HERBATA DATA CENTRE, NAAS

EIAR
VOLUME I MAIN TEXT – CHAPTER 2 ALTERNATIVES

NI2615
01
June 2024

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2 ALTERNATIVES

2.1 Introduction

This chapter of the EIAR identifies and outlines the alternatives considered for the Project. EIA legislation as set out in Chapter 1 indicates that the EIAR must provide a description of the reasonable alternatives studied by the applicant, which are relevant to the project and its specific characteristics. Article 5(1)(d) of the Amended EIA Directive provides that the EIAR shall contain "a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment."

Annex IV to the Amended EIA Directive, provides that the EIAR shall include "a description of the reasonable alternatives (for example in terms of project 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."

This chapter of the EIAR outlines the rationale for selection of the site and key considerations for the design and layout of the main elements of the Project with comparison of environmental effects between alternatives where applicable.

2.2 The Do-Nothing Scenario

The Project site currently comprises of predominantly lands is agricultural grass with smaller elements of residential and agricultural buildings; in a do-nothing scenario the Project site would remain in its current use.

The Project site comprises a range of vegetation that offers biodiversity potential for habitats for species such as bats, birds and bees, and in a do-nothing scenario these habitats will likely endure however in line with the findings of the EIAR (Vol I, Chapter 6 Biodiversity), the Project site currently demonstrates a relatively low level of species or habitat diversity.

The Naas Local Area Plan (LAP) 2021 – 2027 explicitly identifies the Project site for Data Centre; the do-nothing scenario in this case would not fulfil the intended development of the site in accordance with local planning policy.

2.3 Project Location

2.3.1 National and Regional Site Selection

The *Twin Transitions* of Digitalisation and Decarbonisation are considered *mega-trends* which will almost certainly shape economies and societies on a global scale. In the National context, the Irish Government states *the twin transitions are largely complementary – digital solutions can unlock decarbonisation opportunities, for example through smart energy devices and networks. Digitalisation also presents opportunities for reducing carbon emissions, increased remote working, reduced business travel and digitalisation of supply chains* (Statement on The Role of Data Centres in Irelands Enterprise Strategy, July 2022). In parallel, the Irish Governments *Harnessing Digital - The Digital Ireland Framework* (2022) sets out the national digitisation strategy to position Ireland as a digital leader, at the heart of European and global digital developments.

The need for the development of Data Centres in Ireland, versus alternative national locations, is established, with national policy reflective of the same.

Ireland further represents a preferred location, in comparison to alternative national locations, due to the suitability of the climate which facilitates the use of outside air for cooling, reducing the need for additional technology to assist in temperature control which would require in turn, an increase in energy demands. Data Centres in Ireland represent a lower energy demand development in comparison to nations with a warmer climate. Reductions in potential impacts arising from noise and air quality emissions (arising from the need to employ additional temperature controls) are also realised in an Ireland development context.

In a regional context, it is acknowledged that many large, United States based clients are already headquartered in Dublin for their European operations. Consequently, there is a need to reduce the concentration of Data Centres in clustered areas of the greater Dublin region and distribute them more widely. The readiness of an available, suitable site and the availability of the necessary infrastructure connections, determines that the consideration of the Naas area as an alternative to Dublin, is acceptable.

2.3.2 Local Site Selection

In the selection of an appropriate site for the development of a Data Centre, the Applicant give due consideration to compliance with local plan policy, in considering options. The Project site is one of two sites zoned for development of a Data Centre within the *Naas LAP 2021 – 2027*. In respect of these sites, the LAP states *a specific zoning for the development of Data Centres has been applied to two sites which are considered suitable for land extensive development*; these zonings are Caragh Road South (Zoning P(2)) and Jigginstown (Zoning P(1)). This section provides a summary of the LAP zonings which have influenced the selection of the Project site (Zoning P(1)).

Sites not zoned for development of Data Centres within the LAP, were not considered or assessed by the Applicant as they would be perceived as less favourable in terms of plan policy.

2.3.2.1 Commercial Availability

Notably, the delivery of the Project is dependent upon the availability of the subject lands to the Applicant. Agreement has been reached with the owner(s) of the subject lands, with letters of consent provided in support of the planning applications for the same. The lands associated with Zoning P(2) were not available to the Applicant.

2.3.2.2 Naas LAP 2021 – 2027 Zoning

The LAP states the relative land use zoning objective as *to provide for Data Centre development and their associated infrastructure only*.

In respect of the Economic, Retail and Social Infrastructure Capacity (Section 3.7), the LAP states:

The Plan seeks to designate a sufficient amount of land for both enterprise and employment functions, commercial development and for industry and warehousing uses commensurate with Naas's role as a Key Town. The Plan continues to support the town centre as the commercial core. It is envisaged that the larger campus style sites and high-end office complexes will be located in the Northwest Quadrant. Industry and Warehousing are proposed to the southwest and northeast of the town. Sites have been identified for commercial/residential development on land located in the northeast of Naas off the Dublin Road and on the corner of the Newbridge Road / South Ring Road. Lands have been zoned for a mix of general commercial/ industrial/ enterprise uses at the Maudlins Interchange.

The related policy and objectives in respect of the zoning, as stated in the LAP are as follows:

Policy ED 1 Enterprise and Economic Development

It is the policy of the Council to support the development of Naas as the enterprise and employment hub for County Kildare and the region, increase employment located within the town, reduce commuting and ensure new employment development contributes towards reducing carbon output.

Objectives

It is an objective of the Council to:

EDO 1.1 It is the policy of the Council to support the development of Naas as the enterprise and employment hub for County Kildare and the region, increase employment located within the town, reduce commuting and ensure new employment development contributes towards reducing carbon output.

EDO 1.2 Promote enterprise and employment development in the Northwest Quadrant, focusing on high-tech manufacturing, research and development, ICT, food science and production, large scale offices, public administration, banking, tourism and bloodstock, within a high quality campus/park type development.

EDO 1.12 (a) Facilitate the location of Data Centre development on land designated P: Data Centre at… Jigginstown for the identified land use only subject to appropriate environmental assessments, heat mapping, transport impact assessments and consideration of the cumulative impact on the electricity network supply

capacity and targeted reductions in greenhouse gas emissions. (b) Any Data Centre project will be required to include measures to generate energy (sustainable, then renewable in the first instance) on site as part of the overall development proposal.

The LAP expands on the rationale for the zonings, noting that Data Centres are *central to the digital economy and generate added economic benefit across the value chain.*

The LAP further states that *Data Centres by their nature… are land extensive and energy hungry developments and can have differing locational requirements depending on the type of data accessibility speeds they cater for. All Data Centres have common infrastructure requirements such as access to high voltage electricity lines, high powered fibre optic cables, good site security and accessibility. This Plan promotes Naas as a sustainable international destination for ICT infrastructures such as Data Centres.*

In respect of these Zonings, the LAP makes the following observations about the suitability of the sites and justification for the zoning:

Land has been designated between Junction 10 and Junction 9a, located centrally between two of the motorway junctions.

The sites identified in this LAP have the ability to cater for space extensive enterprises contiguous to the existing urban form, proximate to electricity and telecommunication infrastructure.

These lands are identified exclusively for Data Centres, to ensure the location of these types of proposals are controlled proximate to serviced areas of the county.

With regards to Zoning P(1), the LAP makes the following observations about the suitability of the site and justification for the zoning:

The site will be served by the local road network which would disperse traffic between motorway interchanges to reduce any impacts on the motorway network.

Notably, the LAP states that *The Council will not consider any alternative use on these lands, other than those associated with Data Centres.* The only use therefore, considered by the Naas LAP to be 'Permitted in Principle' in lands zoned 'P', is Data Centres; in this regard, both sites are considered equal in terms of plan policy.

Figures 2.1 and 2.2 are extracts of the LAP zonings for both sites, Zonings P(1) and P(2) respectively.

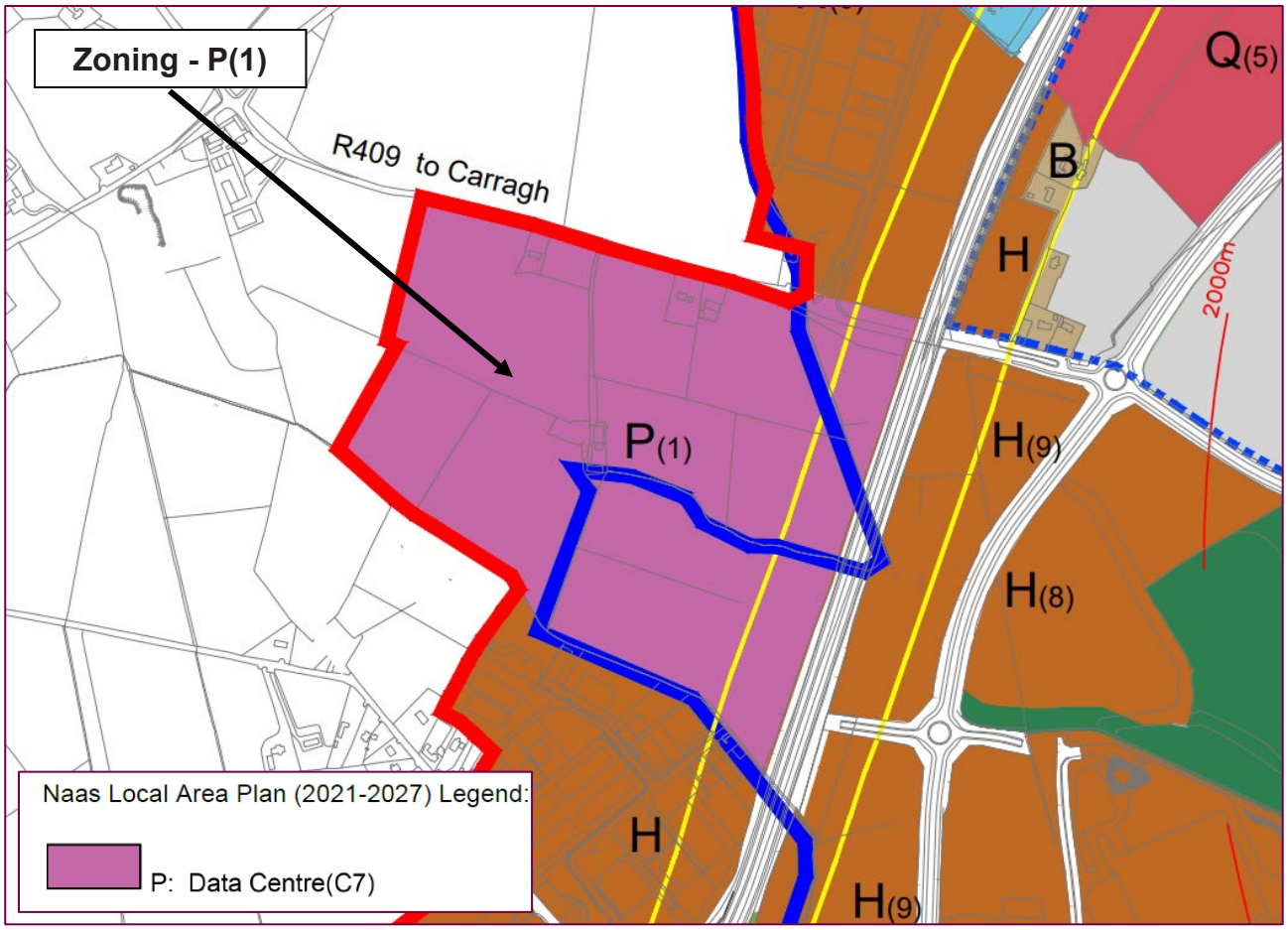

Figure 2.1: Naas LAP 2021 – 2027 (Extract) Indicating Data Centre Zoning, P(1) Jigginstown

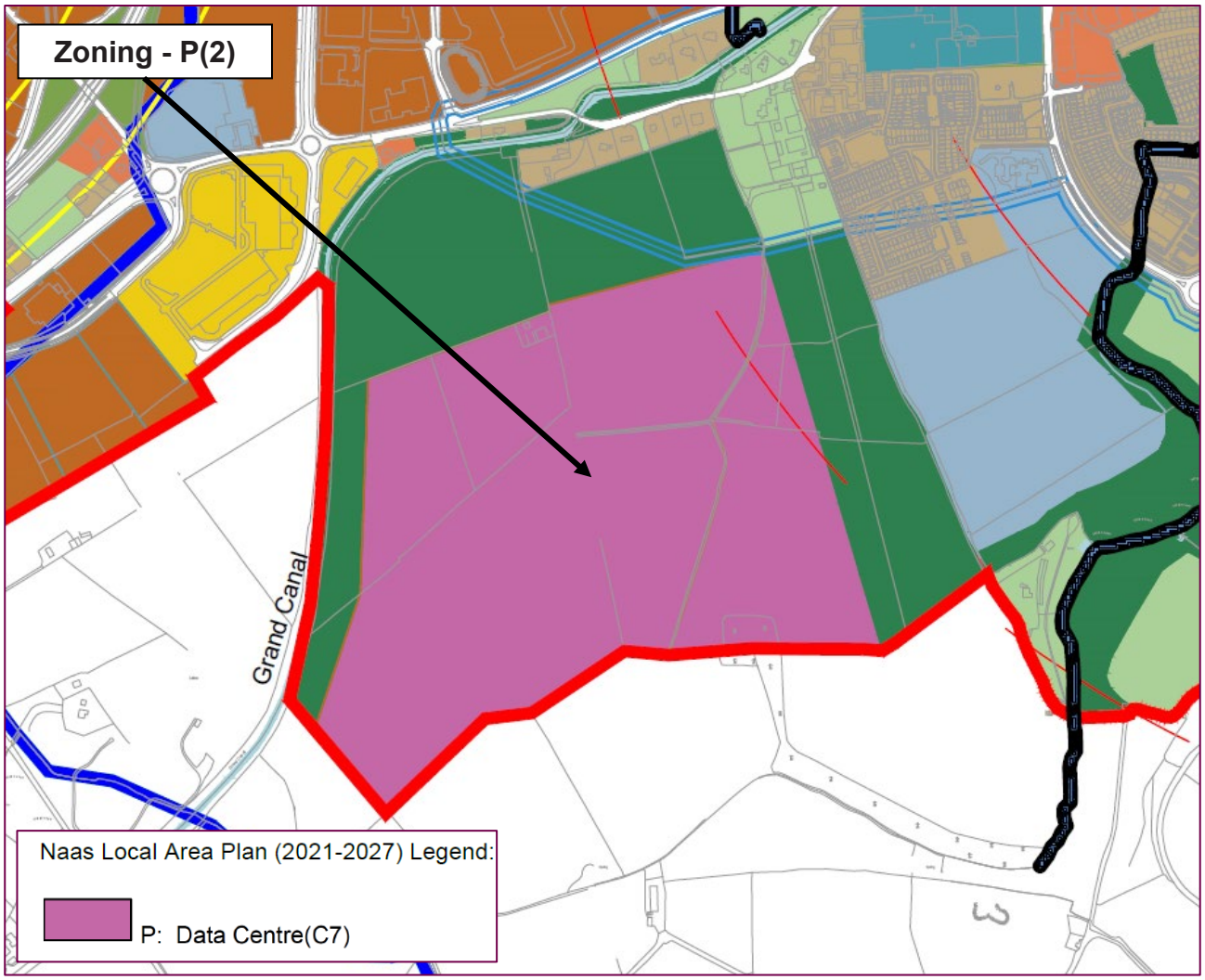

Figure 2.2: Naas LAP 2021 – 2027 (Extract) Indicating Data Centre Zoning, P(2) Caragh Road South

The selection of the Project site and development of a Data Centre is considered entirely in line with the LAP and the realisation of LAP zoning and associated policies.

The selection by the Applicant of Zoning P(1) at Jigginstown, in favour of Zoning P(2) is not considered a deviation from the LAP as both sites, are equally justified in terms of plan policy.

2.3.2.3 Adjacent Land Use Zonings

Zone P(1) is adjoined by lands zoned within the LAP as Industry & Warehousing, to the north and south, relative to the existing M7 and Osberstown business parks. The adjacent LAP zonings are considered compatible with the land use proposed by the Project.

2.3.2.4 Site Access

Transport connectivity is a key consideration in site selection for any development. The LAP notes that both Zonings P(1) and P(2) benefit from close proximity to the motorway network.

Zoning P(1) is located south of the R409, on the western side of the M7 motorway, positioned between Junctions 9a and 10, approximately 2.5km west of Naas. Zoning P(1) benefits from an extensive frontage to the R409, providing direct access (vehicular and pedestrian) to the Project during the operational phase with a secondary emergency access also available via the M7 Business Park to the south.

Utilising the proximity to the R409, the Project seeks to enhance connectivity via provision of a new footpath, cycleway and bus layby to the southern side of the R409. This access will be extended across the R409 bridge over the M7 motorway and link up to the existing footway to the eastern side of the bridge.

Proximity to the R409 also facilitates the provision of a separate, temporary construction access entrance, approximately 120m west of the Osbertown industrial park entrance (to the north of the R409). This entrance will be used for the construction of Phases 1 and 2 of the Project.

2.3.2.5 110kV Grid Connection

Zoning P(1) is located in close proximity to the existing 110kV network. The location of the 110 kV overhead line, traversing the north west corner of the Project site, assists in the ability of the Project to connect with the grid, via the proposed circuit diversion, undergrounding and substation.

Consequently, the extent of the necessary grid connection infrastructure works and potential associated impacts are considered to be limited.

2.3.3 Further Site Connectivity

Proximity to other existing infrastructure which assists in facilitating the Project whilst also contributing to its functionality in terms of connectivity, is also a key consideration in selection of the Project site.

2.3.3.1 Fibre Communications Connectivity

In the national context, Ireland is well served by global fibre connectivity with multiple direct routes to the UK and North America. There are existing multiple submarine Optical Fibre Networks, that provide complete *end to end* services including direct connections from Ireland to North America and multiple indirect routes (via UK landing points) from Ireland to mainland Europe and North America.

In terms of the localised context of the Project site, extensive fibre ducting is present along both the Caragh Road and the Millennium Park Road; in total there are 15 different fibre providers servicing the adjacent Millennium Park industrial estate.

The Project site is comprehensively served from a fibre and telecoms perspective, providing the opportunity for a straightforward and secure fibre and telecoms connection, whilst also limiting the works and associated impacts of the same.

2.3.3.2 Other Services Connections

In addition to the above, the availability of other existing services is a key consideration for the development of the Project site, both in order to provide the necessary services to the Project whilst also limiting the requirement for extensive infrastructure connections, beyond the site boundary. The Project site benefits from the following:

2.3.3.2.1 Mains Water

An existing mains water supply is present along the R409 with appropriate flow and pressure to facilitate a connection and provision of service to the Project.

2.3.3.2.2 Foul Drainage

Whilst there is no existing public foul drainage system serving the Project site, the public foul drainage network is located approximately 275m to the south of the site and runs along the L2030, Newhall Road.

Connection is proposed to the network via a rising main which extends south from the site across agricultural land, to Newhall Road.

2.4 Alternative Site Layouts and Structure Design

Whilst responding to the physical characteristics, environmental considerations and desire to realise the capacity of the Project site, the design of the Project has been subject of an iterative process.

The scale, mass and layout of the Project has been informed by a Site Strategy Masterplan developed with design and technical input from architectural, civil, electrical, and mechanical consultants, taking account of

the necessary technical and physical requirements to deliver a functional Data Centre facility which will seek to attract and serve the widest range of end user tenants (including *hyperscale* clients).

The masterplan design seeks to develop a high-quality Data Centre campus with site strategies to allow the development to integrate sympathetically into its surroundings and create a positive and carefully designed site layout. There is a high priority to retain the existing biodiversity throughout the site and to minimise visual impacts where possible on the site boundaries through planting. (Data Centre Application - Architectural Design Statement, Volume II, Appendix 4.1)

From the outset, the project planning and environmental consultants have worked closely with the design team to ensure the Project is compliant with necessary planning policy whilst minimising environmental impacts.

A comprehensive review of available desktop data along with information derived from project and site-specific technical surveys, has informed every aspect of the design of the Project

Engagement with statutory bodies including Kildare County Council planning authority, has also further influenced many aspects of the Project.

Key site specific considerations, which influenced the design layout from the outset of the process included:

- Bluebell Stream / southern boundary of the site;
- Retention of existing vegetation, particularly at the site boundaries;
- Setback from the M7 motorway to the eastern boundary;
- Exclusion zones associated with existing 220kV powerline.

The above matters shaped the initial Concept Sketch as illustrated in Figure 2.3 below; an extract from the Data Centre Application - Architectural Design Statement (Volume II, Appendix 4.1), the sketch illustrated site constraints which informed the initial design process.

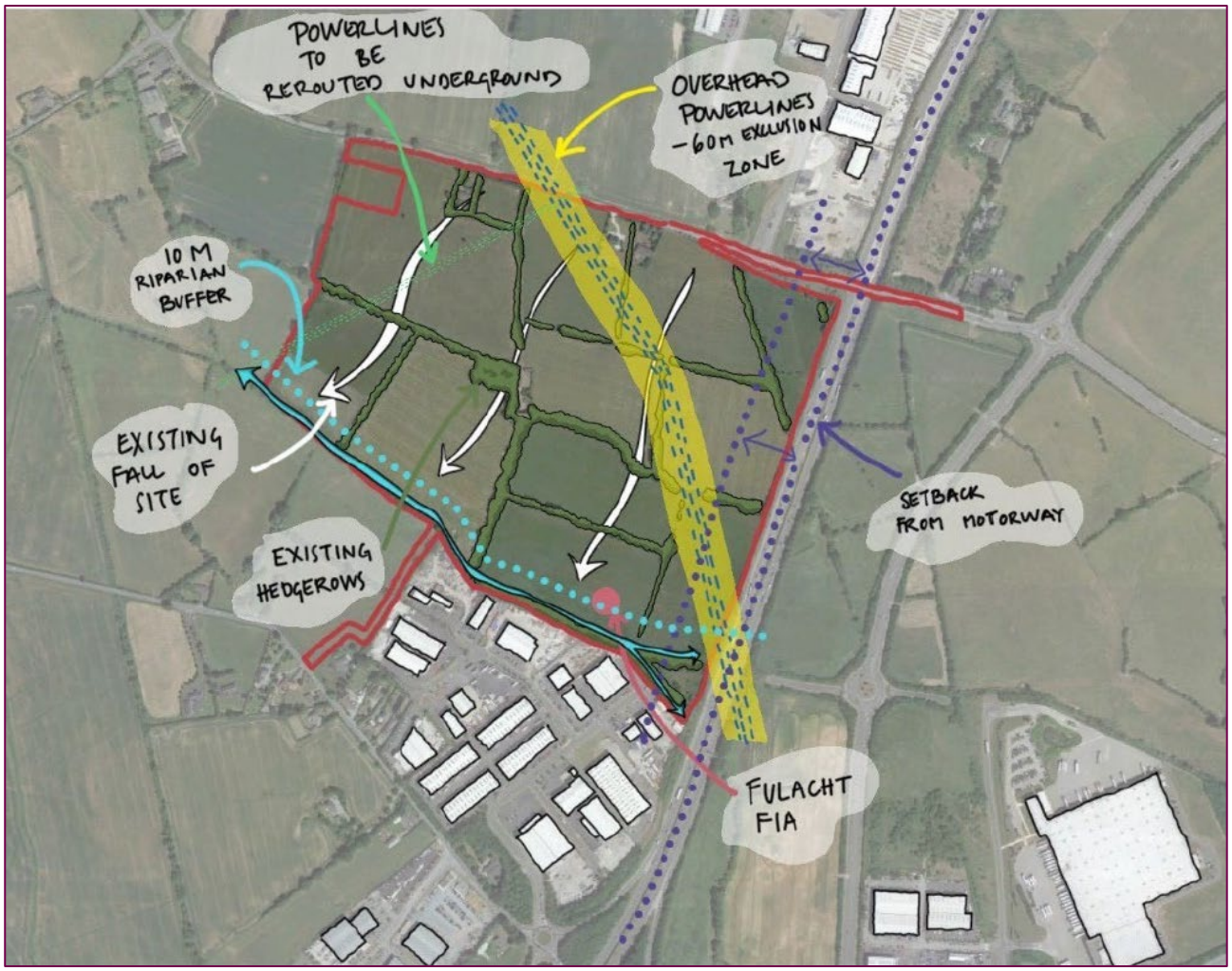

Figure 2.3: Concept Sketch (Data Centre Application - Architectural Design Statement, Volume II, Appendix 4.1)

In consideration of the above site constraints, a Preliminary Design was developed. As illustrated in Figure 2.4 below, the preliminary site layout was developed to incorporate 6 Data Centre buildings, GIS substation, exclusion zones, internal road network and 3 large attenuation ponds.

Due diligence and consideration of planning, environmental and technical matters undertaken at the outset of the design process, resulted in a Preliminary Design which is broadly reflective of the final, proposed Project Design.

Figure 2.4: Preliminary Site - Layout Drawing

The Preliminary Design site layout was further developed to illustrate additional design detail including preliminary landscape planting and boundary vegetation retention, as illustrated in Figure 2.5 below.

Figure 2.5: Detailed Preliminary Site Layout Drawing

As the design process progressed, it was informed by further site, environmental and technical information including geotechnical site investigations, cut and fill analysis, services infrastructure surveys, landscape, ecology and arboriculture studies.

The next iteration of the design process represented a notable shift in the location and orientation of the Data Centre buildings, Data Centre 1 – 3 facing to the fore of the site (in terms of the main access from the R409) and re-distribution of attenuation ponds across the wider site and an increase in areas of land available for landscaping; this revision is more aligned with the final proposed Project Design.

The revised site layout in Figure 2.6, represents a realisation of the following:

- Minimise cut and fill within the site boundary (to ensure excess material is not required to be removed from site);
- Reuse of cut and fill material to develop berms (to enhance screening) along R409 and M7 boundaries;
- Maximising retention of existing hedgerows and trees including some of those which extend into the site from perimeter boundaries;

- A setback of the building line from the M7 (of approximately 51m) as agreed with KCC Roads Planning Section;
- A riparian buffer along the southern boundary (the Bluebell Stream).

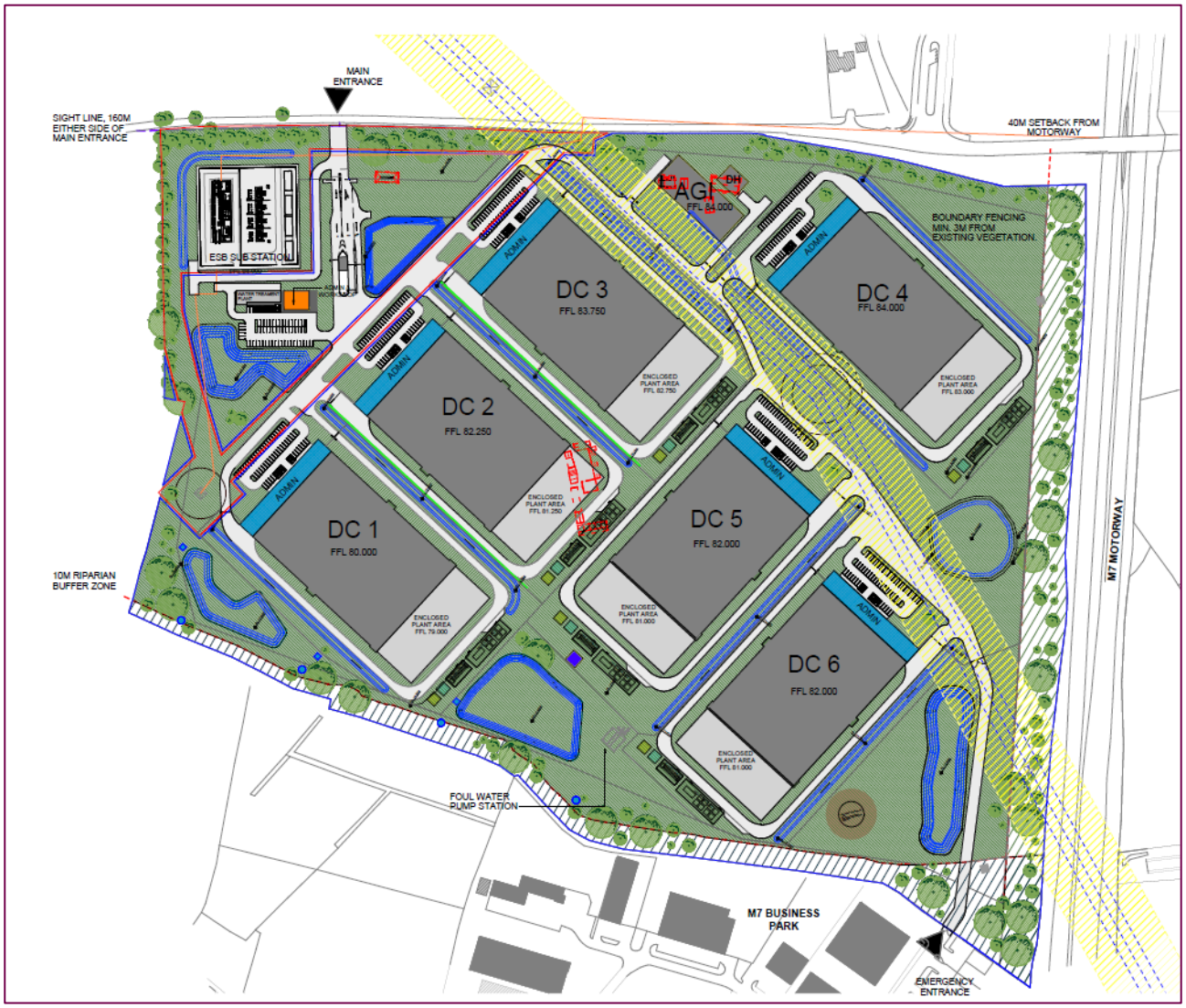

Figure 2.6: Revised Site Layout Drawing

Expansion on further influencing, environmental and technical factors which defined the proposed Project layout design and by default, the consideration of alternatives, are set out in Section 2.4.1 – 2.4.10 below.

2.4.1 Field Boundaries, Hedgerows and Treelines

The Project site is currently defined by treelines and hedgerows, dividing the internal site into multiple fields; additionally, the external boundary of the site is largely made up of mature and semi-mature treelines and hedgerows.

Maximising the retention of this vegetation, particularly to the boundary of the site has been a key driver for the overall site layout. Whilst development of the site requires removal of vegetation to the centre of the site, retention of treelines and hedgerows to the external boundaries has been maximised, achieved by ensuring the proposed Project is scaled and orientated in such a manner to minimise the loss of existing vegetation.

Implementation at an early stage of the design process of landscape planting and management strategy, a 10m riparian buffer zone (to the southern boundary of the site, along the Bluebell Stream watercourse) and setback from the M7 motorway to the east in line with KCC planning requirements, informed the layout and orientation of the Data Centre buildings, the internal road network, location of attenuation ponds and site

entrance points have all been chosen in order to retain as much of the existing treelines and hedgerows as possible.

2.4.2 Landscape Strategy

A Landscape Masterplan (Figure 2.7 below (also see Volume III, Drawing BSM-ZZ-ZZ-DR-L-0301)) has been prepared as part of the wider site design process with alternative layouts progressed and refined throughout.

The iterative approach has resulted in a Landscape Masterplan for the proposed Project design which incorporates the following key principles:

- Retention, protection and enhancement of the boundary hedgerows and tree lines
- Development of new areas of open space, for amenity use as well as for biodiversity
- Increase and enhance biodiversity
- Creation of quality landscaped network and boundary settings for the development
- Provision of exercise opportunities for staff wellbeing at the site
- Good quality, low maintenance hard and soft landscape measures throughout the site
- Integrated sustainable water management.
- Green roof proposals.

Figure 2.7: Landscape Masterplan

The landscape proposals have been largely defined in response to the existing site characteristics. In consideration choices of species, whilst alternatives may be available, the overall Masterplan seeks to implement native species planting, giving consideration to those species retained on site, vegetation lost (i.e. replacement planting) and good practice in the delivery of habitat enhancement measures. Whilst a range of species are proposed, native species of tree, hedges and grasses are key elements of the landscape proposals.

In development of the landscape strategy, engagement with KCC Parks Department was undertaken to explore initial design proposals, visual mitigation strategy and landscape proposals. The use of vertical green walls was considered as a potential opportunity for screening of the Project however ultimately excluded from the strategy due to the availability of space, ventilation, fire access, exposure and potential high failure rates, and high consumption of water due to irrigation.

An alternative implementation of the use of *green walls* as part of the wider site surface water management across the site is proposed as part of the landscape strategy, with an integrated green wall system proposed for all vertical elements. This system will be utilised to soften or replace all retaining wall elements and headwalls and offers a more sustainable solution to providing vertical vegetation and screening of heavy elements, alongside a robust, resilient and deliverable perimeter boundary treatment of structural screening woodland, scrub and hedgerows.

The Landscape Statement is provided in Volume II, Appendix 11.1.

2.4.3 Site Levels and Drainage

Consideration of alternative site layouts has been determined in part, by the existing and proposed levels of the Project site. The existing levels of the Project site differ by approximately 6m between the levels along the northern boundary (84 O.D) and levels along the southern boundary (78 O.D).

A detailed cut and fill analysis was undertaken in order to inform the proposed final levels; all buildings within the Project site are stepped from north to south to follow the existing site levels allowing for a minimum cut and fill within the site.

In consideration of alternative site layouts, the proposed Project arrangement and orientation of the buildings within the site, represents a solution which minimises the amount of cut and fill.

Reuse of cut and fill material within the site boundary represents the preferred alternative, to removal of material from the site.

The cut from the attenuation ponds and foundations is to be reused for the landscape berms which form part of the landscape strategy and provided screening of Data Centre buildings from the R409 and M7.

Figure 2.8 illustrates the proposed building levels which serve to achieve the preferred option in terms of cut and final balance.

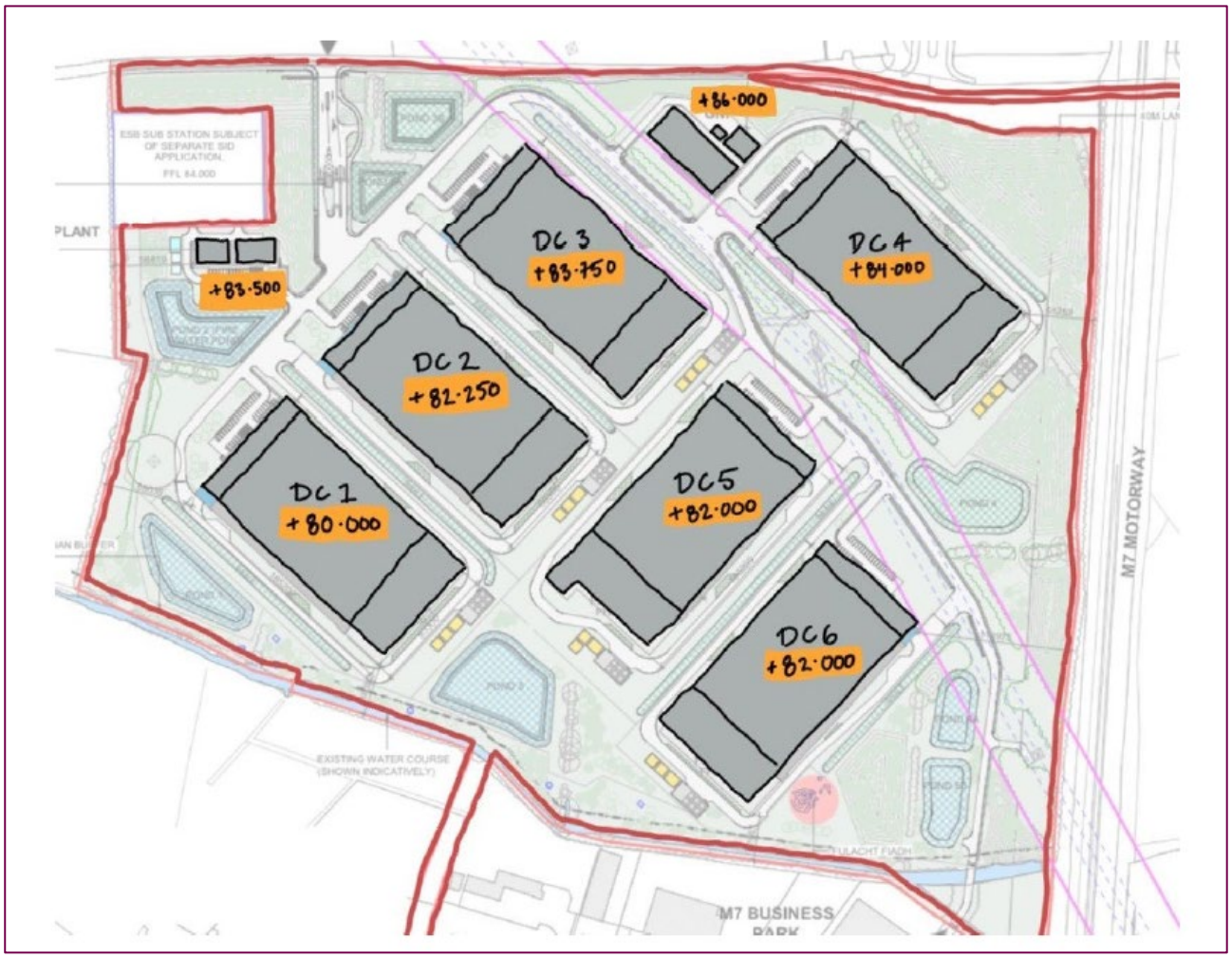

Figure 2.8: Sketch Site Plan with Proposed Levels (Data Centre Application - Architectural Design Statement, Volume II, Appendix 4.1)

The Cut and Fill Analysis Report is provided in Volume II, Appendix 4.3.

The design and location of the attenuation ponds for as set out in the proposed Project design represents an alternative arrangement from the Preliminary design which comprised larger, but fewer ponds.

The attenuation ponds represent one element of the nature-based Surface Water Drainage Strategy SUDS with other features including swales, wetland edges, bioretention, permeable paving, filter drains and rainwater harvesting. The proposed drainage strategy represents an effective drainage design which also maximises sustainability and promotes nature-based solutions for the management of surface water run-off.

2.4.4 Heritage

A recorded archaeological site is located within the boundary of the Project, to the south east corner of the Project site. The site is a *fulacht fia,* identified and recorded with the reference number KD019-028. No obvious visible remains are present on the surface but the location of the feature was a consideration of early design layouts, including the Preliminary Design phase, on the basis of the location data recorded on the National Monuments Record. A 20m exclusion was overlaid on the site with building footprints and internal road network designed to avoid direct impact upon the site from the outset of the site layout design process.

Further iterations of design were developed upon completion of heritage led, geophysical survey work (as detailed within Volume I, Chapter 10 Cultural Heritage), which identified the extent of potential, subsurface archaeological materials. In particular, the proposed location of Data Centre 6, associated access road, earthworks and drainage infrastructure were further refined to accommodate separation from the archaeological site.

Figure 2.9 below illustrates the avoidance of the potential, subsurface features as identified during the geophysical survey, with Data Centre 6 and associated road, set back from the same, as represented in the proposed Project design.

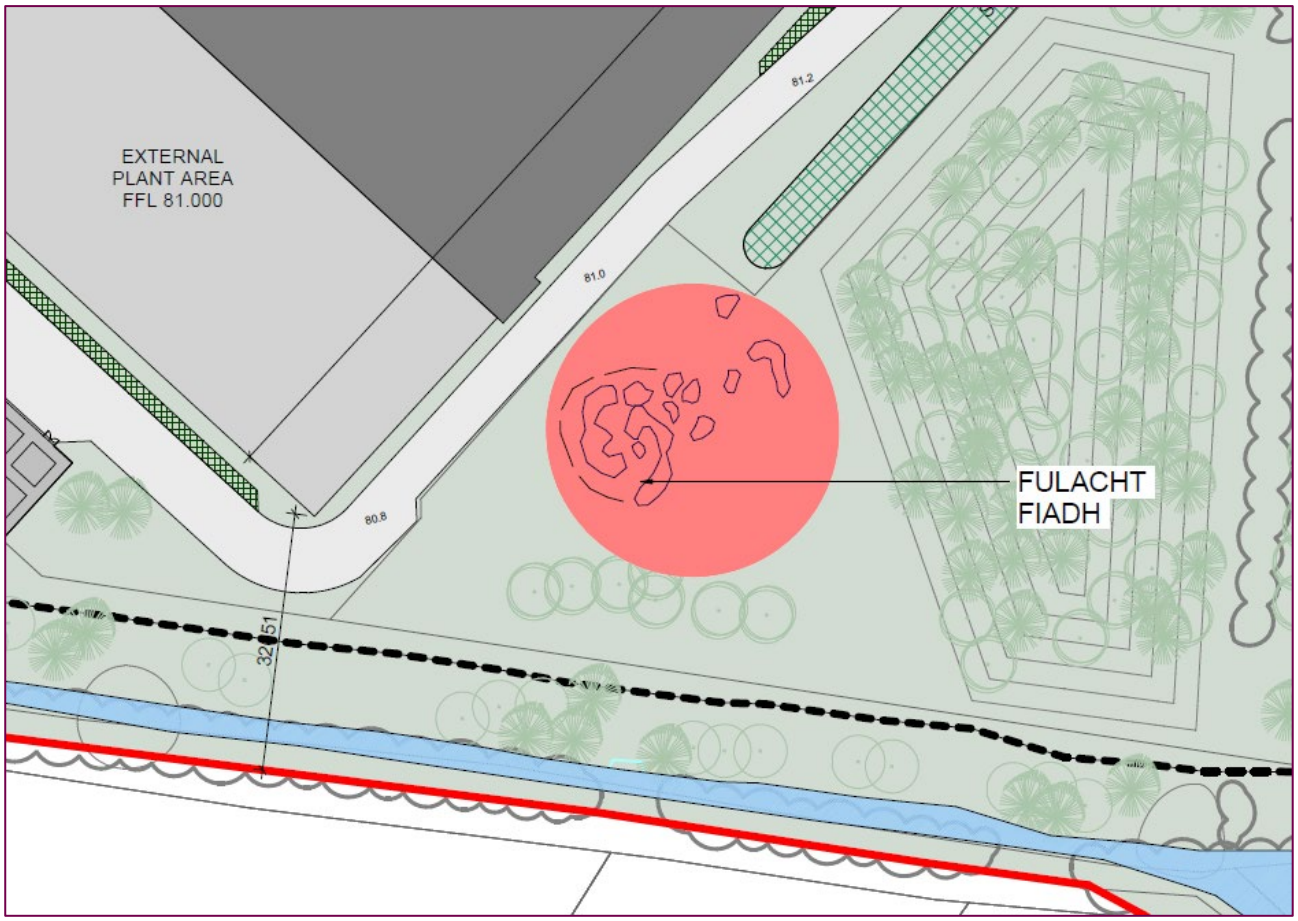

Figure 2.9: Setback of Data Centre 6 and Roadway from Potential Subsurface Features

2.4.4.1 Site Layout Options – Comparison of Effects

As noted above, the proposed Project layout is reflective of the iterative design process which was, from the outset, considerate of planning, environmental and technical matters. As a result, the Preliminary design phase is considered to be broadly reflective of the final, proposed Project Design. Table 2.1 below however provides a summary of the environmental effects, of those disciplines where a differentiation is apparent, comparing the preliminary design to the proposed Project layout.

Table 2.1: Preliminary Design and Proposed Project Design – Comparison of Effects

Environmental Discipline Considered	Comparison of Environmental Effects - Summary
Landscape Resources	*The Preliminary Design is considered to have a greater impact upon existing vegetation on site, including hedgerows and trees which form field boundaries within the site. The Proposed Project Design facilitates retention of greater extent of existing vegetation due to the orientation and layout of the site.*
Biodiversity	*The Preliminary Design is considered to have a greater impact upon biodiversity through loss of existing vegetation on site, including hedgerows and trees. The Proposed Project Design facilitates greater biodiversity resource of the site due to the greater retention of existing vegetation due to the orientation and layout of the site.*
Soils / Cut and Fill Balance	*The Proposed Project Design is considered to have a lesser impact as it achieves a cut and fill balance which does not require removal of spoil material from site.*
Cultural Heritage	*The Preliminary Design is considered to have a greater impact upon cultural heritage features, namely the known fulacht fia site. The Proposed Project Design is considered to have a lesser impact as the design of Data Centre 6 and associated works avoids potential, subsurface features as identified by the geophysical survey*

2.4.5 Data Centre Buildings

2.4.5.1 Scale and Mass

A total of 6 Data Centre buildings are proposed as part of the Project. In broad terms, a duplicate design has been employed across the 6 buildings, with each comprising of a 2-storey admin block, data hall and external plant yard.

The number and scale of the proposed Data Centre buildings is principally dictated by the demands of end user tenants, to include sufficient capacity, servicing and the facility requirements, needed to deliver a functional Data Centre, suitable for hyperscale clients.

The space requirements of the data halls (and associated equipment), the plant yards comprising of gas turbines and associated stacks and air circulation space, along with the various ancillary spaces which form the administration blocks, have all informed the final dimensions of the proposed Data Centre buildings which have remained principally the same throughout the design process. As such, there is limited scope to consider alternatives for the Data Centre buildings in terms of their scale and mass.

2.4.5.2 External Design

An iterative design process has been applied to the external elements of the Data Centre buildings. Careful consideration however was given to the choice of material, finishes and architectural details at the outset and the proposed building designs have remained largely consistent throughout the design process.

Whilst conforming to a broadly duplicate design, careful consideration has been given to the façade design of each Data Centre, with the heights and materials of the sperate components of each building, being chosen to help break up the massing.

Alternatives have been considered with regards to materials and colours used throughout the exterior of the Data Centre buildings in order to create an attractive façade approach. The mass of the large volume of the Data Centre building long elevations has been broken up by variations in the façade profile and the range of materials used.

Careful consideration has been given to the design of the admin block to create a visually appealing entrance to each building and use of colour to help with wayfinding throughout the site. A wide range of materials, finishes has been proposed to integrate the Data Centre buildings to site as much as possible, balancing access and wayfinding factors, taking cues from the surrounding landscape colour palettes.

Overall, the Data Centre buildings have been designed in such a manner as to assist in integrating the buildings to the site, in the context of the earthworks, landscape planting, existing retained vegetation and other built elements of the Project. The Data Centre Application - Architectural Design Statement, Volume II Appendix 4.1, provides further detail on the architectural design of the Project.

2.4.6 Energy Strategy

Whilst many Data Centre developments are typically powered via a *traditional* grid connection (obtaining [near to] 100% of energy demand directly from the grid), this Project seeks to utilise an alternative approach, incorporating an innovative, low carbon and renewable energy strategy in its operation.

Data Centres have become essential components of almost every element of everyday life. The Irish Government *Statement on The Role of Data Centres in Irelands Enterprise Strategy* (July, 2022) recognises that '*data centres are core digital infrastructure and play an indispensable role in our economy and society.'*

Whilst *demand* and *need* are clearly apparent, it is acknowledged that concerns existing around the resource demand associated with the functioning of Data Centres with the security of demand and impact upon Ireland's electrical grid, being an increasingly emotive issue.

Since 2018, annual increases in electricity demand usage associated with Data Centres have been around 600 GWh per year; this equates to an additional 140,000 households being added per year. The Irish Government Statement on The Role of Data Centres in Irelands Enterprise Strategy (July, 2022) notes that *EirGrid predicts that if all contracted capacity were connected, data centres would make up between 25% and 33% of Ireland's electricity demand by 2030.* This rate of increase in demand, coupled with new Data Centre projects (not currently contracted) and geographically dictated demand, has implications for the regional and national energy grid systems.

In 2020, 42% of all electricity generated in Ireland came from renewable sources with the remaining 58% generated from non renewable sources including a range of fossil fuels including coal and oil. Whilst the most recent approved Climate Action Plan 2024 sets a course for Ireland's targets to halve emissions by 2030 and reach net zero no later than 2050, at present a significant proportion of energy is still derived from fossil fuels.

In consideration of the trend for demand and the current makeup of the energy grid, it is apparent that the traditional model, of a *grid reliant* Data Centre development is not representative of a sustainable approach.

The Project seeks to provide an environmentally conscious facility by reducing embodied carbon and maximising the utilisation of renewable, power-grid free energy sources whilst also using the latest technologies in on-site power generation and power storage.

Accordingly, by way of considering an alternative approach, the energy strategy proposed for the Project, represents a low carbon, renewable strategy which meets the KCC policy of a minimum of 30% of the operational energy from renewable sources with the remaining 70% of energy for the Data Centres, to be generated on site using adjacent gas turbines, also linked directly to local battery storage of BESSs.

The proposed strategy was a fundamental element of the Project from the outset and has remained principally the same, throughout the design process.

2.4.6.1 Power Generation

The primary source of power generation will be derived on site using highly efficient gas turbines for most of the generation, with top up from gas engines. This strategy is in line with recent EU and Irish Government direction on the use of gas for generation as a transitional fuel. It also avoids any negative impact from the Project on the public electricity distribution system and allows for any excess power to be exported to the grid to aid Eirgrid in their supply of electricity. The onsite power generation capacity will be in excess of that required for the operation of the Data Centre and will provide an opportunity for the export of energy to the grid if and when required.

2.4.6.2 Gas Supply

2.4.6.2.1 Network Attributes

Gas supply from Gas Networks Ireland (GNI) will provide the primary energy supply to gas turbines in each Data Centre. Currently GNI supply gas mainly imported from the UK derived from the UK's or Norway's North Sea gas fields. GNI have clearly stated that they intend to decarbonize the gas network over the next 20 – 30 years. The GNI Vision 2050 states that the decarbonisation will be achieved by 2050 by replacing natural gas with renewable gases, such as biomethane and green hydrogen, with a goal of ultimately reducing to zero dependency on fossil fuel gasses by 2050.

The proposed strategy of adopting the supply of gas from GNI will over the next 20-30 years significantly reduce the carbon footprint of the power generated on site.

2.4.6.2.2 GNI Network Connection

Whilst the Project includes an on-site Above Ground Installation (AGI) to regulate the supply to the turbines, a physical connection to the GNI network is required to provide the supply to the gas turbines.

GNI will be responsible for providing the required infrastructure works, to construct a new high-pressure gas distribution pipeline, to the Project site boundary (on the R409), from the existing GNI AGI at Glebe West, Co. Kildare.

The final, detailed design, consenting and construction of the required infrastructure works will be the responsibility of GNI in the exercise of their own statutory functions, and therefore Herbata Ltd is not seeking planning consent to carry out these works as part of the Project. To support the decarbonisation of the gas network, a biomethane injection point is included as part of Gas Networks Ireland equipment which will be installed.

To inform consideration and assessment of the cumulative impacts of the Project with the GNI Gas Connection, a report identifying the most likely route for the new high-pressure gas distribution pipeline and a description of the works required to provide same has been prepared. The GNI Infrastructure Upgrade Outline Report is included in Volume II, Appendix 1.2.

The GNI Infrastructure Upgrade Outline Report has been prepared following a review of the existing GNI network, to determine the most likely source of the connection and the most likely route. The location of the existing GNI above ground installations (AGIs) at Glebe West and Naas Town and the associated existing high-pressure transmission line between, has been used to inform the most likely connection point and route for the new high-pressure gas distribution pipeline.

From the existing Naas Town AGI, the most likely route for the new high-pressure gas distribution pipeline is considered to follow a combination of the existing road network (along the Southern Link Road, Naas) and the route of existing utilities (foul drainage network wayleave). From this point, the most likely route is considered to cross the M7 (east of the Project site) before following the route of the R409 to the Project site. It is understood that similar crossings, below the M7 have previously been implemented in order to deliver comparable service infrastructure.

The likely specification of the new high-pressure gas distribution pipeline, pressure levels, construction methodology and timelines, as set out with the GNI Infrastructure Upgrade Outline Report have been informed by experience and knowledge of comparable infrastructure developments.

Alternatives to the most likely route for the new high-pressure gas distribution pipeline (as set out above and in the GNI Infrastructure Upgrade Outline Report) were considered, however were not deemed feasible/likely as GNI hold a wayleave agreement over the existing high-pressure pipeline route from Glebe West to Naas Town AGI. As such, the route of the existing pipeline, represents the most direct route from the nearest available AGI on a high pressure pipeline within 27km of the site.

2.4.6.3 Battery Energy Storage System

Turbines operate at Medium Voltage (MV) level and are coupled with Battery Energy Storage Systems (BESS) to provide low emission 365/24/7 support to critical loads. Each gas turbine and BESS act as one together, they are independent of each other but are linked to the incoming Eirgrid supply to allow export of spare power.

The turbines and engines will provide the primary energy supply to each building. The running of the turbines and engines will be continuous with the quantity of units operating at any one time dependent on the load demand in the data halls and the resilience required.

For the purposes of providing uninterrupted and conditioned power, each Data Centre building will have a dedicated BESS.

2.4.6.4 Renewable Energy Sources

To achieve a minimum 30% renewable energy target, CPPAs will be used from a variety of sources as the Data Centre load level increases over time. Herbata Ltd have been in advanced discussions with various solar and wind renewable energy suppliers with a view to provide capacity through CPPAs. Whilst commitment to these CPPAs will not be possible until planning permission has been granted, it is anticipated that provision of these CPPAs will be a condition of planning consent.

The proposed energy strategy and arrangement of the same, has at least in part, informed the design of the Project, particularly the Data Centre plant yards which accommodate the gas turbines, with the associated grid connection (via the 110kV substation SID application) and exclusion zone (associated with the existing 220kV overhead line) also being key considerations in the layout of the overall site.

2.4.6.5 Consideration of On-Site Alternative Renewable Technologies

The following Low and Zero Carbon (LZC) energy technologies were considered to determine feasibility for on-site use in the Project.

2.4.6.5.1 Solar Panels

Solar photovoltaic (PV) panels were deemed viable for the site on the following basis:

- Orientation of building roof space (south-west facing and/or flat);
- Availability of sufficient unshaded roof space;
- Sufficient electrical demand on site.

Solar thermal technology was not deemed viable due to infrequent demand and conflict with roof mounted solar PV panels.

2.4.6.5.2 Ground Source Heat Pumps

Whilst the use of on-site Ground Source Heat Pump (GSHP) technology was considered compatible in terms of Project demand and cooling systems, the use of such a system was excluded due to lack of availability of suitable (above and underground) land for piping and installation of the GSHP facility and auxiliary equipment. Water source heat pump technology was excluded due to the lack of availability of a sufficient water source close to the site.

2.4.6.5.3 Wind Turbines

Whilst the Project site was considered to have sufficient wind resources to provide on-site energy, the use of on-site (roof mounted or standalone) wind turbines was considered not viable on the following basis:

- Insufficient open land to accommodate turbine(s);
- Potential noise impacts upon nearby sensitive receptors

2.4.6.5.4 Biomass Heating Scheme

Biomass heating (using wood chips/pellets) was considered viable for to provide on-site heating, however the use of such a system was excluded due to the infrequent thermal demand of the Project.

2.4.6.5.5 Biofuel Combined Heat and Power

A Biofuel Combined Heat and Power (CHP) system was considered not viable, however the use of such a system was excluded due to the infrequent hot water baseload demand.

2.4.6.5.6 Fuel Cells

The use of fuel cells (with a primary fuel source of hydrogen) was considered not viable, however the use of such a system was excluded due lack of availability of hydrogen (or suitable alternative) and space on site for fuel cells and associated auxiliary equipment.

As noted, except for roof mounted solar PV panels, none of the alternative renewable technologies were incorporated into the Project, on the basis of technical limitations or availability of a necessary resource.

2.4.6.6 Energy Strategy Alternatives – Comparison of Effects

As noted above, the energy strategy the Project is reflective of intention to implement a low carbon, renewable approach. In consideration of this, the trend for demand and the current makeup of the energy grid, the proposed strategy was a fundamental element of the Project from the outset and has remained principally the same, throughout the design process.

Table 2.2 below however provides a summary of the environmental effects, of those disciplines where a differentiation is apparent, comparing the proposed energy strategy with an alternative, *grid reliant* development.

Table 2.2: Energy Strategy – Comparison of Effects

Environmental Discipline Considered	Comparison of Environmental Effects - Summary
Climate Change	*Whilst the energy grid seeks to decarbonise, a wholly grid reliant development is considered likely to have potential greater reliance upon fossil fuel generated energy, including coal and oil*
Human Environment / Utilities	*A wholly grid reliant development is considered likely to have potential for greater demand upon the electricity grid which currently trends towards unsustainable capacity and demand.*
Nuisance / Noise and Visual Amenity	*Use of wind turbines for energy generation is considered likely to have potential for a greater impact in terms of amenity (visual and noise) upon sensitive receptors*
Land / Land Use	*Use of wind turbines and ground source heat pumps for energy generation is considered likely to have potential for a greater impact in terms of amenity (visual and noise) upon sensitive receptors and an increase in land take requirements*

2.4.7 Electrical Grid Connection Design

As noted in Section 2.4.6, a connection with the existing 110kV network is proposed as part of the Project; the connection facilitates the use of renewable energy from the grid whilst also providing opportunity to feed back into the grid to aid capacity and assist in frequency stability.

An associated Gas Insulated Substation (GIS) is proposed to be located to the north west corner of the Project site and will provide the Project with the grid connection, formed from the *breaking into* and partial undergrounding of the existing 110kV overhead line that currently crosses the site.

The provision of the substation and grid connection will enable the export of energy generated onsite to the wider network. The substation will also enable the energy storage facility to be connected to the national grid and add greater capacity and resilience to the national electric energy generation capacity and the national electric grid. The substation will also allow for development outside of the site to be enabled by having spare 110kV circuits if required. As such, it is considered an essential element for the delivery and functionality of the Project.

The location of the existing 110kV overhead infrastructure, has heavily influenced the placement of the GIS in the north west corner of the Project site, from the outset of the design process (as included in Figure 2.3 Preliminary Site Layout Drawing). The relatively close proximity of the existing 110kV overhead line and tower

infrastructure, readily accommodates the proposed 110kV connection (more so than if the existing 110kV infrastructure were more remote).

With regards to the design and technical specification of the GIS and 110kV connection, these matters are determined by Eigrid requirements for such connections, which are made in accordance with Eirgrid *Policy Statement on Options for Connecting Customers to the Transmission Network* (https://www.eirgridgroup.com/site-files/library/EirGrid/Policy-Statement-on-Options-for-Connecting-Customers-to-the-Transmission....pdf). As such, the ability to consider alternatives sits out with the scope of the Applicant.

The design of the proposed GIS comprises an 8 bay format (2 bays for the incoming and outgoing connections to the existing transmission line, 2 bays for the Project and 4 remaining bays remaining available for future capacity [unrelated to the Project] in the Naas area). The 8 bay format therefore represents additional potential for connections, in comparison to a 4 bay solution.

Appendix 4.13 (Volume II) 110KV Grid Substation and Transmission Line Report which sets out further the context of the proposed connection and the rationale for the proposed specification and layout.

2.4.8 Gas Turbine and External Plant Area Design

During the design phase, the Project noise consultant worked in parallel with the design team in refining the detailed design of the gas turbine and external plant areas associated with the Data Centre buildings.

Following completion of baseline noise monitoring and modelling, to determine operational noise levels, it was predicted that the preliminary gas turbine and external plant area design had the potential to negatively affect noise-sensitive receptors (residential properties) in the vicinity.

In order to address this issue, the design team and noise consultant considered a series of alterations and refinements to the gas turbine and external plant design

Whilst the number and specification of the turbines, their placement relative to the Data Centre buildings and wider site layout and the open roof nature of the external plant area (to permit air circulation), were all relatively fixed parameters to ensure operational viability, a range of design alternative design elements were implemented.

The final design of the gas turbines and external plant area as proposed, includes the following:

- Use of noise absorbing panels for walls within external plant area;
- Bespoke acoustic enclosure for the gas turbine main casing;
- Exhaust silencer.

Modelling undertaken of the alternative turbine and plant area design, as proposed for the Project (along with other operational parameters), determined that operational noise and vibration impacts would be negligible/low at sensitive receptors. Further detail is provided in Chapter 9 Noise and Vibration.

Table 2.3 below provides a summary of the environmental effects between the preliminary design of the gas turbine and external plant areas and the proposed design.

Table 2.3: Preliminary and Proposed Gas Turbine and External Plant Area Design– Comparison of Effects

Environmental Discipline Considered	Comparison of Environmental Effects - Summary
Nuisance / Noise and Vibration	*The Preliminary Design is considered to have a greater significant impact upon sensitive receptors on the basis of noise modelling results. The Proposed design incorporated design led mitigation measures to ensure no significant impacts occurred during operation.*

2.4.9 Surface Water Drainage

The proposed Surface Water Drainage Strategy is based on applying Greater Dublin Strategic Drainage Study (GDSDS) and Sustainable Drainage Systems (SuDS) best practice to provide an effective drainage design that maximises sustainability and promotes nature-based solutions for the management of surface water runoff.

The sustainable management of water throughout the site is a key element of the Project and seeks to ensure there is no increased flood or pollution risk to the catchment, whilst ensuring the integration of SuDs principals throughout.

Study of the Project site established that the implementation of significant, infiltration-based water management is limited and not considered as a suitable solution across the site as a whole. The alternative solution proposed, comprises of the attenuation and discharge of surface water runoff to the Bluebell Stream at the southern boundary. The Project site has been divided into three catchments to reflect the pre-development conditions of the site. Each catchment will have separate discharge points into the Bluebell Stream so that run-off from the site is distributed along the length of the site boundary with the stream, broadly in line with the existing greenfield conditions.

The location and extents of the attenuation ponds through the site have been subject of iterative design, in response to the wider site layout changes and studies informing detailed design. The attenuation of surface water runoff is proposed in a wide variety of nature-based SUDS and surface water network features including Swales, Bioretention areas, Bioretention Ponds, Blue/Green Roofs, Permeable Paving, Filter Drains, Rainwater Harvesting, using flow control devices.

Further detail on the proposed surface water drainage is provided in the Data Centre Application - Planning Engineering Report, Volume II, Appendix 4.2.

2.4.10 District Heating

The KCC *Naas LAP 2021 – 2027* notes that '*waste heat presents a huge indigenous resource and is the single largest available low-carbon source of energy available in the Region that is not being used… Data centres generate significant levels of waste heat which can be used in District Heating systems.'* '

In response, an alternative arrangement for recovery and reuse of waste heat has been implemented as part of the Project. Two of the gas turbines associated with Data Centre 5 are proposed to have waste heat thermal boilers installed within their exhaust flues in order to recover the medium to high grade heat. The heat from the thermal boilers will then be pumped via heat exchangers to the perimeter of the Data Centre campus, to enable district heating pipework to be connected to the identified uses.

Further detail on the proposed district heating element of the Project, is included within The Energy Efficiency and Climate Change Adaptation Design Statement and Energy Policy Compliance Report, Volume II, Appendices 4.2 K and 4.9 respectively.