



Department for
Energy Security
& Net Zero

Department for Energy Security & Net Zero

National Policy Statement for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)

Presented to the Houses of Parliament pursuant to section 9(8) of the
Planning Act 2008

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1 Introduction

1.1 Background

- 1.1.1 The efficient import, storage, and transmission of gas and oil products remain crucial to meeting our energy needs during the transition to a net zero economy. This reflects the ongoing need for oil and unabated gas during the transition to a net zero economy for heating, cooking, electricity and transport, and the production of many everyday essentials like medicines, plastics, cosmetics and household appliances. This will enable secure, reliable, and affordable supplies of energy as we develop the means to address the carbon dioxide and other greenhouse gases associated with their use, including the development of low carbon alternatives.
- 1.1.2 Some limited residual use of unabated gas and oil products may even be needed beyond 2050 to meet our energy objectives. This can be consistent with our net zero target if the emissions from their use are balanced by negative emissions from Greenhouse Gas Reduction technologies.
- 1.1.3 Natural gas will also continue to be used in conjunction with carbon capture use and storage (CCUS) infrastructure to produce low carbon electricity and as a feedstock for clean hydrogen production.
- 1.1.4 Clean hydrogen, and the infrastructure that supports it, will be needed to help transition our energy system to net zero by 2050, with the potential to help decarbonise vital UK industry sectors and provide flexible deployment across heat, power and transport.
- 1.1.5 Noting the continued need for natural gas leading to 2050 (and potentially beyond), this National Policy Statement (NPS) ensures that applications can continue to be made in line with current policies to enable the development of relevant natural gas supply infrastructure and oil and gas pipelines to help maintain natural gas resilience.
- 1.1.6 This NPS, taken together with the ‘Overarching National Policy Statement for Energy’ (EN-1), provides the primary policy for decisions by the Secretary of State on applications it receives for natural gas supply infrastructure and gas and oil pipelines as defined at Section 1.6 of this NPS.
- 1.1.7 The way in which NPSs guide decision making and the matters which the Secretary of State is required by the Planning Act 2008 to take into account in considering applications are set out in Sections 1.1 and 4.1 of EN-1.
- 1.1.8 Applicants should ensure that their applications, and any accompanying supporting documents and information, are consistent with the instructions and guidance given to applicants in this NPS, EN-1 and any other NPSs that are relevant to the application in question.
- 1.1.9 This NPS may be helpful to local planning authorities (LPAs) in preparing their local impact reports.

1.2 Role of this NPS in the wider planning system

1.2.1 Section 1.2 of EN-1 provides details on the role of this NPS in the wider planning system.

1.3 Relationship with EN-1

1.3.1 This NPS is part of a suite of energy infrastructure NPSs. It should be read in conjunction with EN-1.

1.3.2 This NPS does not seek to repeat the material set out in EN-1, which applies to all applications covered by this NPS unless stated otherwise.

1.4 Geographical coverage

1.4.1 Responsibility for decision making on the infrastructure described at Section 1.6 of this NPS will not all fall to the Secretary of State under the Planning Act 2008 but will vary across England, Wales, and Scotland and also between onshore and offshore.

1.4.2 In England, the Secretary of State will decide all applications falling under categories (i), (ii), (iii) and (iv) at paragraph 1.6.1.

1.4.3 In Wales, the Secretary of State will decide only applications:

- under category (i), starting to use existing underground gas storage facilities in natural porous strata where the proposed applicant is a licensed gas transporter; and
- under category (iv), pipelines (at least one end of which is in Wales) over 16.093km (10 miles) long which would otherwise require authorisation under Section 1 of the Pipelines Act 1962 together with diversions to such pipelines regardless of length.

1.4.4 For applications under category (iii) the Secretary of State will only decide the English section of a Gas Transporter pipeline which crosses into Wales.

1.4.5 In Scotland, under category (iv) the Secretary of State will decide applications for cross border oil and gas pipelines over 16.093km (10 miles) long which would otherwise require authorisation under Section 1 of the Pipelines Act 1962 together with diversions to nationally significant pipelines regardless of length, where the pipelines have one end in England or Wales and the other end in Scotland. For applications under category (iii), the Secretary of State will only decide the English section of a Gas Transporter pipeline which crosses into Scotland.

1.4.6 The Secretary of State has no functions in relation to planning applications in Wales and Scotland that do not relate to nationally significant infrastructure. However, energy policy is generally a matter reserved to UK Ministers and this NPS may therefore be a relevant consideration in planning decisions in Wales and Scotland.

- 1.4.7 Offshore oil and gas infrastructure is consented separately to the Development Consent Order (DCO). The offshore area comprises the territorial sea, and the area extending beyond the sea designated as a gas importation and storage zone (“GISZ”).
- 1.4.8 The North Sea Transition Authority (NSTA) will be responsible for licensing gas storage and Liquefied Natural Gas (LNG) unloading infrastructure under the Energy Act 2008 where the unloading is to a pipeline or installation at sea.
- 1.4.9 The Crown Estate is responsible for granting leases for offshore pipelines on or buried beneath the seabed, within the 12 nautical mile territorial limit, which transport oil and gas from offshore reservoirs to processing terminals on the UK coastline, or between countries. These arrangements include a consenting regime for construction of platforms and for the conversion of geological features for gas storage purposes. The Crown Estate, and Crown Estate Scotland, are responsible for leasing the sub-sea storage area or area of the seabed and water column.
- 1.4.10 Offshore oil and gas pipelines consents are also the responsibility of the NSTA and are issued in accordance with the Petroleum Act 1998. They cover marine pipelines in controlled waters meaning the UK territorial sea (up to the Low Water Mark or a bay closure line) and any part of the sea on the UK Continental Shelf (UKCS).
- 1.4.11 In Northern Ireland, planning consents for all nationally significant energy infrastructure projects are devolved to the Northern Ireland Executive, so the Secretary of State will not examine applications for energy infrastructure in Northern Ireland.

1.5 Period of validity and review

- 1.5.1 See Section 1.5 of EN-1 for guidance on the period of validity and review of the energy NPS.

1.6 Infrastructure covered by this NPS

- 1.6.1 This NPS covers the following types of nationally significant natural gas and oil infrastructure:
- i. Underground gas storage and LNG facilities which meet one of the following two tests:
 - *the storage or working capacity test*: a project would pass this test if the storage capacity on completion of the proposal is expected to be at least 43 million standard cubic metres (Mcm) of gas or higher; or
 - *the maximum flow rate test*: a project would pass this test if it has a projected maximum flow rate of at least 4.5 Mcm of gas per day (Mcm/d).

An alteration to an underground gas storage facility or an LNG facility will be for the Secretary of State to consider if it increases the storage capacity or the maximum flow rate of the facility by the above volumes. Applications under this category will include: underground gas storage in natural porous strata (depleted

hydrocarbon fields, aquifers); underground gas storage in caverns; and LNG facilities capable of receiving, storing and re-gasifying LNG.

- ii. Gas reception facilities¹ with a projected maximum flow rate of at least 4.5 Mcm/d (there is no capacity test). An alteration to a gas reception facility will be for the Secretary of State to consider if it increases the maximum flow rate by the above volume. Applications under this category will cover gas reception facilities where gas is received in gaseous form from outside England, Scotland, and Wales.
- iii. Gas transporter pipelines (onshore), which are (a) expected to be more than 800mm in diameter and more than 40 kilometres in length or (b) the construction of which is likely to have a significant effect on the environment. The design operating pressure must be more than 7 bar gauge and must be expected to convey gas for supply (directly or indirectly) to at least 50,000 customers, or potential customers, of one or more gas supplier. These pipelines are referred to in this NPS as Gas Transporter Pipelines.
- iv. Pipelines over 16.093km (10 miles) long which would otherwise require authorisation under s.1 of the Pipe-lines Act 1962, together with diversions to such pipelines regardless of length.

1.6.2 Pipelines which meet the Planning Act threshold at paragraph 1.6.1 (iv) could be carrying different types of gas, fuel or chemicals. This NPS only has effect for those nationally significant infrastructure pipelines which transport natural gas (see paragraph 1.6.4 to 1.6.6 for further information) or oil. However, information in this NPS may be useful in identifying impacts to be considered in applications for pipelines intended to transport other substances.

1.6.3 Some pipelines which are not nationally significant infrastructure projects may nevertheless be granted development consent as associated development by virtue of their connection with another nationally significant infrastructure project such as a power station. The guidance on associated development issued by the former Department for Communities and Local Government provides more information about this².

1.6.4 New hydrogen pipelines and underground storage for hydrogen (in both cases whether or not blended with natural gas) will require consent from the Secretary of State where they meet the threshold at paragraph 1.6.1(i) (but only so far as it relates to storage), (iii) and (iv).

1.6.5 The need for low carbon hydrogen infrastructure is established in Section 3.4 of EN-1.

1.6.6 The guidance that follows in this NPS has been drafted in respect of, and has effect only in relation to, natural gas infrastructure. It does not have effect for hydrogen infrastructure, but may be part of other matters which the Secretary of State thinks are important and relevant to their decision on applications for hydrogen infrastructure, in which case they would need to take it into account.

¹ In accordance with the Planning Act 2008, gas reception facilities mean a facility for the reception of natural gas in gaseous form from outside England and the handling of natural gas (other than its storage).

² <https://www.gov.uk/government/publications/planning-act-2008-associated-development-applications-for-major-infrastructure-projects>. However, note that amendments have been made to section 115 of the Planning Act 2008 in relation to associated development since that guidance was published.

- 1.6.7 Similarly, new CO₂ pipelines will require consent from the Secretary of State where they meet the threshold at paragraph 1.6.1(iv).
- 1.6.8 The need for CCS infrastructure is established in Section 3.5 of EN-1 and general guidance on the assessment of CCS infrastructure is at Section 4.9 of EN-1.
- 1.6.9 The guidance that follows in this NPS does not have effect for CCS infrastructure, but may contain information that is important and relevant to the Secretary of State's decision on applications for CCS infrastructure.
- 1.6.10 As the evidence base evolves, further guidance may also be provided to allow timely implementation of policy relating to low carbon hydrogen, CCUS and other infrastructure necessary for the transition to net zero.

1.7 Appraisal of Sustainability and Habitats Regulations Assessment

- 1.7.1 All the NPSs have been subject to an Appraisal of Sustainability (AoS) required by the 2008 Act and the Environmental Assessment of Plans and Programmes Regulations 2004. A Habitats Regulations Assessment (HRA) has also been prepared in accordance with the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017.
- 1.7.2 These are published alongside this NPS and available at <https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-revisions-to-national-policy-statements>.

2 General assessment and technology-specific information

2.1 Introduction

- 2.1.1 Part 4 of EN-1 sets out the general principles that should be applied in the assessment of development consent applications across the range of energy infrastructure and types of energy infrastructure.
- 2.1.2 Part 5 of EN-1 sets out policy on the assessment of impacts which are common across a range of these technologies (referred to as “generic impacts”).
- 2.1.3 This NPS is concerned with impacts and other matters which are specific to gas supply infrastructure and oil and gas pipelines or where, although the impact is generic and covered in EN-1, there are further specific considerations arising from the technologies covered here.
- 2.1.4 The policies set out in this NPS are additional to those on generic impacts set out in EN-1. Applicants should show how their application meets the requirements in EN-1 and this NPS, applying the mitigation hierarchy, as well as any other legal and regulatory requirements. This includes the assessment principles as set out in Part 4 of EN-1, and the consideration of impacts as set out in Part 5 of EN-1.
- 2.1.5 The Secretary of State should consider this NPS and EN-1 together. In particular, EN-1 sets out the government’s conclusion that there is a significant need for new major energy infrastructure generally (see Part 3 of EN-1).
- 2.1.6 EN-1 Part 3 includes assessments of the need for gas supply infrastructure and natural gas and oil pipelines. In the light of this, the Secretary of State should act on the basis that the need for the infrastructure covered by this NPS has been demonstrated.

2.2 Factors influencing site selection and design

- 2.2.1 Factors influencing site selection by applicants for gas supply infrastructure and oil and gas pipelines are set out below in each relevant section.
- 2.2.2 These are not a statement of government policy but are included to provide the Secretary of State and others with background information on the criteria that applicants may consider when choosing a site.
- 2.2.3 The specific criteria considered by applicants, and the weight they give to them, will vary from project to project.
- 2.2.4 Where there are requirements on applicants or the Secretary of State to consider specific information, these are made clear in the text.

- 2.2.5 The choices which applicants make in selecting sites reflect their assessment of the risk that the Secretary of State, following the general points set out in Section 4.1 of EN-1, will not grant consent in any given case.
- 2.2.6 It is for applicants to decide what applications to bring forward and the government does not seek to direct applicants to particular sites for gas supply infrastructure and oil and gas pipelines.

2.3 Climate change adaptation

- 2.3.1 Part 2 of EN-1 covers the government's energy and climate change strategy, including policies for mitigating climate change.
- 2.3.2 Section 4.10 of EN-1 sets out generic considerations that applicants and the Secretary of State should take into account to help ensure that new gas supply infrastructure and oil and gas pipelines are resilient to climate change, and that necessary action can be taken to ensure the operation of the infrastructure over its estimated lifetime.
- 2.3.3 Section 5.6 Coastal Change and Section 5.8 Flood Risk of EN-1 sets out generic considerations that applicants and the Secretary of State should take into account in order to manage coastal change and flood risks.
- 2.3.4 As climate change is likely to increase risks to some of this infrastructure, from flooding or rising sea levels for example, applicants should in particular set out how the proposal would be resilient to:
- increased risk of flooding;
 - effects of rising sea levels and increased risk of storm surge;
 - higher temperatures;
 - increased risk of earth movement, coastal erosion, or subsidence from increased risk of flooding and drought; and
 - any other increased risks identified in the applicant's assessment.
- 2.3.5 The resilience of the project to climate change should be assessed in the Environmental Statement (ES) accompanying an application. For example, future increased risk of flooding should be covered in the flood risk assessment.

2.4 Consideration of “good design” for energy infrastructure

- 2.4.1 The Planning Act 2008 requires the Secretary of State to have regard, in designating an NPS, to the desirability of good design.
- 2.4.2 Applicants should consider the criteria for good design set out in EN-1 Section 4.7 at an early stage when developing projects.

2.5 Hazardous substances

- 2.5.1 Section 4.14 of EN-1 sets out the regime for obtaining hazardous substance consent where it is required.
- 2.5.2 All establishments wishing to hold stocks of certain hazardous substances, which include oil and gas, above a threshold quantity must consult the Hazardous Substances Authority (HSA), which is usually the local planning authority, and the Health and Safety Executive (HSE) at pre-application stage³. In the case of natural gas, the threshold is 15 tonnes.
- 2.5.3 The HSA will consult the Environment Agency (EA) in England, and Natural Resources Wales (NRW) in Wales, who are the COMAH competent authorities alongside the HSE for non-nuclear activities.
- 2.5.4 LNG is transported in specially designed cargo vessels. The Maritime and Coastguard Agency (MCA) is responsible for inspecting these vessels and the relevant Port Authority is responsible for ensuring that the rules relating to safe port operations are followed.
- 2.5.5 The Secretary of State should be able to rely on these regulatory controls being properly applied and enforced. The safety of shipping of LNG is not therefore a matter for the Secretary of State unless in the individual circumstance of a specific case it regards it as relevant and important to its decision.

2.6 Control of Major Accident Hazards

- 2.6.1 Gas storage and supply infrastructure sites are subject to stringent safety standards under the Control of Major Accident Hazards (COMAH) Regulations 2015.
- 2.6.2 The COMAH Regulations apply to onshore underground gas storage facilities, LNG import facilities and gas reception facilities.
- 2.6.3 Underground storage sites will come within the scope of COMAH if the quantity of gas stored meets or exceeds the thresholds in Schedule 1, Part 2 of the Regulations – 50 tonnes (lower tier) and 200 tonnes (top tier).
- 2.6.4 All sites subject to applications under this NPS are likely to qualify as top tier COMAH sites.
- 2.6.5 Section 4.13 of EN-1 provides further information on the COMAH Regulations and the assessment which should be carried out by applicants. COMAH Regulations apply throughout the life cycle of the facility, i.e. from determining suitability of location, and the design and build stage, through to decommissioning.

³ Further information is available at the HSE's website:
<https://www.hse.gov.uk/landuseplanning/hazardoussubstances.htm>

2.7 Borehole sites

- 2.7.1 Where an activity or operation involves the extraction of a mineral, such as salt in the case of developing salt cavern storage, the site is defined as a borehole site and the Borehole Sites and Operations Regulations 1995 apply from the beginning of operations on site and will continue to apply during the life of the facility until the borehole is decommissioned.
- 2.7.2 HSE enforces these regulations.

2.8 Underground Natural Gas Storage

Introduction

- 2.8.1 Underground gas storage can take place in porous rock and in salt caverns, both on and offshore.
- 2.8.2 The Secretary of State is responsible for the consenting of onshore natural gas storage facilities as described in Section 1.6 above.
- 2.8.3 Nationally significant underground natural gas storage facilities will hold 43 million Mcm of gas or higher; or will have a projected maximum delivery flow rate capacity equivalent to 4.5 Mcm/d or higher.
- 2.8.4 Many of the generic impacts set out in EN-1 are relevant to the consideration of applications for underground natural gas storage facilities.
- 2.8.5 For projects that are subject to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, the applicant must submit an ES including an assessment of the impact of the project (see Section 4.3 of EN-1).

2.9 Underground Natural Gas Storage: Applicant assessment

Factors influencing site selection

Geology

- 2.9.1 There are limitations as to where natural gas can be stored underground, due to natural geological constraints. The subsurface geology influences the extent of the potential gas reservoir and the feasibility of using it for an underground storage facility.
- 2.9.2 Natural gas can be stored underground in a gaseous state in porous rock in a depleted or partially depleted oil or gas field. There are a limited number of suitable oil and gas fields in the UK, and these tend to be concentrated in eastern England and the Weald basin in the south.
- 2.9.3 Natural gas can also be stored in man-made salt caverns. In some areas, Britain has salt present in strata which are, or could be, suitable for gas storage. The most extensive areas, where suitably thick natural layers of salt are found, are in northern England and in smaller areas further south.
- 2.9.4 Aquifer storage is another form of storage in porous media. Porous rock is filled with water and an artificial gas reservoir is created by drilling boreholes into the water bearing rock layer and displacing the water with gas. There must be an impermeable rock layer above the porous media and a suitable geological feature to trap the buoyant gas.
- 2.9.5 There is no history of aquifer storage of natural gas in England and Wales although suitable aquifers are likely to exist.

- 2.9.6 Applicants must undertake, and supply to the Secretary of State, a detailed geological assessment to demonstrate the suitability of the geology at the site for the type of underground gas storage proposed.
- 2.9.7 Applicants must include borehole evidence specific to the proposal where up to date geological data does not exist.
- 2.9.8 When considering storage in porous rock, in a depleted or partially depleted oil or gas field, or in an aquifer, applicants must undertake a detailed geological assessment to determine the suitability of the rocks for underground gas storage.
- 2.9.9 When considering storage in a salt cavity, the geological assessment must include depth below surface, salt thickness, salt purity and presence of shale bands which could affect cavern design. In addition, a study of the geological integrity of the overlying strata and potential for collapse, taking account of the proposed minimum and maximum working pressures, will need to be undertaken.
- 2.9.10 The assessments must include the construction, operational and decommissioning phases and cover the long-term integrity of the affected strata after decommissioning or closure of the storage facility.

Other

- 2.9.11 Section 4.14 of EN-1 and Section 2.5 of this NPS set out how the hazardous substances regime is applied to gas storage infrastructure.
- 2.9.12 The siting of gas storage facilities will also be influenced by safety considerations.

Impacts

- 2.9.13 The impacts identified in Part 5 of EN-1, and below, are not intended to be exhaustive.
- 2.9.14 Applicants must provide information on relevant impacts as directed by this NPS and the Secretary of State.

Noise and Vibration

- 2.9.15 The development of gas storage facilities could involve specific noise impacts, which may vary according to the type of underground storage facility.
- 2.9.16 During the pre-construction phase there could be vibration effects from seismic surveys.
- 2.9.17 During construction, noise impacts could arise from the drilling of new boreholes into existing gas bearing geological strata or other suitable natural cavities, and from brine pumping.
- 2.9.18 During operation, the different modes of operating gas storage facilities will include both free-flow and compression. Free-flow may involve a significant reduction in pressure from the reservoir to the National Transmission System (NTS) line pressure, thereby potentially giving rise to high noise levels. Sources of noise during the compression mode will include noise from the compressors and drivers (usually contained in buildings), associated pipework and external coolers.

- 2.9.19 Applicants must include in the ES an assessment of noise and vibration impacts and include technology-specific issues, where they are relevant.
- 2.9.20 The assessment should cover the impact of any night-time operations, for example continuous drilling to maintain pressure, and explain the need for this.

Gas Emissions

- 2.9.21 There could be specific gas emission impacts which result from gas storage and supply infrastructure.
- 2.9.22 The most significant emissions are likely to come from gas reception facilities where flaring of gas is used to deal with a continuous stream of low volume waste gas from the processing. There may also be emissions from underground gas storage.
- 2.9.23 Applicants should include an assessment of gas emissions and any adverse effects.
- 2.9.24 The ES should include an assessment of the effects of gas emissions on air quality in accordance with Section 5.2 of EN-1 and on greenhouse gas emissions in accordance with Section 5.3 of EN-1.

Water quality

- 2.9.25 During the construction of an underground gas storage facility in a salt bed or in an aquifer there could be effects on the water environment. In a salt bed storage construction, there will be a large demand for water.
- 2.9.26 The specific issue to be considered is the abstraction of water to leach the salt caverns. The Secretary of State needs an accurate picture of this to understand the environmental impacts of the proposed underground storage project.
- 2.9.27 The impact of the subsequent disposal of the brine is covered in Section 2.11 of this NPS.
- 2.9.28 In the case of aquifer storage, the issue is likely to be the displacement of groundwater.
- 2.9.29 Section 5.16 of EN-1 sets out generic policy on the protection of the water environment during the construction, operation and decommissioning of a project.
- 2.9.30 Section 4.12 of EN-1 sets out considerations on the pollution control framework. EN-1 emphasises the need for good design and planning to ensure the efficient use of water, including water recycling. It also covers the biodiversity implications of water abstraction.
- 2.9.31 In a salt cavity development, the applicant must provide an assessment of the effect of abstracting water for solution mining on groundwater resources, the natural environment, and the public water supply.
- 2.9.32 The applicant must assess whether water abstraction for the new development is likely to result in the loss or reduction of water available to any licensed or unlicensed groundwater abstractions or ecological receptors such as rivers and wetlands dependent upon groundwater.

- 2.9.33 The applicant must also assess the impact of the mobilisation of salt and other pollutants, with respect to groundwater quality. This must be part of the ES (see Section 5.16 of EN-1).
- 2.9.34 It is likely that in most cases a water abstraction licence under the Water Resources Act 1991 will be necessary to obtain water for solution mining and, in some situations, to cover the removal of brine from the cavities.
- 2.9.35 In the case of aquifer storage, the applicant should assess the impact of the displacement of groundwater with respect to its potential interference with groundwater flow pathways, mobilisation of contaminants, flood risk, and potential effects on groundwater dependant ecosystems.
- 2.9.36 Applicants are advised to make contact, at or before the pre-application stage, with the EA) / NRW, to discuss the requirements for abstraction licences and Environmental Permits (EPs) and other consents (see Section 5.16 of EN-1).

Disposal of Brine

- 2.9.37 A newly developed salt cavern gas storage facility will require leaching new salt cavities, whether built on the site of an existing salt mine or not. This involves injecting water into the underground strata to dissolve the salt until cavities of sufficient dimension have been formed and then the brine is withdrawn through the same well bore.
- 2.9.38 Where associated pipelines are required to carry brine, these should be part of the application.
- 2.9.39 The ES must include measures to dispose of brine which mitigate its potential adverse environmental effects.
- 2.9.40 Where pipelines are required to carry the brine away, these should be located outside of source protection zones⁴ 1 and 2.
- 2.9.41 If it is not possible to avoid these zones, the applicant will need to demonstrate the use of best available techniques for pollution prevention (details of pollution control regimes are set out in Section 4.12 of EN-1).
- 2.9.42 Wherever possible, measures should include disposing of the brine for commercial use by industry so that mineral resources are used sustainably.
- 2.9.43 Applicants should only propose disposing of brine to an underground reservoir (for example, a disused salt mine) or to the sea as a last resort where there is no practical option for re-use.
- 2.9.44 Where the proposed development involves any discharges to water bodies, including to groundwater or to the sea, the EA should be contacted early in the process, at or before the pre-application consultation stage, to discuss the requirements (including the information required from the applicant).

⁴ The Environment Agency identifies source protection zones as part of its groundwater protection policy. For further information see <https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs>

2.10 Underground Natural Gas Storage: Impact mitigations

Noise and Vibration

- 2.10.1 Applicants should consider the following design measures which are typically taken to mitigate noise for gas supply and storage infrastructure:
- acoustic cladding for buildings;
 - the use of sound attenuators on ventilation systems;
 - acoustic lagging on pipework;
 - multi-stage (inherently quiet) control valves;
 - gas turbine exhaust silencers;
 - acoustic enclosures on pumps; and
 - low speed cooler fans and the use of electric rather than gas powered compressors.

Gas Emissions

- 2.10.2 Underground storage operators must demonstrate that they have taken all reasonable actions in collaboration with underground storage owners to prevent or reduce the leakage of gas within underground storage facilities through their infrastructure and from operation.
- 2.10.3 Typical measures may include periodic leak inspection and repair work or using work practices and new equipment types to minimise leakage and venting.

Water quality and resources

- 2.10.4 Measures to control the abstraction of water will be covered by abstraction licences and Environmental Permits, which will ensure abstraction proposals are consistent with meeting environmental objectives under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and the Conservation of Habitats and Species Regulations 2017 as well as not having any adverse effect on existing lawful water users.
- 2.10.5 Measures to control the abstraction of water will be covered by abstraction licences and EPs.
- 2.10.6 Taking account of these and any EA advice, the Secretary of State should consider whether any mitigation measures are necessary by way of conditions to the DCO in accordance with Section 5.16 of EN-1.

Disposal of Brine

- 2.10.7 Measures to discharge brine into an underground reservoir or the sea, where either is an appropriate course of action, will need to be covered by EPs or discharge consents.

- 2.10.8 Taking account of these and any EA advice, the Secretary of State should consider whether any mitigation measures are necessary by way of requirements in the DCO.
- 2.10.9 Where the brine is discharged to the sea, for example, these could relate to the siting offshore of the outflow pipe (to reduce impact on sensitive flora and/or fauna) and the rate of discharge (to reduce saline concentration levels). For any pipelines situated offshore, the construction of these will require a marine licence.
- 2.10.10 Discharge of brine to sea from outflow pipes should be a last resort.
- 2.10.11 Where an applicant proposes discharge of brine to sea, the application must provide an impact assessment of impacts within the marine environment and appropriate mitigation measures to protect marine biodiversity.

2.11 Underground Natural Gas Storage: Secretary of State decision making

Factors influencing site selection

- 2.11.1 The Secretary of State will give substantial weight to the applicant's geological assessment alongside the environmental assessment, considerations of health and safety issues, and HSE's hazardous substances consent public safety advice if the former does not form part of the ES.

Impacts

Noise and Vibration

- 2.11.2 The Secretary of State should follow the principles for decision making set out in Section 5.12 of EN-1.

Gas emissions

- 2.11.3 The Secretary of State should follow the principles for decision making as set out in the relevant sections of Parts 4 and 5 of EN-1.

Water quality and resources

- 2.11.4 Before making any decisions the Secretary of State will need to liaise with the EA/NRW over any arrangements for licensing water abstraction.
- 2.11.5 The Secretary of State should liaise with the EA/NRW over the potential for the new development to result in loss or reduction of supply to any licensed abstraction or unlicensed groundwater abstraction, or any potential interference with current legitimate uses of groundwater or surface waters, including EPs or any negative effect on a groundwater dependent ecosystem.
- 2.11.6 The Secretary of State should not refuse development consent unless it has good reason to believe that any necessary abstraction licences and EPs will not subsequently be granted (see Section 5.16 of EN-1).

- 2.11.7 The Secretary of State should be satisfied that the impacts on water quality and resources are acceptable in accordance with Section 5.16 of EN-1.

Disposal of Brine

- 2.11.8 Before making any decisions, the Secretary of State should liaise with the EA over any arrangements for discharging brine into a reservoir or the sea to ensure that any discharges can be adequately regulated.
- 2.11.9 The Secretary of State should not refuse consent unless it has good reason to believe that any necessary EPs or discharge consents will not subsequently be granted (see Section 4.12 of EN-1).

2.12 LNG Import Facilities

Introduction

- 2.12.1 LNG (Liquefied Natural Gas) import facilities receive liquefied gas from tanker ships. The gas is cooled to a temperature of -160 degrees C, reducing the volume by a factor of 600, for transport.⁵
- 2.12.2 Conventional onshore LNG import facilities are major installations with unloading facilities (including a jetty), onshore storage and regasification plant. The storage tanks serve the important function of enabling the deliveries of LNG into the terminal to be stored and subsequently converted into gas for transportation by pipeline into the NTS. The regasification plant is essential to raise the temperature of the LNG to convert it to gas.
- 2.12.3 When considering LNG Import Facilities, it is important to consider environmental impacts and mitigation measures holistically across terrestrial and marine environments. This is particularly important when considering new import facilities as the siting of this infrastructure will likely be within already constrained and busy estuarine environments.

2.13 LNG Import Facilities: Applicant assessment

Factors influencing site selection

- 2.13.1 There are some important considerations which will affect the choice of LNG import and storage facility sites.
- 2.13.2 The primary technical siting considerations for a conventional LNG terminal will be the combination of a deep water jetty for berthing LNG carriers, availability of a suitably large site for the necessary onshore industrial development and pipeline access from the LNG terminal to the NTS.
- 2.13.3 Safety considerations and proximity to dwellings, workplaces and other buildings and facilities used by the public will be relevant factors.

⁵ Section 18 of the Planning Act 2008 addresses which LNG facilities are NSIPs

- 2.13.4 Section 4.14 of EN-1 and Section 2.5 of this NPS set out how the hazardous substances regime is applied to gas supply infrastructure.

Impacts

- 2.13.5 Many of the generic impacts set out in EN-1 are relevant to the consideration of applications for LNG import facilities.
- 2.13.6 For projects that are subject to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, the applicant must submit an ES including an assessment of the impact of the project (see Section 4.3 of EN-1).

Noise and Vibration

- 2.13.7 Section 5.12 of EN-1 sets out the generic considerations to be given to the impacts of noise and vibration.
- 2.13.8 LNG import facilities will be located in coastal regions. Noise sources will include process plant, including compressors.
- 2.13.9 In addition noise may be generated by the LNG pumps located on board the LNG tankers, and this source of noise, including its underwater noise impacts, should be included in a noise assessment.
- 2.13.10 The ES must include an assessment of noise and vibration effects including the specific issues outlined above, where they are relevant.

Landscape and visual

- 2.13.11 Section 5.10 of EN-1 sets out the generic considerations to be given to landscape and visual impacts.
- 2.13.12 The ES should include an assessment of landscape and visual effects including the specific issues outlined under mitigation below.

Dredging

- 2.13.13 Dredging is a licensable activity, licences being granted by the Marine Management Organisation (MMO) in England and NRW in Wales, under Part 4 of the Marine and Coastal Access Act 2009 and should be included in the Deemed Marine Licence as part of the DCO in England. As part of this process, the sediment may require analysis to determine contamination levels of the material to be dredged and the suitable reuse and / or disposal options available.
- 2.13.14 LNG import facilities are located on coasts and estuaries. During the operation of an LNG import facility, LNG tanker deliveries by sea will be essential to the facility. This activity gives rise to the need for dredging in order for the deep-water channel and jetty to maintain declared depths and to deepen waters to accommodate the large tankers. Subsequently the dredge spoil must be deposited responsibly and in line with OSPAR Guidelines⁶ if to be disposed of at sea.

⁶ OSPAR guidelines specifying best environmental practice for managing dredged material can be found [OSPAR Agreement 2014-06](#)

- 2.13.15 Dredging and associated construction e.g., of deep-water jetties, may have specific impacts on the local marine, coastal and estuarine environments, and marine biodiversity.
- 2.13.16 These habitats are often of fundamental importance to biodiversity, particularly to bird and fish life. For example, dredging can result in the smothering of nearby habitats and benthic communities. Local increases in suspended sediment concentrations may have an effect on fisheries, leading to the migration of fish or avoidance of the area by fish, whilst disturbed sediment could contain contaminated material that is resuspended into the environment via dredging.
- 2.13.17 Dredging can also affect water quality and resources. Other potential impacts include chemical pollution, and morphological changes, exposure to contaminants and adverse effects on heritage assets, such as marine archaeology.
- 2.13.18 The applicant must include an assessment in the ES (see Section 4.3 of EN-1) of the dredging required:
- to construct the LNG import facility; and
 - to maintain an access channel or berth integral to the facility.
- 2.13.19 The assessment should take into account the magnitude and frequency of dredging and the method selected.
- 2.13.20 As explained in Section 5.4 of EN-1, the ES must set out any effects on designated sites, protected species and on other biodiversity afforded conservation priority. In addition, as explained in Section 5.9 of EN-1, the ES must set out any effects on heritage assets and the wider historic environment.
- 2.13.21 Where relevant, applicants should undertake sediment transfer modelling to predict and understand impacts and help identify relevant mitigating or compensatory measures.
- 2.13.22 The assessment should include the effects on water quality and resources, and on coastal change (see also Sections 5.16 and 5.6 respectively of EN-1 for further information on these).
- 2.13.23 The applicant should assess the scope for mitigating impacts such as by avoiding dredging at certain times of the year or using methods to reduce sediment suspension and uncoordinated dispersal.
- 2.13.24 Where relevant, applicants should undertake modelling to predict and understand both dredging and construction impacts on hydrology, sediment transport and geomorphology, as well as direct habitat loss, and impacts on species from increased underwater noise.
- 2.13.25 As explained in Section 5.4 of EN-1, the applicant should be careful to identify the effects on Marine Conservation Zones and designated protected areas. Applicants should consult the MMO for projects in England, and the NRW⁷ for projects in Wales, at an early stage about this, and any relevant provisions of the Deemed Marine Licence as part of the DCO.

⁷ Marine licence issues and/or conservation issues within 12nm from shore (the SNCB outside of 12nm is JNCC, not NRW).

- 2.13.26 Due to risk of contamination, dredged spoil should not only be deposited responsibly using the waste disposal hierarchy, but also the applicant should seek beneficial use of dredged spoil wherever possible in accordance with policy commitments within the Marine Plans (see Section 4.5 of EN-1).
- 2.13.27 In addition to consulting the MMO and NRW it would be helpful to highlight engagement with the relevant SNCB at an early stage aimed at exploring impacts and potential mitigating measures for Marine Protected Areas.

2.14 LNG Import Facilities: Mitigations

Noise and Vibration

- 2.14.1 Applicants should consider the following design measures which are typically taken to mitigate noise for gas supply and storage infrastructure:
- acoustic cladding for buildings;
 - the use of sound attenuators on ventilation systems;
 - acoustic lagging on pipework, multi-stage (inherently quiet) control valves;
 - gas turbine exhaust silencers; and
 - acoustic enclosures on pumps and low-speed cooler fans.

Landscape and Visual

- 2.14.2 EN-1 suggests that one way to mitigate the visual and landscape effects of a project would be to reduce its scale. Reduction of scale can be an important consideration for schemes which may impact designated landscapes.
- 2.14.3 However, as Section 5.10 of EN-1 recognises, reducing the scale or otherwise amending the design of a proposed energy infrastructure project may result in a significant operational constraint and reduction in function, making the project unfeasible and cause a reduction in functionality.
- 2.14.4 The appearance of some large gas supply infrastructure, such as the large storage tanks required at LNG import facilities, can be improved through countersinking or the use of squat tanks, without any significant operational constraint or reduction in function.
- 2.14.5 Where visual impact is likely to be an issue, the applicant's assessment should consider such options.

Dredging

- 2.14.6 Applicants should propose appropriate mitigation measures to address adverse effects of dredging.
- 2.14.7 Applicants should also demonstrate that during construction and operation, best practice will be followed to ensure that risk of disturbance of, or damage to, species or habitats is avoided or minimised.
- 2.14.8 Sections 5.6 of EN-1 provide further information about mitigation measures.

2.15 LNG Import Facilities: Secretary of State decision making

Impacts

Noise and Vibration

- 2.15.1 The Secretary of State should follow the principles for decision making set out in Section 5.12 of EN-1.

Landscape and Visual

- 2.15.2 The Secretary of State should follow the principles for decision making set out in Section 5.10 of EN-1.

Dredging

- 2.15.3 In assessing the application for development of consent, the Secretary of State must ensure that the MMO and NRW for Wales has been consulted and that appropriate weight is attached to designated protected marine and coastal habitats, protected species, biodiversity, and the water environment, and to impacts on coastal processes and geomorphology. The Secretary of State must also ensure that appropriate weight is attached to designated and non-designated heritage assets⁸.
- 2.15.4 Consultation of the MMO and NRW must include consideration of the impact of a project in combination with any other developments that may be proposed, particularly those involving dredging and disposal. The advice provided by these will be in line with the UK's international commitments relating to protecting the marine environment from the impacts of pollution, including chemical contamination.

⁸ See Section 5.9.4 – 5.9.7 EN-1.

2.16 Natural Gas Reception Facilities

Introduction

- 2.16.1 Onshore gas reception facilities receive gas in gaseous form by pipeline from fields on the UKCS and imports by pipeline from continental Europe. Gas reception facilities process gas to remove hydrocarbon liquids, water, and other impurities, and bring it into a condition that is acceptable for entry into the NTS (where it needs to be in a state that is normally classed as dry sales gas and is fit for burning in domestic appliances).
- 2.16.2 Nationally significant gas reception facilities will have a projected maximum flow rate of at least 4.5 Mcm/d.⁹
- 2.16.3 Many of the generic impacts set out in EN-1 are relevant to the consideration of applications for gas reception facilities.
- 2.16.4 The applicant must submit an ES including an assessment of the impact of the project (see section 4.3 of EN-1).

2.17 Natural Gas Reception Facilities: Applicant assessment

Factors influencing site selection

- 2.17.1 Gas reception facilities are linked to the wider network of onshore and offshore gas supply infrastructure and this places limits and requirements on their location.
- 2.17.2 Gas reception terminals will receive gas piped ashore from producing fields, offshore natural gas storage facilities, and potentially LNG imports where these are re-gasified at sea.
- 2.17.3 Modifications to existing gas reception terminals could be necessary to enhance the efficiency of the terminals or accommodate new fields and/or more complex and specialised processing equipment needed because of changes in gas production. For example, as the more marginal UKCS fields are developed in the future, it is likely that there will be a need to handle more toxic or inert gases, resulting in more hazardous operational activities and waste streams.
- 2.17.4 Because of their function, gas reception facilities are most efficiently sited near the source of incoming natural gas that needs to be processed.
- 2.17.5 Factors which may therefore be relevant to their location include the location of new and existing producing fields, offshore natural gas storage facilities and LNG tanker routes.
- 2.17.6 Access to the NTS by pipeline will be a further factor, as will proximity to the wider network of onshore and offshore gas supply infrastructure.

⁹ Section 19 of the Planning Act 2008

- 2.17.7 Applicants may therefore be faced with a limited set of options for sites, and these are likely to be close to existing gas reception terminals.
- 2.17.8 As with all gas supply infrastructure, safety considerations including proximity to dwellings, workplaces and other buildings and facilities used by the public, will be relevant factors.
- 2.17.9 Section 4.14 of EN-1 and Section 2.5 of this NPS set out how the hazardous substances regime is applied to gas storage infrastructure.

Impacts

Noise and Vibration

- 2.17.10 Section 5.12 of EN-1 sets out the generic considerations to be given to the impacts of noise and vibration. In addition, there are specific considerations which apply to gas reception facilities set out below.
- 2.17.11 Gas reception facilities may be located in coastal regions and sources of noise will include above ground pipework, compressors (usually located in buildings) and process equipment such as heaters and inter-stage coolers.
- 2.17.12 The compressors may either be electric motor or gas turbine driven. Electric motors are preferable in terms of environmental noise considerations.
- 2.17.13 Where gas turbines are used, the gas turbine exhausts may be a significant source of low frequency noise unless adequately controlled. Control valves may also be a source of noise which can be radiated by the associated pipework systems.
- 2.17.14 The ES must include an assessment of noise and vibration effects including the specific issues outlined above, where they are relevant.

Gas emissions

- 2.17.15 There could be specific gas emission impacts which result from gas storage and supply infrastructure, for example due to the need to flare or vent gas.
- 2.17.16 The most significant emissions are likely to come from gas reception facilities where flaring of gas is used to deal with a continuous stream of low volume waste gas from the processing.
- 2.17.17 The venting of gas may be undertaken occasionally at facilities when there are relatively low volumes of hydrocarbon gas that need to be disposed of safely, usually associated with commissioning, decommissioning and maintenance operations.
- 2.17.18 The flaring or venting of gas during the operation of a facility is regulated by the Environmental Permitting Regulations (EPR) which are administered by the EA. Applicants are advised to make early contact with the EA to discuss the requirements at or before the pre-application stage.
- 2.17.19 Section 4.12 of EN-1 provides guidance on the Environmental Permitting regime.
- 2.17.20 The NSTA is responsible for ensuring that the waste of a national resource (hydrocarbons) through flaring or venting is minimised and applicants should

contact the NSTA to check if flaring and venting consents are required regardless of maximum flowrate.

2.17.21 The effects of gas emissions and the specific effects of flaring or venting gas should be assessed.

2.17.22 Applicants should follow the generic considerations on these issues set out in EN-1. In particular:

- Section 5.2 of EN-1 which provides guidance on the effects of emissions on air quality (which can have implications for human health, protected species and habitats or the wider countryside);
- Section 5.4 of EN-1 which provides guidance on biodiversity– any adverse effects of gas flares, which could attract birds, should be considered; and
- Section 5.5 of EN-1 which explains the importance of considering impacts on civil and military aviation – applicants should consider the effect of gas emissions on low flying military aircraft and the implications for siting of facilities.

2.17.23 The ES should include an assessment of the effects of gas emissions on air quality in accordance with Section 5.2 of EN-1.

2.18 Natural Gas Reception Facilities: Mitigation

Noise and Vibration

2.18.1 Applicants should consider the following design measures which are typically taken to mitigate noise for gas supply infrastructure:

- the use of sound attenuators on ventilation systems;
- acoustic lagging on pipework;
- multi-stage (inherently quiet);
- control valves;
- gas turbine exhaust silencers; and
- acoustic enclosures on pumps and low-speed cooler fans.

Gas emissions

2.18.2 The routine or periodic release of gas should be avoided as far as possible, and, where it takes place, its impacts should be minimised.

2.18.3 Mitigation measures to minimise the production of waste gas and effects on air quality include the use of emission control measures, the recovery and re-use of waste gas (for example at an LNG facility by exporting it to the low-pressure gas network), or by combusting the processed gas to reduce greenhouse gas emissions by converting the methane to the less harmful carbon dioxide. Mitigation

measures to reduce the hazards of gas flares to birds could include reducing or shielding light from the flare and/or site during high-risk periods.

- 2.18.4 The NSTA expects operators and existing developments to strive for continuous emissions reductions, deploying best available technology and practices to minimise flaring and venting and that all new developments should be planned on the basis of zero routine flaring and venting.

2.19 Natural Gas Reception Facilities: Secretary of State decision making

Impacts

Noise and Vibration

- 2.19.1 The Secretary of State should follow the principles for decision making set out in Section 5.12 of EN-1.

Gas emissions

- 2.19.2 The Secretary of State should follow the principles for decision making as set out in the relevant sections of Parts 4 and 5 of EN-1.

2.20 Natural Gas and Oil Pipelines

Introduction

- 2.20.1 The gas and oil pipeline networks extend between storage and distribution facilities, and provide an important transport mechanism for natural gas, petrol, gas oil, heating oil, diesel, and aviation fuel. Nationally significant pipelines are those described in Section 1.6 of this NPS.
- 2.20.2 Many of the generic impacts set out in EN-1 are relevant to the consideration of applications for gas and oil pipelines.
- 2.20.3 The applicant must submit an ES including an assessment of the impact of the project (see Section 4.3 of EN-1).

2.21 Natural Gas and Oil Pipelines: Applicant assessment

Factors influencing site selection

- 2.21.1 When designing the route of new pipelines applicants should research relevant constraints including proximity of existing and planned residential properties, schools and hospitals, railway crossings, major road crossings, below surface usage and proximity to environmentally sensitive areas, main river and watercourse crossings. Applicants should be aware of plans and strategies that may impact upon these constraints, such as water level management plans in areas with peat soils.
- 2.21.2 Applicants should undertake desktop studies in the first instance, followed up by consulting the appropriate authority, operator, or conservation body if necessary.
- 2.21.3 Undetected underground cavities from mine workings, abandoned industrial sites and other activities, such as waste disposal, or other utilities' services (water, telecommunications, etc.) could have an effect on the integrity and safety of a pipeline. The effects might include collapse of underground tunnels, damage to utility services and pollution of water courses.
- 2.21.4 Applicants should undertake desktop studies to identify historic¹⁰ or current mine workings, underground cavities serving industrial usage, the nature of any made ground, waste sites, unexploded ordnance, utility services and any other below surface usage when assessing routes for a pipeline.
- 2.21.5 When choosing a pipeline route, applicants should seek to avoid or minimise adverse effects from usage below the surface.
- 2.21.6 Additional study may also be required to support environmental assessments depending on evidence available and findings of desktop studies.
- 2.21.7 Applicants may need to remove and dispose of contaminated material.

¹⁰ See EN-1 Section 5.9.

- 2.21.8 When considering the route of the pipeline, further consideration to the potential maintenance of the pipeline should also be factored in and the impacts that maintenance or additional protection of the pipeline may have.

Pipeline safety

- 2.21.9 The principal legislation governing the safety of pipelines (the Pipelines Safety Regulations 1996¹¹) requires that pipelines are designed, constructed and operated so that the risks are as low as is reasonably practicable (ALARP).
- 2.21.10 The HSE enforces these Regulations, which place general duties on all pipeline operators and additional duties on the operators of major accident hazard pipelines.
- 2.21.11 The additional duties require the pipeline operator to provide certain information to HSE at various stages in the lifecycle of a pipeline.
- 2.21.12 In determining compliance, HSE expects pipeline operators to apply relevant good practice as a minimum.¹²
- 2.21.13 In the pipeline industry there are well established standards, covering design, operation and maintenance of major accident hazard pipelines which can be used to demonstrate risks are ALARP.
- 2.21.14 If a pipeline operator wishes to use other standards, recommendations, or guidance then this should be discussed with the HSE and may be acceptable to the HSE, provided that the pipeline operator can demonstrate that they achieve at least the equivalent levels of safety. A gap analysis should be undertaken to confirm this.¹³

Impacts

Noise and Vibration

- 2.21.15 Section 5.12 of EN-1 sets out the generic considerations in relation to the impacts of noise and vibration.
- 2.21.16 In addition, there are specific noise and vibration considerations which apply to gas and oil pipelines during the pre-construction and construction phases.
- 2.21.17 The applicant will need to identify all the noise and vibration sensitive receptors likely to be affected during these phases and consider any associated pipeline maintenance or protection that may be additionally required.
- 2.21.18 During the pre-construction phase there could be vibration effects from seismic surveys. During construction, tasks may include site clearance, soil movement, ground excavation, tunnelling, trenching, pipe laying and welding, and ground reinstatement.

¹¹ legislation.gov.uk/ukxi/1996/825/contents/made

¹² Further information on the Pipelines Safety Regulations is available at: <http://www.hse.gov.uk/pipelines/index.htm>

¹³ Information on standards is available at: <http://www.hse.gov.uk/pipelines/resources/pipelinestandards.htm>

- 2.21.19 In addition, increased HGV traffic may be generated on local roads by the movement of materials. These types of noise and vibration impacts will need to be assessed.
- 2.21.20 The commissioning of a new pipeline can involve extensive periods of drying after hydrotesting, using air compressors, and noise mitigation may be required for this type of activity.
- 2.21.21 A new gas pipeline may require an above ground installation such as a gas compression station on the route of the pipeline to boost transmission line pressure; these should be outside of protected landscapes wherever possible.
- 2.21.22 A new oil pipeline may require pumping stations. These may be located in quiet rural areas, and therefore the control of noise from these facilities is likely to be an important consideration.

Biodiversity, Landscape and Visual

- 2.21.23 Sections 5.4 and 5.10 of EN-1 set out the general principles that should be applied in the assessment of biodiversity and landscape and visual impacts. Section 4.3.15 of EN-1 outlines how applicants should consider reasonable alternatives in an ES.
- 2.21.24 Additional considerations apply during the construction of a pipeline (which, without mitigation, can affect both landscape, visual amenity and ecology).
- 2.21.25 These comprise the effects upon specific landscape elements within and adjacent to the pipeline route, such as grasslands, field boundaries (hedgerows, hedge banks, drystone walls, fences), trees, woodlands, and watercourses.
- 2.21.26 There will also be temporary visual and landscape impacts caused by the need to access the working corridor and to remove flora and soil.
- 2.21.27 The working width of the pipeline will vary depending on the surrounding terrain. Temporary impacts could include large excavations where deep pits are needed for boring beneath rivers, roads, and sensitive features.
- 2.21.28 The considerations in this section also apply to any pipeline maintenance or protection that may be additionally required and associated impacts.
- 2.21.29 Long term impacts upon the landscape for pipelines are likely to be limited, as once operational the main infrastructure is usually buried. They are likely to include:
- limitations on the ability to replant landscape features such as hedgerows or deep-rooted trees over or adjacent to the pipeline;
 - the route of the pipeline clearly discernible in the landscape as a result of soil disturbance and altered drainage patterns producing changes to vegetation cover ; and
 - structures and indication points necessary to identify the pipeline route and provide it with service access.

- 2.21.30 The ES must include an assessment of the biodiversity and landscape and visual effects of the proposed route and of the main alternative routes considered (see Section 5.10 of EN-1).
- 2.21.31 The application should also include proposals for reinstatement of the pipeline route as close to its original state as possible and take into account any requirements for agreements with the landowner to access areas for aftercare and management work. This is particularly important in designated landscapes.
- 2.21.32 Where it is unlikely to be possible to restore landscape to its original state, the applicant should set out measures to avoid, mitigate, or employ other landscape measures to compensate for, any adverse effect on the landscape. In National Parks, The Broads and AONBs, such measures should seek to further the purposes of the designation.
- 2.21.33 Requirements to be included within the Marine Licence¹⁴ (detailed in paragraph 2.3.16 – 2.3.24 of EN-3) should also be duly considered for infrastructures within coastal and marine zones.

Water Quality and Resources

- 2.21.34 Section 5.16 of EN-1 sets out generic policy on the protection of the water environment during the construction, operation and decommissioning of a project.
- 2.21.35 Section 4.12 of EN-1 sets out policy on the pollution control framework.
- 2.21.36 EN-1 emphasises the need for good design and planning to ensure the efficient use of water, including water recycling.
- 2.21.37 Constructing pipelines creates corridors of surface clearance and excavation that can potentially affect watercourses, aquifers, water abstraction and discharge points, areas prone to flooding and ecological receptors. Pipeline impacts could include:
- inadequate or excessive drainage;
 - interference with groundwater flow pathways;
 - mobilisation of contaminants already in the ground;
 - the introduction of new pollutants;
 - flooding;
 - disturbance to water ecology;
 - pollution due to silt from construction; and
 - disturbance to species and their habitats.
- 2.21.38 Impacts during construction should be avoided as far as possible through route selection or mitigated if unavoidable and ground should be reinstated after construction.

¹⁴ <https://www.gov.uk/topic/planning-development/marine-licences>

- 2.21.39 The abstraction and disposal of large volumes of water through hydrostatic testing of pipelines during commissioning may also impact on water quality. Abstraction and discharges are regulated by the EA, under an abstraction licence and EP respectively.
- 2.21.40 Where the project is likely to have effects on water resources or water quality, for example impacts on groundwater recharge or on existing surface water or groundwater abstraction points, or on associated ecological receptors, the applicant should provide an assessment of the impacts in line with Section 5.16 of EN-1 as part of the ES.
- 2.21.41 Where the project is likely to give rise to effects on water quality, for example through siltation or spillages, discharges from maintenance activities or the discharge of disposals such as wastewater or solvents, the applicant should provide an assessment of the impacts.

Soil and Geology

- 2.21.42 New pipelines will be installed in a variety of geological conditions. It will be important for applicants to understand the soil types and the nature of the underlying strata, as well as the organic content of different soils.
- 2.21.43 Underground cavities and unstable ground conditions may present particular risks to pipeline projects. Impacts could include sterilisation of mineral resources or loss of soil quality.
- 2.21.44 Applicants must assess the stability of the ground conditions associated with the pipeline route and incorporate the findings of that assessment in the ES (see Section 4.3 of EN-1) as appropriate.
- 2.21.45 Desktop studies, which include known geology and previous borehole data, can form the basis of the applicant's assessment.
- 2.21.46 The applicant may find it necessary to sink new boreholes along the preferred route to better understand the ground conditions present.
- 2.21.47 The assessment should cover the options considered for installing the pipeline and weigh up the impacts of the means of installation.
- 2.21.48 Where the applicant proposes to use horizontal directional drilling (HDD) as the means of installing a pipeline under a National or International Site¹⁵ and mitigating the impacts, the assessment should cover whether the geological conditions are suitable for HDD.
- 2.21.49 When considering any application where the pipeline goes under a designated area of geological or geomorphological interest, the applicant should submit details of alternative routes, which either bypass the designated area or reduce the length of pipeline through the designated area to the minimum possible, and the reasons why they were discounted.

¹⁵ Habitats sites are sites under the Conservation of Habitats and Species Regulations 2017 and Ramsar Sites (and sites proposed for such designation). National sites mean sites designated under national legislation for their landscape, environmental, geological or heritage value, including SSSI, national parks, the Broads, AONBs and scheduled monuments.

2.21.50 Applicants should consult with the relevant statutory consultees at an early stage.

2.22 Natural Gas and Oil Pipelines: Mitigation

Site selection

2.22.1 Where it is not considered practicable to select a route that avoids below surface usage, applicants must demonstrate in the ES that mitigating measures will be put in place to avoid adverse effects both on other below ground works and on the pipeline.

2.22.2 Mitigating measures may include:

- protection or diversion of underground services;
- gas detection near landfill sites;
- HDD techniques; and
- rerouting.

Noise and Vibration

2.22.3 Noise mitigation measures applicants should consider for gas and oil pipelines, in particular their associated above-ground installations, include screening or enclosure of compressors and pumps.

2.22.4 Other measures could include the use of sound attenuators on ventilation systems, acoustic lagging on pipework, multi-stage (inherently quiet) control valves, gas turbine exhaust silencers, and high efficiency low speed cooler fans, depending on the specific issues.

2.22.5 Vibration mitigation measures could include the use of non-impact piling such as augur boring.

Biodiversity, Landscape and Visual

2.22.6 Mitigation measures to protect the landscape, visual amenity and ecology could include reducing the working width required for the installation of the pipeline to reduce the impact on the landscape where it will not be possible to fully reinstate the route.

2.22.7 In circumstances where the habitat to be crossed contains ancient woodland, ancient or veteran trees, trees subject to a Tree Preservation Order, or hedgerows subject to the Hedgerows Regulations 1997, the applicant should consider whether it would be feasible to use HDD under the ancient woodland or thrust bore under the protected tree or hedgerow and the Secretary of State should consider requiring this, where not included in the proposal.

2.22.8 In designated landscapes measures may need to go beyond those needed to mitigate for the effects of the scheme and seek to enhance the special qualities of the designated area.

Water Quality and Resources

- 2.22.9 Mitigation measures to protect the water environment could include techniques for crossing rivers and managing surface water before and after construction, including restoring vegetation and using sustainable drainage systems to control run-off.
- 2.22.10 Design measures which are typically taken to protect water quality include:
- the avoidance of vulnerable groundwater areas or appropriate use of above ground pipeline facilities;
 - use of the highest specification pipework and best practice in the storage and handling of pollutants to prevent spillage;
 - careful storage of excavated material away from watercourses and facilities for the disposal of sewage and waste;
 - use of sustainable drainage systems; and
 - careful reinstatement of riverbanks and reed beds.

Soil and Geology

- 2.22.11 Mitigation measures to minimise any adverse effects on soil and geology should include measures to ensure that residual impacts on the surface are minor.
- 2.22.12 Mitigation measures should include appropriate treatment of soil (in particular topsoil and soil with high organic content) during site construction and other infrastructure activity (and appropriate soil storage and reinstatement in line with the principles and practices outlined in the Code of Practice for the Sustainable Management of Soils on Construction Sites¹⁶ and the Agricultural Land Classification¹⁷ which provides guidelines on soil handling and restoration criteria and land quality.
- 2.22.13 Applicants are encouraged to develop and implement a Soil Resources and Management Plan which could help to use and manage soils sustainably and minimise adverse impacts on soil health and potential land contamination. This should be in line with the ambition set out in the Environmental Improvement Plan to bring at least 40% of England's agricultural soils into sustainable management by 2028 and increase this to 60% by 2030.
- 2.22.14 Where HDD is proposed, the applicant should provide an alternative plan for installing the pipeline in the event that HDD fails. Such alternative means could include open cut, micro-tunnelling and tunnelling.

¹⁶ The Code of Practice for the Sustainable Management of Soils on Construction Sites is available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf

¹⁷ <https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land>

2.23 Natural Gas and Oil Pipelines: Secretary of State decision making

Impacts

Pipeline safety

- 2.23.1 The Secretary of State should seek advice from HSE about safety issues when considering an application.

Noise and Vibration

- 2.23.2 The Secretary of State should follow the principles for decision making set out in Section 5.12 of EN-1.

Biodiversity, Landscape and Visual

- 2.23.3 The Secretary of State should follow the principles for decision making set out in Sections 5.4 and 5.10 of EN-1.

Water Quality and Resources

- 2.23.4 The Secretary of State should be satisfied that the impacts on water quality and resources are acceptable in accordance with Section 5.16 of EN-1.
- 2.23.5 The Secretary of State should liaise with the EA/ NRW/ Scottish Environment Protection Agency (SEPA) over the potential for the new development to result in loss or reduction of supply to any licensed abstraction or unlicensed groundwater abstraction, or any potential interference with current legitimate uses of groundwater or surface waters, taking account of the terms of any relevant EPs or any negative effect on a groundwater dependent ecosystem.

Soil and Geology

- 2.23.6 The Secretary of State should take into account the impact on and from geology and soils when considering a pipeline project.
- 2.23.7 A proposal will be acceptable from the point of view of soil and geology if the applicant has proposed a route and other measures (if applicable) that either eliminates any adverse impacts on soil and geology or reduces them to an acceptable level, and that the route chosen does not adversely affect the integrity of the pipeline, for example, by increasing materially the risk of fracture or impact on areas of high population.

3 Glossary

3.1.1 This glossary sets out the most frequently used terms in this NPS. There is a glossary in each of the energy NPSs. The glossary set out in EN-1 may also be useful when reading this NPS.

Term	Definition
ALARP	As low as reasonably practicable
AoS	Appraisal of Sustainability
Ancient or veteran tree	<p>Ancient and veteran trees can be individual trees or groups of trees. They are found in ancient woodlands and as trees outside woods.</p> <p>Ancient trees are exceptionally valuable for their biodiversity, cultural and heritage value. They are irreplaceable habitats that can:</p> <ul style="list-style-type: none"> - be of a great age relative to others of the same species - be large, depending on species, site and management history - have significant decay features such as hollowing and a crown structure typical of old age - have evidence of past use and management (such as pollarding) <p>Veteran trees may not be very old, but they have significant decay features, such as branch death and hollowing. These features contribute to their biodiversity, cultural and heritage value. They are also considered irreplaceable habitat.</p> <p>All ancient trees are veteran trees, but not all veteran trees are ancient.</p>
Ancient woodland	An area that has been wooded continuously since at least 1600 AD. It includes Ancient Semi-Natural Woodlands (ASNW), Plantations on Ancient Woodland Sites (PAWS), Ancient Wood Pasture and Parkland (AWPP) and Infilled Ancient Wood Pasture and Parkland (IAWPP) ¹⁸ .
Associated Development	Development associated with the NSIP as defined in Section 115 of the Planning Act 2008

¹⁸ <https://www.gov.uk/government/publications/keepers-of-time-ancient-and-native-woodland-and-trees-policy-in-england/keepers-of-time-ancient-and-native-woodland-and-trees-policy-in-england#glossary>

Benthic communities	Those organisms attached to, or living on, in or near, the seabed in a given area, which can include the intertidal area of the seabed
COMAH	Control of Major Accident Hazards
DCO	Development Consent Order made under the Planning Act 2008
EA	Environment Agency
EN-1	Overarching NPS for Energy
EP	Environmental Permit
EPR	Environmental Permitting Regulations
ES	Environmental Statement
Generic impacts	Potential impacts of any energy infrastructure projects, the general policy for consideration of which is set out in Part 5 of EN-1
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
HRA Site	One of the sites forming parts of the UK national site network under Regulation 16A, The Conservation of Habitats and Species Regulations 2017 for which an HRA will assess the implications of a plan or project
HSE	Health and Safety Executive
LNG	Liquefied Natural Gas
LPAs	Local Planning Authorities
MCA	The Maritime & Coastguard Agency
Mcm	Million Cubic Metres
Mcm/d	Million Cubic Metres Per Day
DLUHC	Department for Levelling Up, Housing & Communities
MMO	Marine Management Organisation: set up under the Marine and Coastal Access Act 2009
Natural gas	Natural gas means any gas derived from natural strata (including gas originating outside the United Kingdom)
NPS	National Policy Statement
NRW	Natural Resources Wales

NSIP	Nationally Significant Infrastructure Project
NSTA	North Sea Transition Authority (known as the OGA until March 2022)
NTS	National Transmission System
SEPA	Scottish Environment Protection Agency
The storage or working capacity test	= the NSIP threshold; a project would pass this test if the storage capacity on completion of the proposal is expected to be at least 43 Mcm of gas or higher
The maximum flow rate test	= the NSIP threshold; a project would pass this test if it has a projected maximum flow rate of at least 4.5 Mcm/d
UKCS	UK Continental Shelf
Weight	Within this NPS the hierarchy of weight is 1) limited 2) moderate 3) great 4) significant 5) substantial

This publication is available from: www.gov.uk/government/collections/national-policy-statements-for-energy-infrastructure

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