

4.1 INTRODUCTION

This section describes the broad principles of the methodology adopted for the EIA of the Proposed Development.

EIA is a procedure required under the terms of European Union Directive 2011/92/EU (the 'EIA Directive') on assessment of the effects of certain public and private projects on the environment.

The primary objective of an EIA is inscribed under Article 2(1) of the Directive, which states that:

“Member States shall adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects. Those projects are defined in Article 4”

Article 8 of the Directive also states that:

“The results of consultations and information gathered pursuant to [the EIA procedure] must be taken into consideration in the development consent procedure”.

In practical terms, the purpose of the ES produced from the EIA process is to inform the decision-maker (in this case the Secretary of State) and to provide a source of information for stakeholders, regarding the likely significant environmental effects associated with the Proposed Development during its construction, operation and decommissioning.

In accordance with the EIA Directive and the 2000 EIA Regulations, the EIA process for the Proposed Development included the following activities:

- establishing, through consultation, the scope of the EIA including obtaining a Scoping Opinion;
- considering potential alternatives;
- developing a comprehensive understanding of the existing baseline environmental conditions for the Proposed Development site and the relevant 'areas of influence' for each topic;
- identifying potential emissions to the environment;
- identifying the potential environmental effects resulting from the Proposed Development;

- determining how the potential environmental effects can be avoided, minimised or reduced or through informed design and / or further mitigation and how its benefits may be enhanced;
- assessing the significance of the potential effects in conjunction with other effects arising from the Proposed Development and those from other neighbouring developments and / or sources for cumulative effects; and
- proposing options as to how any significant residual effects will be mitigated, managed and monitored.

The likely significant environmental effects of the Proposed Development have been assessed for each relevant environmental topic in *Chapters 6 to 13* of this ES. This has been done by comparing baseline environmental conditions (i.e. the situation without the Proposed Development) with the conditions that would prevail if the Proposed Development is constructed and operated. The significance of these changes has been assessed with consideration of the possible breach of a limit or capacity of the natural environment to absorb the resultant effect.

Effects have been assessed in relation to environmental receptors, that is: people (e.g. residents of buildings, users of facilities, employees of businesses), built resources (e.g. listed buildings) and natural resources (e.g. sites of ecological importance).

It should be noted that EIA is not a linear process, but an iterative one, in which findings are revisited and modified as the application and EIA progress.

Further detail on the scope of the assessment is provided in *Chapter 5*.

4.2

DESCRIPTION OF THE BASELINE ENVIRONMENT

Schedule 4 of the 2000 EIA Regulations (Part 1 paragraph 2) requires the EIA baseline to address:

... the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.

Baseline conditions are defined using a combination of published data sets and other publically available information sources as well as specially commissioned surveys. Each technical topic chapter describes its relevant study area in terms of scale and/or receptor groups included, and the specific data sources it has drawn from (including dedicated surveys). A summary of the main data sources and surveys relevant to each technical topic is presented in *Table 4.1*.

Table 4.1 Key Data Sources and Baseline Surveys

Aspect	Baseline Data Sources and Surveys
Geology, ground conditions and water	Environment Agency water quality data Idle and Torne Catchment Abstraction Management Strategy (CAMS) Outline Water Cycle Strategy (2010) Environment Agency flood risk vulnerability data
Ecology and nature conservation	Desk study and consultation Lincolnshire Local Biodiversity Action Plan (LBAP) Extended Phase 1 Habitat Survey Bat roost suitability survey Badger survey Breeding bird survey Otter and water vole surveys
Noise and vibration	Baseline noise survey around the Proposed Development site both with and without Keadby I in operation
Air quality	Local and national air quality monitoring data Air Pollution Information Service (APIS)
Archaeology and cultural heritage	English Heritage Sites and Monuments Record Lincolnshire Historic Environment Record Historic maps and aerial photographs Previous reports and assessments conducted in the study area Existing geotechnical records
Traffic and transport	Automatic Traffic Count surveys
Socio-economic characteristics	Office of National Statistics (ONS) database
Landscape and visual	Local Landscape Character Areas data Site photography

The baseline environment is described in *Chapters 6 to 13* of this ES, as appropriate to the relevant technical topics.

4.3 DEFINITION OF THE PROPOSED DEVELOPMENT

The ES describes the Proposed Development in accordance with the requirements of the 2000 EIA Regulations (Schedule 4 part 1 paragraph 1) including:

- a) a description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases;*
- b) a description of the main characteristics of the production processes, for instance, nature and quality of the materials used; and*

- c) *an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development.*

As described in *Chapter 2*, it is important to note that certain aspects of the Proposed Development will not be finalised until later in the design process. In order to accommodate this required flexibility and at the same time maintain a rigorous EIA process a reasonable worst case approach has been taken for each topic assessment. This includes consideration of layout configurations (single-shaft and multi-shaft options) and for each topic has ensured that the likely significant effects of the Proposed Development on the environment have been assessed by considering the worst-case environmental option as part of the EIA.

For each environmental topic in this ES both the single and multi-shaft configuration options have been considered with the intention of establishing a 'worst case' basis of assessment. In some cases, where there is no definitive 'worst case' layout, both of the layout configurations have been assessed, on the basis that they have different effects as opposed to one of them being a clear worst case.

Table 4.2 below summarises the layout options assessed for each topic and a justification for this approach.

Table 4.2 Layout Options Assessed in this ES

Topic	Layout configuration assessed	Justification
Land and water	Multi-shaft option	There is little material difference between the options as there will be the same land take within the Proposed Development site for each option. The multi-shaft option has been assessed as there will be a larger building footprint due to the plant massing. It is not considered that there would be any materially different effects between the layout options.
Ecology and nature conservation	Multi-shaft option	For direct landtake associated effects there is little material difference between the options as there will be the same land take within the Proposed Development site for each option. The multi-shaft option has been assessed as there will be a larger building footprint due to the plant massing. It is not considered that there would be any materially different effects between the layout options. Off-site effects due to emissions to atmosphere are as for the Air Quality assessment (see below).
Noise and vibration	Multi-shaft option	The multi-shaft option has been assessed as the worst case, as it includes more noise sources and will produce overall higher noise levels than the single-shaft option.
Air quality	Both single-shaft and multi-shaft option	Air quality effects have been assessed for both single-shaft and multi-shaft options as there is no definitive 'worst case', rather there are different effects between the options. The stack height is the same for both options and far-field effects are similar, while emissions concentrations in the immediate vicinity of the power station differ for the different layouts due mainly to building downwash effects.
Archaeology and cultural heritage	Both single-shaft and multi-shaft options	With regard to direct effects on heritage assets, the multi-shaft option has been assessed as there will be a larger building footprint due to the plant massing. Setting has been assessed for both single and multi-shaft options as there is no definitive 'worst case', rather there are different effects between the options.
Traffic and transport	Multi-shaft option	It is not considered that there would be any materially different traffic and transport effects between the layout options. The multi-shaft option has been assessed as a default.
Socio-economic characteristics	Multi-shaft option	It is not considered that there would be any materially different traffic and transport effects between the layout options. The multi-shaft option has been assessed as a default.
Landscape and visual	Both single-shaft and multi-shaft options	Landscape and visual effects have been assessed for both single and multi-shaft options as there is no definitive 'worst case', rather there are different effects between the options.

4.4

IDENTIFICATION OF EFFECTS

To the extent necessary, all the technical topics will address effects resulting from the construction, operational and decommissioning phases of the Proposed Development.

In accordance with Schedule 4 Part 2 paragraph 3 of the 2000 EIA Regulations, the identification of effects for each topic will include consideration of secondary, indirect and cumulative impacts and effects.

Where inter-relationships exist between different aspects of the environmental and socio-economic setting for the Proposed Development, then where an impact or effect on one aspect is identified the assessment will address the effect (or effects) this may have on the related aspect (or aspects) of the receiving environment. Inter-relationships may include:

- traffic and noise;
- traffic and air quality;
- certain aquatic populations reliant upon good water quality; and
- the value of a feature of cultural heritage being related to its setting.

Projects, plans and proposals with which the Proposed Development may have cumulative effects have been identified in consultation with the local planning authority and assessed accordingly (see also *Section 5.5*).

There is no widely accepted definition of 'indirect' effects and the term is often used interchangeably with 'secondary' effects. However, the 2000 EIA Regulations do distinguish between the two terms. For the purposes of this EIA 'secondary' (and higher order) effects are taken to be part of a chain of impacts or effects that can be directly traced back to an action of the Proposed Development and are assessed as an inherent part of this EIA.

Indirect effects are taken to include the consequences of other development induced by the Proposed Development. In this EIA, the indirect effects arise from the overhead lines connection to the transmission grid, which is not part of the Proposed Development (and therefore the s36 variation application) but a necessary development needed to facilitate operation of the Proposed Development. This is explained further in *Section 5.6*.

4.5

ASSESSMENT OF SIGNIFICANCE

Figure 4.1 sets out the approach to assessment of likely significant effects that may arise from the Proposed Development. This approach has been applied in undertaking the EIA for the Proposed Development, as part of the section 36 variation application.

Figure 4.1 Overview of the EIA Process

Identify Impact

The scoping process identifies the potentially most important/significant impacts and effects (including secondary, indirect and cumulative) for the assessment to address. This is done through a combination of:

- looking at the nature of a project’s activities and the impacts they will give rise to;
- looking at a project’s environmental and social settings and their aspects which are likely to be most sensitive/vulnerable to impacts from the project;
- applying professional understanding gained from the evidence base; and
- considering inputs from stakeholders through consultation.

Decisions are then made on which impacts and effects to assess or to prioritise in the assessment (scoping in and scoping out) and how to assess them (proposed methodology).

Predict Magnitude

A project’s impacts are quantified in terms of eg:

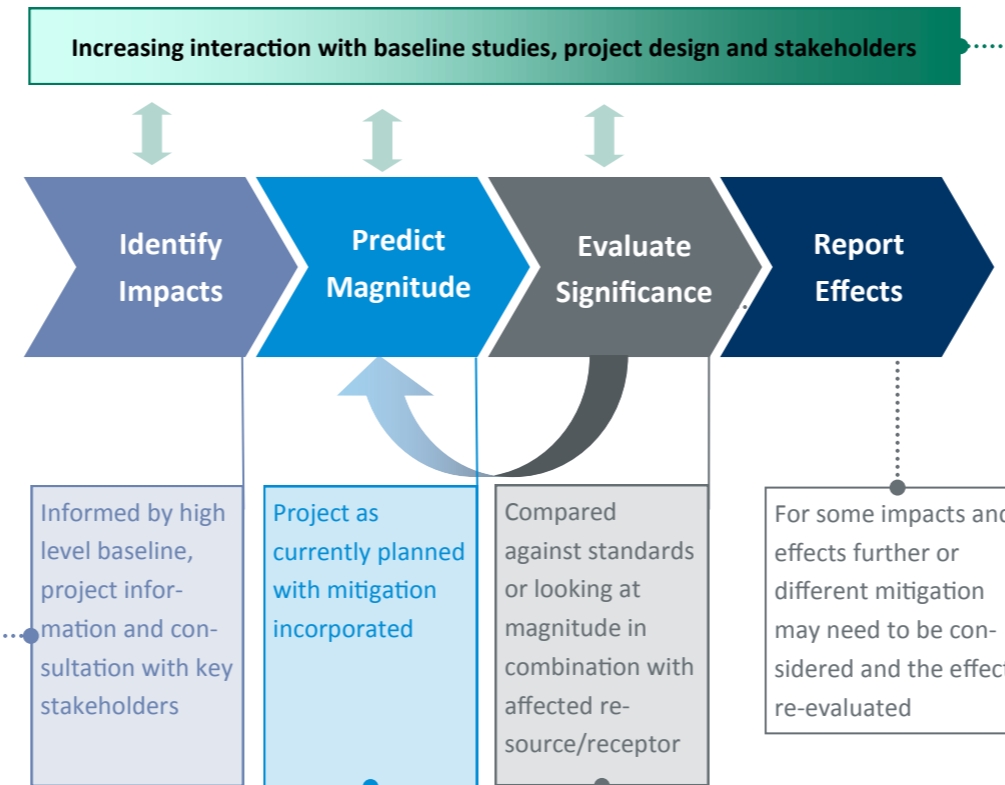
- landtake area or habitat loss;
- proportion of an ecological population exposed to impact;
- change in noise levels at a residence;
- pollutant exposure at a receptor; and
- numbers of jobs generated in the local economy.

In predicting magnitude the effect of all the project mitigation in place (ie committed to by the applicant) is taken into account.

For some impacts, especially noise, air and water pollution, significance is assessed directly against numerical criteria and standards. For exceedances, further mitigation must be incorporated by a project to reduce the magnitude of the impact (and the significance of its effect).

For other impacts nominal levels of magnitude (eg small, medium, large) may be adopted based on widely recognised factors such as: the nature of a change (what is affected and how); its size, scale or intensity; its geographical extent and distribution; its duration, frequency, reversibility and, for unplanned events, likelihood of occurrence.

Some activities will result in changes to the environment that may be immeasurable or undetectable or within the range of normal natural variation. Such changes are assessed as having no impact or to be of negligible magnitude and will not lead to significant effects.



Describe Baseline

Baseline data are collected to better understand the potentially most important impacts and effects identified in scoping. Baseline data may quantify existing exposure levels (eg for noise, air and water pollution), identify vulnerable populations of animals or people, more clearly delineate valued cultural property and ecosystem services etc.

Where a baseline aspect cannot be quantified then nominal levels of importance, quality or value (low, medium, high) are assigned based on widely accepted criteria in fields such as ecology, cultural heritage, landscape and socioeconomic assessment. Inter-relationships between elements of the baseline are identified.

Interact with Project Design

The EIA process interacts with a project design team to develop a basis for the assessment (for example quantities of emissions, noise levels of equipment, sizes of structures). The EIA process also interacts with design to assess alternatives, ‘best available technology’ and mitigation options, especially when after initial assessment some impacts may need to be further reduced.

Consult Stakeholders

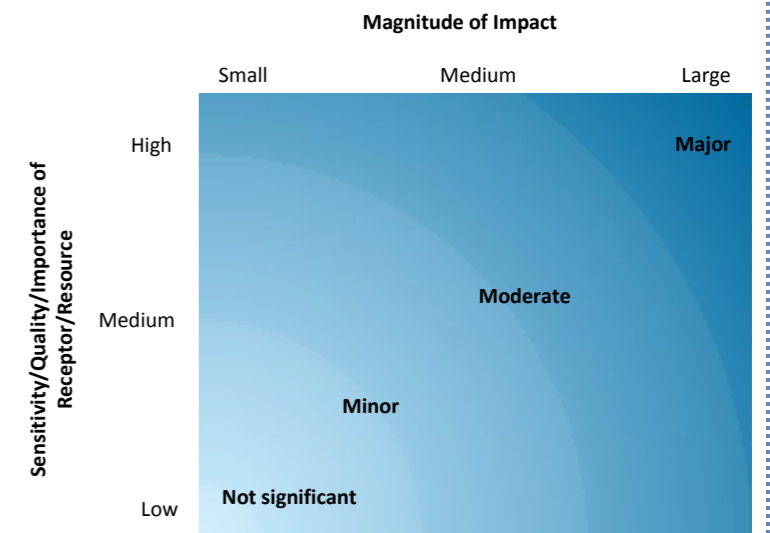
Ongoing stakeholder consultation, post-scoping, is good practice in EIA and is undertaken to refine the assessment and present preliminary findings to stakeholders to elicit early responses and help make the Environmental Statement as fit for purpose as possible.

Evaluate Significance

In evaluating significance, the EIA process is seeking to inform regulators and stakeholders about the effects of a project in a way that helps them make decisions on whether to approve it and allows them to develop suitable conditions to attach to an approval. The evaluation of significance ideally demonstrates legal compliance at least (eg compliance with quantified standards, avoidance of effects on legally protected resources).

In the absence of quantified standards, significance can be evaluated through considering the magnitude of an impact in combination with the importance/quality/value of the receptor or resource that is affected, also considering the response (or sensitivity) of a resource or a receptor to a particular impact. Impacts/effects of more than minor significance may warrant re-examination to see if an impact magnitude can be reduced further. Different mitigation options may be examined and the reasons for selecting one and rejecting others explained. Some impacts/effects that cannot be adequately mitigated may need to be addressed through the consideration of offsets or compensation.

The evaluation process may go through more than one iteration of working with project design to develop suitable mitigation and re-evaluating impacts and effects.



While the above provides a general framework for identifying impacts and assessing the significance of their effects, in practice the approaches and criteria applied vary across different environmental and socio-economic topics.

Schedule 4 of the EIA Regulations requires that where significant effects are identified, “a description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment” should be included in the ES.

One of the key objectives of an EIA is to identify and define socially and environmentally acceptable, technically feasible and cost effective mitigation measures. These should avoid unnecessary damage to the environment; safeguard valued or finite resources, natural areas, habitats and ecosystems; and protect humans and their associated social environments. For each significant adverse effect of the Proposed Development identified during the EIA process, the specialists undertaking the assessments have identified mitigation measures that are consistent with statutory requirements and good practice in their respective field. These measures have been committed to through a number of means, for example: integration into design; by inclusion of management procedures; or through a Code of Construction Practice or equivalent.

Mitigation measures are developed to avoid, minimise, reduce or remedy (e.g. reinstate or restore) for any negative effects identified, and to create or enhance positive effects such as environmental and social benefits. In this context, mitigation measures are taken to include design measures and construction practices, as well as management actions. These measures are often established through industry standards and may include:

- changes to the design of the Proposed Development during the design process (e.g. location of components, size of structures, emissions controls);
- construction working practices (e.g. routing of construction traffic, dust suppression, noise management); and
- operational plans and procedures (e.g. Environmental Management Systems, Emergency Response Plans).

For effects that are initially assessed to be of major significance, a design change is usually required to avoid, minimise or reduce these, followed by a reassessment of significance. For effects assessed to be of moderate significance, specific mitigation measures such as engineering controls are usually required to reduce the impacts and their effects to as low as reasonably practicable levels. This approach takes into account the technical and financial feasibility of mitigation measures. Effects assessed to be of minor significance are usually managed through the implementation of management plans, such as the CEMP, good industry practice, operational plans and procedures.

EIA is intended to ensure that decisions on projects are made in full knowledge of their likely effects on the environment and society. The residual effects and their significance reported in this ES are based on the Proposed Development as planned and designed fully inclusive of all proposed mitigation.

The mitigation measures developed during the EIA process, as well as standard industry practice measures, have been fully committed to by the Company as integral aspects of the Proposed Development. A summary of the mitigation proposed in this ES is set out in *Chapter 15*.

4.7 REPORTING RESIDUAL EFFECTS

Residual effects, once mitigation measures have been applied, will be classified as not significant or still significant (albeit reduced), as appropriate. Where effects are still significant, the mitigation options considered and the reasons for selecting particular measures will be reported in the ES.

Reporting the significance of a residual effect in this ES is based on:

- the predicted magnitude of an impact taking into consideration all the mitigation measures the Proposed Development is committed to that are relevant to that impact; and (where appropriate); and
- the quality or importance of the receptor and its sensitivity (to a specific impact).

Where a quantified standard exists, e.g. for noise or air quality, the evaluation process is a simpler one of comparing the predicted magnitude of the (mitigated) impact with the appropriate standard.

The degree of significance attributed to residual effects is related to the weight the EIA team considers should be given to them in making decisions on the Proposed Development and, where appropriate, the application of conditions to approval.

Ideally through the design, EIA and consultation processes by the time of an application a project should be designed to avoid residual effects of major significance.

Effects of moderate significance are considered important to decision making, warranting careful attention to ensure conditions regarding mitigation and monitoring employ the most appropriate (technically feasible and cost-effective) measures.

Effects of minor significance are brought to the attention of decision-makers but will be identified as warranting little if any weight in the decision; mitigation will typically be achieved using normal good practice, e.g. for construction.

Where concerns remain over the significance of residual effects and there is no scope to reduce the significance of the effect through practicable mitigation measures aimed directly at the impact then the EIA has considered ways to offset the effect.

4.8 INFORMATION TO INFORM A HABITATS REGULATIONS ASSESSMENT

Where a project has the potential, either alone or in combination with other plans or projects, to result in likely significant effects on one or more European sites ⁽¹⁾, an appropriate assessment will be required under the provisions of The Conservation of Habitats and Species Regulations (2010) (*the Habitats Regulations*).

If a development is likely to have a significant effect on a European site and/or a European marine site, a report must be provided with the application showing the site(s) that may be affected together with sufficient information to enable the competent authority to undertake an appropriate assessment (Habitats Regulations Appraisal (HRA)). An appropriate assessment is required to be undertaken if it cannot be excluded, on the basis of objective information, that a project will have a significant effect on a European site, either individually or in combination with other plans or projects.

For the Proposed Development, the competent authority is DECC. The report containing the information required for the purposes of undertaking an appropriate assessment has been provided in *Annex E: Information to Inform a Habitats Regulations Assessment*. This report is separate from the ES, but draws upon the information provided within the ES. The approach taken to produce this report is presented in *Annex E*.

4.9 CONSULTATION

Consultation is a key aspect of the EIA process and essential in agreeing and focussing the specific EIA scope to be suited to the nature of a project and its actual environmental and socioeconomic setting.

This ES directly responds to comments made by a number of technical consultees. *Table 4.3* sets out consultation undertaken in the preparation of the ES.

(1) These are Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs). this protection is also extended to potential SPAs (pSPAs), Ramsar sites, and (in England) possible SACs, proposed Ramsar sites

Table 4.3 Consultation Undertaken in the Preparation of the ES

Consultee	Nature of Consultation
General	
Department for Energy and Climate Change, North Lincolnshire Council, Highways Agency, Health and Safety Executive, Civil Aviation Authority NATS En-route (NERL) Safeguarding, Met Office, Ministry of Defence, National Grid	Environmental Scoping Request to agree scope of EIA
Ecology	
Natural England, North Lincolnshire Council, Lincolnshire Wildlife Trust	Agreeing the scope of ecology surveys and, with Natural England, the approach to addressing habitats Regulations matters.
Noise and vibration	
Department of Environmental Health, North Lincolnshire Council	Agreeing baseline monitoring locations and approach to setting criteria to assess noise.
Cultural heritage	
Historic England	Agreeing the assessment scope
County Archaeologist, North Lincolnshire Council	Seeking opinion on the baseline and approach to surveys
Transport	
Local Highway Authority, North Lincolnshire Council	Agreeing the assessment scope and joint site visit
Landscape and visual	
North Lincolnshire Council	Agreeing viewpoints selected for assessment
Land, water and flood risk	
Environment Agency	Agreeing data for use in Flood Risk Assessment

4.10 COMPARISON OF EFFECTS BETWEEN THE CONSENTED AND PROPOSED DEVELOPMENT

A comparison of the effects of the Proposed Development with those of the Consented Development are required under the ‘2013 Variation Regulations’ regulation 7(6):

- (6) Part 2 of Schedule 4 to the EIA Regulations is to be read as requiring the inclusion in a statement prepared pursuant to regulation 4(1) of the EIA Regulations of—*
- (a) the main respects in which the applicant considers that the likely significant effects on the environment of the proposed development would differ from those described in any environmental statement that was prepared in connection with the relevant section 36 consent; and*
 - (b) a non-technical summary of the differences referred to in sub-paragraph (a).*

Since it is not only the Company’s proposals that have changed over time, but also the baseline and regulatory context for some EIA topics, this comparison has been approached taking such matters into consideration.

- For those matters that were not addressed in the original EIA due to the lack of a requirement at the time (e.g. Habitats regulations, flood risk) the starting point for the EIA of the Proposed Development has been to assess whether there are likely significant effects. Where it has been found there are no such effects no further assessment has been made. Where it has

been found that there are such effects, then a comparative assessment has been undertaken by also assessing the Consented Development against the relevant contemporary requirement.

- For those matters that were addressed in the 1992 EA but for which different criteria now apply (e.g. air quality) the starting point has been to make an assessment based on the modern criteria to determine whether there are any likely significant effects. Where it has been found that there are no such effects then no further assessment has been made. Where it has been found that there are such effects then the Consented Development has been assessed against present day criteria and a comparative assessment has then been undertaken.