

Habitats Regulations Assessment Site Report for Dungeness

EN-6: Revised Draft National Policy Statement for Nuclear Power
Generation

Habitats Regulations Assessment of the revised draft Nuclear National Policy Statement

Habitats Regulations Assessment (HRA) screening and Appropriate Assessment (AA) of the revised draft Nuclear NPS including potentially suitable sites, has been undertaken in parallel with the Appraisal of Sustainability (AoS). These strategic assessments are part of an ongoing assessment process that will continue with project level assessments. Applications to the IPC for development consent will need to take account of the issues identified and recommendations made in the strategic, plan level HRA/AA; and include more detailed project level HRA as necessary.

The Habitats Regulations Assessment is provided in the following documents:

HRA Non-Technical Summary

Main HRA of the revised draft Nuclear NPS

- Introduction
- Methods
- Findings
- Summary of Sites
- Technical Appendices

Annexes to the Main HRA Report: Reports on Sites

- Site HRA Reports
- Technical Appendices

All documents are available on the website of the Department of Energy and Climate Change at www.energynpsconsultation.decc.gov.uk

This document is the Habitats Regulations Assessment Site Report for Dungeness.

This report has been prepared by the Department of Energy and Climate Change with expert input from specialist planning and environmental consultancies MWH UK Ltd with Enfusion Ltd and Nicholas Pearson Associates Ltd.

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1 Introduction

This HRA Report

- 1.1 This report sets out the HRA Screening and Appropriate Assessment components of the Habitats Regulations Assessment (HRA) of the proposals for Dungeness. This site was nominated into the Strategic Sites Assessment (SSA) process to be considered as a potentially suitable site for the deployment of new nuclear power station(s) by 2025. This site report is one of the Site HRA Reports comprising Part III of the HRA Report that accompanies the revised draft Nuclear National Policy Statement (NPS) published for public consultation in Autumn 2009. Part II of the HRA report for the revised draft Nuclear NPS sets out details of the HRA process, methods, findings and summary of the individual assessments at the nominated sites. Part I of the HRA report is a Non-Technical Summary.
- 1.2 This HRA has been undertaken at a strategic level and is part of an ongoing assessment process that started in July 2008 and will continue with project level assessments. Sites that are assessed to be potentially suitable for the deployment of new nuclear power stations by 2025, will be listed in the Nuclear NPS; developers will be able to apply to the Infrastructure Planning Commission (IPC)¹ for development consent to develop new nuclear power stations at those sites.
- 1.3 Each development consent will need to be accompanied by a project level HRA report, alongside an Environmental Statement reporting the findings of a detailed Environmental Impact Assessment (EIA). The proposals will also be subject to various other regulatory and licensing requirements.

The revised draft Nuclear National Policy Statement

- 1.4 The revised draft Nuclear NPS sets out a list of sites that following the Strategic Siting Assessment have been found to be potentially suitable for the siting of new nuclear power stations, and the framework by which development consent decisions on these sites should be made by the Infrastructure Planning Commission.

¹ The Government announced in June 2010 its intention to amend the Planning Act 2008 and abolish the IPC. In its place, the Government envisages that a Major Infrastructure Planning Unit (MIPU) will be established within the Planning Inspectorate. Once established, the MIPU would hear examinations for development consent and would then make a recommendation to the Secretary of State. It would not itself determine applications and decisions would be taken by the relevant Secretary of State. These proposed reforms require primary legislation. Until such time as the Planning Act 2008 is amended, the IPC will continue as set out in that Act. As a result, the NPSs will provide the framework for decisions by the IPC on applications for development consent for major infrastructure projects, and under the new arrangements will provide the framework for recommendations by the MIPU to the Secretary of State.

HRA Process

- 1.5 The Habitats Directive² protects habitats and species of European nature conservation importance. Together with the Birds Directive³, the Habitats Directive established a network of internationally important sites designated for their ecological status. Special Protection Areas (SPAs) are designated under the Birds Directive in order to protect rare, vulnerable and migratory birds. Special Areas of Conservation (SACs), and Sites of Community Importance (SCI's) are designated and defined under the Habitats Directive and promote the protection of flora, fauna and habitats. Internationally important wetlands are also designated under the Ramsar Convention 1971. UK Government policy states that the Ramsar sites are afforded the same protection as SPAs and SACs for the purpose of considering development proposals that may affect them⁴. These sites combine to create a Europe-wide 'Natura 2000' network of European Sites, which are hereafter referred to as 'European Sites'⁵ in this and other HRA reports⁶.
- 1.6 HRA tests whether the impacts identified as arising from a proposal, plan or project are likely to have a significant effect on European Sites of nature conservation importance. Article 6(3) of the Habitats Directive requires an 'appropriate assessment' to be undertaken on proposed plans or projects which are not necessary for the management of the European Site, but which are likely to have a significant effect on one or more European Sites either individually, or in combination with other plans, programmes or projects. In England and Wales this requirement was transposed into UK law by the Conservation of Habitats and Species Regulations 2010⁷ (the 'Habitats Regulations'). The process of fulfilling the requirements of the Directive and the Regulations is now in practice referred to as HRA, and Appropriate Assessment (AA) if required, forms a stage within the overall HRA process.
- 1.7 The full details of the HRA method and process, including the key principles and any assumptions made in this plan level HRA of the revised draft Nuclear NPS and nominated sites, are outlined in Part II of the HRA Report. This report covers the screening and Appropriate Assessment (AA) stages of the HRA for the nominated site at Dungeness, as outlined in Table 1. It takes into account the information contained within the site nomination submitted to

2 Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31992L0043:EN:HTML>

3 Council Directive 79/409/EEC on the protection of wild birds: <http://eur-lex.europa.eu/LexUriServ/site/en/consleg/1979/L/01979L0409-20070101-en.pdf>

4 ODPM, 2005, Planning Policy Statement 9: Biological and Geological Conservation; and ODPM Circular 06/2005: Biodiversity and Geological Conservation – Statutory Obligations and their impact within the Planning System

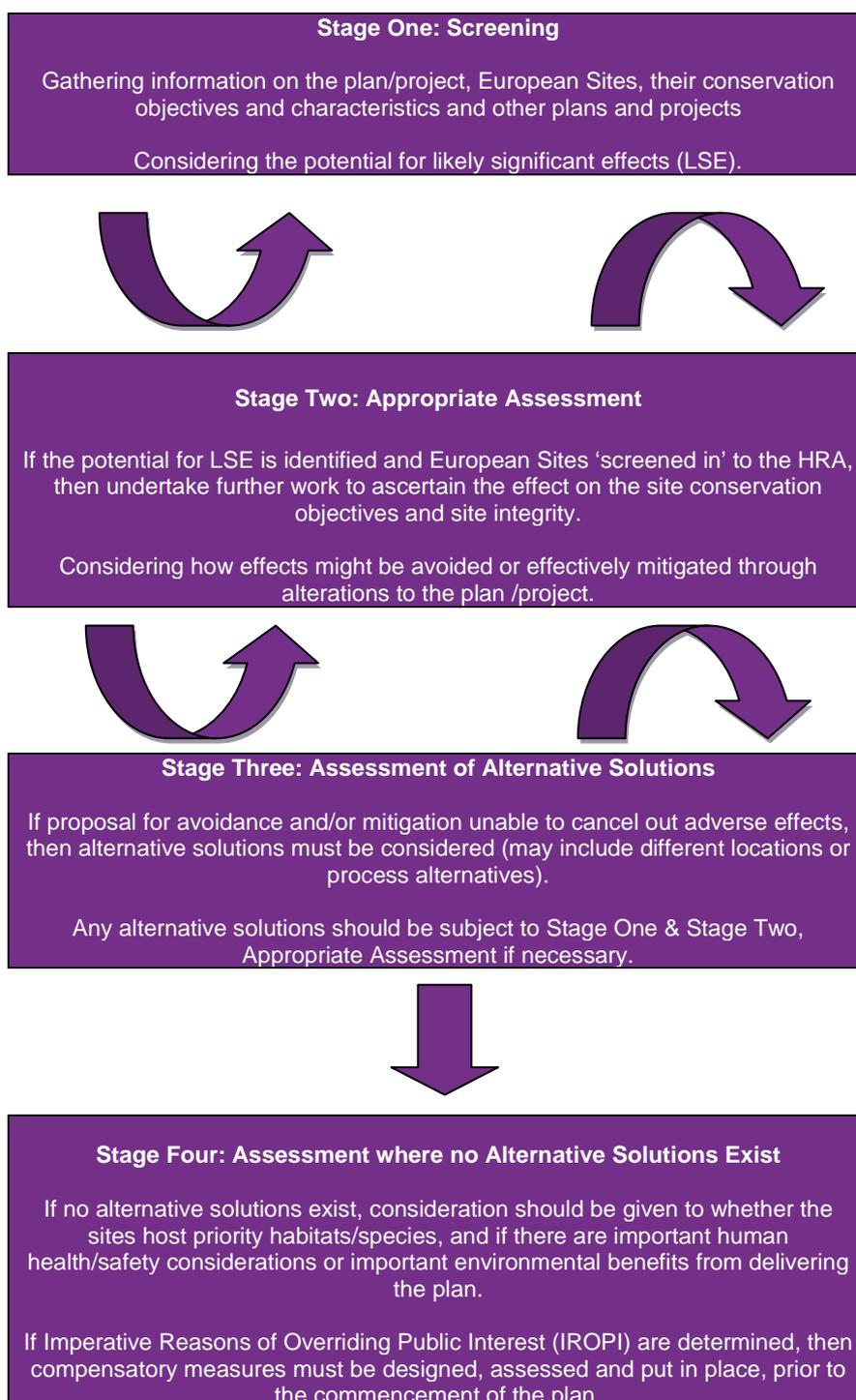
5 Though they do not form a part of the Natura 2000 network, Ramsar sites are included within the definition of 'European Sites' for the purposes of this report.

6 The term European Site is used throughout all the Site HRA Reports and in the Main HRA Report, and incorporates SACs, SPAs, SCIs and Ramsar sites.

7 Regulation 106 applies the requirements and controls in relation to plans under the regulations to National Policy Statements designated under the Planning Act 2008.

Government by the nominator (EDF) on 31 March 2009⁸. The HRA process is typically iterative and assessments have been revised on the basis of commentary from the Statutory Consultees.

Table 1: Habitats Regulations Assessment: Summary Overview of Key Stages
9



⁸ www.energynpsconsultation.decc.gov.uk

⁹ Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission DG Environment (2001) http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm

2 HRA Screening of Dungeness

- 2.1 The nominated site at Dungeness¹⁰ is located on the southern Kent coast, south of Ashford and north-east of Hastings. The nearest town is Lydd, 6km to the north-west. The nominated site is in the civil parish of Lydd within Shepway District and the county of Kent. The grid reference of the approximate centre of the nominated site is 607500, 116850. The location of the site is shown in Figure 1.

Screening

- 2.2 The screening process forms the first stage of any HRA and is focused on the 'likely significant effect' (LSE) test. The aim of the LSE test is to determine whether the plan either alone, or in-combination with other plans and projects is likely to result in a significant effect at European Site[s]. This is essentially a risk assessment process that seeks to understand whether there are mechanisms for any identified impacts arising from the plan to adversely affect the European Sites (i.e. a cause-effect pathway)¹¹. The key questions asked are:
- would the effect undermine the conservation objectives for the European Site?
 - can significant effects be excluded on the basis of objective information?
- 2.3 The tasks undertaken to complete the screening process for Dungeness are described below.

European Site Identification and Characterisation

- 2.4 European Sites within a 20km radius were scoped into the HRA screening process as set out in Table 2 and Figure 2. This area of search reflects guidance recommendations¹², but also takes into account that distance is in itself not a definitive guide to the likelihood or severity of impacts known to arise from developments. For example, inaccessibility/ remoteness is typically more relevant, and factors such as the prevailing wind directions, river and groundwater flow direction will all have a bearing on the relative distance at which an impact can occur. It should be noted that an area of land can be covered by more than one European designation.

10 Nomination documents submitted by the nominator (EDF) at www.energyngpsconsultation.decc.gov.uk

11 Appropriate Assessment of Plans (Therivel, May 2008)

12 Communities and Local Government (2006) Planning for the Protection of European Sites: Appropriate Assessment – Guidance for Regional Spatial Strategies and Local Development Documents; <http://www.communities.gov.uk/documents/planningandbuilding/pdf/160442.pdf>

Table 2: European Sites within 20km of the nominated site boundary

| | Designation | Distance from nominated site boundary ¹³ |
|-------------------------------------|------------------------|---|
| Dungeness | SAC | Partly within |
| Dungeness to Pett Level | SPA | Adjacent in part (to existing access road identified as within nominated site); and within 0.5km of main part of nominated site |
| Dungeness, Romney Marsh and Rye Bay | Proposed Ramsar | Unknown |

2.5 Dungeness, Romney Marsh and Rye Bay Proposed Ramsar site has been included within Table 2 above, even though it is not yet a formally designated listed site in the UK. Proposed sites have been informally consulted upon but are awaiting formal designation¹⁴. The requirements of the Habitats Regulations mean that there could be a need to review the designation of the NPS¹⁵ when the proposed Ramsar site is formally designated, if this HRA process has not considered the interest features of the proposed site. The need to review could therefore arise here if the proposed Ramsar site, when designated, contains features which are different from the two existing designated European sites (i.e. it contains interest features which had not been considered in this HRA process). Natural England has advised that the proposed Ramsar site's interest features are distinct from the features of the other European Sites assessed. Therefore, in order to avoid the need to review the NPS in the future when the proposed Ramsar site has been designated, and since Natural England have also advised us that the interest features are sufficiently well established to allow consideration of them at this stage, the proposed Ramsar site has been considered in this HRA.

2.6 **Appendix 1** details the characteristics of the three European Sites scoped into the Screening Assessment. The characterisations include an overview of the sites':

- ecological features;
- their qualifying features/ reasons for designation;
- conservation objectives and the condition status of their constituent Sites of Special Scientific Interest (SSSIs) where available; and

¹³ Distances measures to nearest site boundary.

¹⁴ Natural England launched a consultation in September 2010 on the Dungeness, Romney Marsh and Rye Bay proposed Ramsar site and possible extensions to the Dungeness to Pett Level SPA.

¹⁵ Regulation 50 of the Habitats Regulations; PPS9

- environmental conditions necessary to support site integrity; and site vulnerabilities, including any key pressures or trends known to be affecting the sites.

Nominated Site Review and Identification of Likely Impacts

- 2.7 The nominated site lies at the edge of Denge Beach, an area of vegetated shingle ridges to the seaward side of the Romney and Denge marshes. It includes parts of the Dungeness, Romney Marsh and Rye Bay Site of Special Scientific Interest (SSSI), the Dungeness National Nature Reserve (NNR), the Dungeness, Romney Marsh and Rye Bay Proposed Ramsar (pRamsar), and the Dungeness Special Area of Conservation (SAC). Dungeness to Pett Level Special Protection Area (SPA) lies within 500m to the north of the main part of the nominated site and adjacent to it in part (along the existing access road included with the nominated site). Natural England have also stated that there are proposals to extend the SPA and add in additional qualifying features, and to rename the extended SPA Dungeness, Romney Marsh and Rye Bay SPA, but that this may be subject to change before formal notification is complete.
- 2.8 The site nomination identifies land covering an area of approximately 50 hectares for permanent works. The nominated site does not include land for temporary construction works. Additional land outside the nominated site (not necessarily adjacent) may also be required for coastal protection measures, highway and rail improvements, and a construction-phase Marine Off-Loading Facility.
- 2.9 The nominated site would occupy an area of land directly west of the Dungeness 'A' and 'B' nuclear power stations, on a shingle foreland projecting into the English Channel. Dungeness 'A' comprises of two Magnox reactors, and started generating electricity in 1965. Power generation stopped at Dungeness 'A' in 2006, and defueling and decommissioning are underway, with the final site clearance scheduled between 2102 to 2111¹⁶. In June 2009, EDF stated that defuelling of the Magnox Reactors at Dungeness A has been deferred, although the NDA intend to start this work in the near future. Dungeness 'B' comprises of two operating Advanced Gas-Cooled Reactors (AGR), and became operational in 1983, having an estimated decommissioning date of 2018¹⁷.
- 2.10 From the nomination documents¹⁸, it is assumed that the nomination is for a nuclear power station development incorporating:
- at least one nuclear reactor;

16 Dungeness A Site Summary: 2006/07 Lifetime Plan, Nuclear Decommissioning Authority. www.nda.gov.uk

17 www.nda.gov.uk/ukinventory/sites/dungeness

18 Op. cit.

- construction stage areas and facilities, including a Marine Off-Loading Facility;
 - infrastructure associated plant and facilities related to the operation of a nuclear power station;
 - possible road widening;
 - increase in coastal protection and flood defence measures;
 - transmission and cooling water infrastructure, including intake and outfall structures; and
 - interim radioactive waste storage facilities.
- 2.11 At this stage in the planning process, the nominator was not required to provide details of the proposed development such as the development footprint, site layout, construction areas, or technology, within the site nomination documents.
- 2.12 The full range of potential impacts on environmental conditions and biodiversity arising from the development of new nuclear power stations are outlined and discussed in Part II of the HRA Report. Impacts of particular relevance to the nominated site include: direct habitat loss, fragmentation and disturbance, and effects on the marine environment. These issues are discussed in detail in the Screening Assessment task below.

Identification and Consideration of Other Plans, Programmes and Projects

- 2.13 It is a requirement of Article 6(3) of the Habitats Directive¹⁹ that HRA examines the potential for plans and projects to have a significant effect either individually or 'in combination' with other plans, programmes and projects (PPPs). The aim is that plans and projects are evaluated within the context of the prevailing environmental conditions and that account is taken of their effects.
- 2.14 Plan level HRA practice has shown that the in-combination assessment is most relevant where plans might otherwise be screened out because their individual contribution is inconsequential. The requirement is that the HRA process should take account of reasonably foreseeable impacts (as opposed to every conceivable effect).²⁰
- 2.15 For the purposes of this assessment consideration was given to:
- Local Development Plans delivering planned spatial growth
 - Major Development Schemes (including transport plans/ airport expansion) where relevant
- 2.16 Where relevant, reference was also made to:

19 Implemented through the Conservation (Natural Habitats &c.) Regulations 1994 (as amended)

20 Tyldesley, D. (2009) The Habitats Regulations Assessment of Local Development Documents. Revised Draft Guidance for Natural England. Natural England, Sheffield.

- Coastal Habitat Management Plans
- Catchment Flood Management Plans
- Catchment Abstraction Management Strategies
- Local Abstraction Management Plans
- Shoreline Management Plans
- River Basin Management Plans
- Minerals and Waste Development Frameworks
- Water Resources Management Plans
- Current lifetime plans (including decommissioning) of neighbouring existing Power Stations

2.17 **Appendix 2** provides a summary of the key plans which are referred to in the Screening Assessment for likely significant effects. Further specific discussion is given in Section 3 where relevant.

Screening Assessment

2.18 The following sections outline the issues arising from the Screening Assessment (LSE test) undertaken at **Appendix 3**, for Dungeness. The Screening Assessment indicated that development at Dungeness has the potential to significantly affect European Sites as a result of:

- **Water Resources and Quality Impacts**
- **Habitat (and Species) Loss and Fragmentation**
- **Coastal Squeeze**
- **Disturbance (Noise, Light and Visual)**
- **Air Quality**

2.19 Each of the above issues is considered in turn below. The following Screening Assessments have been undertaken based against the conservation objectives for all the European Sites listed in Table 2, as provided in Appendix 1.

Water Resources and Quality Impacts

European Sites for which significant effects are likely

Dungeness SAC

Dungeness to Pett Level SPA

Dungeness, Romney Marsh and Rye Bay pRamsar

2.20 The quality of fresh and marine water that feeds and supports the protected European Sites at Dungeness is a key determinant in ensuring the integrity of the habitats and dependant species of the protected sites. Poor water quality arising from the build up of heavy metals and salts and from the discharge of toxic compounds (that may also bind to sediments) can lead to mortality in aquatic life and upon those predators that feed upon them (for example bird species). Toxins

can accumulate in animals and plants through uptake and ingestion through the food chain and can also increase the vulnerability of species to disease. Moreover changes in water quality such as through nutrient enrichment (eutrophication) which can affect the availability of oxygen can dramatically alter habitat and species compositions, with direct and indirect detrimental impacts upon dependant species over time particularly the Annex II species, Great Crested Newts (a qualifying feature of Dungeness SAC). Water abstraction can also impact upon habitats and species, as the removal of water from the natural cycle can affect groundwater supply to protected habitats and result in habitat loss and/or degradation.

2.21 The HRA Screening Assessment reviewed the potential for impacts on water resources and quality arising from the construction, operation and decommissioning phases of a new nuclear power station at the nominated site. Issues include:

- increased/ altered drainage from earthworks and excavations and potential sedimentation changes;
- alteration of flow through abstraction and the return of additional water volumes to the aquatic system;
- changes to water temperature creating 'thermal plumes' as a result of controlled discharges;
- the potential for toxic contamination (for example from anti-fouling agents associated with cooling water systems) from accidental leakage may interact or combine with routine non-radioactive or radioactive discharges that will be subject to discharge consents regulated by the Environment Agency.

2.22 All of the three European Sites screened are identified as possessing specific vulnerabilities relating to water resources.

Dungeness SAC

2.23 The primary qualifying features of the Dungeness SAC include the annual vegetation of drift lines, the perennial vegetation of stony banks, and the Annex II species Great Crested Newt. These habitats and species are vulnerable to contamination from the introduction of synthetic and non-synthetic toxic compounds and to any changes in nutrient and/or organic loading of both marine and groundwater supplies. Such alterations to nutrient levels can impact upon the species composition of those vegetation communities for which the SAC is designated. The abstraction of water could also potentially lower water levels in the naturally occurring fresh water pits (a feature of the SAC). These are features within the Perennial vegetation of stony banks, and are vulnerable to even small fluctuations in water level.

Dungeness to Pett Level SPA

- 2.24 The qualifying features of the Dungeness to Pett Level SPA include migratory and internationally important assemblages of breeding (Common Tern, Little Tern and Mediterranean Gull); wintering bird species (Bewick's Swan and Shoveler); and passage warblers (Aquatic Warbler). The Bewick's Swan is a qualifying species of 15 UK SPAs which support an estimated 99% of the UK population and 42% of the international flyway population. These species are dependent upon the maintenance of the extent and quality of their feeding and breeding grounds, including saltmarsh, mudflats, sandflats and shingle islands, as well as freshwater habitats including ditches, fens and willow carr which are present within the SPA. Contamination of these habitats is therefore a particular issue for these species either through direct contact or accumulation of toxins up through the food chain, whilst alterations to flow-regime arising from abstraction and discharge, and any disturbance to the balance of saline and non-saline conditions will likely lead to the loss and/or degradation of these habitats within the SPA.
- 2.25 In September 2010, Natural England launched a public consultation on proposals to extend the existing area of the Dungeness to Pett Level SPA (almost 1,500 ha) to cover over 4,000 ha of the Dungeness Romney Marsh and Rye Bay SSSI²¹ and to change the name to the Dungeness, Romney Marsh and Rye Bay SPA to reflect the changes. Natural England also propose to add seven new bird species (breeding marsh harrier, avocet and sandwich tern, wintering bittern, hen harrier, golden plover and ruff) and an assemblage of over 20,000 water birds to the qualifying interests. In the vicinity of the nominated site, the potential SPA area would extend from Camber Sands past Broomhill Sands, to within approximately 2.5km of the nominated site to the west, it would include additional areas (long pits and open pits) adjacent to the section of the access road included in the nominated site boundary and would include a large area of the coast to the north east of the nominated site extending from the Dungeness foreland (less than 1km east of the nominated site) to St Mary's Bay. Shingle is currently extracted from parts of this latter section of coastline and transferred to the west of Denge Marsh to compensate for material protecting the existing power stations that has been lost to erosion.
- 2.26 As the proposals to extend the boundaries and qualifying interests of the Dungeness to Pett Level SPA are at the consultation stage and therefore not final, this assessment considers existing boundaries and qualifying interests, and this assessment refers to the site using its current name – the Dungeness to Pett Level SPA.

²¹ http://www.naturalengland.org.uk/regions/south_east/ourwork/dungenessconsultation/default.aspx

Dungeness, Romney Marsh and Rye Bay pRamsar

- 2.27 At present Dungeness to Pett Level Ramsar is proposed. This is also part of Natural England's current consultation. The site supports a number of rare species of plant; a variety of habitats which support a diverse invertebrate assemblage; an internationally important population of Bewick's Swans in the winter; as well as nationally important wintering populations of other waterfowl populations; and nationally important populations of Whimbrel during the spring and autumn passage periods. The proposed Ramsar site is a wetland site that comprises a mosaic of habitats including shingle beaches, artificial lakes, grazing marshes, intertidal sands and mudflats – all of which are sensitive to changes in water resources and quality impacts.
- 2.28 The Dungeness, Romney Marsh and Rye Bay SSSI which underpins the Dungeness SAC contains both buried and active geomorphology features. The vast shingle beach at Dungeness contains a number of natural wetlands, referred to as Open and Fossil Pits, within Dungeness RSPB Reserve and Lydd Ranges. The small pits at Dungeness National Nature Reserve are unique in an area dominated by shingle. The communities within the four pits are quite diverse, with a range of fen and mire communities being present.²²
- 2.29 The Dungeness Pits (as described by Natural England) are of special interest for their basin fen plant communities, and should be added as a reason for notification as an SSSI. Dungeness is described as having extensive coastal gravel deposits, having a gentle ridge and hollow topography, with occasional deeper pits left, presumably, by local currents. The gravel deposits overlay marine sands and silts, some of which are likely to act as aquitards or aquifers. The gravel itself acts as an aquifer, and the upper water level of this aquifer lies above the base of many of the pits. This means there has been approximately 800 years of natural infilling and terrestrialisation of the pits, providing an important Holocene palaeo-ecological archive and a fascinating set of examples of stages in hydroseral succession. A number of factors and events affect hydroseral succession.
- 2.27 Woodland scrub, particularly *Salix* species, is now the natural vegetation of the terrestrialised pits. This may be a response to a lower water table, oxidation of the exposed peat, or concomitant release of nutrients. The scrub presents a hydrological issue, in that large quantities of water can be lost by evapotranspiration. The hydrological model for the pits (in the absence of specific investigation) is likely to be a sump sustained by a fluctuating groundwater, with seasonal seepage from the edge when the gravel aquifer is exceptionally recharged with rainwater.

22 Dungeness Pits, Kent – National Vegetation Classification Survey (2006). RPS, Cambridgeshire.

- 2.28 The Dungeness Pits are an example of Basin fens. The series includes a few pits in which open water predominates, but the majority have no open water at all. Most have floating rafts of vegetation, varying in the degree to which they have stabilised. The elasticity of the rafts provides some buffering against the effects of a fluctuating water table by rising and falling. Dungeness Pits is a small-scale version of how raised bogs are formed. Accumulating dead vegetation (peat) raises the surface above the groundwater, leading a change from (possibly) neutral to alkaline pH and high base ion status, to one of acid pH and low base status.
- 2.29 The assessment of effects on the Open Pits needs to consider the system as a whole. These wetlands have been subject to colonization by vegetation and the Open Pits display stages of a classic hydrosere succession, from open water and marginal reed-swamp, through a form of marsh or fen, to Grey Willow *Salix cinerea* carr. Some of the pits have reached a stage in the hydrosere succession where they have little or no open water. The oldest of these pits are now on the eroding south coast of Dungeness (in Lydd Ranges) and have reverted to saline conditions, being typical, relatively stable, shingle percolation lagoons. The lagoons demonstrate a range of salinities and all show landward transitions to vegetated shingle habitats and to the shingle ridge geomorphology of Dungeness. Such freshwater features are vulnerable to even small water level fluctuations. Within the saltmarsh habitats of the Dungeness, Romney Marsh and Rye Bay SSSI, good water and sediment quality should be maintained. Management of the saline lagoons needs to be tailored to each individual lagoon, and based upon an understanding of the natural features of importance and the external factors affecting the lagoon. Maintaining salinity and water depth can be particularly important. The marshes are primarily managed through grazing. The ditches, drains and other wetland features require regular and careful management such as periodic removal of sediment and vegetation to return ditches to an early stage of the management cycle. Ditches should also be managed to ensure that there is sufficient depth of water (0.3-0.5 m) throughout the ditch network for most of the year, although some species favour desiccated ditches. Good water quality is essential in maintaining a healthy wetland system. The swamp communities with the SSSI also require that water quality is maintained according to the requirements of the wetland communities present. Management should ensure that the local surface water that drains into basin fens and other natural shingle wetlands is of appropriate quality.
- 2.30 The Dungeness, Romney Marsh and Rye Bay SSSI is also designated specifically to protect Water Voles. Water Voles are sensitive to fluctuations in water level and pollution²³. This SSSI is one of the best in Britain for invertebrates, supporting many rare and scarce species

23 Water Vole Conservation Handbook, Second Edition. Strachen, R. & Moorhouse, T. (2006). Wildlife Conservation Research Unit, Oxford.

associated with shingle and sand dune habitats and wetlands. The nominated site is also home to Britain's only population of Sussex Emerald Moth.

- 2.31 Given the Dungeness nominated site lies within the Dungeness SAC, and within 0.5km of the Dungeness to Pett Level SPA (adjacent in part, and likely to lie within the pRamsar, although exact site boundaries of the proposed Ramsar are currently unknown), generic vulnerabilities relating to the water resources and quality are likely to be similar. All sites are vulnerable and likely to be vulnerable to changes in water quality.
- 2.32 The Screening Assessment therefore indicates that the potential for significant effects from impacts of water resources and quality upon the ecological integrity of these European Sites are likely, and should be considered further through Appropriate Assessment to determine the nature and extent of the potential significant effects identified.

Habitat (and Species) Loss and Fragmentation

European Sites for which significant effects are likely

Dungeness SAC

Dungeness to Pett Level SPA

Dungeness, Romney Marsh and Rye Bay pRamsar

- 2.33 Habitat loss and fragmentation in relation to European Site integrity can occur naturally (such as tree fall, changing flow patterns in aquatic systems) or as a result of human intervention. Direct anthropogenic²⁴ impacts such as through the construction of road/transport infrastructure or flood/sea defences as a result of encroachment of the development footprint upon the coastal fringe, can present barriers to species migration and result in the removal of habitats which cannot be easily be re-created. Such construction can also directly affect nutrient flows, sediment transport regimes, balances in salinity of habitats at the coastal fringe, and habitat connectivity. Additional land take is also likely to occur for construction, ancillary and induced development (for example, when potentially providing parking space for workers, access roads, and a temporary works area). The total scale of the area required for the development is not defined at this strategic stage.
- 2.34 Given that the SAC lies within the nominated site, the development would involve an area of land take (specific areas unknown at this stage) from the SAC. Each of these European Sites is vulnerable to the impacts arising from habitat loss and fragmentation, therefore, significant effects upon the ecological integrity of these sites are considered likely. The Screening Assessment noted that potential

²⁴ "Anthropogenic impacts" means impacts as a result of human activity

direct impacts would arise from the construction phases of development at Dungeness, including construction of the power station itself, and infrastructure and facilities related to the operation of the power station. Direct loss of designated habitat may also occur should the proposals require coastal defence measures to be implemented. According to the EDF site nomination report for Dungeness it will be necessary to construct cooling water intake and outfall structures and possibly coastal defence and marine off-loading facilities beyond the nominated site boundary. The site nomination report states that *'in the event that direct seawater cooling of the turbine condensers is not acceptable and indirect cooling systems are necessary for some or all of the cooling load, additional space will be required. Depending on the plant output and cooling systems that are used, this additional area could be up to 20ha per reactor unit. Therefore, a land area between 30 and 50ha is expected to be required'*.

- 2.35 Loss and fragmentation of habitat is also significant at the Dungeness to Pett Level SPA given the reliance of Common Tern, Little Tern and Mediterranean Gull (breeding); overwintering Bewick's Swan and Shoveler; and migratory bird species (Aquatic Warbler) upon the coastal and freshwater habitats supported within the SPA.
- 2.36 The direct impacts of loss and fragmentation of habitat are specifically relevant to the Dungeness SAC, with habitats designated within this site being particularly vulnerable to any loss of its habitat or other supporting habitat given its restricted extent. Habitat loss and fragmentation can also impact on the designated species Great Crested Newt - an Annex II feature of the SAC. The dispersal and maintenance of Great Crested Newt populations is directly impacted by habitat fragmentation and the loss of suitable breeding ponds and fresh water pools. Barriers to newt movements should be avoided.
- 2.38 The Dungeness SAC is dependent on both coastal geomorphology and coastal processes. The nominated site incorporates areas of the Dungeness, Romney Marsh and Rye Bay SSSI which is a nationally important site by reason of a diverse range of biological and geological features, specifically the coastal geomorphology of Dungeness and Rye Harbour, and the following nationally important habitats – saltmarsh, sand dunes, vegetated shingle, saline lagoons, standing waters, lowland ditch systems, and basin fens. The SSSI contains buried deposits, surface features and actively evolving coastal landforms. The shingle features of the Dungeness SAC have evolved over decades, and are typical of a site where natural changes are both necessary and beneficial to the features. Management of this SSSI aims to limit disturbance or removal of material of interest. The SAC contains both buried and active geomorphology. Development adjacent to such areas may also impact upon subsurface features, for instance through drainage. The static geomorphological features, most significantly the ridge features away from the active coastal front, are important as a long-term record of coastal change. Such features are

irreplaceable if destroyed, and Natural England's Views About Management document²⁵ relating to this SSSI states that '*management should aim to protect such areas from activities that may damage or obscure them. Such activities range from development and coastal defence schemes to recreational pressures, such as off-road driving*'.

- 2.39 Open Pit features are also present in the SAC. Conservation of the active shoreline is focused on minimizing disruption to coastal processes and allowing the shoreline to function as naturally as possible in the face of a range of pressures, including climate change. It is acknowledged that both the Dungeness and Rye Harbour elements of the SSSI have been strongly influenced by human activities; however the site remains of classic importance. Part of the interest is in understanding how human activity influences its long-term evolution. However, coastal management measures should work with and not against coastal processes, and operate in synergy with the evolutionary trends of the shingle foreland.
- 2.40 The biological features of the Dungeness, Romney Marsh and Rye Bay SSSI may require little or no management intervention as they are maintained naturally by active coastal processes, such as the evolution of the cusped foreland, sand dune formation and estuary dynamics. The key requirement in areas of vegetated shingle is to avoid disturbance, especially in more open communities. Within the saltmarsh habitats, grazing may be required as management. Good water and sediment quality should be maintained.
- 2.41 The direct impacts of loss and fragmentation of habitat is specifically relevant to the proposed Ramsar site, as the site offers a mosaic of diverse habitats, which supports a number of rare species of plants; and a variety of habitats which support a diverse invertebrate assemblage (as listed under Ramsar criterion 2a). Ramsar criterion 3c refers to the pRamsar supporting internationally important populations of Bewick's Swan and other waterfowl; and Whimbrel during spring and autumn passage periods.
- 2.42 The Screening Assessment concludes that significant effects of habitat loss and fragmentation on the European Sites are likely and should be considered further through Appropriate Assessment.**

Coastal Squeeze

European Sites for which significant effects are likely Dungeness SAC

²⁵ English Nature – Views About Management. A statement of English Nature's views about the management of Dungeness, Romney Marsh and Rye Bay Site of Special Scientific Interest (SSSI). Date notified 16 August 2006

Dungeness to Pett Level SPA

Dungeness, Romney Marsh and Rye Bay pRamsar

- 2.43 Coastal squeeze impacts are closely related to habitat loss and fragmentation, and relate specifically to situations where the coastal margin is squeezed by the fixed landward boundary. Coastal squeeze typically arises through the development of flood and sea defences and the reinforcement of coastal margins through hard engineering (construction works, drainage, and infrastructure provision), thereby preventing and altering the natural transport and movement of coastal material, impacting on species and habitats.
- 2.44 The Screening Assessment identified potential for the loss of marine and sub-tidal habitats during the construction phase given that the nominated site encroaches upon the coastal fringe. Such encroachment will exacerbate current stress levels tolerated by an existing man-made coastal defence which comprises a shingle embankment along the shoreline. This embankment requires continual maintenance to minimise impacts of coastal erosion and flooding. In addition, should additional coastal defence measures be required as part of the proposed development, current longshore sediment transport regimes will likely be altered with direct adverse effects upon the designated habitats which are sensitive to any alterations in sediment supply. Likely significant impacts may also occur in relation to the balance of saline and non-saline conditions within those habitats which support species for which the SAC and SPA are designated. As the exact boundaries are not yet known for the pRamsar, as a precautionary approach, coastal squeeze impacts upon this site are considered to be the same as those listed for the SAC and SPA.
- 2.45 Given that areas of the SAC lie within the nominated site, within 0.5 km of the SPA, and that the pRamsar site is likely to be within both the SAC and SPA site boundaries (exact boundaries unknown at this stage), generic vulnerabilities relating to coastal squeeze are possible. As each of the European Sites considered are vulnerable to the impacts arising from coastal squeeze, significant effects upon the ecological integrity of these sites are therefore likely. In particular, the alteration to the hydrological and sediment transport regimes arising from the development of infrastructure and coastal defences at the coastal fringe will likely result in the loss and/or degradation of designated habitats, thereby impacting upon those species which they support. The development of the nominated site is therefore likely to exacerbate coastal squeeze impacts upon all three of the European Sites.
- 2.46 Likely significant effects are therefore assumed, and the impacts of coastal squeeze should be considered alongside habitat loss and fragmentation through further Appropriate Assessment.**

Disturbance (Noise, Light and Visual)

European Sites for which significant effects are likely

Dungeness SAC

Dungeness to Pett Level SPA

Dungeness, Romney Marsh and Rye Bay pRamsar

- 2.47 Disturbance to habitats and species can arise from a number of sources. While recreational activities are frequently implicated in disturbance events, sources can also include traffic, construction activity and intermittent sounds (for example, alarms or sirens). Such impacts upon bird species are particularly significant and tend to occur on a continuum where the most disturbing activities are those that are irregular, unpredictable loud noise events and movement or vibration of a long duration. Less disturbing are regular, frequent, quiet and predictable patterns of sound or vibration with limited vibration.²⁶
- 2.48 Breeding and overwintering birds (which are qualifying features of the Dungeness to Pett Level SPA) expend unnecessary energy and have reduced feeding times as a result of responding to disturbance events. Displacement between feeding sites can also place pressures on available resources, placing additional pressures on supporting habitats.²⁷ The net effect of these disturbance events is a direct negative impact on species survival. As both breeding and overwintering birds use the nominated site there are no clearly defined periods when construction would not cause disturbance.
- 2.49 The Screening Assessment identified disturbance as being of potential significance for the Dungeness to Pett Level SPA interest features (breeding pairs of Common Tern and Little Tern; passage warblers (Aquatic Warbler); over-wintering bird species (Bewick's Swan and Shoveler). Increased disturbance is likely to arise from a range of sources. During construction lighting, noise and vibration are likely to increase due to the presence of construction vehicles and workers. Post-construction disturbance may be at an increased level in comparison to pre-construction ambient levels. Increases in disturbance (including lighting, noise and vibration) may result in the reduction of sight lines and commuting corridors, whilst also diverting birds from their chosen roosting and feeding sites. These disturbance sources and effects may be equally relevant offsite for example through the construction road/rail access.
- 2.50 The pRamsar supports overwintering birds (which are a qualifying feature under criterion 3c). Habitat disturbance on such species could require such species to expend unnecessary energy, and have

26 Scott Wilson (Nov 2008) EcoTowns: Sustainability Appraisal and Habitats Regulations Assessment.

27 Gill, Sutherland & Norris (1998) The consequences of human disturbance for estuarine birds. RSPB Conservation Review 12. 67-72.

reduced feeding times as a result of the disturbance. Displacement between feeding sites can also place pressures on available resources, placing additional pressures on supporting habitats²⁸. The net effect of these potential disturbance events would be a direct negative impact on species survival. As overwintering birds (Bewick's Swan and Shoveler) use the nominated site there are no clearly defined periods when construction would not cause disturbance.

- 2.51 Disturbance caused by an increase in light during the operational stage, and increased noise during the construction and operational stage could impact on the breeding success of the Mediterranean Gull, Common Tern, and Little Tern, together with Aquatic Warblers (on passage), and over-wintering Bewick's Swans and Shovelers. Whimbrel and other waterfowl are also present on the pRamsar.
- 2.52 Given the likely construction phase of the development and identified sensitivities of the designated species to disturbance events, significant effects must be considered likely in the Screening Assessment, and should be considered further through Appropriate Assessment.**

Air Quality Impacts

European Sites for which significant effects are likely

Dungeness SAC

Dungeness to Pett Level SPA

Dungeness, Romney Marsh and Rye Bay pRamsar

- 2.53 The effects of changing and poor air quality at European Sites vary according to the pollutant type (acid deposition, ammonia, nitrogen oxides, ozone and sulphur dioxide) and the nature of the receiving environment. Key pollutants that are of concern for terrestrial habitats are sulphur dioxide (SO₂), ammonia (NH₃) and nitrogen oxide (NO_x). Deposition of nitrogen can lead to soil enrichment and sulphur dioxide to acidification which may alter species composition with impacts on associated species.
- 2.54 Background air quality in the UK has improved progressively and is expected to continue to improve significantly over the next 15 years with tightening emissions standards and moves towards 'cleaner' energy generation.
- 2.55 The Screening Assessment identified air quality as a specific vulnerability for the qualifying and interest features of the sites and noted the potential for impacts on air quality at a local level arising from the construction and decommissioning phases of Dungeness.

28 Gill, Sutherland & Norris (1998) The consequences of human disturbance for estuarine birds. RSPB Conservation Review 12. 67-72.

- 2.56 The mobilisation of dust particles and increased emissions from associated traffic can adversely affect those sensitive habitats adjacent to the development site. Dust particles can be of a different acidity to the surrounding habitats, and major roads within 200m have the potential to increase nitrogen and carbon emissions impacts from vehicles²⁹.
- 2.57 The lichen heath community, which forms part of the shingle vegetation community of the Annex 1 Perennial Vegetation of Stony Banks habitat, are particularly sensitive to air quality, therefore an increase in the mobilization of dust particles associated with construction, increased HGV traffic and decommissioning, poses a threat, as they are particularly prone to smothering from dust.
- 2.58 The Screening Assessment also noted the potential for unplanned radioactive releases to the atmosphere, for instance as a result of accidents, but that regulatory sources indicate aerial emissions to be low and cause little (human) and biodiversity radiation exposure.³⁰
- 2.59 The pRamsar supports a number of rare species of plant (such as the Brackish Water Crowfoot, Rootless Duckweed and Divided Sedge); and invertebrates (such as Aquatic Weevil and Medicinal Leech). Changes in air quality could impact on the water quality on the nominated site, and these species could potentially be sensitive to such changes.
- 2.60 Given that the proposed development site of Dungeness lies within the Dungeness SAC, and the Dungeness to Pett Level SPA, generic vulnerabilities relating to air quality are possible. As each of the European Sites are considered vulnerable to the impacts arising from air quality, significant effects upon the ecological integrity of these sites are therefore likely.
- 2.61 Given the extended construction phase of the development and identified sensitivities of the designated species to disturbance events, the potential for significant likely effects should be considered further through Appropriate Assessment.**

Conclusions and Recommendations of Screening Assessment

- 2.62 In line with the screening requirement of the Habitats Directive and Regulations, an assessment was undertaken to determine the likely significant effects of the development at Dungeness on the three European Sites that lie within 20km of the nominated site for

29 Department for Transport (2003) Transport Analysis Guidance, the Local Air Quality Sub-Objective TAG Unit 3.3.3.

30 Environment Agency (2005) Measuring Environmental Performance, Sector Report for the Nuclear Industry.

Dungeness. The Screening Assessment and conclusions were informed by:

- The information gathered on the European Sites – **Appendix 1**;
- Consideration, where necessary, of other plans and projects that have spatial/ contextual relevance – **Appendix 2**;
- The summary analysis of potential environmental impacts generated by the development activities arising from Dungeness;
- Government guidance³¹ which indicates that HRA for plans is typically broader and more strategic than project level HRA and that it be undertaken at a level that is proportionate to the available detail of the plan.

2.63 The Screening Assessment identified a number of key impacts arising from the proposed development and the potential for significant effects at all three of the European Sites scoped into the screening process. These findings are summarised in Table 3 below.

Table 3: Summary of Likely Significant Effect Screening Assessment

| European Sites within 20km of the nominated site at Dungeness | Water Resources and Quality | Habitat Loss and Fragmentation | Coastal Squeeze | Disturbance (Noise, Light, Visual) | Air Quality |
|---|-----------------------------|--------------------------------|-----------------|------------------------------------|-------------|
| Dungeness SAC | ✓ | ✓ | ✓ | ✓ | ✓ |
| Dungeness to Pett Level SPA | ✓ | ✓ | ✓ | ✓ | ✓ |
| Dungeness, Romney Marsh and Rye Bay pRamsar | ✓ | ✓ | ✓ | ✓ | ✓ |

| Key | | |
|------------------------------|---|--|
| Likely Significant Effect | ✓ | further Appropriate Assessment required |
| No Likely Significant Effect | ✗ | no further Appropriate Assessment required |
| Significant Effect Uncertain | ? | precautionary approach taken and further Appropriate Assessment required |

³¹ Planning for the Protection of European Sites: Appropriate Assessment - Guidance For Regional Spatial Strategies and Local Development Documents, at <http://www.communities.gov.uk/documents/planningandbuilding/pdf/160442.pdf>

- 2.64 It is recommended that the HRA proceeds to the next stage of 'Appropriate Assessment' in relation to the three European Sites where the potential for likely significant effects (✓) or significant effect uncertain (?) has been identified. This next stage of the HRA process is outlined in the following section 3 of this report.

3 HRA Appropriate Assessment of Dungeness

Scoping and Additional Information Gathering

- 3.1 To support the Appropriate Assessment (AA) phase, additional information was gathered on the European Sites and environmental conditions, in line with the specific issues identified by the screening exercise (**Appendix 4**). This additional information included air quality data and trends, available from the UK Air Pollution Information System (APIS), water quality and abstraction data produced by the Environment Agency (EA). Various ecological survey reports and documents were also received from Natural England (on Open Pit features and shingle vegetation) and the nominator, EDF, (including their survey reports for Great Crested Newts, vegetation, and birds). The responses of EDF, Shepway District Council and Natural England to the consultation on the initial draft NPS and this HRA report were also reviewed and considered.

Assessing the Impacts (in-combination) Appropriate Assessment

- 3.2 The HRA Screening Assessment considered whether the impacts arising from a new nuclear power station at the nominated site at Dungeness have the potential to affect the integrity of the European Sites scoped in to the assessment process. The following sections summarise the analysis undertaken to determine whether the effects on the integrity of European Sites are likely to be adverse, either alone or in-combination with other plans and projects.
- 3.3 A comprehensive review of relevant Plans and Projects which could give rise to in-combination effects on the three European Sites (detailed in Table 3) has been undertaken, and is reflected below in relation to each impact category. The key plans and projects are described in **Appendix 2** and referred to in relation to each relevant impact below.
- 3.4 The conservation objectives for all three European Sites are detailed in **Appendix 1**, and summarised as follows:

Dungeness SAC

To maintain in favourable condition:

- the annual vegetation of driftlines,
- the Perennial vegetation of stony banks; and
- the habitats and populations of Great Crested Newts.

Dungeness to Pett Level SPA

To maintain in favourable condition:

- the habitats for the populations of Annex 1 species (Little Tern, Bewick's Swan, Common Tern, Mediterranean Gull and Aquatic Warbler) with particular reference to standing water, shingle, marshy grassland, arable, coastal waters and shingle islands;
- the habitats for the populations of migratory bird species (Shoveler) with particular reference to standing water, and marshy grassland; and
- the habitat for the population of Annex 1 species (Little Tern, Common Tern, Bewick's Swan, and Mediterranean Gull) with particular reference to standing water.

Dungeness, Romney Marsh and Rye Bay **pRamsar**

The conservation objectives for the pRamsar are not yet published. It has therefore been assumed that the conservation objectives for the pRamsar are the same as the SAC and SPA.

Water Resources and Quality

Dungeness SAC

Dungeness to Pett Level SPA

Dungeness, Romney Marsh and Rye Bay **pRamsar**

- 3.5 Current Environment Agency data³² indicates that the ecological potential for rivers near to the SAC and SPA are classed as being moderate cAWB (candidate Artificial Waterbodies); the ecological status of the lake near to Dungeness have not been assessed; Estuaries and coastal waters near to Dungeness are classed as being moderate cHMWB (candidate Heavily Modified Waterbodies); the chemical status of the river environments near to Dungeness have not been assessed; the chemical status of estuarine and coastal waters near to Dungeness are 'failing to achieve good' to the North East, and 'good' to the South West; and the chemical status for groundwater and the quantitative status for groundwater near to Dungeness are both poor.
- 3.6 The Environment Agency have produced a Catchment Abstraction Management Strategy (CAM) for the River Rother, published in Spring 2006. The process for rewriting this CAM will recommence in April 2010. The actions relevant to Dungeness, from The Rother CAM Annual Update (October 2007), were: The Rother Estuary Study – Natural England to confirm the freshwater needs of the estuary. This started in 2007 and will finish in 2009; and River Rother – A joint co-operative study between the Environment Agency (Water Quality), NFU and Southern Water to evaluate the dilution needs of the river and investigate the relationship between eutrophication and flow rates. This started in 2006 and is due to finish in 2010. As such evaluations are ongoing, and there are uncertainties about water resources, a

³² The data used in this assessment is taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time. Draft plans were presented to the Government for approval in September 2009, with final plans published in December 2009.

precautionary approach requires that likely significant effects be assumed through water quality and quantity on the European Sites until greater site specific details are known.

- 3.7 The River Quality Objective (RQO) is an agreed strategic target, expressed in terms of River Ecosystem standards, and indicates the level of water quality that a river should achieve in order to be suitable for its agreed uses. Under the RQO 2003 Compliance grading, the River Lydd was classed as a significant failure. Effluents from a new power station may contribute to changes in already vulnerable ground water quality. The extent of the river catchment areas surrounding the European Sites are unknown, however both the River Lydd and River Rother catchments appear to flow into the European Sites, therefore it is not possible to conclude that water resources and quality will avoid direct impacts from the development of a new nuclear power station at Dungeness.
- 3.8 The Denge Gravels aquifer lies within the SAC and SPA; and is particularly important for the Open Pit features in the SAC. The aquifer currently has a status of 'no water available'. Most of the current abstraction pressure is from public water supply. Additional development on the area could potentially lead to further pressures on the water supply of the area. Climate change is an important issue facing water resource management, with the latest scenarios suggesting temperatures will rise across England, with summers in southern England becoming drier and winters wetter. Global warming is resulting in a loss of intertidal land through sea level rise. This has implications for water availability in general. Rainfall becoming both more seasonal and of increasing intensity, could lead to higher runoff and less water being able to percolate into the aquifers which supply the bulk of public water supply in the area. This could lead to increased pressures on the SAC, SPA and associated species.
- 3.9 The Annual vegetation of drift lines, the Perennial vegetation of stony banks, and the Annex II species Great Crested Newts are vulnerable to contamination from the introduction of synthetic and non-synthetic toxic compounds and to any changes in nutrient and/or organic loading of both marine and groundwater supplies. Such alterations to nutrient levels would impact upon the species composition of those vegetation communities for which the SAC is designated. The conservation objectives are to maintain such habitats in a favourable condition. Increased nutrient levels leading to eutrophication within freshwater bodies and altered oxygen levels can also impact upon the survival of Great Crested Newts, a further qualifying feature of the SAC. The nominated site at Dungeness lies partly within the Dungeness SAC. The nominated site is vulnerable to changes in water quality, and the water abstraction requirements of the development are currently unknown.

- 3.10 Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges.
- 3.11 Water abstraction could potentially have impacts on the qualifying bird species present within the SPA. Given that water abstraction requirements for the development are currently unknown, a precautionary approach requires that, at the strategic level, potential adverse effects be assumed for the SAC, SPA and pRamsar in relation to water supply and abstraction, until greater site specific detail (including on technology and mitigation measures) is known. The conservation objectives of the SPA are to maintain the habitats in favourable condition, for the Annex 1 species (Little Tern and Common Tern). Changes to water levels would not be maintaining such habitat in a favourable condition. The potential for mitigation measures to effectively address the potential adverse effects on site integrity is considered further in the avoidance and mitigation section of this report.
- 3.12 The Nomination Report³³ states that it is likely that excavations for foundations will need to be dewatered during the construction phase. The extent of hydrogeological effects arising from dewatering would require detailed investigation, as even a small or brief loss of water in the Open Pits could be damaging to these vulnerable features. Potential effects could include temporary loss of surface water features within adjacent areas. Such adverse effects could potentially be avoided, reduced or mitigated, for example by incorporating a hydraulic cut-off (partial or complete) around the excavations.

Effects in Combination with Other Plans and Projects

- 3.13 Aspects of the following plans and programmes could lead to 'in combination' effects on European Sites with regards to disturbance (see Appendix 2):
- An Appropriate Assessment of the Draft South East Plan, 2006 was undertaken and highlights that the following aspects may affect European Sites. An increase in water extraction, with the potential adverse effect on Dungeness SPA, SAC and pRamsar sites due to the increased water abstraction in association with development in the South East Plan; as well as the potential adverse effect on water quality of Dungeness SPA, SAC and Ramsar sites due to increased discharge in association with development under the South East Plan.
 - In addition to this plan, both the Sustainable Communities in the South East: Building for the Future (2003) and The South East Regional Housing Strategy (2006) stated that generic effects

33 EDF Strategic Siting Assessment for the Development of New Nuclear Power Stations in the UK. Site Nomination Report for Dungeness (Report SSA/DN/001). www.energynpsconsultation.decc.gov.uk

relating to housing development and population will lead to an increase in water abstraction associated with new development. Such in-combination effects could potentially impact upon the European Sites.

- 3.14 **At this strategic level assessment, where detailed development plans are not defined, a precautionary approach requires that adverse effects be assumed through water quality and quantity on the three European Sites. The potential for mitigation measures to effectively address the potential adverse effects on site integrity is considered further in the avoidance and mitigation section of this report.**

Habitat (and Species) Loss and Fragmentation/ Coastal Squeeze

Dungeness SAC

Dungeness to Pett Level SPA

Dungeness, Romney Marsh and Rye Bay pRamsar

- 3.15 The nomination report³⁴ states the development would involve a small area of land take from the Dungeness SAC, around the existing nuclear power station site. The Dungeness to Pett Level SPA lies approximately 500m to the north of the main part of the nominated site (although adjacent in part), and there would be no land take from the SPA for any permanent operations. This is likely to be the case even if the boundaries of the SPA are extended in line with Natural England's consultation proposals. However at this stage of the process, the area to be used for temporary construction is not required to be defined in the nomination. The boundaries of the pRamsar are not finalised at this stage, therefore it is not possible to say if land-take would involve the pRamsar.
- 3.16 The principal adverse effect of new nuclear development at Dungeness on the whole sequence of shingle ridges and their associated vegetation, would be the direct loss of vegetated shingle habitat and therefore a reduction in the extent of the SAC. Such land-take has the potential to affect the integrity of the SAC, but detailed baseline investigations would be required to fully assess the impact. The conservation objectives for the SAC include to maintain the Annual vegetation of driftlines, the Perennial vegetation of stony banks— land-take from development would not be maintaining these habitats. Natural England advised within their initial comments on the previous draft of this report, that *'...even a small area of land-take may be deemed to have an Adverse Effect on Integrity (AEOI). There are no minimum extents defined for AEOI and this is assessed on a case-by-case basis depending on the feature on how this would be affect the structure and function, and how important an individual site is, for the*

34 Op. cit.

feature across its range'. The features of the European Sites need to be considered as a whole interacting system.

- 3.17 A National Vegetation Classification (NVC) report has been prepared by Entec on behalf of the nominator³⁵. The report states that *'the proposed works area (PWA) incorporates part of the Dungeness SAC and has identified shingle communities of high conservation value both within the PWA and immediately adjacent to it. The SD1 NVC community identified within the report corresponds with habitat 'H1220 Perennial Vegetation of Stony banks' within the Dungeness SAC citation. The report also states (within section 5.2) 'Currently we are not able to qualify what proportion of the better plant communities are represented within the PWA and therefore what the impact of works would be on the features of the SAC. Because of the limited geographical spread of sampling undertaken in 2007 we cannot be sure that the range in variation in Dungeness plant communities has been identified and therefore cannot fully place the PWA communities within the full spectrum of Ness plant communities.'*
- 3.18 The NVC report states that further work is required to determine the impact on the habitats of the SAC. It is therefore considered that adverse impacts on site integrity cannot be ruled out. The NVC report notes that the site has highly distinctive communities because of its unique characteristics which are of conservation value. Extensive surveys of Dungeness by specialist shingle experts have identified a wide range of shingle vegetation communities. The shingle communities at Dungeness are not all covered by the NVC report and have been subject to a separate classification by Ferry et al, (1990), as set out in Table 1 of Entec's report.
- 3.19 There is the potential for the construction of a new nuclear power station to involve damage and disturbance to SAC habitats in the vicinity of the nominated site within additional areas of temporary works. It is considered likely that shingle would be used to create a bund, and this may involve imported material or material from the surrounding area. It is understood that the current power station operators currently use shingle from the east side of the Ness area, where it is naturally deposited. Such ongoing habitat loss and disturbance is likely, with the development of an additional new power station. Such continual disturbances would prevent the SAC habitats from remaining intact, or evolving further. The importance of the habitat systems and how they relate to each other needs to be considered as a whole. Natural England confirmed that permission to extract shingle from the eastern shore on Dungeness Point has lapsed and that no shingle has been extracted for the last three winters including 2009/10. It is understood that a planning application (submitted jointly by British Energy and the Environment Agency in 2007) is awaiting determination by Kent County

35 British Energy Group PLC Dungeness National Vegetation Classification Report (2007). Entec. www.energy-nps-consultation.decc.gov.uk

Council, and that Natural England has expressed concerns over the likely impacts of the proposed extraction on the evolution of the SSSI and the SAC.

- 3.20 Natural England has noted that it is important to understand where the best elements of the feature habitats are, for example where the ridge structures are intact, so this can be taken into account during site design. It was suggested that the most undisturbed areas are presently around the current compounds, and these areas are of particular interest. Natural England has stated that some shingle ridges that have not been subjected to much previous disturbance lie within the nominated site and are continuous into the wider area, displaying an important sequence of shingle ridges. Natural England has noted that even those ridges that have been disturbed previously should be protected from any further disturbance³⁶. Any development within such areas would have an impact on these features. Mitigation and creation of shingle habitats is a long-term exercise. Recovery from damage is a long-term process and is unlikely to result in the original type of vegetation. This needs to be addressed when considering long-term impacts. There are currently limited examples of areas where shingle has been restored successfully, which are discussed further under 'Avoidance and Mitigation Measures' below.
- 3.21 Since 1988, there has been a significant advance in research on the Dungeness Foreland and on the adjoining marshland, which has demonstrated further that Dungeness Foreland is a nationally important site for coastal geomorphology and Holocene coastal change. It has been described as 'a spectacular landform which has an intimate geomorphological relationship to the adjoining areas of Walland and Romney Marshes'³⁷. This connectivity significantly enhances the scientific and geomorphic importance of the landform.
- 3.22 It is also expected that the prevailing ground level of the permanent works at the nominated site would be raised above expected flood level heights (approximately by 1-2 m around the buildings), to provide flood protection for the development into the future. Such works would not be likely to maintain the habitat in a favourable condition, and would likely have serious implications for the SAC, especially without further information on the type of material to be used (and its source). Any potential access roads may also have to be raised from flooding, to provide continuity of access in rising flood levels. Such access may need to be maintained, with or without the new development for existing stations. Such ground raising works would be likely to bury features of the European Sites, leading to adverse effects.

36 NCC report – Dungeness: A geomorphological assessment. C. P. Green & D. F. M. McGregor, 1986.

37 Long, A., Plater, A. and M. Waller, 2006. Geomorphological interest features at Dungeness, Kent. Natural England.

3.23 Great Crested Newt surveys were conducted for the nominator over two successive years (2007 and 2008³⁸) at Dungeness at four waterbodies within 500m of a 'preliminary works area' (largely equivalent to the nominated site) and within 500m of the access road, that were considered suitable habitats following a screening assessment. All the waterbodies lie outside the nominated site, and there are no waterbodies within the nominated site capable of sustaining Great Crested Newts. The surveys concluded that a single Great Crested Newt was found in one of the waterbodies. The report concluded that Great Crested Newts are likely to occur in all of the six waterbodies intermittently, due to the recorded history of the species in the locality, but that the isolated location of the waterbodies from core populations with the SAC and the limited connective terrestrial habitat makes colonisation by dispersing Great Crested Newts difficult. The report also concluded that the high fish populations are likely to reduce the Great Crested Newt populations to very low, and prevent populations becoming established in some waterbodies. The terrestrial habitats present, between the waterbodies and the preliminary works area and access road, consist of low level partially vegetated shingle, and the presence of this habitat minimises the potential for Great Crested Newt migration into areas that may be impacted by the development. More favourable newt habitat is located further to the west within the RSPB reserve, towards Manor Farm, where tussocky grassland and scattered scrub is better developed, particularly on the edges of small, less exposed waterbodies (considered to be more suitable for newt species). The newt survey report concludes that there would be no requirement to mitigate for Great Crested Newts in the development, although if the proposed development footprint changes, the validity of that conclusion should be reassessed.

Effects in Combination with Other Plans and Projects

- 3.24 Aspects of the following plans and projects could lead to 'in combination' effects on European Sites with regards to habitat (and species) loss/fragmentation and coastal squeeze (see Appendix 2):
- The proposed expansion of Lydd Airport (including application for erection of passenger terminal building, carparking, and runway extension) could have in-combination effects. The area surrounding the airport is environmentally sensitive, being within and adjacent to the European Sites. The SAC runs along the eastern side of the runway; the SPA is located approximately 0.5km east and 0.2km south of the airports southern boundary, being within 1km of the existing Power Station. The proposed runway extension is located within the Dungeness SSSI and its construction would involve the loss of some 2.17 ha from the edge of Dungeness SAC and SSSI. As the whole area is considered to be botanically rich and supports several rare and scarce species of invertebrates, a sizeable population of Great Crested

38 British Energy Group Plc Dungeness Great Crested Newt Survey report 2008, Entec, November 2008.

Newts, and rare and scarce plants including saltmarsh goosefoot. The area is also important for birds both in the breeding season and winter. Appropriate Assessment would be required for the airport extension.³⁹

- The Dungeness and Pett Levels Coastal Habitat Management Plan (CHaMP) (undated although likely 2001) states that losses of the surface shingle through gravel extraction are considerable with up to 20% of the surface destroyed. Disturbance including building of infrastructure (including the nuclear power stations) has caused major disruption to the surface ridge structures, which support significant invertebrate populations, and its vegetation amounting to a further 50% loss. Today only approximately 30% of the surface retains the original ridge structure, a small proportion of which retains intact vegetation. The CHaMP assesses the likely implications for the European sites of strategic options for flood and coastal defence and habitat management ('Do Nothing', 'Hold the Line', Alternative Management practices, and three Managed Retreat options), in relation to the likely long-term evolution of the foreland at Dungeness over the next 30-100 years. The CHaMP identifies that 'Do Nothing' and 'Managed Retreat version 2 option' would involve large-scale coastal change in the Pett and Camber area, with the latter involving an 8% loss of the SPA site area. However, the CHaMP states that this may be beneficial in terms of ecological sustainability. Continuing with the existing 'Hold the Line' policy is reported to have a limited impact on the European sites; the main impact being a loss of perennial shingle habitat, which could potentially be compensated for by introduction of shingle from a source outside the Dungeness sediment transport system (although this would not represent true functioning of dynamic coastal processes). The CHaMP recommends that these issues are considered seriously in the SMP.
- The extent of loss to marine and terrestrial habitats from the construction of new cooling water culverts, and a marine landing facility is currently not defined, and its significance in the context of wider habitat changes cannot be assessed at this stage. It is possible that these changes may act cumulatively or accelerate changes, in relation to the primary designation features (Annual vegetation of driftlines, Perennial vegetation of stony banks) as well as the coastline generally, and the species associated with these. Furthermore, such changes may act cumulatively or may accelerate changes identified in the CHaMP above in relation to the designated features.
- South Foreland to Beachy Head Shoreline Management Plan (1st revision, 2007) discusses the predicted changes in the shoreline in 0-20, 20-50 and 50-100 years, and sets out present-day, medium term and long-term policies for shoreline management. The SMP's preferred present-day, medium term and long term policies are to continue to

39 South East England Regional Assembly Regional Planning Committee – RPC Sub-Group – Statutory Consultations February 2007

'hold the line' and protect the power station frontages and hinterland assets, including the European sites. The SMP recognises that achieving this policy will become increasingly problematic due to the process of shingle migration and sea level rise, and that retaining the shingle bund will become increasingly difficult. The SMP Action Plan notes that ongoing shingle recycling operations are required to implement the short –term policy of maintaining the required standard protection, and that the SMP is being reviewed in this area.

- In-combination effects are likely to occur during the decommissioning of Dungeness 'A' and 'B' which could potentially have adverse effects on the European Sites. It is understood that beach feeding associated with the coastal defences for the Dungeness 'A' power station, currently being decommissioned, could be required for a timescale beyond that of the proposed development, and the maintenance of the shingle ridge on the immediate foreshore would continue with or without the new development. This ongoing disturbance of the shingle is considered to be preventing natural successional processes occurring, and is not maintaining the habitat in a favourable condition, as stated in the conservation objectives. 'In combination' effects with the decommissioning of Dungeness 'A' and 'B' on the designated sites' habitats and species are likely to depend on the proposals for flood risk management and the timing of decommissioning in relation to any new build, which would need to be assessed at project level.

3.25 At this strategic stage where detailed development proposals are not defined, it is not possible to conclude that there will not be adverse effects through habitat loss and coastal squeeze on the SAC, SPA and pRamsar. The potential for mitigation measures to effectively address the potential adverse effects identified is considered further in the avoidance and mitigation section of this report.

Disturbance (Noise, Light, Visual)

Dungeness SAC

Dungeness to Pett Level SPA

Dungeness, Romney Marsh and Rye Bay pRamsar

- 3.26 Birds are particularly vulnerable to disturbance from close human proximity and the Screening Assessment noted the potential for construction and decommissioning phases, as well as from recreational activities, can all create disturbance events. It is not possible at this strategic plan stage, without information on the proposed construction phase, to determine how the nature or timing of the development may affect interest feature birds reliant on specific/individual areas of habitat, or to conclude that there will be no adverse effect on the three European Sites.
- 3.27 The discharge of heated cooling water can cause disturbance to fish populations and subsequently the qualifying bird interests of the SPA

could potentially be impacted upon. The nominator's report of recent bird surveys⁴⁰ noted that a number of Common Terns used the outfall throughout the survey period (April and July 2007 inclusive), and that this is likely to be of national importance. It was not clear whether Common Terns, Little Terns and Mediterranean Gulls are using the outfall during the breeding season, are part of the Dungeness to Pett Level SPA breeding populations, but it is intuitive that there is likely to be some interchange of birds between the two areas, particularly post-breeding. It was also noted in the nominator's report of recent bird surveys⁴¹ that the warm water outfall represents an important feeding resource for many bird species during the migratory and winter periods. The outfall also potentially provides a resource of regional importance for Common Tern (a qualifying interest species of the SPA) and Herring Gull, and is potentially of county importance for Black-Headed and Common Gulls during parts of the survey period (August 2007 and March 2008). Given that the range of potential disturbances as well as potential benefits are currently unknown in relation to Dungeness, a precautionary approach requires that adverse effects be assumed for the European designated sites until greater detail (including on technology and mitigation measures) is known.

- 3.28 The nomination report states that there is also the potential for short-term construction phase impacts on wildlife with the SAC, for example disturbance caused by lighting and noise. Construction management plans could be developed to minimize such impacts, if justified on the basis of the detailed ecological studies carried out at project level.
- 3.29 **Given that the disturbance levels (noise/light/visual) arising from the development are currently unknown, a precautionary approach requires that at the strategic level potential adverse effects be assumed for the European Sites until greater site specific detail (including on technology, the construction phase and mitigation measures) is known. The potential for mitigation measures to effectively address the potential adverse effects on the site integrity is considered further in the avoidance and mitigation section of this report.**

Air Quality

Dungeness SAC

Dungeness to Pett Level SPA

Dungeness, Romney Marsh and Rye Bay pRamsar

- 3.30 Information provided by the Kent and Medway Air Quality Monitoring Network indicates that air quality in Kent is generally low. (<http://www.kentair.org.uk/pollutionlevels.php>). The overall air pollution index for a site or region is calculated from the highest concentration of five pollutants (Nitrogen dioxide, Sulphur dioxide, Ozone, Carbon

40 British Energy Group PLC, Dungeness – First Interim Bird Report, Entec. October 2009.

41 British Energy Group PLC, Dungeness – Second Interim Bird Report, Entec. July 2009.

monoxide and particulates). Deposition of nitrogen can lead to soil enrichment and sulphur dioxide to acidification which may alter species composition with impacts on associated species. English Nature's State of Nature Report (Maritime Habitats) 2002 stated that nationally, nitrogen inputs to the sea have increased by 20% since 1984.

- 3.31 The UK Air Pollution Information System⁴² has noted that many of the qualifying feature species and habitats are sensitive to eutrophication and acidification. Additional loading on these will have impacts.
- 3.32 The Environment Agency assesses that, non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and therefore the Agency does not consider them to be an environmental priority.
- 3.33 Air quality issues around Dungeness are considered to potentially be most significant during construction and decommissioning phases (increase in transport etc). The potential for cumulative effects from other plans and programmes, for instance increased air pollution from increased air traffic movements, could have further impacts on air quality. The mobilisation of dust particles and increased emissions from associated traffic can adversely affect those sensitive habitats adjacent to the development site. Dust particles can be of a different acidity to the surrounding habitats, and major roads within 200m have the potential to increase nitrogen and carbon emissions impacts from vehicles⁴³.
- 3.34 The Screening Assessment identified air quality as a specific vulnerability for the qualifying and interest features of the European Sites. As Dungeness lies within the SAC and within 0.5km of the SPA (pRamsar site boundaries are unknown at this stage), these designated sites are vulnerable to changes in air quality, adverse effects upon the ecological integrity of the designated sites cannot be ruled out.
- 3.35 Lichen heath communities form part of Annex 1 habitat PVSb, and are sensitive to air pollution. Construction, increased HGV traffic and decommissioning pose the biggest threats, as lichens are particularly prone to smothering effect of dust. Maintaining the Perennial Vegetation of Stony Banks in a favourable condition is one of the condition objectives for the SAC, and such changes in air quality would hinder this.
- 3.36 **Therefore, a precautionary approach requires that at the strategic level, potential adverse effects be assumed on the designated sites from air quality impacts. The potential for mitigation measures to effectively address the potential adverse effects on**

42 www.apis.ac.uk

43 Department for Transport (2003) Transport Analysis Guidance, the Local Air Quality Sub-Objective TAG Unit 3.3.3.

site integrity is considered further in the avoidance and mitigation section of this report (see below).

Avoidance and Mitigation Measures

- 3.37 Avoidance and mitigation measures can apply both at a strategic policy level in the form of policy amendments/caveats, and in more detail at project level, where they are specific measures applicable to the identified issues at individual sites. This HRA is being undertaken at a strategic level where there are development uncertainties regarding the nature, scale and final footprint of the development at the nominated site. These uncertainties limit the capacity of the HRA to reasonably predict the effects on a European Site⁴⁴.
- 3.38 At this strategic level, the HRA for Dungeness can make avoidance and mitigation recommendations to inform the strategic siting assessment process and the overall development of the NPS. These recommendations may also subsequently provide guidance to the IPC and potential developers to ensure that any future development at Dungeness takes into account the findings of this strategic level assessment in more detailed, project level HRA.
- 3.39 The HRA recommendations for avoidance and mitigation measures in relation to Dungeness are outlined below and summarised in Table 4. Part II of the main HRA report also summarises the measures identified in this report alongside those proposed by other individual site HRAs.
- 3.40 In addition, a discussion is included of the likely effectiveness of avoidance and mitigation measures in light of information received from the nominator (EDF) and Natural England, submitted to DECC in response to consultation on the draft NPS and accompanying HRA in November 2009. This HRA is part of an ongoing assessment process that would continue at development consent stage and be informed by detailed information regarding the development plans at Dungeness, including consideration of the impact on local defined habitats not covered by the HRA plan process should the site be listed in the final Nuclear NPS.

Water Resources and Quality

- 3.41 Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation).
- 3.42 Thermal, radioactive and non-radioactive discharges should go beyond complying with existing standards, with radioactive discharges required

⁴⁴ The key principles and any assumptions made in this plan level HRA of the Nuclear NPS and nominated sites are outlined in Part II of the HRA report.

to be As Low As Reasonably Achievable (ALARA)⁴⁵ and that all other discharge levels are required to be an improvement on existing standards. All discharges which lead to adverse effects on the integrity of European Sites should not be permitted. In addition to thermal effects from direct cooling, there are potential water quality issues, in particular nutrient enrichment from anti-fouling agents, which may be associated with the cooling water process.

- 3.43 The IPC, as guided by the Nuclear NPS, can direct requirements for the efficiency of water use and the protection of water quality. This may include requiring that management measures relating to supply and discharge (including potential effects on European Sites) are in place prior to the implementation of the development, and that decisions relating to best available technology take specific account of the sensitivities of the individual receiving environments.
- 3.44 Adverse effects could be mitigated at the project level through suitable design - including use of Sustainable Drainage Systems (SuDS) - and the selection of appropriate construction methods.
- 3.45 Fish protection measures should be incorporated into cooling water intake/system design. Fish mortality could potentially impact on fish-eating birds that are protected by the SPA, such as Common Terns, Little Terns and Mediterranean Gulls.
- 3.46 Further studies are necessary to determine impact of discharging heated waters. Potential impacts on hydrology/hydrogeology will need to be understood. Generic effects of discharged water are well documented however water quality studies specific to the area are necessary to determine impact⁴⁶.
- 3.47 There is a small risk of accidental discharges/incidents of radioactive materials into the environment. Avoidance should be ensured through current regulations, safe operation and decommissioning and safe waste storage and transfer.

Habitat (and Species) Loss and Fragmentation/Coastal Squeeze

- 3.48 The Nuclear NPS should seek to prioritise, through the guidance it provides to the IPC, the avoidance of direct habitat impacts that may lead to loss or fragmentation. In relation to the identified issues at Dungeness this may include for example, minimising losses of habitat through site layout and design, and maintaining the connectivity of wildlife corridors around the site. In order to reduce loss or damage to

⁴⁵ ALARA is not a dose limit; it is a practice that has as its objective the attainment of dose levels as far below applicable limits as possible.

⁴⁶ Sustainable Development Commission. The role of nuclear power in a low carbon economy. Paper 3: Landscape, Environment and Community Impacts of nuclear power. March 2006.

surrounding habitats, the position of the proposed development at Dungeness within the network of habitats will need to be considered, and if necessary, the nominated site boundary altered.

- 3.49 Appropriate management systems and the use of an ecological and environmental management plan, should be put in place to protect the European Sites.
- 3.50 The nominator has stated that it believes there are a number of areas which could be suitable for enhancement or restoration to provide mitigation and/or compensatory habitats, and that it believed that the possibility of compensating either within or beyond the existing SAC could not be ruled out.
- 3.51 In response to consultation on the initial draft NPS and HRA report, the nominator (EDF) confirmed⁴⁷ its understanding that there is sufficient evidence to suggest that the restoration of vegetated shingle habitats can be achieved and that the creation of compensatory habitats may be possible. EDF provided reviews of guidance and recent practice on restoring vegetated shingle habitats⁴⁸ and of potential areas where mitigation measures might be undertaken and compensation habitats could be created⁴⁹, in addition to a review of compensatory measures agreed for proposed developments in Natura 2000 sites (also provided earlier, in 2009)⁵⁰. These reports, and Natural England's advice⁵¹ on review of EDF's reports, have been analysed and can be found at www.energynpsconsultation.decc.gov.uk.
- 3.52 The nominator's Dungeness Shingle Review report identifies various case studies and methodologies that relate to the restoration of shingle habitats. Natural England notes that most of the work relates to techniques that have been developed to restore the condition of existing shingle features, and that many of the approaches are (or were) experimental and have not been proven. It is also considered that such methodologies and case studies would not comprise mitigation or compensation measures for the direct loss of shingle habitat in the SAC.
- 3.53 The Dungeness Shingle Review report also identifies one potential habitat creation methodology which would create new shingle habitats as compensation through the stripping of soil on areas of agricultural land to expose buried geomorphological shingle ridge features. The report identifies one such case study at Rye Harbour Farm, although

47 Consultation response letter dated 22 February 2010 from EDF Energy to OPM.

48 Entec UK Ltd for EDF Energy, November 2009. Dungeness Shingle Review: A Review of Guidance and Recent Practice on Restoring Vegetated Shingle.

49 Royal Haskoning for Entec/EDF Energy, January 2010. Dungeness Vegetated Shingle Compensation Area Search and Mitigation Review.

50 Entec UK Ltd for EDF Development: EDF New Build Ecology. August 2009. Review of Compensatory Measures agreed for proposed developments in Natura 2000 sites.

51 Natural England advice to DECC on EDF's response to the Nuclear NPS consultation, with specific relevance to Dungeness and shingle Annex 1 Habitats, March 2010.

the report (and EDF's Review of Compensatory Measures report) does not include any description of the nature or outcome of the works and states that no information could be obtained. Natural England has provided a review and further information on this case study, which is summarised below.

- 3.54 Natural England's consultation response states that the previous version of this report (and by implication, the nominator's Dungeness Shingle Review report) mixed up two distinct case studies when referring to potential mitigation and compensation methodologies. The first case is the Pett Level Sea Defence scheme, located to the west of the mouth of the River Rother. This scheme was taken through the planning process and the Habitat Regulations in 2001. It was determined that there were no alternatives and there were imperative reasons of over-riding public interest in full consultation with English Nature (one of the three founding bodies of Natural England). The compensation package was agreed with England Nature. This was to provide compensation for the adverse effect on the integrity of the site, which was the loss of 2 hectares of shingle habitat from a shingle recycling application from the Environment Agency for flood risk management. The compensation was the positive management and restoration of shingle vegetation on former shingle ridges outside the SAC that had been previously in agricultural use but were still exposed at the surface. These ridges were continuous with the SAC. Natural England states that the positive management amounted to removing / stopping agricultural operations, fencing the shingle to allow for controlled, light grazing with goats and monitoring the recovering vegetation, and that no soil stripping overlying shingle was undertaken as part of this compensation package.
- 3.55 The second case is located on the Lydd Ranges frontage within the SAC. The EA, in taking the Folkestone to Cliff End Coastal Strategy through the Habitat Regulations process, is currently exploring the IROPI case for the Lydd Ranges frontage. The Lydd frontage scheme is at strategy stage. Any scheme arising from the strategy would require full planning permission and would need to go through the Habitats Regulations. The EA is at the stage of trying to assess what suitable compensatory habitat could be secured if a scheme was to progress. This is not at scheme level yet and there is a screening process ongoing for likely locations for suitable compensation. It is clear that there is a limited resource of sites that could be suitable. Natural England also noted that the scale of the EA's compensatory land purchase is much smaller than any land mass which would be required to compensate for losses in connection with development of a nuclear power station at the nominated site.
- 3.56 Natural England also state that, in addition to the area of the restoration of shingle ridges at Rye Harbour Farm, but completely outside and separate from the compensation package agreed under the Pett Level Sea Defence scheme, some experimental trials were progressed by

the EA as part of enhancement work to achieve UK BAP targets, to determine if soil stripping of material was a feasible option to restore shingle habitat. These plots were those in which topsoil had been introduced for agricultural purposes, or where the surface layers of shingle had been mixed up through deep ploughing in the past. There were five small experimental plots, but after four years only two of these, on the top of shingle ridges, were considered to be showing promise. In summary, the material exposed did not have a high enough proportion of shingle, thus the surface was not suitable for colonisation by shingle vegetation. Also, the buried sediments did not contain a seed bank of shingle species, and most plants colonising were arable weeds, with a high soil content within the shingle. As part of the experiment trials, seeding with typical shingle species was incorporated, as was weeding and maintaining the plots. The results are not viewed as being a successful method of establishing early stage vegetated shingle. Areas of naturally deposited sediment lying above shingle were not considered suitable for this experimental work, because of the SSSI designation for the geomorphological interests of the site. Natural England advises that such trials were never considered to be any part of the compensation package, nor were they intended to inform future compensation that might be needed.

- 3.57 Natural England's advice, including in light of the above case studies, is that the stripping of soil to expose shingle underneath is a very experimental approach and not a proven method of mitigation or compensation.
- 3.58 In light of the above, it is the professional opinion of the Government's environmental consultants, and that of Natural England, that mitigation of impacts relating to habitat loss would not be possible and it is unlikely that it will be possible to compensate for the direct habitat loss effects of the proposed development, as no proven methodology yet exists.
- 3.59 The nominator's '*Dungeness Vegetated Shingle Compensation Area Search and Mitigation Review*' report focuses on the potential areas where shingle habitat could potentially be created by the methodology of soil stripping described above. It also identifies areas both within the Dungeness SAC and outside the SAC, but within the Dungeness, Romney Marsh and Rye Bay SSSI, where it considers the potential for habitat restoration has been identified in areas where the shingle ridges are designated features of the SSSI but are buried beneath agricultural land.
- 3.60 Two of the areas referred to as worthy of consideration (Lydd Ranges West and East) and the majority of a third (Greatstone-on-Sea) lie within the Dungeness SAC. These areas are already designated SAC and would therefore not provide mitigation, as the SAC would reduce in

size with the new nuclear power station. Although EU guidance⁵² does allow for improvements to habitats within SACs when developing compensation measures, it is noted that particular attention must be given to rare habitats and to habitats which it would take a long period of time to establish the same functionality. In addition, the EU guidance states that compensation ratios should be above 1:1 given the difficulties involved for new/recreated habitats. The area of habitat loss is considered likely to be at least approximately 50 hectares although this figure does not include areas required for construction and ancillary infrastructure outside the main reactor building footprint identified by the nominator. Natural England has stated that, given the potential scale of habitat loss in the SAC, it is unlikely that an equivalent area would be found to meet the requirements for compensatory habitat.

- 3.61 Furthermore, Lydd Ranges West and East are active MOD ranges that are considered unlikely to be available for habitat re-creation. The part of Greatstone-on-sea (outside SAC) and Jury's Gap area are both identified as in arable land use and therefore subject to disturbance.
- 3.62 The remaining area referred to, Lydd North, is not contiguous with the SAC and is part of the SSSI. Natural England has stated that the designation of areas as SSSI due to their geomorphological special interest with international significance (a Geological Conservation Review site) would potentially preclude remove of surface layers to expose buried shingle.
- 3.63 **In light of the above, it is not considered that the mitigation of impacts related to habitat loss would be possible. Potential compensation areas identified by the nominator are unlikely to be suitable or sufficient to provide compensation for the loss of habitat within the SAC, even if an accepted methodology existed for such habitat creation.**

Disturbance (Noise, Light, Visual)

- 3.64 Disturbance events in relation to bird species are most significant when they are irregular/ sudden and unpredictable. Noise, light and visual impacts may be managed at a site level through phasing and timing that takes account of breeding and feeding cycles (which are currently unknown) and should be supported by information on flight lines and migration routes as well as feeding and roosting areas. These measures should be included within a construction environmental management plan, which would help to minimise disturbance. The precise detail and the nature of the measures required would need to be agreed with the Statutory Body prior to the commencement of development. These measures could form part of the wider site

⁵² Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC Clarification of the Concepts of: Alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission, etc (EC, January 2007).

management plan that developers be required to agree and implement prior to commencement. It should be noted that as both breeding and overwintering birds use the site there are no clearly defined periods when construction would not cause disturbance.

- 3.65 Avoiding adverse effects on fish species is in part influenced by the efficiencies achieved within the industrial process and the nature of the technologies (extent of cooling water requirements). Fish protection measures could be incorporated within cooling water intake/system design that take account of identified sensitivities in fish populations in the marine environment around Dungeness.

Air Quality

- 3.66 Air quality impacts are assessed as being significant for the European Sites at Dungeness. Mitigation measures should include sustainable transport plans including, for example: the use of non-road transport where possible; the phasing of development; and robust monitoring at sites to track changes throughout the lifecycle of proposed operations. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between existing power stations and the new build overlaps.

Table 4: Summary of Avoidance and Mitigation Recommendations

| Potential Effects | Suggested Avoidance and Mitigation Measures - Recommendations for the IPC |
|---|--|
| Water Resources and Quality | |
| <ul style="list-style-type: none"> Water Quality Increase in nutrient loading | <ul style="list-style-type: none"> Direct requirements for the protection of water quality through suitable discharge quality standards to avoid adverse effects (on integrity of European Sites) Implementation of appropriate site management and pollution control measures in all phases of the development to avoid pollution, which should be monitored Selection of appropriate construction methods |
| <ul style="list-style-type: none"> Surface and Groundwater Flow | <ul style="list-style-type: none"> Require suitable design, including use of Sustainable Drainage Systems |
| <ul style="list-style-type: none"> Changes to water temperature | <ul style="list-style-type: none"> Direct the required standards for thermal discharges to avoid adverse effects |
| <ul style="list-style-type: none"> Impacts on hydrological regimes/species | <ul style="list-style-type: none"> Implement standard and tested measures to limit potential mortality of fish and other marine organisms to a level that avoids adverse effects |
| Habitat (and Species) Loss and Fragmentation/ Coastal Squeeze | |
| <ul style="list-style-type: none"> Direct loss of habitat and reduction of extent Loss of supporting and buffer habitat (construction of associated infrastructure) | <ul style="list-style-type: none"> It is not considered that mitigation of impacts related to habitat losses would be possible. Minimize habitat losses through site layout, careful location of offsite infrastructure, minimizing land take Requiring site travel plan to minimise need for land take for parking on site Requiring use of suitable tunnelling techniques or burial of any outfall pipe and cabling required to avoid buried geomorphological interests Reinstatement of any areas affected by construction works Control of workforce access and egress to the nominated site to ensure that damage does not occur outside the construction site Ecological mitigation and management plan, to link to existing integrated land management plan |
| <ul style="list-style-type: none"> Changes to hydrology and sediment transport regimes arising from construction | <ul style="list-style-type: none"> Use of hydraulic cut-offs if necessary around excavations for foundations |

| Potential Effects | Suggested Avoidance and Mitigation Measures - Recommendations for the IPC |
|---|---|
| <ul style="list-style-type: none"> Barriers to Migration for species | <ul style="list-style-type: none"> Translocation under licence of protected species that are at risk of being affected during the construction phase Screening of works areas, including height restrictions where necessary to limit disturbance and impacts on migratory paths Incorporation of fish protection measures within cooling water intake/system design Maintaining connectivity of wildlife corridors around site |
| Disturbance (Noise, Light, Visual) | |
| <ul style="list-style-type: none"> Construction and Decommissioning Indirect effects (construction of associated infrastructure) | <ul style="list-style-type: none"> Minimise need for encroachment of construction into sensitive areas through site design Require the incorporation of fish protection measures within cooling water intake/system design Screening of the works area and use of appropriate controls, including timing of activities, to limit disturbance |
| <ul style="list-style-type: none"> Physical disturbance through noise and vibration impacts from Construction and decommissioning Indirect effects (construction of associated infrastructure) | <ul style="list-style-type: none"> Noise, light and visual impacts can be managed at a site level through phasing and timing that takes account of breeding and feeding cycles and should be supported by information on flight lines and migration routes as well as feeding and roosting areas Require management of construction to minimise disturbance, for example, through timing, visual/noise screening |
| Air Quality | |
| <ul style="list-style-type: none"> Emissions arising from Construction, Operation and Decommissioning Increase in dust/particulates locally Releases from planned and accidental emissions | <ul style="list-style-type: none"> Release of radioactive emissions controlled through regulatory process and risk assessment undertaken for consenting process Minimise emissions during construction through appropriate controls that are managed and monitored to avoid adverse effects from pollution |
| <ul style="list-style-type: none"> Increased development/traffic growth arising from construction, operation and decommissioning | <ul style="list-style-type: none"> Sustainable transport plans including, for example: the use of non-road transport where possible; the phasing of development; and robust monitoring by operators at sites to track changes throughout the lifecycle of proposed operations Promote the use of carbon-efficient forms of transport and construction during the power |

| Potential Effects | Suggested Avoidance and Mitigation Measures - Recommendations for the IPC station lifecycle |
|-------------------|---|
| | |

Summary of HRA Findings and Recommendations

3.67 The HRA Screening Assessment identified the likely significant effects on three European Sites as a result of impacts that may arise from the development of a new nuclear power station at the nominated site at Dungeness. These effects were assessed further through the AA stage of the HRA which considered European Site data; available environmental condition data; and the potential effects of other plans and projects ‘in-combination’, in coming to a conclusion on the likelihood that the nominated site will have adverse effects on European Site integrity.

3.68 Taking into account the strategic nature of the plan and the information available, the AA cannot, at this strategic level, rule out adverse effects on the integrity of the three European Sites with regards to impacts upon water resources and quality; air quality; habitat and species loss and fragmentation/ coastal squeeze; and disturbance (noise, light and visual) (see Table 5 below):

Table 5: Summary of Appropriate Assessment

| Potential Effects Arising from Development | European Sites at which adverse effects cannot be ruled out |
|---|---|
| Water resources and quality | <ul style="list-style-type: none"> Dungeness SAC Dungeness to Pett Level SPA Dungeness, Romney Marsh and Rye Bay pRamsar |
| Air Quality | <ul style="list-style-type: none"> Dungeness SAC Dungeness to Pett Level SPA Dungeness, Romney Marsh and Rye Bay pRamsar |
| Habitat (and species) loss and fragmentation/ Coastal squeeze | <ul style="list-style-type: none"> Dungeness SAC Dungeness to Pett Level SPA Dungeness, Romney Marsh and Rye Bay pRamsar |
| Disturbance (noise, light, visual) | <ul style="list-style-type: none"> Dungeness SAC Dungeness to Pett Level SPA Dungeness, Romney Marsh and Rye Bay pRamsar |

- 3.69 The AA recommends a suite of avoidance and mitigation measures to be considered as part of the project level HRA (Table 4). Based on HRA experience, professional judgement, and the consultation advice received from the Statutory Consultees, if the proposed suite of measures is effectively implemented as an integral part of the nominated site development (including through refinements developed as part of site level HRA), it is concluded that there is the potential to address the identified adverse effects relating to Air quality and Water quality on the European Sites' integrity. It is less certain at this stage that impacts relating to disturbance could be mitigated for. It is not considered that mitigation of impacts related to habitat loss would be possible.
- 3.70 With regards to habitat (and species) loss and fragmentation impacts within the SAC, Natural England's 2009 draft guidance⁵³ states '*if it cannot be ascertained that there will be no adverse effects on the integrity of the European Site the project will have to be refused or pass the tests of Regulation 49*'. This would require the IPC and nominator to consider alternative solutions, and if none are available, to proceed to considering imperative reasons of over-riding importance (IROPI) at a project level. In the case of the latter, any necessary compensatory measures will need to be secured in accordance with Regulation 53.
- 3.71 However, based on a review of information provided by Natural England and the nominator (EDF), including preliminary discussions and responses to the consultation on the initial draft NPS and HRA report, it is considered that mitigation of impacts relating to habitat losses caused by of a new nuclear power station at Dungeness would not be possible. It is also considered that habitat losses will prove difficult to compensate for, due to the lack of a proven or accepted methodology for providing compensation, a lack of sufficient and suitable areas for habitat creation, the active role that coastal processes play in maintaining the shingle habitats, and the time period that successional shingle vegetation communities take to establish.
- 3.72 The discussion of mitigation and compensation options included above in 3.44 – 3.59 should be referred to.
- 3.73 In addition, EDF's review of compensatory measures agreed for proposed developments in Natura 2000 sites (see 3.47) was also reviewed. It is clear that compensatory measures have been technically possible and agreed with Natural England in a range of situations for developments affecting European Sites. However, it is considered that the EDF report was not able to provide assurance that the scale and quality of compensatory habitat, that is likely to be required at Dungeness (in relation to the effects on Dungeness SAC), is likely to be deliverable for the habitat types affected at the nominated site. The EDF report includes reference to the Environment Agency's Pett

⁵³ Tyldesley, D. (2009) The Habitats Regulations Assessment of Local Development Documents. Revised Draft Guidance for Natural England. Natural England, Sheffield

Frontage Sea Defence scheme and infers that similar compensation is possible for a new nuclear power station at Dungeness, although no information about the sea defence project was available to the report authors. EDF's report has confused compensation work with experimental trials at Rye Harbour Farm (as discussed in paragraph 3.50-52 above). Natural England has advised that the risks associated with securing suitable mitigation and compensatory habitat for vegetated shingle habitats should not be underestimated, and that the habitat at Dungeness is unique and unlikely to be replicated elsewhere.

- 3.74 Overall, Natural England has confirmed in their consultation response that, given the potential scale of impact of habitat loss within Dungeness SAC, it is unlikely that an equivalent area would be found to meet the requirements for compensatory habitat under the Habitats Directive, and that the methodologies proposed by the nominator are very experimental and are not considered likely to be successful in delivering the necessary compensatory habitat.
- 3.75 While any proposals for compensation arising from the development of the nominated site at Dungeness would have to be thoroughly assessed at project level, the evidence provided by EDF (see above 3.44 – 3.59) does not change the conclusions reached at this strategic planning stage, e.g. it is considered that mitigation of impacts related to habitat loss would not be possible and that it is likely to be difficult to compensate for the adverse effects of habitat loss and fragmentation identified in relation to the development of the nominated site at Dungeness. These conclusions are supported by Natural England.
- 3.76 In summary, it is concluded that further assessment supported by detailed data at the project level will be required before it can be concluded whether nuclear power station development at this nominated site can be undertaken without adversely affecting the integrity of the Dungeness to Pett Level SPA. However, it is unlikely to be possible to develop nuclear generating facilities at Dungeness without adversely affecting the integrity of Dungeness SAC (and possibly the proposed Dungeness Romney Marsh and Rye Bay proposed Ramsar site, should the pRamsar and SAC have the same boundaries).
- 3.77 It is also concluded that there are likely to be inherent difficulties in providing compensation for habitat losses at Dungeness SAC.

Glossary

| | |
|----------|--|
| AA | Appropriate Assessment |
| AoS | Appraisal of Sustainability |
| APIS | UK Air Pollution Information System |
| DECC | Department of Energy and Climate Change |
| CAMS | Catchment Abstraction Management Strategy |
| CHaMPs | Coastal Habitat Management Plans |
| cSAC | Candidate Special Area of Conservation |
| EA | Environment Agency |
| EIA | Environmental Impact Assessment |
| HAP | Habitat Action Plan |
| HRA | Habitats Regulations Assessment |
| ICZM | Integrated Coastal Zone Management |
| IPC | Infrastructure Planning Commission |
| LA | Local Authority |
| LDF | Local Development Framework |
| LSE | Likely Significant Effect |
| LTP | Local Transport Plan |
| NE | Natural England |
| European | Natura 2000 sites |
| NPS | National Policy Statement |
| PPP | Plans, Programmes and Projects |
| pSPA | Potential Special Protection Area |
| Ramsar | Wetland Sites designated by the Ramsar Convention |
| pRamsar | Proposed Wetland Sites designated by the Ramsar Convention |
| RQO | River Quality Objective |
| RSPB | Royal Society for the Protection of Birds |
| SAC | Special Area of Conservation |
| SPA | Special Protection Area |
| SSA | Strategic Siting Assessment |
| SSSI | Site of Special Scientific Interest |

| | |
|------|--------------------------------|
| SuDS | Sustainable Drainage Systems |
| WRMU | Water Resource Management Unit |

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