NORTH LINCOLNSHIRE GREEN ENERGY PARK

Planning Act 2008

Infrastructure Planning (Applications Prescribed Forms and Procedure) Regulations 2009

Regulation 5(2)(q)

North Lincolnshire Green Energy Park

Volume 5

5.12 Design Principles and Codes

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Contents

Glossary of Terms and Acronyms

Glossary	
The Applicant	North Lincolnshire Green Energy Park Limited
The Order Limits	The limits of the land covered by the Development Consent Order.
The Application Land	The land within the Order Limits.
Energy Park	the core elements of the Project including the ERF; carbon capture, utilisation, and storage facility; bottom ash and flue gas residue handling and treatment facility; concrete block manufacturing facility; plastic recycling facility; hydrogen production and storage facility; electric vehicle (EV) and hydrogen (H2) refuelling station; battery storage and hydrogen and natural gas above ground installations.
Energy Park Land	An area within the Application Land, containing the core elements of the Project (ERF; carbon capture, utilisation, and storage facility; bottom ash and flue gas residue handling and treatment facility; concrete block manufacturing facility; plastic recycling facility; hydrogen production and storage facility; electric vehicle (EV) and hydrogen (H2) refuelling station; battery storage and hydrogen and natural gas above ground installations) located north of Ferry Road West (B1216).
The Project	The whole of the NLGEP and associated project elements.
Acronyms	
AGI	Above Ground Installations
CBMF	Concrete Block Manufacturing Facility

CCUS	Carbon Capture, Utilisation and Storage facility
DCO	Development Consent Order
DHPWN	District Heat and Private Wire Network
EIA	Environmental Impact Assessment
ERF	Energy Recovery Facility
EV	electric vehicle
H2	Hydrogen
NIC	National Infrastructure Commission
NLGEP	North Lincolnshire Green Energy Park
NSIP	Nationally Significant Infrastructure Project
PRF	Plastic Recycling Facility
RHTF	Residue Handling and Treatment Facility
SuDS	Sustainable Drainage Systems

Executive Summary

1.1.1. Design Principles have been used by the Project team to identify objectives for the North Lincolnshire Green Energy Park (NLGEP) project (the Project). The Design Principles form part of the information to be submitted for the Development Consent Order (DCO) application for the Project by the Applicant.

1.1.2. Design Codes together with the Works Plans (**Document Reference 4.4**) and the parameters described within the Environmental Statement (**Document Reference 6.2.3**), provide the primary design information to inform the design of the Project at subsequent stages.

1.1.3. The Design Principles and Design Codes document summarises the Project Vision and provides a description of the Project. It explains the purposes of the design process as bringing together engineering, environmental and creative expertise to shape and deliver a development project and provide good value that works well for climate, people, and places, as set out in the National Infrastructure Commission (NIC) 'Design Principles for National Infrastructure' guidance.

1.1.4. The Design Principles are a set of decision-making reference points based on four main design themes. Throughout the Project's evolvement, interpretation and application of the Design Principles has been through underlying Objectives for the Design Principles.

1.1.5. The Design Codes are a set of design rules that transcend both the Project evolvement stages up to the DCO application and help shape elements of the detailed design work that will follow-on. They focus on two and three-dimensional elements of design. The Design Codes contain different levels of instruction and prescription. They are a series of rules to be applied to the on-going design of the Project, and thereby help to steer some aspects of the design detail at the next stages of the development and implementation of the Project. They help provide the next level of detail beyond those set out in the project parameters, which reflect Environmental Impact Assessment (EIA) decisions.

1.1.6. Compliance with the Design Codes will ensure the high-quality outcome is achieved as envisaged, and the Design Codes will form the basis of design assessment of the Project as it comes forward.

1.1.7. The Codes in effect provide a manual for aspects of the design and comprise written instructions as appropriate. Before designers (and others involved) start work on the detailed design, they shall first familiarise themselves with the general content of this document to help formulate a design response that underpins the DCO application.

1.1.8. There is intended to be some flexibility in design to allow for interpretation of the Design Principles to enable joined up thinking and to achieve improved project outcomes, whereas the Design Codes are less inherently flexible as they have been written to apply only to design elements that are more critical and where they are instrumental in achieving a particular design of environmental mitigation outcome that underpins the DCO.

1.1.9. Under four core Focus headings of People, Value, Places and Climate (referencing the NIC guidance) the NIC themes are interpreted as bespoke Design Principles and Codes for the Project, and which are manifested in the illustrative masterplan.

1.1.10. The evolved design work has informed the illustrative design and enabled informed understanding of the Project design outcome, so that well-considered, reliable, and deliverable project parameters can be fixed and secured within the DCO application.

1.1.11. Illustrative design material has been submitted for context in the Design and Access Statement (DAS) (**Document Reference 5.3**) and as stand-alone drawings to help stakeholders understand the Project and how it might look when completed.

2.0 Introduction

2.1.1. Design Principles have been prepared and used by the Project team which in turn have helped to set design objectives for the Project. The Design Principles form part of the information to be submitted to discharge Requirement 3 of the DCO. All details submitted will be required to be in accordance with this document.

2.1.2. Design Codes have also been prepared as part of the DCO application and, together with the Parameter Plans, provide the primary design information to inform the preparation of the subsequent design.

3.0 Our Vision

Our vision is to create a pioneering green energy park in North Lincolnshire.

3.1. A more sustainable future

3.1.1. The UK has set legally binding targets to reach net-zero carbon emissions by 2050, which will require huge transformations in the way we heat our homes, power our industries and travel around the country. Carbon capture, storage and usage will need to be part of the strategy to achieve net zero carbon within 30 years.

3.1.2. The need for a new approach is especially urgent in the Humber, where industry currently releases more carbon into the atmosphere than anywhere else in England, and where millions of tonnes of waste go to landfill every year.

3.1.3. The Project will help meet these challenges while fulfilling a vital public service and furthering the country's green revolution.

3.1.4. The Project could see up to 290 new jobs created that will help develop new skills that support the region's transition to net zero. Up to 2,940 jobs will be supported during the construction phase of the Project.

3.2. Project Description

3.2.1. The North Lincolnshire Green Energy Park (NLGEP) ('the Project'), located at Flixborough, North Lincolnshire, is a Nationally Significant Infrastructure Project (NSIP) with an Energy Recovery Facility (ERF) capable of converting up to 760,000 tonnes of non-recyclable waste into 95 MW of electricity at its heart and a carbon capture, utilisation and storage (CCUS) facility which will treat the excess gasses released from the ERF to remove and store carbon dioxide (CO2) prior to emission into the atmosphere.

3.2.2. The NSIP incorporates a switchyard, to ensure that the power created can be exported to the National Grid or to local businesses, and a water treatment facility, to take water from the mains supply or recycled process water to remove impurities and make it suitable for use in the boilers, the CCUS facility, concrete block manufacture, hydrogen production and the maintenance of the water levels in the wetland area.

3.2.3. The Project will include the following Associated Development to support the operation of the NSIP:

- a bottom ash and flue gas residue handling and treatment facility (RHTF)
- a concrete block manufacturing facility (CBMF)
- a plastic recycling facility (PRF)
- a hydrogen production and storage facility
- an electric vehicle (EV) and hydrogen (H2) refuelling station
- battery storage
- a hydrogen and natural gas above ground installations (AGI)
- a new access road and parking
- a gatehouse and visitor centre with elevated walkway
- railway reinstatement works including, sidings at Dragonby, reinstatement and safety improvements to the 6km private railway spur, and the construction of a new railhead with sidings south of Flixborough Wharf

- a northern and southern district heating and private wire network (DHPWN)
- habitat creation, landscape, and ecological mitigation, including green infrastructure and 65-acre wetland area
- new public rights of way and cycle ways including footbridges
- Sustainable Drainage Systems (SuDS) and flood defence; and
- utility constructions and diversions.

3.2.4. The Project will also include development in connection with the above works such as security gates, fencing, boundary treatment, lighting, hard and soft landscaping, surface and foul water treatment and drainage systems and CCTV.

3.2.5. The Project also includes temporary facilities required during construction, including site establishment and preparation works, temporary construction laydown areas, contractor facilities, materials and plant storage, generators, concrete batching facilities, vehicle and cycle parking facilities, offices, staff welfare facilities, security fencing and gates, external lighting, roadways and haul routes, wheel wash facilities, and signage.

3.2.6. The overarching aim of the Project is to support the UK's transition to a low carbon economy as outlined in the Sixth Carbon Budget (December 2020), the national Ten Point Plan for a Green Industrial Revolution (November 2020) and the North Lincolnshire prospectus for a Green Future. It will do this by enabling circular resource strategies and low-carbon infrastructure to be deployed as an integral part of the design (for example by reprocessing ash, wastewater, and carbon dioxide to manufacture concrete blocks and capturing and utilising waste-heat to supply local homes and businesses with heat via a district heating network).

4.0 Design Principles

4.1. Overview

4.1.1. The purposes of the design process are to bring together engineering, environmental and creative expertise to shape and deliver a development project and provide good value that works well for climate, people, and

places, as set out in the National Infrastructure Commission (NIC) 'Design Principles for National Infrastructure' guidance.

4.1.2. The approach to the design process is outlined in the Design and Access Statement (DAS) principally under sections 4.3, 5.1, 5.2 & 5.3. The DAS is the appropriate place for the narrative describing the design approach and process, and the DAS includes sections that set out the findings from the design, consultation process, and design outcomes that relate to the Proposed Development. To avoid complexity and repetition, the Design Principles and Codes document sets out only the Principles and Codes and does not repeat the detailed description of the approach to design found in the DAS. Section 3.0 of the Design Principles and Codes document provides however an overview of the design process and describes the application of the Design Principles to the project. However, the Design Principles and Codes document does explain the approach to the Project's Design Principles in reference to the NIC's Design Principles for National Infrastructure on which they are based and closely reflect, with the rationale that this is important introduction to the DCO project Principles.

4.1.3. Paragraphs 1.1.11 and 4.9.2 of the DPC Document explain that the DAS includes illustrative design material which has been submitted to demonstrate how the parameters have been tested and set, and to also provide a context and understanding of scheme. Section 8 of the DAS explains how sustainability has been part of the design process and the Design Principles and Codes secure elements of sustainable design.

4.1.4. The DAS is not intended to be a certifiable DCO document as the illustrative material contained in the DAS is an expression of how the Project could be implemented, when applying the Principles and Codes as required by Requirement 3 of the DCO.

4.2. Applying NIC guidance: Design Principles to achieve good design

4.2.1. In developing this guidance, the NIC define the role of principles as:

4.2.2. *"Principles should act as reminders to the delivery organisation, a steer in the right direction, and a means of restoring focus to the big picture….. Design Principles should be a point of departure, setting out a common understanding [of] the issues*

to be addressed." (Developing Design Principles for National Infrastructure (NIC, 2018)).

4.2.3. As a project team we set about developing the Project principles over the period 2019-2020. The Project principles align with the core purposes and ambitions of the 'Design Principles for National Infrastructure' which are Climate, People, Places and Value.

4.2.4. The purpose of developing the principles was to help ensure that the whole project team are all working towards to the same outcome, identifying overlap between disciplines and setting a framework within which to deliver good design.

4.2.5. Design is as much about process as it is about the eventual design product. Imaginative thinking about design should be embedded at every step of planning and delivery. Adhering to agreed Design Principles helps ensure a good process leads to good design outcomes.

4.3. Good design for national infrastructure projects

4.3.1. The importance of good design is referenced in Section 4.5 of the Overarching Energy National Planning Policy Statement (NPS) EN-1 (NPS EN-1), where it states that:

"Applying "good design" to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible1."

4.3.2. Section 4.5 of NPS EN-1goes on to say:

a) good design, in terms of siting and use of appropriate technologies can help mitigate adverse impacts …

b) the [consenting authority] needs to be satisfied that energy infrastructure developments are sustainable….., are as attractive, durable and adaptable ….. as they can be

c) the applicant has taken into account both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located) as far as possible

d) applicants should be able to demonstrate in their application documents how the design process was conducted and how the proposed design evolved

e) Applicants … should consider taking independent professional advice on the design aspects of a proposal

4.3.3. The following paragraphs are extracts from the National Policy Statement for Renewable Energy Infrastructure (EN-3) (NPS EN-3) where 'good design' is referenced:

Section 2.4.2: *Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the Project to mitigate impacts such as noise and effects on ecology.*

Section 2.5.47: *The IPC should be satisfied that the design of the proposed generating station is of appropriate quality and minimises adverse effects on the landscape character and quality.*

Section 2.5.50*: Good design that contributes positively to the character and quality of the area will go some way to mitigate adverse landscape/visual effects. Development proposals should consider the design of the generating station, including the materials to be used in the context of the local landscape.*

Section 2.5.51*: Mitigation is achieved primarily through aesthetic aspects of site layout and building design including size and external finish and colour of the generating station to minimise intrusive appearance in the landscape as far as engineering requirements permit. The precise architectural treatment will need to be site-specific.*

Section 2.5.52: *The IPC should expect applicants to seek to landscape waste/biomass combustion generating station sites to visually enclose them at low level as seen from surrounding external viewpoints*.

Section 2.5.57: *The primary mitigation for noise for biomass and EfW generating stations is through good design to enclose plant and machinery in noise-reducing buildings, wherever possible, and to minimise the potential for operations to create noise.*

4.3.4. The National Design Guide (NDG) and National Model Design Code (NMDC) expectations and approach relating to good design, have been enveloped in the project under the NIC principles which are considered appropriate and more comprehensive for the type of

development. Being based on the NIC principles, the project specific design Principles incorporate NDG and NMDC expectations under the NIC headings, adoption/ endorsement of the objectives in Section 4.5 of NPS EN-1, the NPPF, and the NIC guidance on design principles 'Design Principles for National Infrastructure'.

4.4. Using the Design Principles and Design Codes

4.4.1. The Project is a complex and multi-faceted project, and the Design Principles reflect the Project Vision and its core values. They provide a distilled set of design statements that underpin the design approach taken by the Project's design team up to the DCO application.

4.4.2. The Design Principles are a set of decision-making reference points based on four main design themes. Throughout the Project's evolvement interpretation and application of the Design Principles has been through underlying Objectives for the Design Principles.

4.4.3. The Design Codes are a set of design rules that transcend both the Project evolvement stages to DCO application and help shape elements of the detailed design work that will follow-on. They focus on two- and three-dimensional elements of design and are also rooted into the Project vision, and important decisions made during the design process.

4.4.4. The Design Codes contain different levels of instruction and prescription. They are a series of rules to be applied to the on-going design of the Project, and thereby help to steer some aspects of the design detail at the next stages of the development and implementation of the Project. They help provide the next level of detail beyond those set out in the project parameters, which reflect EIA decisions.

4.4.5. The Design Codes provide clarity over what constitutes acceptable design quality and where there have been important design decisions that shape the application, and thereby they provide a level of insight for designers, and control for the planning authority and other stakeholders.

4.4.6. Compliance with the Design Codes will ensure the high-quality outcome is achieved as envisaged. As the Design Codes will form the basis of design

assessment for the development of the Project as it comes forwards, it is recommended that a Design Codes Compliance Statement will help demonstrate how the detailed design submitted to discharge requirements relate to the Design Codes.

4.4.7. The Codes in effect provide a manual for aspects of the design and comprise written instructions as appropriate. Before designers (and others involved) start work on the detailed design, they shall first familiarise themselves with the general content of this document to help formulate a design response that underpins the application.

4.5. Who uses the Design Principles and Design Codes?

4.5.1. The design team working on the DCO application have used the Design Principles to identify the project parameters for the DCO application. Future design teams, local planning authorities, and stakeholders will use the Design Principles as a reference point throughout the follow-on life of the Project including design, construction/implementation, operation, and decommissioning. The Design Principles can be improved if necessary to reflect, for example, advances in technology or emerging areas of concern. New Design Principles may be required at later stages of the Project's life.

4.5.2. The Design Codes are more specific and will be used by local planning authorities and stakeholders following-on from the DCO application in, for example Development Control roles, and by design teams as a basis for on-going design work.

4.5.3. There is intended to be some flexibility in design to allow for interpretation of the Design Principles to enable joined up thinking to achieve improved project outcomes, whereas the Design Codes are less inherently flexible as they have been written to apply only to design elements that are more critical and where they are instrumental in achieving a particular design of environmental mitigation outcome that underpins the DCO.

4.6. The stages of design consideration for NLGEP

4.6.1. Early in the Project the NIC Design Principles were reviewed and considered appropriate as a basis for the Project. An initial set of Project

Principles were identified using the structure of headings from the NIC, interpreted through Project Objectives.

4.6.2. Throughout the design process for the Project, these have been a reference point and have been applied to the *design* work. Consequently, the project team have now considered these to be the Project *Design* Principles, interpreted through the Objectives. To provide some continuation of design consideration the Project *Design* Codes have been developed in the latter stages of the design process especially in relation to design for mitigation of environmental effects, and to communicate aspects of the design decisions that would otherwise be concealed within the 'catch-all' of a maximum parameter approach.

Project Principles	Adopted initially at the start of the Project
Project Objectives	Developed for project response to the Site
Design Principles	Project Principles evolve through the design
Design Codes	Insight to design decision-making

4.7. Applying NIC guidance to the Project

4.7.1. The application of the NIC focus areas resulted in the following project principles being established for the Project.

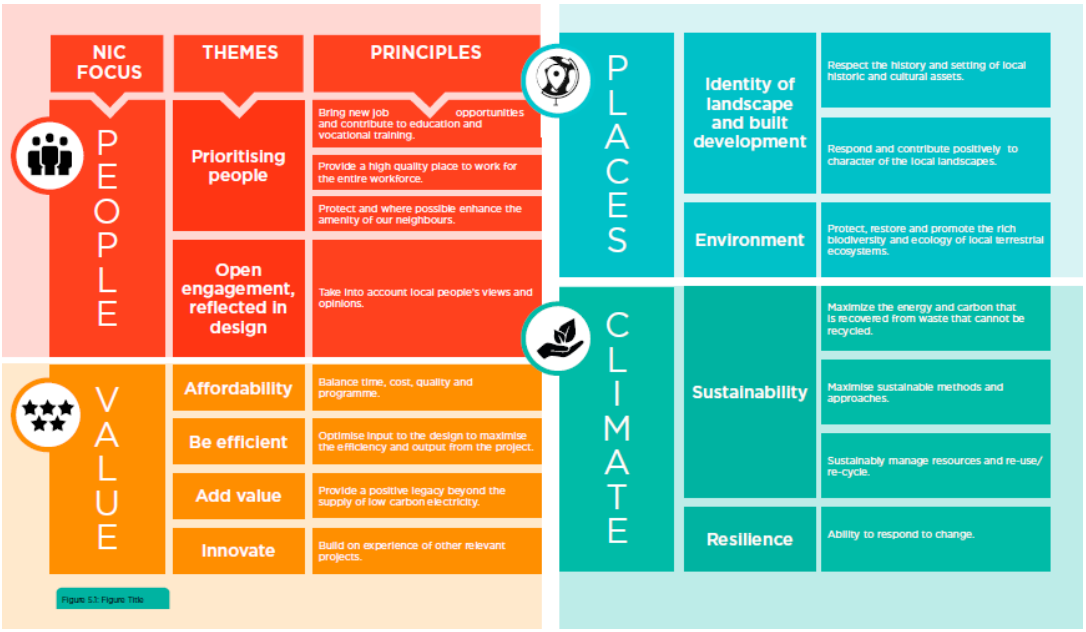

Figure 1. NLGEP Design Principles

4.8. NLGEP Design Principles

4.8.1. Under the four core Focus headings of People, Value, Places and Climate (referencing the NIC guidance), this section explains in more detail how the NIC themes are interpreted as bespoke Design Principles and Codes for the Project, and which are manifested in the illustrative masterplan.

4.8.2. The design thinking for each of the project principles was refined during the early design stages and progression of the Project to establish a set of Design Principles and Objectives. These add a level of detail that is specific to the Project and local context and have acted as a point of reference and direction for the project team through the design and PEIR stage to shape the Project.

4.8.3. The Design Principles and their Objectives are 'live' and have been reviewed and refined by the team to reflect emerging outcomes from assessment and technical/design modelling work. The Design Principles and their Objectives have been reviewed throughout the work stages to reflect stakeholder feedback. Through the design evolution of the Project, the changes that have occurred during this time have been monitored against the Design Principles and Objectives.

4.9. Design Principles help determine the Project Parameters

4.9.1. It is important to recognise that the DCO planning strategy is a Rochdale Envelope / Parameter-based approach. To test the proposals, there has been design evolution beyond the parameter level of detail submitted for the DCO application.

4.9.2. The evolved design work has informed the illustrative design and enabled informed understanding of the Project design outcome, so that well-considered, reliable, and deliverable parameters can be fixed and secured within the DCO application. Illustrative design material has been submitted for context in the DAS (**Document Reference 5.3**).

4.9.3. This evolved design work does not form part of the Project information that is consented through the DCO, but the Design Principles and Codes provide a decision-making reference point for on-going detailed design and construction design/implementation of the consented DCO project.

4.10. Design Principles Focus 1: People

4.10.1. Theme - Prioritising People

DP_PEOPLE 1.01

- Bring new job opportunities and contribute to education and vocational training
- Provide a high-quality place to work for the entire workforce
- Protect and where possible enhance the amenity of our neighbours

Objectives:

- To bring to Scunthorpe and North Lincolnshire areas direct and indirect job opportunities that are compatible with the area's economy, potential and culture
- To consider how temporary works and permanent changes will affect people including those in the wider area to create a safe and

considerate construction project, and an attractive and safe place to work when the Energy Park is complete and in operation; and

- To consider and minimise the impacts on close neighbours, Amcotts and Flixborough, by considering and minimising adverse visual and operational environmental effects.

4.10.2. Theme - Open engagement, reflected in design

DP_PEOPLE 1.02

- Take into account views and opinions of local people

Objectives:

- To hold meaningful and open engagement with a wide range of local and statutory consultees and communities, and demonstrably respond to feedback.

4.11. Design Principles Focus 2: Value

4.11.1. Theme – Affordability

DP_VALUE 1.03

- Balance time, cost, quality, and programme

Objectives:

- To bring learning from previous projects across the design team.

4.11.2. Theme - Be efficient

DP_VALUE 1.04

- Optimise input to the design to manage the efficiency and output from the Project

Objectives:

- To minimise land used; and
- Ensure construction processes are well connected and streamlined.

4.11.3. Theme - Add value

DP_VALUE 1.05

- Provide a positive legacy beyond the supply of low carbon energy

Objectives:

- To encourage the sustainable development of employment and education opportunities to the local community with, for example, apprenticeship schemes through both the client and supply chain partners.

4.11.4. Theme – Innovate

DP_VALUE 1.06

- Build on experience of other relevant projects

Objectives:

- To encourage innovation and experience from elsewhere through design, construction, and operation, taking advantage of new technology where appropriate.

4.12. Design Principles Focus 3: Places

4.12.1. Theme - Identity of landscape and built environment

DP_PLACES 1.07

- Respect the history and setting of local historic assets
- Respond and contribute positively to character of local landscapes

Objectives:

- To bring about positive change to the local setting and communities where possible
- To consider close views, as well as long views from the wider context

- Integrate design work with early landscape and visual impact assessment
- To concentrate the ERF to land that is brownfield as a priority or adjacent to similar land use; and
- To consider the composition of larger elements, including the relationship of the new development to adjacent land uses.

4.12.2. Theme – Environment

DP_PLACES 1.08

- Respect, restore and promote the rich biodiversity and ecology of local terrestrial ecosystems

Objectives:

- To deliver an integrated landscaping and biodiversity strategy that delivers a net gain in biodiversity.

4.13. Design Principles Focus 4: Climate

4.13.1. Theme – Sustainability

DP_CLIMATE 1.09

- Maximise the energy and carbon that is recovered from waste that cannot be recycled
- Maximise sustainable methods and approaches

Objectives:

- Maximise capture opportunities for carbon capture utilisation and storage facility (CCUS) and energy storage
- Adopt a 'low carbon' strategy during construction of the Project and during the operation and decommissioning of the ERF
- Siting the development on site area that is less susceptible to fluvial and tidal flooding
- Utilisation of sustainable transportation options; and

- Re-use materials and resources and minimisation of multiple handling of materials wherever possible.

4.13.2. Theme – Resilience

DP_CLIMATE 1.10

- Ability to respond to change

Objectives:

- Predict future requirements for the ERF, and design the DCO infrastructure to be resilient and flexible

4.13.3. The Project team developed a diagram (Figure 2) early in the Project design process based on the NIC Focus and Themes, along with Design Principles and associated Objectives for the Project. The Diagram has been summarised as a table shown in Figure. 1.

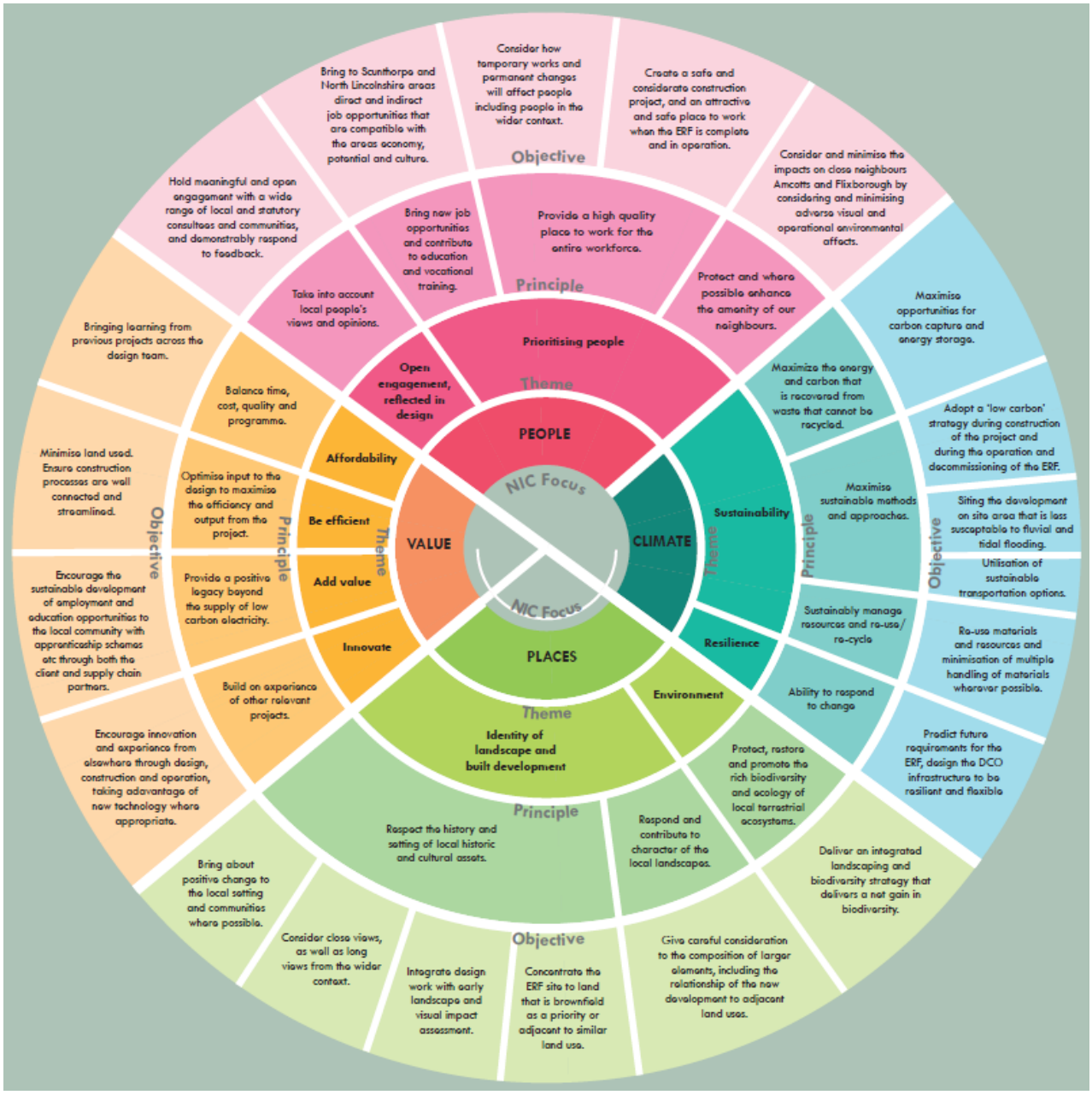

Figure 2. NLGEP Design Principles wheel.

5.0 Design Process & Codes

5.1.1. This section sets out the Design Process and Codes for the Project. They focus on the design process along with two- and three-dimensional elements of design and aim to provide a certain amount of flexibility, while fixing the crucial aspects that determine the fundamental success of the scheme. Each Code includes bullet points indicating the design rationale(s).

5.2. Design Process

DC_PRO 1.01

A Design Champion will be appointment for each phase of the Project who will take ownership of design and delivery of good quality sustainable design sustainable design.

- To enable clearer articulation and discussion about design quality and sustainable design between design teams, and externally with community, local authorities, and stakeholders.
- To ensure that the principles and codes set out within this document are appropriately considered during the detailed design stage.
- To ensure that good design and sustainability is considered alongside other factors, such as cost, safety and technical compliance as the design of the Project progresses.

DC_PRO 1.02

The detailed design will be subject to an external design review panel prior to submission to the Local Planning Authority as per Requirement 3 of the DCO.

- To provide scrutiny to the design outcomes and draw-in experience from similar scale and types of project/ design, with ability to bring local through to national expertise and relevance, such as the Design Council.
- To provide scrutiny of the application of the principles and measures set out within the document at the detailed design stage.

5.3. Environment

5.3.1. Flood Risk and Drainage; minimise impact of flooding

DC_ ENV 1.01

Drainage swales are to be designed to also accommodate planting and standing water.

- To contribute to a strong network of existing habitats
- To create new diverse and inter-connected habitats; and
- To integrate the Energy Park into its setting.
- To achieve the principles of the landscape and ecology strategy set out in Section 5.17 and 5.18 of the Design and Access Statement (Document Reference 5.3).

DC_ ENV 1.02

Larger building footprints (including the ERF) are located in the northern extents of the Energy Park Land, adjacent to the Flixborough Industrial Estate.

DC_ ENV 1.03

Separate and fragment the extent of building platforms across the Energy Park Land.

- To minimise increasing flood impacts on neighbouring areas
- To reduce land area removed from flood plain and minimise volume of materials required for development platforms
- To maximise efficiency of flow dynamics under flood conditions
- To ensure operational continuity; and
- To provide a safe operational environment.

5.3.2. Ecology and biodiversity

DC_ ENV 1.04

Planting is to be naturalistic and comprise native and indigenous plant mixes.

DC_ ENV 1.05

Structural planting is to consist of native and indigenous species and wherever possible from local provenance.

- To increase local, regional, and national biodiversity
- To address loss of habitats and species depletion
- To contribute to a strong network of existing habitats
- To create new diverse and inter-connected habitats; and
- To integrate the Energy Park into its setting.
- To achieve the principles of the landscape typologies set out in Section 5.17 of the DAS.

DC_ ENV 1.06

Drainage infrastructure is to be an integrated element of the landscape design.

- To contribute to a strong network of existing habitats
- To provide habitat corridors connected to the wetland
- To create new diverse and inter-connected habitats; and
- To integrate the development into its setting.
- To achieve the principles of the landscape typologies (Section 5.17 of the DAS) and the Flood and Drainage Strategy (Section 5.19 of the DAS).

5.4. Landscape and Public Realm

5.4.1. The landscape design for the Project covers extensive areas of land and includes access routes, building plots and curtilages, drainage systems, infrastructure installations and operational areas. The landscape design also provides a mitigation response to landscape and visual impacts, public realm, private realm, conservation of existing landscape features and creation of appropriate new landscape for the location. Landscape design can help adaptation to climate change and create a legacy.

5.4.2. Relationship between Building and Landscape

DC_ LAN 1.01

Larger building footprints are in the northern part of the Energy Park Land, adjacent to the Flixborough Industrial Estate.

- To ensure when viewed from the North-West to the North-East the ERF and other large buildings are seen against existing built-up context of Flixborough Industrial Estate.

DC_ LAN 1.02

Planting along the new access road approaching the proposed visitor centre should allow intermittent views towards the building location.

- To enable visual connectivity and orientation to public-accessible facilities.

DC_ LAN 1.03

Curtilage landscape adjacent to public routes is to be designed to be an extension of the wider landscape planting scheme.

- To integrate the buildings and their associated landscape into the wider landscape beyond the plots
- To create a consistent 'family' of building plots and landscape

- To bring wider landscape close into the development plots and infrastructure and use landscape as a dominant element in the local context; and
- To avoid piecemeal and small-scale approach to design.
- To achieve the principles of the Curtilage Landscape Typology as set out in Section 5.17 of the DAS.

DC_ LAN 1.04

Curtilage landscape of the ERF and other building plots where not adjacent to public routes can be designed to reflect the wider landscape planting but appropriate for the scale and operational use of the space.

- To make sure internal areas within plots are useable for intended purpose but do not dilute the strength of the external surrounding landscape treatment; and
- To create a high-quality place to work.

DC_ LAN 1.05

Plot frontages onto the new access road will have different arrangement of planting to 'open' stretches of the road. Where future building plots are possible plot frontage planting can be implemented.

- To ensure there is an appropriate design response between areas where there are buildings and landscape in combination; and
- To ensure areas where the new structural landscape is a dominant feature it is expected to contribute to the wider landscape without buildings being present.
- To achieve the principles of the 'Landscape Approach Diagram – Curtilage Landscape Concept' as shown on Figure 5.28 of the DAS.

DC_ LAN 1.06

Design the visitor centre to have an extensive brown roof.

- To integrate building into the naturalistic wetland habitat setting
- To extend habitat opportunities; and
- To differentiate the visitor centre from the family of infrastructure buildings and facilities.

DC_ LAN 1.07

The development platform along Bellwin Drive will not be contiguous with the building façade and will be ameliorated with planting.

- To provide a stepped platform that integrates a change in scale from highway/footway level to the building ground level.

5.4.3. Structural planting

DC_ LAN 2.01

Structural planting is to consist of native and indigenous species and wherever possible from local provenance.

- To ensure species resilience and successful landscape contribution over time
- To reflect local landscape character and landscape types; and
- To be adaptable to climate change.
- To achieve the principles of the landscape and ecology strategy set out in Section 5.17 and 5.18 of the DAS.

DC_ LAN 2.02

Structural planting is to be large-scale, simple, and limited in variation across the Energy Park Land.

- To break up visibility of the larger elements of the Energy Park
- To add large scale landscape features consistent with the scale of the Energy Park
- To provide a consistent framework for the Project, including access and operational infrastructure; and

- To reflect dominant local landscape features and integrate the Project into its setting.
- To achieve the principles of the landscape typologies set out in Section 5.17 of the DAS.

DC_ LAN 2.03

Structural planting in the flood plain is to be designed to be a deliberate rectilinear arrangement and pattern in the landscape.

DC_ LAN 2.04

Structural landscape is to reflect characteristic flood plain landscape and local landscape patterns integrating vegetation and drainage.

- To integrate the development into the existing rectilinear flood plain landscape pattern
- To help visually integrate the buildings and infrastructure into their setting
- To be efficient and organised over large areas; and
- To be part of a deliberate design of systematic land use comprising plots; and drainage patterns, and planting.

5.4.4. Infrastructure Landscape

DC_ LAN 3.01

Planting is to be naturalistic and comprise native species.

- To increase biodiversity; and
- To increase local and regional biodiversity.
- To achieve the principles of the landscape typologies set out in Section 5.17 of the Design and Access Statement (Document Reference 5.3).

DC_ LAN 3.02

Drainage infrastructure is to be an integrated element of the landscape design.

DC_ LAN 3.03

Landscape elements are to reflect local landscape features and planting types.

- To contribute to a strong network of existing habitats
- To create new diverse and inter-connected habitats; and
- To integrate the Project into its setting.
- To achieve the principles of the landscape typologies (Section 5.17 of the DAS) and the Flood and Drainage Strategy (Section 5.19 of the DAS).

DC_ LAN 3.04

Create a consistent approach to planting and landscape features along the length of the new access road.

- To ensure the Energy Park is conceived and designed as a whole and avoid piece-meal approach across its extent; and
- To address the scale and extent of development with an appropriate scale of landscape response.
- To achieve the principles of the Road Corridor Landscape Typology as set out in Section 5.17 of the DAS.

DC_ LAN 3.05

Drainage swales to be planted and be capable of holding areas/stretches of standing water or moist ground.

- To increase local and regional biodiversity
- To contribute to a strong network of existing habitats

- To create new diverse and inter-connected habitats
- To provide habitat corridors connected to the wetland; and
- To integrate the Project into its setting.
- To achieve the principles of the landscape typologies (Section 5.17 of the DAS), ecology strategy (Section 5.18) and the Flood and Drainage Strategy (Section 5.19 of the DAS).

DC_ LAN 3.06

Development platform embankments are to be 1:3 gradient or as appropriate where not expected to be planted with structural planting.

- To minimise land-take for the Energy Park
- To reduce imported material required
- To minimise flood risk to surrounding areas; and
- To maximise opportunity to plant into adjacent existing non-made-up ground levels and thereby avoid difficulties associated with planting into made up slopes.
- To achieve the principles of the Curtilage Landscape Typology as set out in Section 5.17 of the DAS.

DC_ LAN 3.07

Development platform embankments are to be maximum 1:5 gradient, but ideally 1:12, or as appropriate where expected to be planted with structural planting.

- To enable planting to be established on slopes
- To minimise land-take
- To reduce imported material required; and
- To minimise flood risk to surrounding areas.
- To achieve the principles of the Curtilage Landscape Typology as set out in Section 5.17 of the DAS.

DC_ LAN 3.08

Retaining walls that form the development platform an act as a plot frontage onto public routes are to be planted.

DC_ LAN 3.09

Drainage and surface water attenuation basins are to be designed to be capable of holding standing water throughout the year and designed as habitats.

- To increase biodiversity
- To enable planting and a variety of aquatic and marginal habitats; and
- To minimise visual impact and integrate into the surrounding wetland and plot landscapes.
- To achieve the principles of the landscape typologies (Section 5.17 of the DAS), ecology strategy (Section 5.18) and the Flood and Drainage Strategy (Section 5.19 of the DAS).

DC_ LAN 3.10

Elevated walkway to be planted either by using climbing plants on wires or frames and/ or hanging/ trailing plants from the upper level.

- To increase biodiversity
- To enable planting and a variety of aquatic and marginal habitats
- To enhance the walkway and experience; and
- To minimise visual impact and to differentiate and integrate the walkway into the Energy Park.

5.4.5. Public realm/ streetscape

DC_ LAN 4.01

Street furniture (lighting, litter bins, bollards, etc.) is to be minimised and located in consistent locations and patterns throughout the Energy Park Land.

- To minimise impact; and
- To ensure the Energy Park is conceived and designed as a whole and avoid piece-meal approach across its extent.

DC_ LAN 4.02

Service access covers and utility corridors are to be provided consistently and to a pre-determined strategy and arrangement allowing for implementation of additional infrastructure where foreseeable.

- To ensure access is available and does not require removal of any planting, avoids impact on trees, and disturbance to hard landscape areas; and
- To ensure the Project is conceived and designed across its extent and avoid disruption to established landscape.

DC_ LAN 4.03

Building facades and envelopes to be used as the secure boundary wherever possible.

- To reduce need for security fences and stand-alone boundaries to minimise visual impact.

5.4.6. Materials

DC_ LAN 5.01

The materials used to construct the hard landscape and boundary treatments will be high quality, robust and low maintenance.

DC_ LAN 5.02

Landscape design will utilise materials that reflect the vision of the Project as purposeful and timeless, with modern design and materials alongside local and natural materials to reflect a pioneering Energy Park.

- To ensure that the visual quality of the Energy Park is retained over time.
- To achieve the principles of the Landscape Strategy and Architectural Design Concept (Materials) set out within Section 5.17 and 5.23 of the DAS, respectively.

DC_ LAN 5.03

Landscape materials will be consistently applied across the Project where appropriate.

- To maintain the appearance of a 'family of designed landscapes' across the Application Land.

DC_ LAN 5.04

The materials used to construct the hard landscape and boundary treatments will be as sustainable as possible regarding origin, embodied energy, maintenance requirements and durability.

- To avoid depleting natural resources; and
- To be responsible to climate change.

5.4.7. Planting types

DC_ LAN 6.01

Woodland planting and understorey to be entirely native species and reflect local woodland type(s).

DC_ LAN 6.02

Hedgerows to be entirely native species and reflect local hedgerows particularly historic hedgerows.

DC_ LAN 6.03

Wildflower and ruderal extensive planting to be entirely native species and where possible use seed from local provenance.

- To increase local biodiversity
- To integrate the Project into the existing pattern of vegetation and the setting; and
- To reflect local landscape character and landscape types.
- To achieve the principles of the Landscape and Ecology Strategies (Sections 5.17 and 5.19 of the DAS).

DC_ LAN 6.04

Screen planting to be native species and designed to reflect local planting and landscape types, and indigenous woodland hierarchy and structure.

DC_ LAN 6.05

Flood plain plantation/ plantation and ground flora to be planted in a systematic grid pattern comprising native species reflecting localised conditions.

- To increase local biodiversity
- To integrate the development and plots into the existing pattern of vegetation and the development setting; and
- To be a part of the systematic approach to design of new structural planting and plot configurations making up the features of the new flood plain landscape.

- To achieve the principles of the landscape typologies and Ecology Strategy (Sections 5.17 and 5.19 of the DAS).

DC_ LAN 6.06

New access road margin planting to comprise native species, including the grasses/ wildflowers alongside the mown road verge.

- To increase local biodiversity
- To be appropriate for a rural route
- Grasses / wildflowers to be selected and managed to provide up to 1.5m height during peak of growing season
- To provide height and sense of separation between the cycle/footway and the carriageway
- To integrate the route into the pattern of new landscape associated with the Project
- To be a part of the systematic approach to design of new structural planting and plot configurations making up the features of the new flood plain landscape; and
- To improve the experience travelling along the length of the route.
- To achieve the principles of the Road Corridor Landscape Typology (Sections 5.17 of the DAS).

DC_ LAN 6.07

Plot frontage planting to be simple and grid-planted native tree species and tall planting comprising native ground flora/ grasses.

- To increase local biodiversity
- To be appropriate for the location
- To integrate the plot frontages into the setting of the new access road
- To provide visual identity along plots frontages and variation along the route; and
- To provide visual navigation for example at plot entrance and junctions.

- To achieve the principles of the Curtilage Landscape Typology (Sections 5.17 of the DAS).

DC_ LAN 6.08

Plot planting to be designed to extend the organised pattern and planting principles of infrastructure, road, and plot frontage planting.

- To continue the same landscape pattern
- To integrate plots into the wider flood plain landscape
- To ensure a family of landscape design response throughout the Energy Park; and
- Adapted to provide screening and amenity where required.

DC_ LAN 6.09

Wetland planting to be naturalistic and comprise native species.

- To create naturalistic wetlands
- To provide varied wetland habitats ranging from open water, marsh, reedbeds and vegetated margins, shallows, spits, scrapes, wet grassland, banks, scrub, wet woodland, pollards, and grassland; and
- To integrate the wetlands into the flood plain and river corridor location.
- To achieve the principles of the Wetland Landscape Typology (Sections 5.17 of the DAS).

DC_ LAN 6.10

Swales to be planted with native species.

- To ensure swales become habitat corridors
- To include swales as part of the network of new habitats
- To maximise biodiversity; and
- To integrate swales as a component of the new landscape being created.

- To achieve the principles of the Landscape Typologies and Ecology Strategy (Sections 5.17 and 5.19 of the DAS).

5.5. Access

5.5.1. Public Rights of Way

DC_ ACC 7.01

Retained public rights of way to be complemented by additional paths crossing the Application Land.

- To provide better connectivity and improved access to open spaces
- To encourage active and healthy lifestyles
- To provide points of engagement and benefit for local people; and
- To promote walking and cycling to work to reduce carbon footprint of commuting travel.
- To achieve the principles of the Public Connectivity Strategy set out within Section 5.15 of the DAS.

DC_ ACC 7.02

The wetlands are to be designed to be accessible.

DC_ ACC 7.03

Stopped-up length of Stather Road is to be designed to be accessible.

- To provide opportunities for interacting with nature and wetland wildlife and habitats along the River Trent corridor and flood plain
- To provide a platform for educational opportunities
- To become part of a loop or river-side route connecting with other routes; and
- To provide alternative routes to work on foot or for recreational access to countryside.

- To achieve the principles of the Public Connectivity Strategy set out within Section 5.15 of the DAS.

5.5.2. Routes

DC_ ACC 8.01

Footway/ cycleways: Combined foot and cycle paths to be a minimum of 3m wide.

- To be GDA compliant and as inclusive as possible and responding to the needs of disabled users, ensuring spaces are design for different abilities.
- To achieve the principles of the Public Connectivity Strategy set out within Section 5.15 of the DAS.

DC_ ACC 8.02

Network of footpaths in the area that link the eastern extents of the Energy Park Land with the open spaces and wetlands along the river.

- To become part of a loop or river-side route connecting with flood plain and scarp routes; and
- To provide alternative routes to work on foot or for recreational access to countryside.
- To achieve the principles of the Public Connectivity Strategy set out within Section 5.15 of the DAS.

5.5.3. Thresholds/ boundaries

DC_ ACC 9.01

Clear boundaries and security between public and private areas, service areas and access points. The materials, treatments, security measures, and degree of visual permeability to be considered and designed as part of the Energy Park design.

- To ensure boundaries, which can be visually prominent, are part of the family of design throughout the Energy Park.

5.6. Architecture

5.6.1. The future location and scale of built development of the Project will be determined by the maximum design parameters, which were shaped through the development of an architectural design for all buildings, to understand the visual impact and potential mitigation necessary. The illustrative architectural designs have informed our understanding of how the designs may be developed in the future and have also enabled the development of the following Design Codes, which will be used to guide the detailed design process.

5.6.2. Built volumes and orientation

DC_ARC 1.01

Buildings to be located to match predominant orientation of buildings and road infrastructure of the adjacent Flixborough Industrial Estate.

- To integrate with surrounding built context and minimise visual impact.
- To achieve the principles of the orientation shown on the illustrative layouts within the DAS.

DC_ARC 1.02

Built form to be visually structured and visually broken-up through variation in roof heights and massing, with the buildings sized appropriately for the chosen technology and future advancements that allow for safe and efficient operation of the facility.

- To minimise visual impact and address building bulk and scale.

DC_ARC 1.03

Location of rooftop equipment determined to be where visual impact is lowest; size of equipment to be minimised and arrangement.

- To be visually balanced and minimise visual impact.

DC_ARC 1.04

Roof shapes to minimise the visual impact of buildings with flat or low-pitched roofs, potentially in combination with curved roof shapes.

- To soften the appearance of larger scale buildings and provide better blending with the sky.

DC_ARC 1.05

Integrate pipes, silos/storage tanks within the buildings, or screen or wrap with a consistent material.

DC_ARC 1.06

Ventilation louvres to be avoided on visually sensitive sides of the roof curves and upper parts of the building, restricted to Northern and Southern facades.

DC_ARC 1.07

The design of the visitor centre to have a minimum footprint and a discernible form and massing.

- To create a more ordered appearance, cleaner lines, minimise clutter and minimise visual impact.

DC_ARC 1.08

Visitor centre to have raised ground podium to provide high level views over the wetlands and ground and first floor terraces to provide direct access onto the wetlands.

- To provide spaces accessible to the public and integrate the building with the landscape.

DC_ARC 1.09

Visitor centre to have flat roof shape.

- To accommodate a brown roof.

DC_ARC 1.10

Location of the windows of the visitor centre to be carefully considered.

- To add visual interest and break up the scale of the building.

DC_ARC 1.11

Stack to be treated as a single visually refined 'column'.

- To minimise visual impact and to blend the stack with the sky.

5.6.3. Energy efficiency

DC_ARC 2.01

The buildings within the Energy Park will be built to high standards of sustainability, using materials that are common and as local as possible.

DC_ARC 2.02

Factors such as embodied energy, source of material, and whether a material is renewable, should influence the choice of materials.

DC_ARC 2.03

The reusing of resources should be explored at construction as well as operational and, later-on, decommissioning stage.

DC_ARC 2.04

Buildings should be highly energy efficient, and their design should reflect this.

- To not deplete natural resources; and
- To be responsive to climate change/ conscious of the effects of climate change.

5.6.4. Detailing and Colour

DC_ARC 3.01

Where possible, rooftop equipment to be clad in wall cladding.

DC_ARC 3.02

Where appropriate, design parapet roof edges.

- To minimise visual impact of rooftop plant and provide safe access.

DC_ARC 3.03

Ventilation louvres to be flush mounted and colour matched.

DC_ARC 3.04

Location of roller shutter doors and personnel doors to be considered and matched in colour; doors should be equally spaced.

- To match and blend visually to surrounding cladding.

DC_ARC 3.05

Glazing of continuous curtain walling design incorporating panels of clear or back-painted glass.

- To blend in with facades

DC_ARC 3.06

Use of large areas of single coloured cladding.

- To provide a more visually recessive year round backdrop for the planting.

DC_ARC 3.07

Use of a light colour for the ERF stack. The final colour is to be confirmed through a colour study undertaken at the detailed design stage.

- To blend the stack with the sky.

DC_ARC 3.08

Use of a light colour for the upper parts of the buildings and a contrasting darker colour for the plinths. The final colour is to be confirmed through a colour study undertaken at the detailed design stage.

- To allow the buildings to be read on two distinct levels with lower levels of the buildings treated as an operational plinth upon which a contrasting upper architectural building form would be located.
- To blend the upper areas of wall cladding with the sky and the lower areas, including the plinths, with the surrounding landscape.

5.6.5. Lighting

DC_ARC 4.01

Glazing on upper levels, to be restricted to elevations not subject to long distance views.

- To minimise the visual impact caused by "interrupting" the elevation and undermining the blending from building and sky.

DC_ARC 4.02

Minimise windows on western and eastern elevations, where internal lighting may spill out of openings.

DC_ARC 4.03

Minimise door openings on eastern and western elevations where internal lighting may spill out of openings.

- To reduce potential visual impact; and
- To specifically control light emissions on elevations facing towards Amcotts and Flixborough.

5.6.6. Security

DC_ARC 5.01

The perimeter fence required around the EFW with controlled access points will be subject to specific security requirements. The fence and access points should be considered in the landscape proposals put forward.

DC_ARC 5.02

Visually impermeable barrier, at least 3m high, to be installed along the western and eastern edge of development platform for the ERF.

- To ensure security requirements are met; and
- To minimise visual impact of the fence line.
- To provide screening of ground level storage and activity such as loading bays and vehicle movements.

5.6.7. Materials

DC_ARC 6.01

The materials used to construct the buildings will be high quality, robust and low maintenance.

- To ensure that the visual quality of the development is retained over time.

DC_ARC 6.02

The materials will be carefully selected to support the overall architectural design approach and offer contrast in texture, finish, and colour.

- To best mitigate the visual impact of the development but also to add visual interest.

DC_ARC 6.03

The use of highly reflective materials will be avoided.

- To minimise visual impact; and
- To minimise glare.

DC_ARC 6.04

Where appropriate proposed material will be consistently applied across the Energy Park.

- To maintain the appearance of a 'family of buildings' throughout the Energy Park.

DC_ARC 6.05

The wall cladding systems will employ robust, easily maintainable, and replaceable materials appropriate for the industrial environment.

- To ensure that the cladding will maintain its visual appearance over time
- To establish a 'family of buildings' throughout the Energy Park; and
- To ensure that cladding is appropriately robust and if damaged can be easily replaced.

DC_ARC 6.06

The wall cladding systems for the 'plinths' and Northern and Southern facades of the main buildings (exc. visitor centre) will be in flat composite insulated cladding system incorporating recessed vertical joints flashings.

- To maintain the clean lines and balanced appearance of the overall design; and
- To support the design principle of a 'family of buildings' throughout the Energy Park.

DC_ARC 6.07

The wall cladding systems for the 'hoods' of the buildings (exc. visitor centre) will be a standing seam built up system.

- To maintain the clean lines and balanced appearance of the overall design by having a secret fix system
- To allow for a finish that will best achieve the visual blend with the sky
- To offer a contrasting visual texture to the plinth level 'flat' cladding; and
- To support the design principle of a 'family of buildings' throughout the Energy Park.

DC_ARC 6.08

The roof cladding systems will be metal built-up cladding and be robust and easily maintainable and should be appropriate to support the installation of rooftop Photovoltaics (exc. visitor centre).

- To ensure that the cladding will be low maintenance and robust.