazardous and require careful management.

Conditioning and treatment would result in closure of existing facilities used to manage the plutonium inventory, which could have a positive impact on the local landscape. Disposal at the earliest opportunity avoids the need to continuously replace existing stores and repackage the plutonium, which will be required under the baseline scenario. Repackaging is needed periodically, depending on the type of plutonium and if the original container has already been replaced. Decommissioning the existing plutonium stores is likely to generate considerable volumes of waste, some of which may have low levels of radioactivity, and a very small amount may qualify as ILW.

Any conditioning technology selected would create a full range of employment, from construction to highly skilled technical and managerial jobs. It is likely that conditioning and treatment would both maintain existing skills and facilitate the development of new skills and knowledge during the operational period.

## 6.5 Integrated Waste Management

The Strategy for Integrated Waste Management employs a systems approach, looking at the overall capability of the NDA's waste management system rather than for individual projects and sites. The system comprises four stages, three of which – treatment and packaging, storage, and disposal – are discussed below.

It should be recognised that a systems approach means there may not be prescriptive options for each of the stages. In addition, the system is not a linear process, and the strategy demonstrates a circular view of waste, for example, waste may be put in interim storage then go backwards in the system cycle to be treated once a new treatment process has been developed. This can impact the credible options that are available at each stage for different waste streams.

### 6.5.1 Treatment, Packaging and Storage

#### *6.5.1.1 Treatment, packaging and storage at local (on or near site) facilities*

The treatment, packaging and storage of waste at local facilities will involve the construction of new facilities that are on or near to sites where waste continues to be produced. There is the potential for these to be modular in nature, or even mobile, however, are likely to significantly impact the environment, health and socio-economics both positively and negatively around the sites chosen.

From an environmental perspective, the main risks of treatment and packaging at local (on or near site) facilities are associated with the footprint of the facilities themselves, including the extent of construction activities involved. The construction of numerous local facilities would likely involve the greatest material requirements of the credible options. For each new facility; land, construction, operation and maintenance would be required. Construction activities risk increased instances of discharges to the air and water environment of dust, emissions from vehicles, and site run off, leading to pollution of the local environment.

One of the main health opportunities offered by the local treatment and storage option is the avoidance of risk associated with transport movements. This includes the risk of traffic accidents and changes in air quality that can influence the risk of cardiovascular and respiratory illness amongst the local population. Treatment at or close to sites may reduce health risks by ensuring that wastes are converted to a safe and secure form more quickly.

The use of local treatment, packaging and storage facilities may allow socio-economic benefits such as jobs and investment to be spread amongst a number of communities, although opportunities to reuse the land or divest it for some socio-economic or environmental benefit may not be realised.

#### *6.5.1.2 Treatment, packaging and storage at regional facilities*

Storage, treatment and storage of waste at regional facilities would involve the construction of a number of regional hubs. These facilities would likely be located at or in close proximity to the site with the highest volume of waste in a particular area.

Compared to local facilities, an increase in transport would create the risk of impact on air quality.

Socio-economic benefits would be reduced to the area around these regional hubs rather than spread out across local areas. Sufficient transport infrastructure would need to be in place to ensure that the facility is equipped to receive and manage waste transported from neighbouring sites, likely improving regional transport assets.

#### *6.5.1.3 Treatment, packaging and storage at national facilities*

Treatment, packaging and storage of waste at national facilities would involve establishing individual facilities at national locations that would serve all NDA sites for specific purposes. The implementation of this credible option would be dependent on the availability of sufficient transport infrastructure.

National facilities for the treatment of waste would have the largest physical environmental footprint. As a result, landscape and visual impacts, and potentially releases of pollutants to air, water and the ground would risk being larger in scale. Risks of impacts to biodiversity, wildlife and cultural heritage features may also be greater than under the local and regional options, although this is highly dependent on the final location of such facilities. However, having individual facilities for the treatment of waste would require the transport of waste from NDA sites across the UK to those facilities. This would increase the risks of pollution from these activities, including noise and vibration, as well as the health issues associated with increased pollution.

A single national or regional facility to manage all wastes of a particular type could be seen as an opportunity in terms of advancing knowledge, skills, education and training, or as a risk if it locked-up skills and resources which could be better directed elsewhere. In such a situation, creation of a single specialised facility to manage a particular waste stream may offer socio-economic opportunities, however these would be confined to one spatial area.

### 6.5.2 Disposal

#### *6.5.2.2 On-site or in situ disposal at additional sites*

It is recognised that there are significant constraints associated with the disposal of radioactive waste at the LLWR such as the potential risk of coastal erosion of the site. Therefore, to get the full benefits afforded by the updated policy framework for managing radioactive substances [6], the NDA are investigating alternative capabilities for the disposal of all radioactive waste that does not require disposal in a GDF.

On-site or *in situ* disposal at additional sites may require an increase in land, to be utilised as waste disposal sites. It is therefore likely that there will be significant impacts through its requirements for increased land and in the construction of facilities in the short term. However, it could offer the opportunity to reuse land on an existing NDA site that has been decommissioned, which would reduce the risks associated with land increase. Both scenarios would negate any opportunities associated with the clean-up and release of NDA land in the long term.

Impacts of on-site or *in situ* disposal include the risk of changes in air and water quality and increased landscape and visual impacts. There is additional risk that noise may also be generated from vehicle movements, and the use of plant would require energy that could generate carbon emissions. The construction of a new facility to dispose of waste

would also require increased use of resources and generation of carbon emissions. Disposal of waste *in situ* may offer the opportunity to reduce traffic volumes associated with movement of waste away from site, with the benefits of reduced noise, vibration and air pollution.

Construction of a new disposal site would provide an opportunity for the generation of construction jobs in the short-term that would be a considerable boost to the local economy during this period. There would also be a long-term requirement for personnel to operate and maintain the sites. Appropriate education and training, and maintenance of knowledge and skills would be required for both short term construction jobs and the longer-term operational employment.

#### *6.5.2.3 Disposal to NSD at LLWR subject to permitting and planning*

The new policy framework for managing radioactive substances [6] enables implementation of NSD of less hazardous ILW in England and Wales. The first phase of NSD has been planned at the LLWR in Cumberland though permitting and planning is still required before it can receive less hazardous ILW.

Disposal of waste to NSD at LLWR, subject to permitting and planning, would not require any land to be increased for a site. This provides potential benefits of land on NDA sites becoming available for release. There would still be the need to construct relevant facilities at LLWR.

Waste disposal to NSD at LLWR would likely see an increase in the transport of waste from all 17 of the NDA sites from the UK to that facility. This increase in transport presents risks of impact to air and water quality, noise and vibration, and climate change, as well as the health impacts associated with increased pollution in the vicinity of the transport routes.

The use of the LLWR site for the disposal of NSD potentially offers opportunities in terms of advancing knowledge, skills, education and training, as well as continued employment and local investment. In such a situation, creation of a single specialised facility to manage a particular waste stream may offer socio-economic opportunities, however these would be confined to one spatial area.

#### *6.5.2.4 Disposal to GDF subject to ongoing consultation and investigation.*

The strategy for radioactive waste disposal has devolved significantly since the previous IIA (2021) [5] due to the implementation of the new policy framework [6]. The policy continues the implementation of geological disposal for the most hazardous radioactive waste and reaffirms the UK and Welsh Governments' position on implementing geological disposal and their commitment to working in partnership with communities that are willing to participate in the siting process. However, a GDF will be a Nationally Significant Infrastructure Project (NSIP) that will require significant environmental, health and other assessments beyond the scope of this IIA and so has not been assessed.

## 6.6 Critical Enablers

### 6.6.1 Transport

The NDA has a commitment to ensuring the effective, safe, and secure transportation of materials. NTS is recognised as the NDA group's expert in transporting radioactive and nuclear materials. Additionally, the NDA aims to minimise the environmental, economic, and social impacts of its transport operations.

The increased use of rail transportation is a desirable and preferred option to reduce the impacts associated with the distribution of materials such as construction products and soil from NDA sites. The NDA also intends to support the UK Government's efforts in transporting radioactive and nuclear materials by developing a new National Focal Point for nuclear transport.

Increasing the use of rail transport, and as such being less reliant on road transport, gives the opportunity to decrease the impact of transportation on the environment. Transportation by rail reduces the risk of negative impacts on air quality (and associated health impacts). This could include reduced generation of dust and emissions, and of air pollutants such as $NO_x$, sulphur dioxide ($SO_2$) and PM. Additionally, transport by rail has a greater capacity per journey than road, which would further reduce impact on air quality in comparison to road transport by way of requiring fewer journeys leading to reduced emissions of greenhouse gases such as $CO_2$, $CH_4$ and $NO_x$. It will also use less fossil fuels than traditional road transport, assuming that traditional methods of transportation are used and not clean fuels, e.g. hydrogen, and so an increased use of rail for transport would decrease the risk of negatively impacting climate change.

Transport by rail allows for radiological materials to be transported in a more controlled and safer environment, with decreased contact with the general public. The use of road transport necessitates the use of public roads in the vicinity of homes and recreation areas leading to impacts through noise and vibration. An increase in noise and vibration can affect a person's general health over time. If these are in recreation areas, then the risk of impact becomes greater. Noise and vibration can cause disturbed sleep, which can lead to other health conditions in the long-term.

For the NDA to increasingly use rail transport there would be a need for increased investment in the rail network, in turn leading improvements in rail infrastructure. This may, however, lead to a decrease in investment in road infrastructure, in turn risking a degradation of the road network in areas local to NDA sites. The reduction in the number trips required through prioritising rail may also lead to reduced employment in the transport sector, with a small opportunity for retaining for some staff.

## 6.7 Cumulative Effects

Cumulative effects have been identified where potentially insignificant impacts occur simultaneously and combine to produce a more significant effect. Cumulative effects of the Strategy are discussed in detail in Volume 2 of the IIA. Two types of cumulative effects were identified, intra-strategy effects and inter-plan effects.

The four driving strategic themes of the Strategy do not operate in isolation at each of the NDA's sites. All four themes interact with one another and the Critical Enablers. The potential effects of implementing the Strategy may therefore be increased or decreased if preferred options under different themes result in development or changes in transport and other infrastructure over similar timescales, or in the same location.

The strategic themes identified as having the highest level of interaction and the greatest likelihood of cumulative effects are Site Decommissioning and Remediation and Integrated Waste Management, and Spent Fuels and Nuclear Materials.

The NDA strategy is focussed on the safe, secure and cost effective decommissioning of their sites. However, government policies and plans influence how the NDA's Strategy is carried out. Examples of this are the updated UK policy framework for managing radioactive substances and nuclear decommissioning [6], the agreed arrangements for the future transfer of ownership of the 7 EDF AGR power stations to the NDA [69], anticipated transfer of liabilities from the MOD to the NDA [70], the anticipated update of the National Policy Statement for Nuclear Power Generation and the ongoing development of advanced nuclear technologies [71].

# 7. Mitigation and Enhancement

In line with requirements of a Strategic Environmental Assessment, potential measures have been identified to mitigate adverse and enhance positive effects that may result from implementing the NDA Strategy (2026) [76]. The decision over which specific measures are needed will usually be made at the discretion of the SLCs which operate the NDA sites, in accordance with regulations, the NDA's Value Framework and site-specific assessment. The mitigation and opportunities for enhancement identified in the IIA will be considered during future strategy development.

## 7.1 Mitigation

### 7.1.1 Legislation and Codes of Practice

The NDA are required to comply with a wide range of legislation and codes of practice applied at International, European, National and Local Government level. Those which apply to the NDA have been outlined in Volume 3 of the IIA. A common requirement of legislation and codes of practice is for impact assessments and management procedures to be carried out at a site-specific level to mitigate the impact of activities at sites.

Table 2 displays where relevant legislation, policy and guidance act as mitigation against potential significant impacts of the NDA strategy.

**Table 2 Factors mitigated through regulation**

| Mitigation Measure | Activity relevant to | | | | Topic Relevant to |
|---|---|---|---|---|---|
| | Land | Construction | Maintenance | Transport | |
| Biodiversity Risk Assessment | ✓ | ✓ | | | Biodiversity |
| Relocation of sensitive species | ✓ | ✓ | | | Biodiversity |
| Flood and coastal risk assessments | ✓ | | | | Coastal Change & Flood Risk |
| Cultural heritage impact assessment | ✓ | | ✓ | | Cultural Heritage |
| Construction Environment Management Plan | ✓ | ✓ | | | Air Quality, Noise & Vibration, Water Resources & Quality, Respiratory Disease, Coastal Change & Flood Risk, Radiological Emissions & Discharges, Life |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | Expectancy, Geology & Soils |
| Environmental Permitting Regulations | ✓ | ✓ | ✓ | ✓ | Air Quality, Noise & Vibration, Water Resources & Quality, Respiratory Disease, Radiological emissions & discharges, Radioactivity, General Health, Climate Change |
| Planning Regulations | ✓ | | ✓ | ✓ | Landscape & Visual Impacts, Cultural Heritage, Waste & Materials, Population, Local & National Assets, General Health, Respiratory Disease, Mental Health |
| Guidance on Applying the Waste Hierarchy | ✓ | ✓ | ✓ | ✓ | Materials & Waste, Geology & Soils |
| Environment Act (2021) | ✓ | ✓ | ✓ | | Water Resources & Quality, Biodiversity, Geology & Soils |
| UK Policy Framework for Managing Radioactive Waste & Decommissioning | ✓ | | ✓ | | Radioactivity |
| Health & Safety at Work Act | | ✓ | ✓ | | Radiological Emissions & Discharges, Radioactivity, General Health |
| Ionising Radiation Regulations | | ✓ | ✓ | ✓ | Radiological Emissions & Discharges, Radioactivity, Air Quality, Materials & Waste, Water Resources & Quality, |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | General Health, Respiratory Disease |

### 7.1.2 NDA strategy and plans

In addition to external regulations the activity undertaken by the NDA is governed internally in accordance with its own strategies, plans, programmes and frameworks.

Table 3 displays where NDA plans, programmes and frameworks, policy and guidance act as mitigation against impacts of the NDA strategy.

**Table 3 Factors mitigated by NDA strategies and plans**

| Mitigation/Enhancement Measure | Activity relevant to | | | | Topic Relevant to |
|---|---|---|---|---|---|
| | Land | Construction | Maintenance | Transport | |
| NDA Group socio-economic grant funding programme | ✓ | | | | Local and National Assets, Economy, Mental Health |
| NDA Value Framework [7] | ✓ | ✓ | ✓ | | Economy, Employment |
| NDA Business Plan [72] | ✓ | | | | Mental Health |
| NDA Group Inclusion Strategy [28] | | ✓ | ✓ | ✓ | Diversity, Employment |
| NDA Strategy (2026) [76] – Critical Enablers | | | | ✓ | Air Quality, Biodiversity, Climate Change, Diversity, Materials and Waste, Water resources and quality |
| NDA Social Impact and Communities Strategy [73] | | ✓ | ✓ | ✓ | Local and National Assets, Economy, Mental Health, General Health |

## 7.2Enhancement

There are opportunities for the NDA to offer environmental, health, and socio-economic enhancement through the implementation of the Strategy, some of these have been discussed below.

### 7.2.1 Environment

The NDA, particularly through its Site Decommissioning and Remediation theme has the opportunity to promote biodiversity and develop green spaces by returning sites that have long been in industrial use to a greenfield state where this is possible. Remediation offers the opportunity for sites to be transformed into areas that support local wildlife and ecosystems, with benefits to the general and mental health of the population local to the sites.

Through the sustainable management of nuclear materials and non-radioactive waste the Strategy offers the opportunity of reducing environmental risks associated with NDA sites in the long term. Implementation of the waste hierarchy and reducing waste generation at NDA sites gives the potential to reduce the historic environmental footprint of the NDA Groups sites.

The implementation of energy-efficient technologies, and low-carbon technologies, where new facilities are required, in addition to a preference for rail transport over road, may allow an overall reduction in the NDA's carbon footprint during the timeframe of the Strategy.

### 7.2.2 Health

The presence of the NDA in an area gives the opportunity to enhance the health opportunities of the population. NDA presence may lead to greater investment in the healthcare facilities in the area. The NDA may also have the opportunity to invest in local recreation areas and sports teams, which may lead to improved general and mental health.

### 7.2.3 Socio-Economic

The NDA group has grant giving powers which are administered in collaboration with each SLC [73]. The NDA can offer grants for projects which support the delivery of the strategy in communities where its sites are located. Funding is available for collaboration with universities, innovation hubs, and research organizations to stimulate the development of new, safer, and more cost-effective decommissioning technologies.

Through the Strategy and through close working with partner organisations and communities the NDA can achieve enhancement by:

- Optimal utilisation of socio economic budgets.
- High-quality projects of different types and values.
- Transparency of decision making supported by evidence.
- Demonstrable delivery progress and measurable social impact.
- Evidence of 'adding value' including maximising on 3rd party funding.

# 8. Monitoring

The SEA Regulations 2004 [4] state that the responsible authority, in this case the NDA, are required to monitor the significant environmental effects of the implementation of each plan or programme. It is necessary to identify unforeseen adverse effects at an early stage in order to undertake appropriate remedial action.

As stated in the Strategy 4 Post Adoption Statement [5], monitoring should address questions such as:

- Were the results of the assessment, including predicted effects, accurate?
- Is the strategy contributing in practice to the achievement of objectives?
- Are there any adverse effects (i.e., is the strategy acting against achievement of the objectives)? If so, are they within acceptable limits or is remedial action required?

In addition, monitoring action should be focused on:

- significant adverse effects that may give rise to irreversible damage, with a view to identifying trends before such damage is caused; and
- aspects where the assessment has identified the risk of significant adverse effects, but where there is uncertainty, and where monitoring would help to resolve that uncertainty and enable preventative or mitigation/remedial measures to be taken.

Monitoring of environmental impacts is undertaken by NDA Groups on a site or project specific basis, as shown in Table 4.

**Table 4 Monitoring data collected by the NDA**

| Theme/Topic | Reported |
|---|---|
| Spent Fuel | NDA Mission Reporting |
| Nuclear Materials | NDA Mission Reporting |
| Materials and waste | NDA Mission Reporting |
| Decommissioning & Demolition (including remediation) | NDA Mission Reporting |
| Land Use | NDA Mission Reporting |
| Carbon emissions | NDA Sustainability Review [10] |
| Diversity | NDA Group Inclusion Strategy [28] |

Monitoring of a range of IIA related topics and themes is also undertaken by a variety of national bodies covering the UK, England and the devolved administrations of Scotland and Wales, as shown in Table 5.

Table 5 Monitoring data collected by external organisations

| Theme/Topic | Monitoring body | Reported |
|---|---|---|
| Radiological emissions | EA et al | RIFE Report [32] |
| Non-radiological emissions | EA, SEPA | EA Pollution Inventory [33], Scottish Pollution Release Inventory [34] |
| General Health | UK Government, Scottish Government | Office for National Statistics [22], Scotland's Census [62] |
| Water resources and quality | EA, SEPA, NRW | EA Catchment Data Explorer [48], SEPA Water Classification Hub [49], Data Map Wales [44] |
| Heart and circulatory disease | British Heart Foundation | Heart and Circulatory Disease Statistics 2024 [51] |
| Cancer | NHS England, Public Health Scotland, Public Health Wales, | Cancer Registration Statistics 2022 [52], Cancer Incidence Public Health Wales [53], Cancer Incidence in Scotland 2021 Report [54] |
| Radioactivity (Health) | EA et al | RIFE Report [32] |
| Life expectancy | UK Government, Scottish Government | Office for National Statistics [22], National Records of Scotland [56] |
| Mental Health | NHS England, Scottish Government, Welsh Government | NHS Mental Health Bulletin [57], Scottish Health Survey [74], National survey for Wales [75] |
| Population | UK Government, Scottish Government | Office for National Statistics [22], Scotland's Census [62] |

# 9. Conclusions

This Integrated Impact Assessment, combining a Strategic Environmental Assessment, Health Impact Assessment and Socio-economic Impact Assessment, aims to inform, but not drive, future NDA strategic decision-making. As such, there are a number of general conclusions that can be drawn from the IIA of the NDA Strategy (2026) [76].

Most significant impacts were in relation to the acquisition of land for the construction, operation and maintenance of new facilities. These generic activities will be required for developing and constructing new assets for the Safe Stewardship (Site Decommissioning and Remediation); all options for the consolidation and interim storage of spent fuels (Spent Fuels); new facilities for plutonium and uranium storage (Nuclear Materials); and additional facilities for the treatment, packaging and storage of waste (Integrated Waste Management).

The adverse impacts of construction can be mitigated by reusing existing facilities and by complying with already existing legislation and best practice. The preferred options for Site Decommissioning and Remediation and Integrated Waste Management strategies are selected on a case-by-case basis. A change in transport requirements associated with the location and number of new facilities could also offset some of the significant impacts because of reduced construction, operation and maintenance activities.

Implementation of a number of the preferred options may put pressure on the existing nuclear skills base. This pressure will be increased if or when aligned to any future demand from the UK's new nuclear build programme. Health risks associated with options are linked to environmental and socio-economic changes. There is the opportunity for the socio-economic impacts associated with closing facilities to be mitigated by transferring staff to alternative facilities or sites, or from the creation of business areas on delicenced land.

There is considerable uncertainty regarding how options will be implemented at a future time and at site level by SLCs. The results of this assessment should therefore be viewed as being indicative of potential trends. The results of this IIA should be used to inform future, more detailed assessments, to help select strategic options, as well as inform future decision-making made by the NDA and the SLCs which operate its sites. Specific impacts upon particular receptors may be more appropriately assessed as part of project-level site specific EIAs.

The cumulative effects of strategic themes of the Strategy were assessed. It is concluded that the two strategic themes with the highest probability for cumulative effects are Site Decommissioning and Remediation and Integrated Waste Management, and that Spent Fuels and Nuclear Materials themes may also interact at certain sites. The timing of implementation of the Defence Nuclear Organisation's (DNO's) Nuclear Liabilities, the New Nuclear Programme and advanced nuclear technologies relative to implementation of the NDA strategy is uncertain, consequently making it difficult to accurately predict potential cumulative effects.

The IIA assessment results will be used as part of the context for future strategic decision-making alongside aspects such as cost, feasibility, security and site-specific factors. The mitigations and potential enhancements identified in the IIA will be considered during future strategy development, and emerging legislation will be taken into account during the next IIA for Strategy 2031. Following public consultation, this IIA Report will be published alongside the NDA Strategy (2026) [76]. The outcomes of the consultation and its influence on development of the Strategy and the IIA will be documented in an IIA Post-Adoption Statement.

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# Distribution List

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# Appendix A IIA assessment guide questions

| IIA Topic | Assessment Guide Questions | | |
|---|---|---|---|
| | Generic Guide Question<br>'could the option…' | Detailed Guide Question<br>Check need for further assessment / investigation. | |
| | | Risks of adverse effects<br>'Is there a risk that the option could…' | Opportunities for benefits<br>"Is there an opportunity that the option could…" |
| **Environment** | | | |
| Air quality | ▪ … cause a change in non-radioactive discharges (e.g. $NO_x$, $SO_x$ and particulate matter)? | ▪ … result in emissions which cause a breach of air quality objectives? | ▪ … achieve a reduction in emissions which helps to prevent the risk of a breach of air quality objectives? |
| Biodiversity | ▪ … have any effects on protected and/ or notable (national or local) species of fauna, flora or fungi? | ▪ … have lasting (over a period of more than several years) effects on populations of protected and/ or notable species? | ▪ … generate increase, or help to prevent reduction in, populations of protected and/or notable species (including vulnerability to future impacts)? |
| | ▪ … have any effects on designated and/ or important non-designated habitats? | ▪ … cause lasting loss of habitat and/ or severance to habitat? | ▪ … create or enhance habitat, prevent its loss, or reduce severance to habitat? |
| Climate change | ▪ … cause a change in direct emissions of carbon dioxide ($CO_2$) and other greenhouse gases (GHG)? | ▪ … inhibit achievement of industry $CO_2$ and GHG targets? | ▪ … achieve a reduction in emissions which helps to achieve industry $CO_2$ and GHG targets? |

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| | ▪ … cause a change in indirect emissions of $CO_2$ or other GHG due to use of materials (embodied carbon) or change in energy use? | ▪ … inhibit achievement of national $CO_2$ and GHG targets? | ▪ … achieve a reduction in emissions which helps to achieve national $CO_2$ and GHG targets? |
| Coastal change and flood risk | ▪ …result in changes to the frequency or severity of (including vulnerability to) flooding from any source, e.g. groundwater or surface water? | ▪ …lead to increased flood risk or increased impacts of floods (e.g. through expansion of/ changes to infrastructure in flood prone areas)? | ▪ …lead to reduced flood risk or vulnerability to floods? |
| | ▪ …result in changes to the rate of, or vulnerability to, landscape change, including coastal / fluvial erosion and sea level rise? | ▪ …lead to increased coastal / fluvial erosion in any location (e.g. secondary impacts of construction / engineering) or increased vulnerability to landscape change? | ▪ …lead to reduced impacts of coastal / fluvial erosion or vulnerability to landscape change? |
| Cultural heritage | ▪ … have an effect on valued (designated or otherwise) historic buildings, features or sites, or any other known aspects of cultural heritage? | ▪ … result in damage / degradation to an historic building, feature or site, or any other known aspect of cultural heritage? | ▪ … lead to enhancement of, or prevent the loss (preservation) of, an historic building, feature or site? |
| | ▪ … have an effect on surface or sub-surface archaeology? | ▪ …result in damage to or loss of archaeological features or assets? | ▪ … result in prevention of loss (preservation) of archaeological features or assets? |
| Geology and soils | ▪ …result in a change in non-radioactive discharges to the ground? | ▪ … lead to or worsen ground contamination that would then require corrective measures? | ▪ … help to reduce or remove existing ground contamination? |
| | ▪ … result in a change in soil resources or quality? | ▪ … lead to a loss of soils (e.g. through construction / excavation) or decline in soil quality? | ▪ … prevent the loss of soils, enable long-term restoration of soils or lead to improvements in soil quality? |
| Landscape and visual impacts | ▪ …have any effects on landscapes / seascapes or the visual environment? | ▪ … result in lasting degradation of landscape / seascape character, loss of landscape / | ▪ … result in improvement of landscape / seascape character, protection / |

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| | | seascape features or changes to valued (e.g. locally, regionally) views? | enhancement of landscape / seascape features, or of valued views? |
| Materials and waste | ▪ … lead to a change in material requirements? | ▪ …lead to a substantial increase in material volumes from primary resources (e.g. not recycled materials), or of a finite or scarce resource? | ▪ … lead to a substantial reduction in the requirement for primary and/ or finite or scarce resources? |
| | ▪ … lead to a change in waste arisings? | ▪ … lead to a substantial increase in waste arisings requiring disposal (e.g. not reusable, recyclable or recoverable)? | ▪ … lead to a substantial reduction in waste arisings requiring disposal (e.g. through prevention, reuse, recycling or recovery)? |
| Noise and vibration | ▪ …result in changes in the noise environment beyond the site boundary? | ▪ … lead to noise levels which breach guideline values (e.g. World Health Organisation)? | ▪ … lead to an improvement in the noise environment at sensitive receptors, e.g. residents, schools, health-related facilities, etc.? |
| Radiological emissions and discharges | ▪ … cause a change in radioactive discharges (to air, water or ground)? | ▪ … inhibit achievement of nuclear sector targets (‘expected outcomes’) as part of the UK Discharge Strategy, in line with OSPAR commitments? | ▪ … lead to a reduction in discharges which helps to achieve of nuclear sector targets as part of the UK Discharge Strategy? |
| | ▪ … cause a change in exposure of people or the environment to radiological emissions? | ▪ … result in a breach of statutory dosage limits caused by radiological emissions? | ▪ … achieve a reduction in exposure of people or the environment to emissions? |
| Water resources and quality | ▪ … result in a change in non-radioactive discharges to groundwater or surface water? | ▪ … lead to or worsen groundwater or surface water pollution that would slow or prevent the achievement Water Framework Directive (WFD) objectives? | ▪ …help to improve / remove existing groundwater or surface water pollution, and/ or achieve WFD objective? |

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| **Health** | | | |
| General Health | ▪ …result in any effects which may have implications for the general health of the public or lead to changes in access to health-related facilities or services, or how people obtain the support and services they need to be healthy? | ▪ …result in any effects which may have negative implications for the general health of the public or result in cultural or institutional effects which may negatively influence the health of the public? | ▪ …result in any effects which may have positive implications for the general health of the public or result in cultural or institutional effects which may positively influence the health of the public? |
| Life Expectancy | ▪ … result in any effects which may have implications on life expectancy of the public? | ▪ … result in any effects which may have negative implications on life expectancy of the public? | ▪ … result in any effects which may have positive implications on life expectancy of the public? |
| Mental Health | ▪ …result in any effects which may have implications for the mental health and well-being of the public or lead to changes in access to health-related facilities or services, or how people obtain the support and services they need to be healthy? | ▪ …result in any effects which may have negative implications for the mental health and well-being of the public or result in cultural or institutional effects which may negatively influence the health of the public? | ▪ …result in any effects which may have positive implications for the mental health and well-being of the public or result in cultural or institutional effects which may positively influence the health of the public? |
| Radioactivity | ▪ …lead to changes in radiological safety which may have health implications for the public? | ▪ …lead to radiological safety changes which may negatively influence the health of the public and/ or breach statutory public dosage limits? | ▪ …lead to radiological safety changes which may positively influence the health of the public and/ or prevent a breach of statutory public dosage limits? |
| Respiratory Disease | ▪ …result in any effects on air quality which may have health implications for the public? | ▪ …result in air quality changes which may negatively influence the health of the public and/ or breach air quality standards? | ▪ …result in air quality changes which may positively influence the health of the public and/ or prevent a breach of air quality standards? |
| **Socio-Economic** | | | |

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| Diversity | ▪ … result in changes to retainment of skills and talent of represented groups? | ▪ … result in decreased retainment of skills and talent of represented groups? | ▪ … result in increased retainment of skills and talent of represented groups? |
| Employment | ▪ … result in changes to employment at one or more skills levels (e.g. by NVQ level)? | ▪ … result in a net loss of total jobs, or an imbalance in skills levels? | ▪ … result in net job gains, or help improve or sustain the balance in skills levels? |
| Economy | ▪ …result in changes to the NDA's contribution to economies (local, regional or national)? | ▪ …lead to increased pressure on economies and/ or direct economic losses? | ▪ …lead to reduced pressure on economies and/ or direct economic gains? |
| | ▪ …result in changes to other sectors, such as tourism? | ▪ …lead to declines in other economic sectors? | ▪ …lead to improvements in other economic sectors? |
| | ▪ …result in other indirect changes to levels of investment into an area? | ▪ …lead to declines in levels of investment into an area? | ▪ …lead to improvements in level of investment into an area? |
| Local and National Assets | ▪ …result in changes to local and/ or national assets, such as the infrastructure which supports services or facilities valuable to communities? | ▪ …lead to loss / restriction of locally, and/ or nationally important assets? | ▪ …lead to improvements / provision of locally and/ or nationally important assets? |
| Population | ▪ … result in changes to population within communities? | ▪ … result in unsustainable or rapid changes to population within communities placing burdens of local services, housing and facilities? | ▪ … result in sustainable or gradual changes to population within communities placing minimal burdens of local services, housing and facilities? |