

CONTENTS

| | | |
|------------|---|------------|
| 6.0 | NEED, ALTERNATIVES AND DESIGN EVOLUTION | 6-1 |
| 6.1 | Introduction | 6-1 |
| 6.2 | The Need for the Proposed Development..... | 6-1 |
| 6.3 | The ‘Do Nothing’ Scenario | 6-4 |
| 6.4 | Alternative Sites | 6-4 |
| 6.5 | Alternative Locations within the Site | 6-4 |
| 6.6 | Alternative Technologies..... | 6-4 |
| 6.7 | Consideration of Alternative Designs and Design Evolution | 6-5 |
| 6.8 | Conclusions | 6-15 |
| 6.9 | References | 6-15 |

TABLES

| | |
|---|------------|
| Table 6.1: Summary of preliminary environmental appraisal | 6-1 |
| Table 6.2: Summary of design evolution and consideration of potential environmental effects..... | 6-6 |

6.0 NEED, ALTERNATIVES AND DESIGN EVOLUTION

6.1 Introduction

- 6.1.1 This chapter of the Environmental Statement (ES) sets out the alternatives that have been considered during the evolution of the Proposed Development and design process as presented in Chapter 4: The Proposed Development.
- 6.1.2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations') state that the Environmental Statement should contain "A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects" (Regulation 14(2)(e)). This chapter recognises and fulfils this requirement in respect of the Proposed Development.
- 6.1.3 On the matter of alternatives, National Policy Statement (NPS) EN-1 (DECC, 2011a) paragraphs 4.4.1 and 4.4.2 state that "*This NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option. However, applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant's choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility.*"
- 6.1.4 In this context, the consideration of alternatives and design evolution has been undertaken with the aim of avoiding and/ or reducing adverse environmental effects (following the mitigation hierarchy of avoid, reduce and, if possible, remedy), while maintaining operational efficiency and cost-effectiveness, and considering other relevant matters such as available land and planning policy.
- 6.1.5 The design parameters for the Proposed Development are consistent with the parameters defined within the Planning Permission for the Consented Development. The design will be further refined following the grant of any DCO if the decision is made to develop the Proposed Development, although any such changes will remain within the design parameters set by the DCO.

6.2 The Need for the Proposed Development

- 6.2.1 There is a substantial body of policy and evidence in support of the twin national needs for new low carbon energy generation facilities and waste management facilities, which is further reflected in local planning policy. This is summarised below and set out in more detail in the Planning, Design and Access Statement (Document Ref. 5.5).
- 6.2.2 The need for new electricity generation capacity of all types is set out in government policy – the Overarching National Policy Statement for Energy (NPS EN-1) (Department of Energy and Climate Change, 2011a). This explains at paragraphs 2.2.16 - 2.2.19 that the Government is implementing a variety of

reforms in order to promote investment to replace ageing coal-fired and nuclear power infrastructure with safe, secure, affordable and increasingly low carbon supplies of energy.

- 6.2.3 Paragraph 2.2.20 states that in order to manage the risks to achieving security of supply the UK needs sufficient electricity capacity to meet demand at all times including a safety margin of reserve capacity, reliable associated supply chains to meet demand as rises, and a diverse mix of technologies and fuels.
- 6.2.4 Part 3 of NPS EN-1 sets out why there is an urgent need for new electricity infrastructure, for reasons including meeting energy security and carbon reduction objectives, replacing closing generating capacity, increasing capacity to complement renewable supply and preparing for future rises in electricity demand.
- 6.2.5 Paragraph 3.3.11 explains that the more renewable generating capacity we have the more generation capacity we will require overall, to provide back-up at times when the availability of intermittent renewable sources (such as wind and solar) is low.
- 6.2.6 Paragraph 3.3.15 of NPS EN-1 states that the urgency at which new energy infrastructure should be brought forward is as soon as possible and certainly within the next 10-15 years (i.e. the period up to 2021 – 2025).
- 6.2.7 Paragraph 3.1.3 explains that the Planning Inspectorate should “*assess all applications for development consent for the types of infrastructure covered by the energy NPSs on the basis that the Government has demonstrated that there is a need for those types of infrastructure and that the scale and urgency of that need is as described for each of them in this Part*”.
- 6.2.8 Awareness of energy security has increased following the 9 August 2019 blackout and subsequent news reporting. This incident involved a total loss in generation of around 2,100 MW, more than double the capacity the National Grid currently holds in reserve under the Security and Quality of Supply Standards (SQSS) (Energy Emergencies Executive Committee, 2019), and causing a sudden drop in frequency. The National Grid: Electricity System Operator has since suggested a review of the SQSS to determine whether greater quantities of reserve capacity are needed while also balancing the costs and risks. This demonstrates the ongoing relevance of the reforms outlined in NPS EN-1.
- 6.2.9 The important role of energy from waste power stations in addressing these needs is outlined in paragraphs 3.4.3 – 3.4.5 of NPS EN-1. Energy from waste is a renewable form of generation, as the principal purpose of the combustion of waste is to reduce the amount of waste going to landfill in accordance with the Waste Hierarchy and to recover useful energy from that waste. The Waste Hierarchy derives from the Waste Directive as implemented by the Waste (England and Wales) Regulations 2011. This ranks waste management options according to what is best for the environment and minimising resource consumption. The first priority is the prevention of waste, then re-use, and then recycling. Energy recovery follows this, and finally, disposal. Energy recovery includes anaerobic digestion and (as in the Proposed Development) incineration

with energy recovery. Accompanying guidance explains that for some forms of waste the hierarchy is different, so for example, low grade wood waste should undergo energy recovery in preference to recycling. As demonstrated by the Fuel Availability and Waste Hierarchy Assessment (Document Ref. 5.7) the Proposed Development would support the Waste Hierarchy and divert waste from less preferable forms of management.

- 6.2.10 NPS EN-1 at paragraph 3.4.4 notes that energy from waste can provide 'dispatchable' power, providing peak load and base load electricity on demand, constituting an important contribution to the security of UK electricity supplies and which becomes even more crucial as increasing levels of intermittent renewables are constructed. It is necessary to bring forward new renewable electricity generation projects as soon as possible, and the need for such projects is therefore urgent. The Proposed Development would make a material contribution towards that need, generating up to 95 MW, and would be brought into operation as soon as 2023.
- 6.2.11 The Proposed Development would furthermore meet an identified national need for waste management facilities. Analysis of the amount of RDF likely to be available at the anticipated Proposed Development opening year of 2023 (see the Fuel Availability and Waste Hierarchy Assessment (Document Ref. 5.7)) indicates that there is sufficient residual waste arisings for the Proposed Development, when considered at either a regional or national level. The quantity of combustible waste that is currently either landfilled, or diverted from landfill but processed into RDF and exported overseas, is greater than the capacity of the Proposed Development, and this remains the case even when considering future increases in recycling rates and the commissioning of other proposed or under construction energy from waste facilities. The regional assessment considers the East Midlands and Yorkshire and Humber regions, whilst the national assessment covers the whole of England. Regionally, the assessment concludes that around 1 million tonnes of fuel per year will be available in 2023, whilst nationally a total of around 6.7 million tonnes of fuel per year will be available.
- 6.2.12 The Proposed Development would also represent a modern and efficient addition to the UK stock of energy from waste power stations. It will be classed as an energy recovery facility with its performance complying with the R1 Energy Efficiency formula in Annex II of the Waste Framework Directive 2008/98/EC. The Proposed Development would, once consented and permitted, represent an 6% increase over the current England wide capacity permitted R1 rated facilities, measured by throughput (Environment Agency, 2019).
- 6.2.13 Policy 1 of the North East Lincolnshire Local Plan (North East Lincolnshire Council (NELC), 2018) forms the basis of the land allocations for Employment Areas in order to deliver 8,800 jobs and support growth within a number of sectors including renewables and energy. The Local Plan also recognises that there is a need to ensure that there are sufficient waste management facilities within the Borough to meet the requirements of the area. The accompanying text for Policy 49 'Restoration and aftercare – Waste' recognises that waste

disposal through means such as landfill is the least desirable waste management option. The Proposed Development will be located on an existing employment area and will not have a negative impact on the existing use – the South Humber Bank Power Station (SHBPS) – and is located near to strategic roads whilst being well separated from residential areas.

- 6.2.14 There is, in conclusion, a clear and urgent national need for this type of infrastructure as set out in the energy NPSs. The Proposed Development is well located and will make effective use of a renewable resource, diverting waste from landfill or from export overseas while supporting energy security and diversification.
- 6.2.15 In identifying reasonable and relevant alternatives to study, as described in this chapter, regard has been had to their ability to meet these needs, as compared to the Proposed Development.

6.3 The 'Do Nothing' Scenario

- 6.3.1 A 'do nothing' scenario in which the Proposed Development does not proceed is the baseline against which the impacts of the Proposed Development will be compared within the EIA. The 'do nothing' scenario could comprise the development of the Consented Development only, or no development on the Site.
- 6.3.2 In relation to the first of these 'do nothing' scenarios, Chapters 7-16 of this ES provide a comparison of the effects of the Proposed Development to the effects of the Consented Development. In the second 'do nothing' scenario, the environmental effects of the Proposed Development as set out in this ES would not occur, but the beneficial socio-economic effects would also not be realised nor would the need for an additional waste management facility (the Proposed Development) which comprises a form of renewable energy be met.

6.4 Alternative Sites

- 6.4.1 The Applicant chose the Site (which is within its control) at the existing SHBPS for the Consented Development. Whilst no alternative sites were considered, careful consideration was given to the suitability of the Site and the location and layout for the Main Development Area (which is discussed further in Table 6.1 and Section 6.6). Central to informing this suitability assessment was the completion of an initial environmental appraisal via a desk based study, which identified key environmental sensitivities within and surrounding the Site.
- 6.4.2 Table 6.1 summarises these key environmental sensitivities and provides commentary on each of them.

Table 6.1: Summary of preliminary environmental appraisal

| SENSITIVITY | DISTANCE | PRELIMINARY APPRAISAL CONCLUSION |
|--|--|---|
| Highways and access | Adjacent to Site | The Site has good access to the highway network which is likely to have sufficient capacity for the operational traffic. Assessment of cumulative traffic impacts with other committed developments required. |
| Proximity to residential receptors | Over 1 km to the west of the Main Development Area | The Main Development Area is at a substantial distance from residential receptors and is largely screened from the west by the existing SHBPS. Emissions to air and noise effects are unlikely to be significant at residential receptors based on distance and prevailing wind directions. |
| Land use | The Site | The Site lies within operational land associated with the SHBPS and allocated in the Local Plan (NELC, 2018) as Existing Employment Area, and within the South Humber Industrial Investment Programme area promoted by the Greater Lincolnshire Local Enterprise Partnership and North East Lincolnshire Council. |
| Archaeological remains (non-designated assets) | Within the Site, but outside the Main Development Area | The Main Development Area was stripped during the construction of the SHBPS and any surviving remains would have been removed during this process. |

| SENSITIVITY | DISTANCE | PRELIMINARY APPRAISAL CONCLUSION |
|---|---|---|
| Proximity to designated nature conservation sites (Humber Estuary Site of Special Scientific Interest (SSSI), Special Area for Conservation (SAC), Special Protection Area (SPA) and Ramsar site) | Approximately 175 m to the east of the Main Development Area. | <p>Habitats Regulations Assessment process to be followed, including assessment of operational air emissions.</p> <p>Stack height to be set at suitable height to avoid significant adverse effects on designated sites.</p> <p>Noise disturbance to bird populations requires careful consideration and influences development layout on the Site.</p> |
| Flood risk | The Site is located within Flood Zone 3. | Flood Risk Assessment required to assess flood risk on and off Site and to inform design, although the Site is defended by existing and maintained flood defences. |
| Surface water features (Humber Estuary and ponds and ditches) | Within and immediately adjacent to the Site. | <p>No controlled waters or Water Framework Directive waterbodies are present on the Site. However, the Humber Estuary lies 175 m to the east of the Main Development Area.</p> <p>There are several ditches on Site. These need to be surveyed for ecological value/protected species.</p> <p>Layout to avoid direct impacts on surface water features where possible, and design/construction methods to avoid potential pollution of ditches, which discharge to the Humber Estuary.</p> <p>Water Framework Directive assessment is required.</p> |

| SENSITIVITY | DISTANCE | PRELIMINARY APPRAISAL CONCLUSION |
|--|--|--|
| Potential for contaminated land due to former industrial land uses | On Site | Phase I Geo-environmental Study required. |
| Potential for cumulative effects with other committed developments | There are other committed developments within 1 km of the Site | Assessment of potential for cumulative effects with other committed developments required, including the South Humber Bank Link Road, South Humber Industrial Investments Programme and Strategic Ecological Mitigation sites. |

6.4.3 Following the completion of the preliminary appraisal, the Site was considered to be suitable for an energy from waste development and the design of the Consented Development was progressed, taking into consideration the potential sensitivities outlined in Table 6.1.

6.4.4 As the design of the Consented Development progressed, preliminary environmental assessments were carried out. These informed the initial design and enabled early consideration of potential environmental impacts from the Consented Development location or layout that may have the potential to give rise to any significant environmental effects so that possible alternative solutions could be achieved. These preliminary assessments included:

- preliminary flood risk appraisal;
- preliminary Habitats Regulations Assessment (including air dispersion modelling);
- preliminary ecological appraisal; and
- preliminary traffic and transport appraisal.

6.4.5 Taking the findings of the above into account, the Site, and specifically the Main Development Area, was selected for the Consented Development for the following reasons:

- the Main Development Area is currently undeveloped land within the boundary of the SHBPS;
- the Site is also located within an existing industrial area with potential for off-site Combined Heat and Power opportunities;
- the Site has excellent transport links with capacity on the surrounding network to accommodate construction and operational traffic associated with the Consented Development; and
- the Site is in the freehold ownership of the EP UK Investments Ltd group.

6.4.6 As the Proposed Development is, in effect, the Consented Development with additional infrastructure to increase the electrical output, necessarily located on the same Site as the Consented Development, no further consideration of the suitability of the site has been undertaken for the Proposed Development.

6.5 Alternative Locations within the Site

6.5.1 The location of the Main Development Area within the SHBPS site was kept as far away from the Humber Estuary designated nature conservation site as possible, so as to minimise the risk of disturbance to that receptor. Alternative configurations of the layout within the Main Development Area were considered, and this is summarised within Section 6.7 and Table 6.2 below.

6.6 Alternative Technologies

6.6.1 The principal available technical alternatives considered were:

- conventional combustion – combustion of waste using grate or fluidised bed technologies followed by energy recovery using a steam turbine and electricity generator; or
- advanced thermal treatment – including gasification, plasma gasification and pyrolysis followed by energy recovery by combustion of the syngas arising from the process.

6.6.2 Thermal treatment is assessed primarily on technical performance including minimising pollutant emissions to air and water and maximising energy recovery. In respect of gasification/ pyrolysis and other advanced techniques, the available technologies do not currently demonstrate environmental benefits and may in some cases recover less energy than conventional combustion techniques. Conventional combustion using a grate was therefore considered optimal for the Proposed Development.

6.6.3 Other complementary technical options for the management and treatment of waste are listed below:

- anaerobic digestion – a biological process whereby organic waste (e.g. food or green waste) is biodegraded by naturally occurring bacteria in a sealed tank in the absence of oxygen. This process produces a 'biogas' and an organic residue called 'digestate'. The biogas is captured, and the methane is cleaned and can then be used in a variety of ways, including in a gas engine, to produce electricity and/ or heat; compressed and used as a vehicle fuel; or injected into the national gas transmission system. The 'digestate' can potentially be used in a number of land applications (mainly farming but also restoration and landscaping) depending on its nutrient content and level of stability. However, its use is restricted when mixed wastes are used as an input due to the risk of contamination;
- Mechanical Biological Treatment (MBT) – a generic term for a combination of mechanical equipment (similar to that used in a materials recycling facility to physically separate different materials fractions) and some biological treatment element (aerobic with air or anaerobic without air to biodegrade or bio-dry the organic fraction of the waste); and

- mechanical pre-treatment – combines a number of screening/ mechanical sorting techniques to extract a small amount of additional recyclate from residual municipal waste. It should be noted that this recyclate will generally be of a lower quality than that collected during front end materials recycling and it is not intended to replace that system but to enhance recycling rates where necessary.

6.6.4 Non-thermal technologies such as anaerobic digestion and MBT are complimentary to rather than a replacement for thermal treatment since they can only treat the organic fraction of the waste, and the inorganic part (e.g. plastics) would require separate treatment. These complementary technologies may be undertaken by fuel providers off Site, but do not form part of the Proposed Development (or the Consented Development).

6.7 Consideration of Alternative Designs and Design Evolution

6.7.1 During the design of the Proposed Development to date, a number of design iterations and design alternatives have been considered to avoid, reduce and/or remedy potential environmental effects and the proposed design has been consulted upon with relevant consultees (previously as part of the pre-application and application consultation for the Consented Development).

6.7.2 Table 6.2 summarises the design iterations of note that have taken place to date and the reasons for the iteration, noting where the change related to reducing potential impacts on the environment or sensitive receptors, as required by the EIA Regulations.

Table 6.2: Summary of design evolution and consideration of potential environmental effects

| DESCRIPTION OF DESIGN ELEMENT | SUMMARY OF OPTIONS CONSIDERED | COMPARISON OF ENVIRONMENTAL EFFECTS | OUTCOME |
|-------------------------------|---|---|--|
| Operational Site access | <p>Various options for access were considered, including:</p> <ul style="list-style-type: none"> - access via the existing SHBPS entrance; and - a new dedicated access from South Marsh Road to the east of the SHBPS entrance (at various locations along the northern boundary of the Site). | <p>Both access options would introduce additional traffic to South Marsh Road, but the new dedicated access would minimise disruption to the existing SHBPS's operation.</p> <p>A new dedicated access would require widening of an existing ditch culvert with potential for adverse effects on water vole and surface water quality during construction, but these can be mitigated by temporary pre-construction displacement of water voles from the working area (if any are present) and good construction practice to prevent surface water pollution.</p> <p>The position of the proposed new access has been identified with consideration of proximity to the existing SHBPS entrance and access to other neighbouring sites including Synthomer, NEWLINCS, farmland and Humber Estuary flood defences, to minimise the potential for disruption.</p> | <p>A new access to be developed from South Marsh Road in the north-east of the Main Development Area, to minimise disruption to the SHBPS's operation.</p> |

| DESCRIPTION OF DESIGN ELEMENT | SUMMARY OF OPTIONS CONSIDERED | COMPARISON OF ENVIRONMENTAL EFFECTS | OUTCOME |
|-------------------------------|---|--|--|
| <p>Site layout</p> | <p>Various layouts have been considered throughout the design evolution of the Proposed Development to date, all of which located the Proposed Development away from the Humber Estuary so as to minimise the potential for effects on habitat.</p> <p>The various layouts have included different configurations for buildings, structures and internal access arrangements, with consideration of the need to:</p> <ul style="list-style-type: none"> - allow suitable offset distance from the ditches in the north and south of the Site to reduce impacts on water vole; - avoid siting buildings and structures above the SHBPS underground cooling water pipes where possible; - avoid occupied buildings | <p>Layouts that would not allow an offset between buildings and the ditches around the Site would require water voles to be translocated prior to construction, whereas layouts including a suitable offset would minimise effects on water vole and not require translocation.</p> <p>No potential layouts were developed that included workplaces accommodating more than 100 occupants or with three or more storeys within the HSE Inner Zone</p> <p>There are no notable differences in environmental effects between layouts in relation to the underground cooling water pipes, HSE consultation zones and operational functionality.</p> | <p>The Proposed Development layout has been optimised to include a 5 m offset between ditches and buildings/ internal access roads (with the exception of the ditch crossing for the new site access, as described above), avoid siting buildings/ structures above the cooling water pipes where possible, avoid the administration/ office building being located in the HSE Inner Zone, and maximise operational functionality.</p> |

| DESCRIPTION OF DESIGN ELEMENT | SUMMARY OF OPTIONS CONSIDERED | COMPARISON OF ENVIRONMENTAL EFFECTS | OUTCOME |
|-------------------------------|--|--|---|
| | being located within the Health and Safety Executive (HSE) Inner Zone around nearby hazardous installations; and - achieve operational functionality. | | |
| Stack height | Stack heights of 90 m and 100 m were considered with regards to the dispersion of air pollutants. | 100 m stacks would provide better dispersion of air pollutants than 90 m stacks, avoiding potential for significant adverse effects on human or ecological receptors (including the Humber Estuary). 100 m high stacks would have a slightly larger Zone of Theoretical Visibility (ZTV) compared to 90 m stacks, although the landscape and visual effects would not be significantly different. | Following completion of the air dispersion modelling for the Consented Development stack heights of 100 m were identified as appropriate to mitigate significant environmental effects on sensitive ecological receptors. |
| Cooling technology | Water, hybrid and air cooling have been considered. | Water and hybrid cooling technologies would have a large water demand (which air cooling would not). This would require upgrading of the existing SHBPS cooling water pumping station (potentially requiring works in the | Air cooling is considered to represent the Best Available Technique (BAT) for the Proposed Development because it would not affect water resources or directly affect the Humber Estuary and |

| DESCRIPTION OF DESIGN ELEMENT | SUMMARY OF OPTIONS CONSIDERED | COMPARISON OF ENVIRONMENTAL EFFECTS | OUTCOME |
|--|--|--|---|
| | | <p>Humber Estuary, with corresponding potential effects on the habitat) and either an increase in the permitted abstraction volumes from the Estuary, or a new groundwater borehole and abstraction licence, both of which would have water resources implications.</p> <p>Air cooling technology would generate more noise than water cooling and is typically slightly less efficient.</p> | <p>the slight loss of efficiency is minimal for the cooling demand of the Proposed Development.</p> <p>Air cooling therefore chosen as the cooling technology.</p> |
| <p>Sizing and capacity of the Proposed Development</p> | <p>The size of the Proposed Development is a commercial consideration.</p> <p>One and two stream development options have been considered.</p> <p>The option to increase the efficiency of the plant by adding additional components to the Consented Development (the Additional Works) has also been considered since the Planning Permission was granted.</p> | <p>A two stream plant would have greater potential for significant adverse air quality, noise, traffic, ecology, landscape and visual amenity, and waste effects than a single stream plant (assuming that the size of a stream remains constant) due to the larger scale of operation, but a single stream plant would have less potential for significant beneficial socio-economic effects.</p> <p>The environmental effects of the Proposed Development are not significantly different to the</p> | <p>Planning Permission for the Consented Development with a fuel throughput of up to 753,500 tonnes per annum and electrical output of up to 49.9 MW was granted in April 2019.</p> <p>A single stream development has been discounted for commercial reasons.</p> <p>Development Consent for the Proposed Development with a fuel throughput of up to 753,500 tonnes per annum</p> |

| DESCRIPTION OF DESIGN ELEMENT | SUMMARY OF OPTIONS CONSIDERED | COMPARISON OF ENVIRONMENTAL EFFECTS | OUTCOME |
|--|--|---|---|
| | | <p>Consented Development, as the development footprint, building scale and massing will be similar, and the fuel throughput and emissions will be the same as those assessed for the Consented Development, so the effects on air quality, noise, traffic, ecology, landscape and visual amenity, land contamination, water resources, flood risk and drainage, socio-economics and waste are similar.</p> | <p>and electrical output of up to 95 MW will now be sought.</p> |
| <p>Potential phasing of the Proposed Development</p> | <p>For commercial reasons, the possibility of a two stream development being built in two phases was considered.</p> | <p>Constructing the two stream development in a single phase would generate slightly increased potential for air quality, noise and traffic effects during construction due to the greater intensity of activity on Site and associated greater magnitude of air quality, noise and traffic impacts.</p> <p>Constructing a two-stream development in two phases may reduce the magnitude of air quality, noise and traffic impacts but would increase the duration of construction effects and disturbance.</p> | <p>Two-phase construction has been discounted for commercial reasons, although three construction programme scenarios (Scenario 1, Scenario 2 and Scenario 3) are being considered by the EIA (see Chapter 5: Construction Programme and Management), with the 'worst case' identified and assessed for each topic.</p> |
| <p>Design of fuel</p> | <p>The base of the fuel bunker</p> | <p>Some of the excavation material</p> | <p>Both options (excavation of the</p> |

| DESCRIPTION OF DESIGN ELEMENT | SUMMARY OF OPTIONS CONSIDERED | COMPARISON OF ENVIRONMENTAL EFFECTS | OUTCOME |
|-------------------------------|---|---|--|
| <p>bunker</p> | <p>will be around 10 m lower than the internal floor level of the fuel reception hall, to provide sufficient capacity in the fuel bunker and enable delivery vehicles to tip fuel into the bunker. This could be achieved by excavating the base of the fuel bunker to around -8 m Above Ordnance Datum (AOD) (assuming a ground level of around 2 m AOD), or by raising the internal floor level of the fuel reception hall to around 5.5 m AOD to reduce the fuel bunker excavation depth to around -4.5 m AOD (with ramps on embankments for access and egress).</p> <p>The dimensions of the fuel reception hall building would not vary between these options.</p> | <p>arising from excavation of the fuel bunker to -8 m AOD would need to be exported from the Site, as any significant land raising could have undesirable flood risk impacts.</p> <p>If the depth of the fuel bunker below ground was reduced, this would improve the cut and fill balance and it is estimated that the corresponding reduction in excavation arisings would reduce construction traffic by around 1,000 HGV movements.</p> <p>The other potential differences in environmental effects between these options are on visual receptors (due to the potential use of ramps) and ecological noise receptors (due to HGV traffic noise affecting birds in fields to the north and south of the Main Development Area), but following visual appraisal and noise modelling it has been concluded that there is no significant difference in effects between the options.</p> <p>There are no other notable differences in environmental effects between the fuel bunker design</p> | <p>fuel bunker up to -8 m AOD with the fuel reception hall floor level around 2 m AOD, and excavation of the fuel bunker to around -4.5 m AOD with the fuel reception hall floor level around 5.5 m AOD) remain open and have been assessed in the EIA where relevant.</p> |

| DESCRIPTION OF DESIGN ELEMENT | SUMMARY OF OPTIONS CONSIDERED | COMPARISON OF ENVIRONMENTAL EFFECTS | OUTCOME |
|-------------------------------|--|--|---|
| | | options. | |
| Application Site boundary | <p>The application site boundary for the Consented Development encompassed the Applicant’s land holding at SHBPS. The new Site access works at South Marsh Road would be undertaken on adopted highway in accordance with a Section 278 (Highways Act 1980) agreement.</p> <p>The application site boundary has been reviewed for the Proposed Development, with reference to land required outside the Applicant’s ownership and land not required (particularly where it is subject to other third party interests). The Proposed Development Site boundary published in the PEI Report and subject to formal consultation included the highway land required for the construction of the new site</p> | There is no difference in environmental terms between the different application site boundary options. | Proposed Development Site boundary (as shown in Figure 3.1, ES Volume II (Document Ref. 6.3)) selected to include the proposed new site access works on South Marsh Road within the Order limits and exclude land that is not required for the Proposed Development (particularly where there is third party apparatus and where the Applicant does not need to carry out works). |

| DESCRIPTION OF DESIGN ELEMENT | SUMMARY OF OPTIONS CONSIDERED | COMPARISON OF ENVIRONMENTAL EFFECTS | OUTCOME |
|---|---|---|---|
| | <p>access on South Marsh Road. Following consultation, the final DCO application Site boundary also excludes land that is not required for the Proposed Development and has third party apparatus, to avoid any potential conflict with those interests.</p> | | |
| <p>Biodiversity mitigation and enhancement area</p> | <p>The Consented Development included an indicative area to the west of SHBPS to be used for ecological enhancement and mitigation.</p> <p>The extent of this indicative area and the nature of the mitigation and enhancement proposals have been reviewed in relation to the Proposed Development, informed by the Section 42 consultation response from Natural England. As a result the extent of the mitigation and enhancement area has been enlarged and the proposed measures have been</p> | <p>Both the smaller indicative mitigation and enhancement area proposed for the Consented Development and the larger area identified for the Proposed Development are considered to provide adequate mitigation and enhancement for the loss of habitat within the Main Development Area (see Chapter 10: Ecology).</p> <p>The larger area offers greater potential for biodiversity enhancement.</p> | <p>A larger indicative biodiversity mitigation and enhancement area has been identified for the Proposed Development, compared to the indicative area proposed for the Consented Development.</p> |

| DESCRIPTION OF DESIGN ELEMENT | SUMMARY OF OPTIONS CONSIDERED | COMPARISON OF ENVIRONMENTAL EFFECTS | OUTCOME |
|-------------------------------|--|--|--|
| | described in more detail (see the Biodiversity Strategy (Document Ref 5.11)) | | |
| Foul drainage strategy | <p>There are three options for foul drainage:</p> <ul style="list-style-type: none"> - discharge to the mains sewer; - tankering off Site; or - treatment on Site using a package treatment plant which discharges to one of the drainage ditches within the Main Development Area. <p>The package treatment option has been identified since the PEI Report was published.</p> | All three options provide appropriate means for discharge of foul drainage and no adverse environmental effects are anticipated (see Chapter 14: Water Resource, Flood Risk and Drainage). | All three options have been assessed in the EIA where relevant. The final solution will be agreed with the relevant consultees in accordance with a DCO requirement. |

6.8 Conclusions

- 6.8.1 The 'do nothing' scenario has been discounted on the basis that there is a clear need for the Proposed Development, which will provide an additional waste management facility and generate renewable energy.
- 6.8.2 The Site is considered to be suitable for the Proposed Development on the basis of its good access to the highway network, location away from residential receptors, and situation within an undeveloped area of SHBPS operational land under the Applicant's ownership. Effects on the Humber Estuary SSSI/ SAC/ SPA/ Ramsar site and other environmental receptors can be mitigated by design.
- 6.8.3 Alternative locations within the Site and alternative technologies have also been considered with consideration and comparison of environmental effects.
- 6.8.4 The Proposed Development design has evolved following consideration of access points, site layout, stack height, cooling technology, sizing and capacity, phasing of construction, fuel bunker design, Site boundary, biodiversity mitigation and enhancement proposals and foul drainage options, and environmental effects of each option have been appraised alongside technical and commercial considerations.

6.9 References

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