Submission through NSIP Portal

17th January 2025

The Examining Authority
Planning Inspectorate

Application by RWE Renewables UK Solar and Storage Limited for an Order Granting Development Consent for the Byers Gill Solar Project. PINS Reference No: EN010139.

The Examining Authority (ExA) invited all Interested Parties to provide submissions by Deadline 8 on Friday 17 2024. Further, in accordance with the request at the recent Hearings by the Inspectors for written submissions with references, the attached Table is submitted on behalf of Bishopton Villages Action Group (BVAG) a registered Interested Party (IP Reference Number 200048675).

BVAG does not necessarily express the views of the local Parish Councils or Meetings, although many of the opinions are shared by the affected community. BVAG includes residents from the villages of Bishopton, Great Stainton, Little Stainton, Brafferton, Whitton, Stillington, Sadberge, Carlton, and Redmarshall.

Statement of Common Ground and Design Approach Document

For Deadline 8, BVAG have concluded a Statement of Common Ground with the applicant. The community has also been active in proposing a set of detailed Proposed Modifications to the Panel Areas. These are submitted as part of the Design Approach Document as an Appendix setting out the community's suggestions for improving the design should consent be granted. BVAG's intention is that the panel modifications would form part of any future detailed design approval process.

Please do not hesitate to contact me if you have any queries.

[redacted]

Andy Anderson MRTPI FRGS

For and on behalf of Bishopton Villages Action Group

Attached : Deadline 8 Table- BVAG Deadline 8 submissions.

Bishopton Villages Action Group

Deadline 8 Responses and Comments

17th January 2025

This table sets out BVAG's responses to / comments on documents and submissions at Deadline 8, as per the items set out in the ExA's Rule 8 letter Annex A Examination Timetable for this deadline.

The relevant items which are dealt with in this table are:

• comments on responses to the ExA's Third Written Questions (ExQ3);

• comments on any further information / submissions received by Deadline 7; and

• any further information requested by the ExA under Rule 17.

This table also sets out relevant oral submissions made by BVAG during ISH8, and responses to the ExA's requests for action / information / clarification made during ISH8.

For ease of reference, the table is arranged under the relevant topic headings as opposed to under Examination stages / deadlines, but in no particular order.

BVAG Deadline 8 Responses and Comments Table

Topic	BVAG Comment
Alternatives	At **ISH8**, RWE made a closing statement which suggested that although they acknowledged that the proposed development would undoubtedly have significant detrimental impacts upon the local community, they considered these were outweighed by the need for renewable energy production facilities. However, BVAG considers the development proposal has been pursued without due recognition of the proper and diligent consideration of alternatives. Previously, in Deadline 4 24th October 2024 submissions, BVAG raised the issue of alternatives to the proposal. Whilst recognising that Government policy supports ground-mounted solar as part of a portfolio of renewable energy, and recognising the emergency of climate change, BVAG's opinion is that there are locations which are appropriate for solar, and locations which are not. More appropriate would be grey belt, brownfield, industrial areas, and roof tops, for example. Locations such as that selected for Byers Gill solar, which surround people's homes and villages, remove high-quality agricultural land from production, and blight the landscape for a generation (or more if extended) are inappropriate. The benefits of the proposal have not been assessed against alternative locations including more efficient methods (eg wind) of generating the same amount of power. Alternatives are not just about re-locating some panels from one field to another. For a project of this scale, real alternatives should include establishing where and how do we best generate 180MW without creating widespread harm to people, homes, and a landscape which has produced food for at least 1,000 years?

Overplanting (1): Ratio	At ISH8, during oral submissions, BVAG's planning expert Mr Andy Anderson referred to the following note illustrating that there is a variety of overplanting scenarios ranging in the following examples from ratios of 1.3 to 1.6, with 1.3 / 1.4 being the most frequent. Examples of overplanting from both Lightsource bp and other recently developed projects (in the public domain) include: • Thornham Solar Farm, Norfolk - 15MWac output and 20.6MWp = 1.4 : 1 • Fishburn Solar Farm, Durham - 41.4MWac output and ~60-65MWp = 1.4-1.6 : 1 • Bluestone Solar Farm, Durham - 40MWac output and 51.36MWp = 1.3 :1 • Shotwick Solar Park, Wales - 50MWac output and 72MWp = 1.4 : 1 • Llanwern solar farm, Newport, Wales: 49.9MW output and 75MWp = 1.5 : 1 • Lark's Green solar farm: 49.9MWac output and 71MWp =1.4 : 1 • Lyneham RAF airbase (Bradenstoke Solar Park): 49.9MW output and 69MWp = 1.4 : 1 • Mallards Pass - 240MWac output and 320-360MWp = 1.3-1.5 : 1 **RWE´s overplanting ratio** is not justified: why was 1.6 selected rather than a smaller ratio, eg 1.3 or 1.4, which would bring **significant** benefits? There is a **correlation** between overplanting and land take. RWE confirmed a hypothetical scenario whereby overplanting at Byers Gill of 1.4 would require 13% less land. <u>Benefits of panel reduction</u> BVAG commented that this scenario offered an opportunity to reduce the proposed use of 7% of the existing BMV land under proposed panels. Further, a reduction in land-take would reduce the adverse impacts on homes and villages through removing panel areas which are closest to homes and villages, footpaths and other amenity spaces. In this regard, BVAG has proposed priority areas for panel area modifications in discussion with RWE. These are referred to in the **BVAG Statement of Common Ground** and form an Appendix of the **Design Approach Document**.

	Viability and relevance to overplanting **RWE's response to ExA Q3 GCT.1** on viability confirms a positive Net Present Value (NPV) but does not provide any background costs or revenue scenarios to show how this conclusion has been arrived at. Therefore information on viability remains unknown. According to RWE, the overplanting of 1.6 results from design and layout decisions. Given that design, layout and technology would result from the viability levels, there is no opportunity to test to what extent the proposed overplanting can be altered, and to test different viability scenarios. Therefore, without fuller information on project viability, the efficiency and efficacy of the proposals cannot be assessed. BVAG contend that policy requires a **balancing** of the benefits of renewable energy versus the harms which the proposal creates. It is not possible to undertake this balance without testing and weighing the design decisions and alternative scenarios. BVAG contend that a reduction in panels areas through a lower and industry-norm over planting ratio could potentially be achieved through variations in: • Technology and selection of solar panels. • Technology and selection of inverters. • Viability scenarios.
Overplanting (2): Longhedge Case	Re the issue of the proposed development's level of capacity and the Longhedge appeal (**REP6-020, RWE 8.26**: response to matters raised at ISHs 5-7 & OFHs 3-4, response to BVAG comment on pp. 11 & 12 of 32). The key point is whether the Byers Gill proposal could generate 'up to 180MW' on a smaller area of land, potentially resulting in lower levels of harm. The Applicant pointed out that BVAG's representative Carly Tinkler (CT) '*was unable to say whether a legal challenge will be brought to the decision which has been taken*'. CT can now confirm that the claim (ref. AC-2024-BHM-000287) has been lodged. The current situation is that the Secretary of State and Interested Party (the Appellant) have responded and neither has conceded. A response will be submitted in due course. The implication of the decision being allowed to stand is that that developers will be further encouraged to install many more solar panels than are needed to provide the stated capacity of the site – that could be 200, 300, 400% more, there is no limit: in order to generate higher profits they will use far more land than is actually required to achieve the stated capacity. This also

	means that large quantities of useable energy can be wasted because the energy generated must be clipped before reaching the grid, to keep the site within its AC capacity.
Climate Change	1. Andy Anderson raised the issue of Climate Change under the Agenda Item 'Principle of Development'. This results from recent changes in Government planning policy (NPPF) which raise the importance of assessing climate change in deciding planning applications, and recent Court decisions on the importance of EIA providing information on indirect impacts. AA noted that this issue had been raised by BVAG previously but that the above changes added greater weight to the matter (see BVAG Relevant Representation 15th May 2024 – Section 16. Life Cycle Emissions). 2. BVAG contend that the principle of the proposed development is based on Climate Change goals as expressed through legislation, policy and various international agreements. These provide the basis for the need for renewable energy and whether the proposal provides the benefits for climate change as claimed by the Applicant and described in the Environmental Statement. AA introduced two Court Judgements which set the context for comments on the proposal with regard to assertions on Climate Change: • Friends of the Earth Limited & Others (1) and South Lakeland Action on Climate Change – Towards Transition (2) v Secretary of State for Levelling Up, Housing and Communities, West Cumbria Mining Limited & Cumbria County Council [2024] EWHC 2349 (Admin). • R (Finch on behalf of the Weald Action Group & Others) v. Surrey County Council (& Others). BVAG contend that RWE have failed to include the development's likely significant indirect environmental effects in the scope of their EIAs, including scope 3 emissions. In a recent Court Judgement, 'The Court determined that the Environmental Statement ("ES") and EIA process required of the developer, West Cumbria Mining Limited ("WCM"), should have included details of GHG emissions arising from the combustion of coal produced at the mine, as they were "significant likely indirect effects of the project"[2] . Therefore, given the scale and significance of the GHG emissions produced, that information should have been considered by the SoS and their assessment was an "obviously material consideration" that should have been accounted for prior to granting permission[3]. '*The Court determined that the Environmental Statement ("ES") and EIA process required of the developer, West Cumbria Mining Limited (WCM), should have included details of GHG emissions arising from the combustion of coal produced at the mine, as they were "significant likely indirect effects of the project"*"[2]. Therefore, given the scale and significance of the GHG emissions produced, that information should have been considered by the SoS and their assessment was an "obviously material consideration" that should have been accounted for prior to granting permission[3]. Thus, the SoS had breached the applicable EIA Regulations by determining that the GHG emissions from

	burning coal produced from the site were not a significant or likely effect of the proposed development' [redacted] 3. RWE sets out the greenhouse gas (GHG) Assessments of the proposal in Examination Document **(APP-123**) Document 6.4.5.1 'Environmental Statement Appendix 5.1 Greenhouse Gas Assessment.' The emissions are divided into **embodied carbon** (production) and **transport.** **RWE states in its table 'Embodied Carbon'** The **3 largest components** of the assessment consist of • Battery Storage (BESS) • PV Panels • Supports (ground-mounted steel). These elements comprise 99% of the stated emissions (tCO2e). However the 'Emissions factor source' is not provided. The Application states : "***Confidential Pvsyst Simulation Report for the Proposed Development provided by the client".*** **RWE is therefore failing to disclose information. BVAG contend that:** **Public disclosure is a key principle under EIA Regulations and in addition :** Environmental Information Regulations (EIR) 2004 require public access to environmental information. GHG emissions data, being a key part of environmental impact, fall under the scope of disclosure. Aarhus Convention: the UK is a signatory to this international treaty, which emphasises public access to environmental information and participation in decision-making. The following are of great relevance: • **guidance given by the Courts** in recent cases on EIA and indirect effects; • the **significant proportion of CO2** emissions which the 'confidential' components of the solar installation provide; and • the recent emphasis in the **new December 2024 NPPF** (Paragraph 163) ie '*The need to mitigate and adapt to climate change should also be considered in preparing and assessing planning applications, taking into account the full range of potential climate change impacts*'

	In the light of the above and other relevant factors, BVAG consider that the Applicant has failed to provide adequate information on the impacts of the proposal on climate change, and that the principle of the development – which must be balanced on its contribution to climate change goals – when weighed against harm, is flawed. 4. It is noted that the transport emissions table requires clarification. • RWE Emissions Table states that the distance of China to Stockton-on-Tees Port assumes 19,377km. Please confirm which Port in China (AA estimates that the sea distance between Shenzhen, China, and Teesport, United Kingdom, is approximately 26,756 km). Therefore, if minimising transit time is a priority, selecting the Port of Shenzhen as the departure point for shipments to the UK is advantageous • RWE transport emission states 25km HGV from the port at Teesport to Byers Gill. This could be nearer 35km and likely to be a double run. • Panels with a 25-year life span would need replacing within the term of the 40-year project and therefore additional travel will be needed. • What is the land distance internally in China from production to port based on RWE proposed Jinko Panels? Jinko Solar operates multiple manufacturing facilities across China, including locations in Shangrao (Jiangxi province), Chuzhou (Anhui province), and Sichuan province. The nearest major port facilities to these production sites are: i) Shangrao, Jiangxi Province: The closest significant port is the Port of Ningbo, located approximately **500-600** kilometres away. ii) Chuzhou, Anhui Province: This location is also about **500-600** kilometres from the Port of Ningbo. iii) Sichuan Province: Specific details about the exact location of Jinko Solar's facilities in Sichuan are not provided, but the province is inland, and the nearest major ports would likely be along China's eastern coast, such as Shanghai or Ningbo. Given the inland locations of these manufacturing facilities, Jinko Solar relies on overland transportation to reach these coastal ports for international shipping. The inland China transport emissions are therefore likely to be significantly larger than the 25km internal UK emissions. RWE is asked to clarify this. **AA was asked by the ExA and RWE to provide Lichfields Note on Overplanting, which is attached to the submission.**

Efficiency	In their response to **ExQ1 PPD.1.13**, the Applicant states that in terms of energy / power, the proposed development '*could produce 263,872 MWh per annum resulting in a capacity factor of 16.7% [calculated as: 263,872 / (365*24*180)]*'. Could the Applicant please confirm whether the 16.7% capacity factor relates to the average overall efficiency of ground-mounted solar developments throughout the UK? It would be helpful to know the genesis of that figure.
Cumulative Effects	During **ISH8**, cumulative effects were discussed, at Agenda Item 6. BVAG explained to the ExA that its position on cumulative effects is as follows: 1) In the Landscape Statement of Common Ground (LSoCG) between BVAG and the Applicant, it is agreed (at para. 2.3) that '*the Proposed Development would give rise to significant adverse residual operational… cumulative effects on landscape character, settlement character, and visual amenity*'. 2) At para. 3.5, under Matters Not Agreed, the LSoCG states that '*Whilst there is not agreement about certain aspects of methods, and all of the LVIA's predicted levels of effects on landscape character areas, settlements, and visual receptors, these are not considered to be important-enough factors in the decision-making process to warrant detailed discussion'*. 3) BVAG's opinion is that the Applicant's assessment of the cumulative effects of other topics (such as transport, hydrology, biodiversity, amenity and so on) is inadequate and potentially flawed, and the Applicant's responses to date have not altered this opinion. Item 2) above includes the LVIA's cumulative effects assessment method, which was the focus of discussions between the Applicant's and DBC's landscape experts. In principle, BVAG understands and agrees with DBC's landscape expert's confusion, and doubts / concerns about flaws in the LVIA's method and the justifications offered by the Applicant's landscape consultant. It is important to consider the definition of the term 'cumulative' as used in the context of EIA / LVIA, and how cumulative effects should be assessed. **GLVIA paras. 7.9 – 7.16** are relevant, and may be helpful in this regard.
Glint and Glare	Re glint and glare effects and **ExQ3 GCT.3.2** 'can the Applicant confirm if it has considered non-reflective panels', the Applicant's response was that '*All solar panels procured / used by RWE are non-reflective as they are designed to absorb light*'. BVAG agrees that solar panels are '*designed to absorb light*', but not that they are '*non-reflective*'. EN-3 para. 2.10.102 states that '*Solar panels are specifically designed to absorb, not reflect, irradiation [93]*'. Footnote 93 states, '*Most commercially available solar panels are designed with anti-reflective glass or are produced with anti-reflective coating and have a reflective capacity that is generally equal to or less hazardous than other objects typically found in the outdoor environment, such as bodies of water or glass buildings*'.

	On p. 45 of Appendix B of the Applicant's glint and glare study, it is stated that '*A specular reflection* [made by solar panels] *has* ***a reflection characteristic similar to that of a mirror***' (my emphasis). According to a study called *Understanding Emerging Impacts and Requirements Related to Utility-Scale Solar Development* (September 2016) by Argonne National Laboratory, the glint and glare arising from solar panels is '*of* ***unusual intensity and unique appearance***' (my emphasis).
Sheep-grazing	Following discussions about this matter at ISH6, the ExA asked the Applicant to provide a list '*of Solar Farms RWE is aware of where sheep or other animals graze*'. This was subsequently provided (**REP6-020 / RWE 8.26**: RWE response to matters raised at ISHs 5-7 & OFHs 3-4, RWE response to CT comment on p. 15/32). Having looked closely on Google Earth, there only appear to be sheep in one field on one of the solar sites on the list (Newlands Farm, Axminster, Devon EX13 5RX); however, the images could have been taken at times when sheep had been taken indoors. No hens or geese are visible, but they might not be so easy to spot. One of the sites may not yet be operational (Twitch Hill Solar, Shropshire TF10 9AE). BVAG is making its own inquiries, but apart from the one cited above, does the Applicant have any evidence for sheep / other animals being grazed on these sites? Incidentally, and with reference to keeping poultry on solar sites, it must be borne in mind that poultry manure contains considerable amounts of soil-enriching nutrients (eg nitrogen, phosphorus, and other excreted substances such as hormones, antibiotics, pathogens and heavy metals which are introduced through feed); this can be very damaging to vegetative cover, and adversely affect soil and water quality (and peoples' quality of life as well). The manure also contains ammonia. The toxic effects of ammonia gas can damage and kill plants, and can decrease soil PH. This is also relevant to **EXQ3 LUS.3.5**.
Soil: Effects / Benefits?	Re **REP6-020 / RWE 8.26:** RWE response to matters raised at ISHs 5-7 & OFHs 3-4. The Applicant's response to this matter (on p. 16 of 32) includes, at Appendix A.1, a report which '*shows that there is comprehensive, quantitative evidence of the benefits to soil health from converting from arable land to pasture*'. However, this does not address the point BVAG was making, ie that 'resting' arable soil for long periods of time (over 5 years) decreases levels of fertility. The Applicant's stated intention is to restore the land to its previous use (ie arable agriculture). The question is, how would the current levels of soil fertility / the ALC grade be restored at decommissioning? If the current ALC grade could not be achieved, then the development would have resulted in the permanent loss of over 20ha of BMV land, when Natural England assumed the loss would be temporary.

	BVAG does not agree that 'restoration to agriculture' at decommissioning would be a 'significant' scheme benefit, as claimed by the Applicant: this is simply restoring the site to its original condition. Indeed, this also suggests that the development would result in associated **significant disbenefits**. BVAG also raised the question of the Applicant possibly having to carry out an EIA under the EIA (Agriculture) Regulations at decommissioning, mainly due to the likely adverse effects on biodiversity arising from the change from pasture to arable cultivation.

LICHFIELDS

Note

Our ref 65284/02/AGR/PMc
Date 18 September 2024

Subject **Installation and operation of a Solar Farm together with all associated works, equipment and necessary infrastructure by Lightsource BP**

Response to Letter received from Goodenough Ring Solicitors – 9 July 2024

1.0 Introduction

1.1 At Durham County Council's (the "Council") Planning Committee of 8th May 2024, the Council reached a minded-to-grant decision on Planning Application Ref. (DM/23/01868/FPA), subject to the completion of a Section 39 Agreement in respect of landscape and ecology management.

1.2 Subsequent to that decision, a letter dated 9th July 2024 was sent by Goodenough Ring Solicitors to the Council (the "Letter") in which Goodenough Ring Solicitors raised a number of questions regarding the Application and its determination. The Letter was submitted alongside a note titled 'Technical Analysis of the Capacity of Hett Moor Farm' by Ian Galloway (the "Technical Analysis").

1.3 The Letter explains that Goodenough Ring Solicitors are acting on behalf of Ian Galloway, a local resident of Burnhope, who is supported by local residents of Hett. In the interests of context, Mr Galloway separately brought judicial review proceedings against the Council and Lightsource bp (as an Interested Party) in relation to the Burnhope Solar Farm (Case Numbers AC-2023-LDS-000229 and AC-2023-LDS-000290 and hereafter referred to as "the Burnhope Judgement"). The Burnhope Judgement was issued on 21 February 2024 quashing the planning permission for Burnhope Solar Farm and returning it to its pre-determined status with the Council.

1.4 This note responds to the Letter. Firstly, it seeks to provide clarity on how the capacity of a solar farm is measured in the context of EN-3 (**Section 2.0**) and provides an explanation on the approach to overplanting (**Section 3.0**). **Section 4.0, Table 1** directly addresses the individual points raised by the Letter in relation to the capacity and overplanting of Hett Moor Solar Farm together with two illustrative Figures (**Figure 1** and **Figure 2**). Lastly, **Section 5.0** responds to the point raised in the Letter regarding Community Benefit.

1.5 This note, supplements the 'Supplementary statement regarding overplanting' by Lightsource bp dated 8th March 2024 (the "Supplementary Statement"), which was

submitted ahead of the determination of the Application. Both documents should be read together.

2.0 EN-3 and measuring capacity

2.1 The designated National Policy Statement (NPS) EN-3 (which was designated on 17 January 2024) clarifies in paragraph 2.10.53 that:

> *'the maximum combined capacity of the installed inverters (measured in alternating current (AC))* ***should be used for the purposes of determining solar site capacity'****.*
>
> (emphasis added in bold)

2.2 In line with this recently stated national policy, it is alternating current (AC) capacity[1] that is the relevant measurement for defining the capacity of the solar farm with respect to the 50MW (AC) threshold contained in Section 15 of the Planning Act 2008.

2.3 EN-3 clearly explains the difference between direct current (DC) and alternating current (AC) capacity, and explains that installed generating capacity (DC or commonly referred to as MWp) can be larger than the AC export capacity to the grid.

2.4 Lightsource bp has previously clarified in its Supplementary Statement (8th March 2024) that the maximum combined output of the installed inverters would be no greater than 49.9MWac and this would be controlled via a condition attached to the planning permission (refer to proposed Condition 19).

2.5 More detail on the design and capacity at Hett Moor Solar Farm is provided in **Table 1**.

EN-3 and other measurements to determine maximum extent

2.6 Paragraph 2.10.56 of EN-3 states that *"AC installed export capacity should not be seen as an appropriate tool to constrain the impacts of a solar farm",* and *"Applicants should use other measurements, such as panel size, total area and percentage of ground cover to set the maximum extent of development when determining the planning impacts of an application".*

2.7 The location, extent and design of the Hett Moor Solar Farm has been explained in the Application documents and the Supplementary Statement (8th March 2024) and has naturally been informed by a number of constraints and opportunities of the site, including, but not limited to:

- proximity to available grid connection capacity;
- maximising the potential renewable energy generation and associated benefits of the site (i.e. powering homes and reducing carbon emissions);

[1] Note that footnote 91 of EN-3, clarifies that the *"combined maximum AC capacity of the installed inverters may only exceed the aforementioned thresholds for the sole purpose of overcoming reactive power consumption within the solar farm between the inverters and the connection point".*

- delivering additional environmental benefits including a significant net gain in biodiversity;
- minimising potential environmental impacts through avoiding designated sites and sensitive or valued receptors or habitats, and the provision of additional landscaping to screen the proposals; and
- presence of utilities across the site.

2.8 This is standard industry practice and in accordance with paragraph 2.10.60 of EN-3, which explains that applicants will consider several factors when considering the design and layout of sites, including proximity to available grid capacity to accommodate the scale of generation, orientation, topography, previous land–use, and ability to mitigate environmental impacts and flood risk.

3.0 The Approach to Overplanting

Direct Current and Alternating Current

3.1 The power exported from any grid connected power station needs to be in AC at the correct power quality (e.g. voltage, frequency etc.) required by the grid network operator in the connection agreement. Solar panels (PV modules) convert sunlight into DC electricity during daylight hours. Solar plants use inverters, transformers and other power electronics to convert the DC electricity into AC and further control the quality of the power output from the plant before it is injected into the grid.

3.2 To provide further detail, the DC generated by the solar panels varies in accordance with the intensity of sunlight (i.e. irradiance, measured in kW/m^2) that hits the panel surface. Since the output of a solar module varies with irradiance and temperature, the industry uses an agreed testing procedure defined in IEC 61215 to measure the capacity of a solar module under a set of fixed, close to ideal, conditions – these are known as the Standard Test Conditions (STC). The output of the module at STC is the capacity that is stated as the power rating on the module datasheet and sticker and is broadly recognised as the maximum output of the panel, hence the DC capacity of solar farms often being quoted as MWp, where 'p' stands for 'peak'. The STCs reflect an idealised scenario under laboratory-controlled conditions, however the electricity generated by panel in DC in real world conditions will seldom achieve the maximum of its name plate (e.g. 570Wp) mainly due to the difference in module temperature during an instantaneous laboratory test vs. the temperature a solar panel will operate at during prolonged exposure to sunlight in the real world.

3.3 The output of the inverters on a solar farm will vary continuously in accordance with the input DC power they are receiving from the solar panels. Similarly to many other types of electrical equipment, inverters have been tested and are specified within a number of technical boundaries and the maximum output of the inverter is defined in the datasheet.

3.4 Overplanting can help to accommodate this difference in name plate power rating and the variability of the real power delivered in the real-world environment. Further detail on overplanting is described below.

Explanation of Overplanting

3.5 'Overplanting', or oversizing as it is sometimes referred to, is a term used by the solar industry to describe the situation in which the maximum installed generating capacity (DC) of the solar generation facility is larger than the facility's grid connection (AC) would allow. This enables the facility (or solar farm) to maximise the renewable energy generating efficiency over its lifetime and make best use of the available grid connection's export capacity with the land that is available for the development. Grid capacity is a scarce resource in the UK[2]. Overplanting is a standard factor in the design process across the solar industry worldwide.

3.6 EN-3 confirms that the approach of overplanting is an acceptable one, recognising that the efficiency of solar panels decreases over time (known as degradation) and therefore enables the grid connection to be maximised across the lifetime of the site. In addition, an increased MW DC relative to the MW AC installed inverter capacity in the design accommodates:

- power losses with converting DC to alternating current AC;
- power losses from transporting electricity and the increasing or decreasing of voltage levels; and
- a lower generation in real world conditions including:
  - times of low irradiation (i.e. when it is cloudy, or at dawn and dusk); and
  - shading e.g. from trees, particularly in the winter months and at the start end of the days.

3.7 A solar farm connected to the grid, without overplanting and a DC:AC ratio of 1:1 would therefore not be able to maximise the secured and available export capacity of renewable energy to the grid at its connection location. Having a DC:AC ratio >1 does mean that during sunny periods in the summer months when conditions are close to perfect, that the DC output of the solar panels is curtailed by the capacity of the AC equipment it is connected to. In the UK, these periods only account for a small proportion of the year – during peak hours on sunny days between April-October. The true benefit of overplanting is found in all other daylight periods; namely where irradiance levels are not at or close to the 'ideal' conditions defined under STC in IEC 61215. During these periods the additional solar panel capacity is a benefit to the project as the reduced DC output accounts for a larger proportion of the available AC equipment output. Please see an illustrative example below:

3.8 77MWp DC capacity, 50MWac inverter and grid connection capacity [DC:AC ratio = 1.54]. During an afternoon with 500W/m2 sunlight (partly cloudy).

3.9 irradiance = 500W/m2 [50% of STC]

3.10 module output = ~0.5x77 = ~38.5MW [50% of MWp]

[2] Department for Energy Security and Net Zero 2023 Transmission Acceleration Action Plan, available here: https://assets.publishing.service.gov.uk/media/65646bd31fd90c0013ac3bd8/transmission-acceleration-action-plan.pdf

3.11 DC to AC conversion losses of 4%

3.12 AC output = 38.5x0.96 = 36.96MWac [74% of grid connection capacity]

3.13 It can be observed that there is a range of overplanting ratios across the industry, this is because the design of a solar farm and the level of overplanting will always seek to strike a balance between technical requirements; irradiance; topography; land; environmental and other constraints.

Control of export capacity

3.14 The installed inverter capacity for Lightsource bp designed solar farms are designed to account for the maximum export capacity and the District Network Operator's (DNO) G99 Regulation requirements for the grid connection, which includes reactive power requirements and other power quality requirements.

3.15 Each solar farm's Power Plant Controller (PPC) controls all inverters on site, in order to maintain the output within the export limit (defined by the connection offer) at all times. In some cases, a nominal amount of additional inverter capacity is required to ensure the AC export capacity, and overcome reactive power consumption as recognised in EN-3 footnote 91.

3.16 The PPC is a control box at the main substation, controlling the inverters via fibre optic cables and control logic/software.

Design and Extent of Hett Moor Solar Farm

3.17 As described above, the extent and design of a solar farm, including the degree of overplanting, is influenced by the location, characteristics of the site and the potential impact on the surrounding area.

3.18 As set out in EN-3, Lightsource bp recognises that it is not appropriate to treat installed export capacity as the way to constrain the impacts of a solar farm.[3] Factors that need to be considered include, but are not limited to, the topography, existing landscape features, ecological features, potential archaeology, and quality of the agricultural land. When determining the impacts of the solar farm, measurements such as the panel size, total panel footprint and solar panel cover as a proportion of the site should also be considered.[4]

3.19 The planning application details the site selection, and evolution of the design in response to land, planning and environmental constraints and opportunities; which have been informed through consultation and surveys and assessments. The design process has sought to minimise impacts through mitigation measures and render them acceptable, and provide additional benefits beyond renewable energy, including a net gain in biodiversity through the enhancement and provision of habitats.

3.20 Further detail on the design and extent of Hett Moor Solar Farm, in response to the points raised in the Letter, is provided in **Section 4.0.**

[3] EN-3, paragraph 2.10.56.
[4] These factors are listed in EN-3 paragraph 2.10.56 as potential appropriate constraints / measurements for the decision-maker to consider when determining the planning impacts

LICHFIELDS

4.0 Table 1 - Response to the Letter

#	Letter	LSbp technical responses
Error as to the DC capacity		
2	The Council has made an error of fact (E v Secretary of State for the Home Department [2004] EWCA Civ 49) as to the DC capacity of the solar farm.	Carnwath LJ held that in order to find unfairness there had to be (1) a mistake as to an existing fact (2) the fact must have been "established" i.e. objectively verifiable (3) the appellant mustn't have been responsible for the mistake and (4) the mistake must have played a material (though not necessarily decisive) role in the tribunal's decision. It is not accepted that the Council made any error of fact which would meet these criteria or at all.
3	The applicant says the drawings show 135,420 panels. Our client's count is 135,360 taken from the Basic Layout and the amended Panel Elevations. The size of the panels is shown on the elevations. These are exactly the same size as the Trina 685 Wp panels in the Burnhope planning application for a non-material amendment (DM/23/03147/NMA).	*Number of panels* The number of panels in drawing (LP3-BDL (GBR_Hett Moor_LP3-BDL_10) is confirmed as 135,420 according to internal CAD software. Whilst the difference between the two figures would not be discernible in practice, we are happy to confirm that our previously stated panel figure is correct. *Type of panel* The Application for the Hett Moor Solar Farm included typical panel elevations which are representative of a number of panel types on the market at the time of the Application. The Council has assessed, and the planning committee has resolved to approve the Application using a 'typical' panel elevation. The Council did not approve a particular panel type as is alleged in the Letter. Whilst it is correct to say that no particular panel type was approved by the Council, in order for any assessment to be realistic, the dimensions of the panels shown on the indicative elevation plan (ref. PNL_2P_25/6854_01) match that of a number of the larger, utility scale solar panels (or photovoltaic (PV) modules) on the market today including, but not limited to, a 685Wp panel manufactured by Trina Solar. For context, there are over 12,000 models of solar panel available on the market today[5]. Although solar panels have different efficiency and power output characteristics, the vast majority of these modules are virtually identical in appearance to an untrained eye (aside from minor variations in dimensions). We therefore do not consider it useful to

[5] [redacted]

#	Letter	LSbp technical responses
		assign any significant value to the model or assumed efficiency of a drawing block in the planning application – it could represent a near infinite range of DC capacities when noting that within that footprint it is possible for multiple power classes or even multiple suppliers and power classes to be used in a single utility scale power plant without there being any visually discernible difference to the overall appearance of the solar farm. Generally speaking, solar farm developers such as Lightsource bp are incentivised to select solar panel suppliers and products that are at the leading edge of technological trends. This is because high efficiency solar panels can reduce the installation and balance of system equipment costs. However, module efficiency is only one factor considered by developers and contractors when making procurement decisions. Other factors including carbon footprint, regulatory compliance and traceability are forming an increasingly significant part of the equation when making procurement decisions. The application stage is often years prior to construction and procurement decisions are generally not made until permission is granted. Consequently, it is essential to the solar industry that applications and subsequent permissions allow for applicants to have the ability to finalise the solar panel power class(es) based on sound procurement principles prior to construction. As described above, most panels are virtually identical in appearance, with only very minor variations in dimensions. As a result, finalisation of the solar panel is considered non-material from a planning perspective. The typical panel elevation submitted with the Hett Moor Solar Farm Application was based on the size of one of the larger scale panels on the market; thereby assuming a reasonable worst-case height. Lightsource bp has installed panels with a 570Wp rating on a project constructed in 2023-24. It is therefore reasonable to assume that a similar panel rating could be used in the delivery of the Hett Moor Solar Farm,
4	As the Court demonstrated in R (Galloway) v Durham County Council [2024] EWHC 367 (Admin) (paragraph 88), the DC can be calculated either from the particular type of panel shown, or by applying the output of reference	*Calculating the capacity* The DC capacity referenced in the Letter and Technical Analysis is calculated based on a 'total surface area' or 'combined surface area' method and based on a reference to an assumption in the draft EN-3 from September 2021 on the surface area of a typical panel and typical

#	Letter	LSbp technical responses
	panels to the total surface area of the panels. Applying that exercise to the present application: • Surface area: 2.384m × 1.303m = 3.106352 m^2 per panel. Total surface area of panels is 420,662 m^2 • Trina 685 (from 135,420 x .50) 92.762MW • Draft EN-3 reference panel (225MW per m^2) 420,862 x 0.225 = 94.693MW • Longi 540 (211W per m^2) 420,862 x 0.221 = 93.010 MW Using the 135,360 panel figure and draft EN-3, the surface area is 420,476 m^2 and capacity is 94.607MW.	output. This was removed in the subsequent draft of EN-3 and is not present in the designated EN-3 adopted into law on 17th January 2024. The 'combined surface area' is not a typical method used by the industry to calculate the capacity of a solar farm. The author of the note has also made assumptions on the panel type and capacity, and therefore the total capacity of the site. Lightsource bp reject the methodology used from a technical perspective since this is not an industry recognised approach. The Supplementary Statement confirmed that the Hett Solar Farm installed solar panel capacity would be approximately 77MWp with maximum combined capacity of the installed inverters of 49.9MWac in line with EN-3. The design of the solar farm at the application stage is a realistic design, based on topographical data, irradiation, and other environmental constraints, as well as technical inputs including assumptions for solar panel and other equipment specifications based on the current market conditions. CAD software is used to simulate different scenarios and optimise the preliminary design for the site. As with all engineering and construction projects, the technical detail of design is optimised once the project has been consented as part of the technical detailed design stages prior to construction. The optimisation is based on specific metrics, namely the levelised cost of electricity (LCOE) and well as sound procurement principles.
5	The applicant's supplementary statement (produced in March 2024) asserted that the proposed capacity was approximately 77 MWp (paragraph 7 of the supplementary statement). That statement was wrong. The Committee report was in error at paragraph 194 in adopting the 77 MWp figure. The DC capacity was therefore 20.39% to 22.99% higher than the Committee was informed. This may well exceed the 1.8 'over-planting' maximum asserted by the applicant.	The Supplementary Statement of 8th March 2024 referred to the scheme having a MW (DC) or MWp level of around 77MWp which is considered to be within an optimum range for a 49.9MWac project for this site. Approximately 77MWp provides an overplanting ratio of around 1.54 on a scheme that is capped through planning condition (Condition 19) to export no more than 49.9MW (AC). The typical elevation in the planning Application is sized such that it could accommodate the dimensions of panels of various ratings and various manufacturers' specifications. These might be a 570Wp panel (for which the dimensions vary depending upon manufacturer) or one of the larger scale panels on the market. The planning conditions (nos. 4 and 10 when read together, as directed to) call for the development to be built out in accordance with approved plans which include a Panel Elevations Plan (PNL_2P_25/6854_01) though requiring the final

#	Letter	LSbp technical responses
		design and materials (i.e. the panel specification) to be approved at a later stage when the condition is discharged. Overplanting could be provided using different panel types and capacities, and an illustrative scenario is provided below in Item 6.
6	If the Council or the applicant wish to defend the 77 MW figure, then they should demonstrate exactly how it has been calculated.	The applicant's statement of 8th March 2024 referred to the scheme having a MW (DC) or MWp level of ~ 77MWp. This is an approximate estimate at this stage of an 'optimised design' for a 49.9MWac project for this site. 77MWp provides an overplanting ratio of approximately 1.54 on a scheme that is capped through planning condition (Condition 19) to export no more than 49.9MW (AC). 77MWp is based on the assumption there are 135,420 panels and that a 570Wp panel is installed (which is reasonable to assume at this stage, as set out in Item 3). The typical elevation in the planning application is sized such that it could accommodate the dimensions of panels of various ratings and various manufacturers' specifications. If 135,420 x 570Wp rated solar panels were used for Hett Moor Solar Farm it would result in an installed DC capacity of around 77MWp. The solar panels could be installed without extending either the height of the table submitted in the typical elevation or the number of panels in the layout plan. There may however be some very minor difference in the lengths of the panels. Final layout plans and elevations would need be in accordance with the approved plans and elevations (Condition no. 4) unless otherwise approved through Condition No. 10. **Figure 1** is the layout plan from the original application with 135,420 panels of a typical panel. This is the plan for which planning permission is sought. Alternatively, a second illustrative alternative layout is provided in **Figure 2** (Opt 2) which illustrates what an optimised layout could look like for a ~77MWp solar farm with 685Wp panels. This design arranges the tables with slightly wider spacing between each row and thereby optimises the design for an installed DC capacity of around 77MWp. This would be beneficial to the operation of the Hett Moor Solar Farm as the increased row spacing would reduce potential shading and, in turn, increase the performance of the panels throughout the days, and over the year particularly at times when the sun is lower in the sky. As can be seen by the overlay, in this scenario, the full extent of the site

<table>
<tr><th>#</th><th>Letter</th><th>LSbp technical responses</th></tr>
<tr><td></td><td></td><td>would be required as per the original planning application with only a few tables not required (as illustrated in red).

A summary is provided in the table below:

<table>
<tr><th></th><th>Original layout (Figure 1)</th><th>Scenario 2 (Figure 2)</th></tr>
<tr><td>No. Solar Panels</td><td>135,420</td><td>112,380</td></tr>
<tr><td>Assumed Panel Type and Capacity (Wp)</td><td>570</td><td>685</td></tr>
<tr><td>Total installed DC capacity (MWp)</td><td>77.19</td><td>76.98</td></tr>
<tr><td>Maximum installed inverter capacity (MWac)</td><td>49.9</td><td>49.9</td></tr>
<tr><td>Overplanting ratio</td><td>1.54</td><td>1.54</td></tr>
<tr><td>Shading loss</td><td>5%</td><td>3.3%</td></tr>
<tr><td>Estimated specific yield (kWh/kWp)</td><td>879</td><td>936</td></tr>
</table>
</td></tr>
<tr><td>7</td><td>There was therefore a more substantial overcapacity than Committee members were aware of. That goes to the heart of how much land is to be taken up by panels.</td><td>The applicant’s statement of 8th March 2024 referred to the scheme having a MW (DC) or MWp level of around 77MWp. For the reasons described above, Lightsource bp rejects the assertion that the proposed DC capacity of the project is more substantial.</td></tr>
<tr><td colspan="3">The approach to overplanting</td></tr>
<tr><td>8</td><td>The Committee report failed to deal with the reasons for overplanting and the damaging and environmentally counterproductive consequences of the applicant’s approach.</td><td>The reasons for, and approach to overplanting are described in Section 3.0. EN-3 confirms that the approach of overplanting is an acceptable one.

Overplanting is a standard factor in the design of any solar farm, and for Hett Moor Solar Farm an overplanting ratio of 1.54 and a target installed DC capacity of around 77MWp is considered to be in the optimal range to maximise the renewable energy generating efficiency of the site. The scenarios above, illustrate that this can be achieved with different panel types and capacities on the market which are yet to be procured and within the site layout plan and typical elevation plans and</td></tr>
</table>

#	Letter	LSbp technical responses
		proposed conditions; specifically planning conditions 4 and 10 which require the final design and materials to be submitted for approval prior to commencement of development (including the inverters). The output of the inverters will be limited by Condition 19 to 49.9MWac. The permission does, therefore, enable a scheme to be built using a 570Wp or other panels, with an overall DC generation of around 77MWp, within the maximum parameters assessed and accepted in the planning permission (i.e. the maximum height of the table panels and the total coverage of the tables). The planning permission does not oblige Lightsource bp to use panels with a 570Wp rating. Notwithstanding, the final panels will not be materially different in appearance from the typical elevation regardless of their power rating. The visual differences in the dimensions and panels of different suppliers will not be discernible when the site is fully constructed. Similarly, the final inverter technology will be chosen prior to commencement of the development. The final inverters chosen will not be materially different from the reference inverters which form the basis of this Application and have been used in the assessments. The extent and design of Hett Moor Solar Farm, which accounts for a reasonable level of overplanting, has been assessed and considered as part of the application process.
9	Solar panels generate DC. DC needs to be converted to Alternating Current ("AC") for transmission along the grid. Inverters are used to make that conversion (see EN-3, paragraph 2.10.50). Some energy is necessarily lost in that process. So, if the AC capacity of a solar farm is 50MW then the DC capacity will be higher.	In terms of "capacity", the DC capacity of a solar farm is linked to the nameplate capacity of the installed PV modules whereas the AC "capacity" typically refers to the inverter capacity or the capacity of the grid connection point. It is possible for the AC capacity of a solar farm to exceed DC capacity in some instances, but typically utility scale solar farms will be designed to have a higher DC capacity than AC for the reasons described above in section 3 – to maximise the renewable energy generating efficiency over its lifetime and make best use of the available grid connection's export capacity.
10	The 2021 scheme was originally for a capacity of 60MW, amended to 62.75MW. No explanation has been	The 2021 scheme is not the scheme that forms part of the application in question. Refer to item 8 above re. benefits of overplanting.

#	Letter	LSbp technical responses
	given why the DC capacity is to be increased to 77MW (on the applicant's figures) or the actual capacity of between 92.7 and 94.7MW.	
11	The DC to AC ratio of inverters can vary. The applicant says in its supplementary statement, 'Lightsource bp typically overplant by between 1.25-1.8, and this range is typical of solar farms in the UK and overseas' (paragraph 6). The applicant provides no evidence in support of this assertion.	Unfortunately, the statement in the GRS letter is erroneous from a technical point of view. An inverter itself does not have a DC to AC ratio. The DC:AC ratio typically refers to the ratio between the nameplate capacity of the installed PV modules versus the nameplate capacity of the installed inverters. Similar to panels, there are a large number of different inverter types on the market and the technology is continually evolving. The application drawings are for a typical central inverter which can come in a variety of capacities – the typical inverter plans include conservative, worst-case dimensions. For the same reason as for the solar panels, it is therefore essential that applications, and subsequent permissions, allow for applicants to have the ability to select inverters available on the market at the time of procurement and are optimal in relation to the final solar panel type and configuration of the site, including for example the detailed electrical design (cable routes, lengths, etc). Examples of overplanting from both Lightsource bp and other recently developed projects (in the public domain) include: • Thornham Solar Farm, Norfolk - 15MWac output and 20.6MWp = 1.4 : 1 • Fishburn Solar Farm, Durham - 41.4MWac output and ~60-65MWp = 1.4-1.6 : 1 • Bluestone Solar Farm, Durham - 40MWac output and 51.36MWp = 1.3 :1 • Shotwick Solar Park, Wales - 50MWac output and 72MWp = 1.4 : 1 • Llanwern solar farm, Newport, Wales: 49.9MW output and 75MWp = 1.5 : 1 • Lark's Green solar farm: 49.9MWac output and 71MWp =1.4 : 1 • Lyneham RAF airbase (Bradenstoke Solar Park): 49.9MW output and 69MWp = 1.4 : 1 • Mallards Pass - 240MWac output and 320-360MWp = 1.3-1.5 : 1

#	Letter	LSbp technical responses
		At 1.54 : 1, the estimated overplanting ratio for Hett Moor Solar Farm is comparable to these recent examples. Furthermore, this is just a sample of recent projects and there is no technical reason why overplanting ratios beyond are unreasonable. Looking internationally, we can find examples of overplanting ratios of up to 2 : 1 being proposed in certain circumstances. EN-3 Footnote 92, advises that *"…reasonable overplanting should be considered acceptable in a planning context so long as it can be justified and the electricity export does not exceed the relevant NSIP installed capacity threshold throughout the operational lifetime of the site and the proposed development and its impacts are assessed through the planning process on the basis of its full extent, including any overplanting".*
12	In evidence to the DCO examination for the Sunnica Energy Farm, the proposer of that scheme said, 'A standard DC:AC ratio design in the UK market is between 1.25:1.00 to 1.40:1.00 DC:AC ratio' (8.114 Response to SNTS Deadline 7 Submissions in relation to Scheme Sizing and 'OverBadging', paragraph 1.2.31. The decision on that scheme is awaited.	We cannot comment on other planning applications but note that Lightsource bp has a significant track record of successfully developing, building and operating utility scale projects in the UK. As stated above, Lightsource bp reject the assertion that the proposed DC capacity of the project is above the range stated in the Supplementary Statement.
13	As a comparison, the Energy Savings Trust describes inverter efficiency for home solar panels as 93-96%, so a ratio of no more than 1:1.075:[2]. The need for higher (and so less efficient) ratios does not derive from the inverters themselves, but decisions by operators. Some now dated government guidance, Photovoltaics in Buildings Guide to the installation of PV systems[3], said 'inverter ratios from 1:1 to 1:0.8 are commonly applied in the UK' (so a	The two sources referenced in the Letter are related to the installation of solar generating systems on rooftops rather than utility scale power projects and are extremely outdated: • The Energy Savings Trust webpage referenced is a guidance note for homeowners looking into installing a solar energy system in a domestic setting; it is a not a reputable source of information for utility scale solar energy projects in 2024. Although there are similarities between domestic and utility scale solar, it is not a valid comparison. A relevant example of an inverter available on the utility scale solar market today, that could be used by the applicant on the project, has an efficiency of 98.5% (European)[6]. • The "Buildings Guide to the installation of PV systems" is a document from 2006. There are numerous ways in which the

[redacted]

#	Letter	LSbp technical responses
	DC:AC ratio of 1:1 to 1:1.25) (page 34).	document referenced is not relevant to a discussion on a utility scale project in 2024, a few of these are listed below: ○ It was a guidance document for rooftop installers written at a time when solar PV was a new and unfamiliar technology ○ Solar module prices were approximately 40 times more expensive per Wp in 2006 than they are today[7] [8] ○ There have been significant improvements in the efficiency of the components over the last 18 years as well as the understanding of how to optimise system designs. The total solar capacity installed globally in 2006 was 6GW[9]. ○ The total additional capacity installed globally in 2023 alone was 447GW[10]. ○ Rooftop installations are typically more space constrained than ground mounted utility scale projects. Additionally, the marginal cost of installing more DC capacity is higher on a rooftop than in an open field (e.g. additional scaffolding costs, inaccessible roof areas requiring greater labour or H&S measures etc.). Both of these factors typically incentivise a lower overplanting DC:AC ratio on a rooftop solar installation than a ground mounted one. The references are not relevant from a technical perspective and are spurious in nature.
14	Solar conditions do vary in other countries, but the US Energy Information Administration reported in 2018 that ratios were usually between 1:1.13 and 1:1.30, with a capacity weighted average of 1:1.25.4	Although published in 2018, the data in the study is from 2001-2016, this detail was missed from the Letter and is an important oversight. As per the comments above significant progress has been made in the solar industry since this period. In the article, the range of overplanting for PV plants between 50-100MWp (the range relevant to the Hett Moor Solar Farm) is approximately 1.25 : 1 to 1.36 : 1 DC:AC ratio – averaging at **1.30:1**. This is slightly lower than the optimised 77MWp or 1.54 : 1 ratio that has been estimated for Hett Moor Solar farm. Utility scale projects in the US tend to make use of single axis tracking systems rather than the fixed tilt mounting structures proposed on the project in question. Single axis trackers will generate significantly higher specific yield per

[redacted]

#	Letter	LSbp technical responses
		module installed (kWh/kWp) than a fixed tilt solar plant at the same location. In addition to this, the states within the USA that had the largest deployment of solar projects in the period 2001-2016 included California, Nevada and Arizona. The climatic conditions of those states are different to those in the North-east of England – with far more clear sky days and greater overall irradiation each year. These factors result in a higher yield per module installed, more hours operating at maximum AC output and will consequently incentivise a lower overplanting ratio. Therefore, we reject the relevance of the data-source in the context of the fixed tilt solar plant design and the climatic conditions relevant to the Application.
Conclusion		
15	In conclusion: i. The applicant says it overplants by 1.25 to 1.8, so 62.5MW to 90MW. That has a substantial effect on the size of the solar farm and so on its planning impacts. Taking the applicant's figures of 4.2 acres per MW at Hett Moor Solar Farm (including intervening planting)[5], a 90MW solar farm would be 115 acres larger than a 62.5MW solar farm. ii. The range claimed by the applicant is not supported by any evidence. What evidence there is supports much lower ranges than the applicant's. The ratio put forward by the applicant (1:1.54 (77/49.9)) is much higher than published typical ratios. iii. The scheme proposed has a DC output of between 92.7 and 94.7MW. The figure claimed and adopted by the Committee report is wrong. iv. The planning application scheme ratio is therefore between 1:1.86 to 1:1.90.	Taking the items one by one: i. The reference to overplanting ratios of 1.25 and 1.8 is for solar farms that Lightsource bp has and is currently developing, and for the reasons explained above, the extent and design of a solar farm, including the degree of overplanting, is influenced by characteristics of the site and the potential impact on the surrounding area as well as the technical measurements such as panel size, total area and percentage of ground cover. The extent of overplanting will be different from one project to another. The Supplementary Statement (8th March 2024) and Application provide further details on the extent of land used. ii. Further details have been provided explaining that an installed generating capacity of around 77MWp with an overplanting ratio of 1.54: 1 is a reasonable, and an optimal level of overplanting at this time for a project in this location with a total installed capacity of inverters of up to 49.9MWac. Further explanation is provided on the need for the Application, and subsequent permission, to allow for the applicant to have the ability to finalise the solar panel power rating(s) based on sound procurement principles prior to construction. The scenarios above illustrate that 77MWp can be achieved with different panel types within the site layout plan and typical elevation plans, and proposed conditions – specifically planning Conditions no. 4 and 10 which require the final design and materials to be submitted for approval prior to commencement of development (including the inverters). The output of the inverters will be limited by Condition 19 to 49.9MWac. iii. The drawings provided in the Application are typical of solar panels on the market. The Letter and Technical Analysis have made assertions on the capacity of the panels, and used various methods for calculating the installed capacity of the solar farm including a method which is not used by the

#	Letter	LSbp technical responses
	This is considerably above the range claimed by the applicant (1.25-1.8), the ratio claimed for this scheme (1.54) and the evidence from elsewhere (which is no higher than 1.4). v. The applicant has failed to provide any justification for the inverter ratio which they have adopted, and none is offered in the Committee report. Given the substantial effect on the size of the solar farm of different ratios, the particular ratio (and so land take) needs to be justified. That has not been done.	industry. The Application, and the permission which the committee mind to grant was <u>not</u> for a specific panel type and capacity which cannot be defined at the planning application stage. It has been demonstrated that the optimal level of installed capacity is around 77MWp for this project (a DC:AC ratio of 1.54 : 1), and this could be delivered in accordance with the approved plans, unless amended by details approved under Condition 10 (refer to proposed Conditions 4 and 10). iv. Refer item iii. above. v. Lightsource bp has previously clarified in its Supplementary Statement (8th March 2024) that the maximum combined output of the installed inverters would be no greater than 49.9MWac and this is to be controlled via a condition attached to the planning permission (refer to proposed Condition 19). The installed inverter capacity for our solar farms, including Hett Moor, is designed to account for the maximum export capacity and the District Network Operator's (DNO) G99 Regulation requirements for the grid connection, which includes reactive power requirements and other power quality requirements. In some cases, a nominal amount of additional inverter capacity is required to ensure the AC export capacity, and overcome reactive power consumption as recognised in EN-3 footnote 91. A Power Plant Controller (PPC) will also control all inverters on site, in order to maintain the output within the export limit (defined by the connection offer) at all times. Similar to solar panels, there are a large number of different inverter types on the market and the technology is continually evolving.

4.1 In summary, the factors that have led Lightsource bp to design the scheme in the way that is shown on the approved layout plan are:

1 the objective of maximising the renewable energy generating efficiency of the site which has been achieved by using an overplanting ratio of around 1.54 / 77MWp with an export capacity of up to 49.9MWac; and

2 to allow the development to come forward using a range of panel types and capacities which are available on the market at the point of procurement and construction and which including 570Wp panels that have been used elsewhere by Lightsource bp;

3 the ability to use 570Wp panels to generate a target peak of around 77MW (DC) with a layout which is in line with that approved, and finalised through the discharge of Condition no. 10;

4 the impacts of such a layout have been fully assessed and accepted in the grant of planning permission;

5 condition no.10 would enable the final layout to be approved, potentially including the use of a higher rated panel.

4.2 We trust that this provides further information to inform the Council on approach to the design of the proposed Hett Moor Solar Farm, and provides further clarification on the level of overplanting, noting that EN-3 Foot note 92 requires that *"reasonable overplanting should be considered acceptable in a planning context so long as it can be justified and the electricity export does not exceed the relevant NSIP installed capacity threshold*".

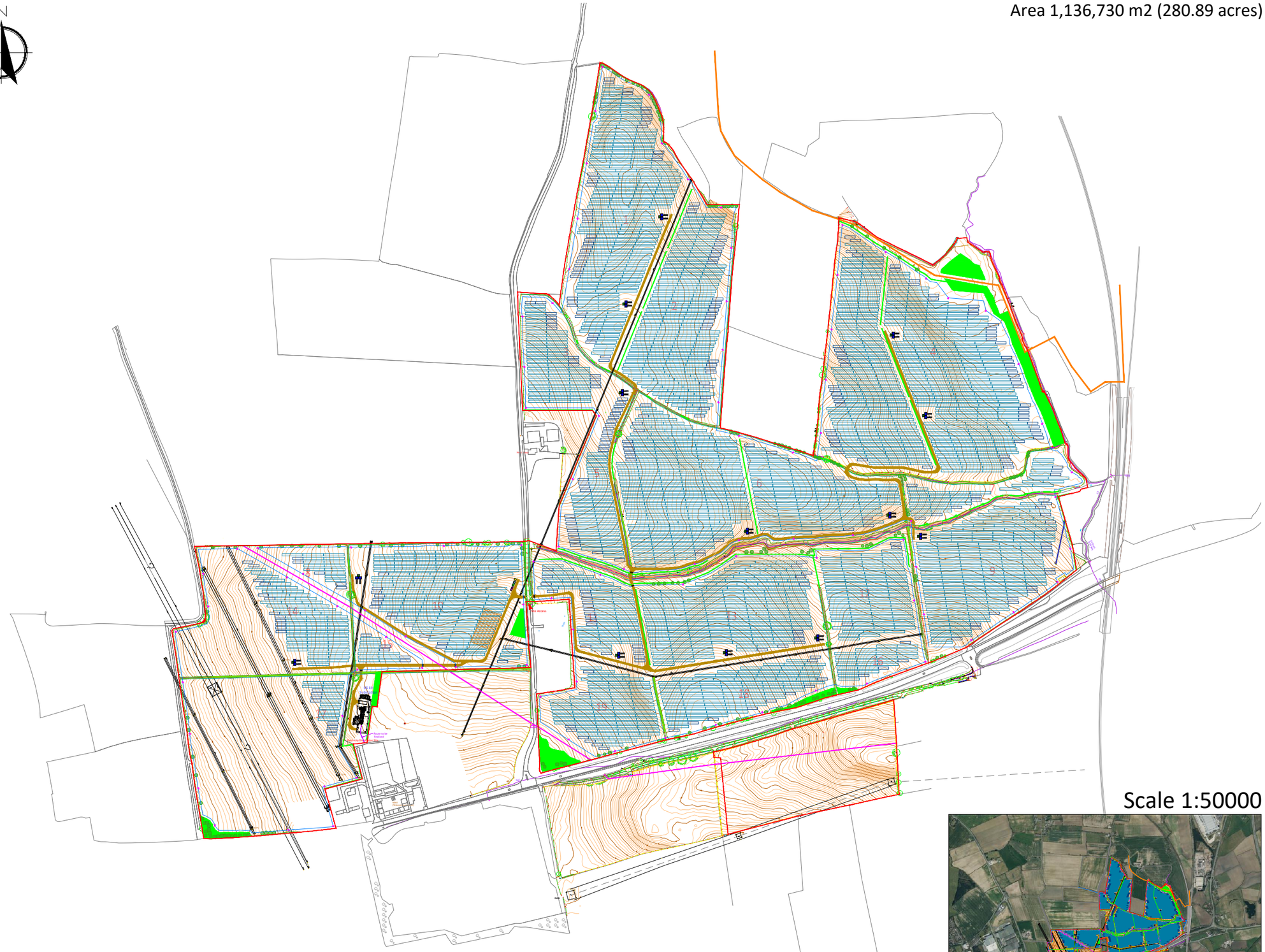
5.0 Community Benefits

5.1 The Minutes (page 13) and the recording of the planning committee meeting (at ~2 mins 36 seconds) clearly states that community benefit was, "**not** something that you can afford weight to". [redacted]

Appendix 1 - Figure 1

GBR_Hett Moor_LP3 - Basic Design Layout_10

Area 1,136,730 m2 (280.89 acres)



- Site Boundary
- Site Access
- Security Fence
- Module Table 30 x 2
- Module Table 15 x 2
- Transformer
- Inverter
- Switchgear Substation
- DNO Substation
- GRP Cabinet
- Customer Substation
- Monitoring House
- Auxiliary Transformer
- Storage
- Access Road
- Tree
- Access Gates
- CCTV
- Toilet
- Footpath
- Pipeline
- Proposed Planting

Scale 1:50000

ISO full bleed A3 (420.00 x 297.00 MM)

DRAWN	CHECKED	APPROVED	DATE
DA			20.06.2023

PROJECT NAME & ADDRESS:
Location: Hett Moor Farm
Postcode:

NOTES:
-
-
-
-

Paper Size:	Scale:	Sheet:
A3	1:7500	1

CAPACITY:

DRAWING TITLE:
GBR_Hett Moor_LP3 - BDL_10

DRAWING NUMBER:	STATUS:
LP3-BDL	Preliminary

lightsource bp

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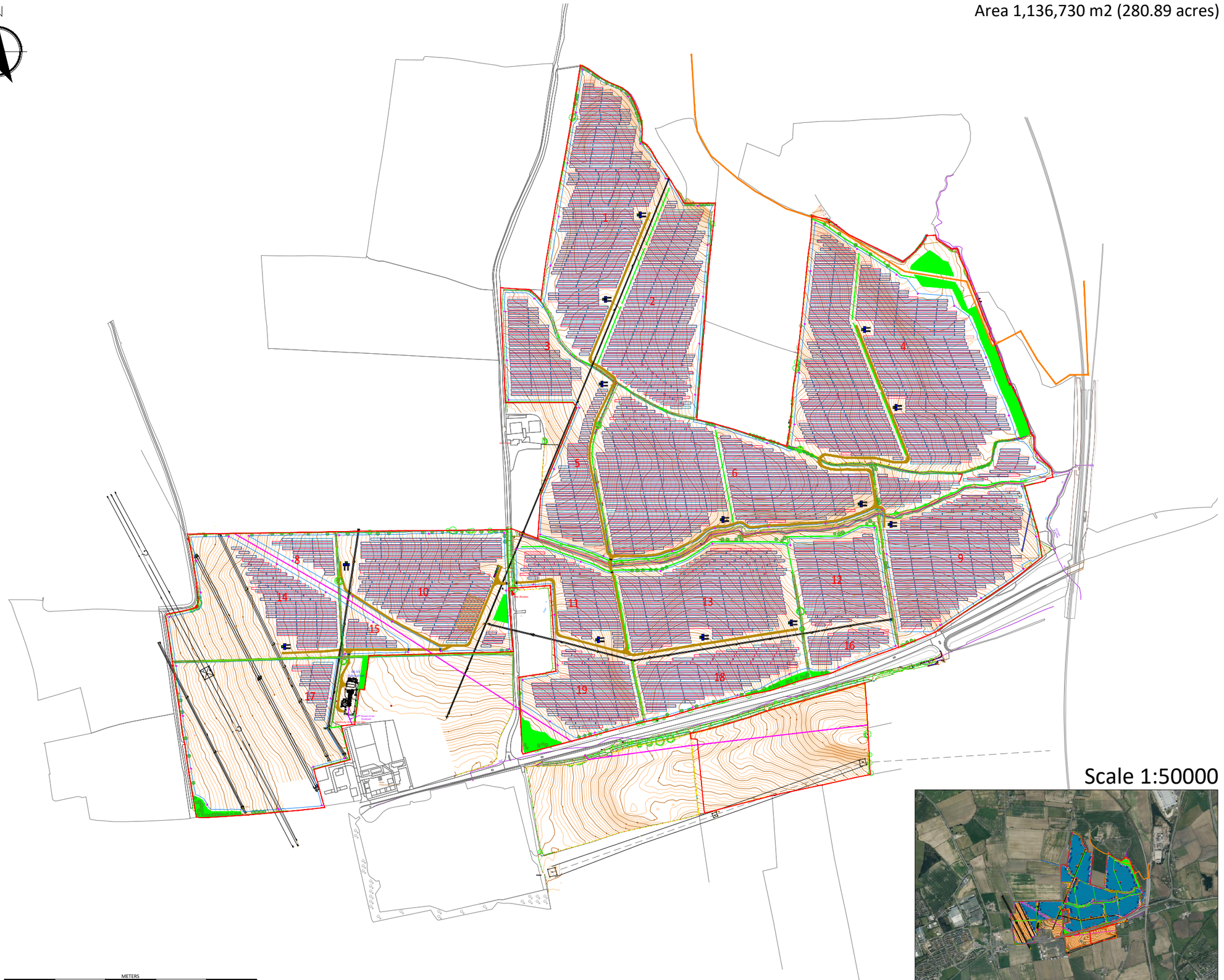
7th Floor, 33 Holborn, London, EC1N 2HU
General: +44 (0) 333 200 0755
Web: [redacted]

LICHFIELDS

Appendix 2 - Figure 2

GBR_Hett Moor_LP3 - Basic Design Layout_11

Area 1,136,730 m2 (280.89 acres)



- Site Boundary
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- Transformer
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- Access Gates
- CCTV
- Toilet
- Footpath
- Pipeline
- Proposed Planting

Scale 1:50000

ISO full bleed A3 (420.00 x 297.00 MM)

DA			23.07.2024
DRAWN	CHECKED	APPROVED	DATE

PROJECT NAME & ADDRESS:
Location: Hett Moor Farm
Postcode:

NOTES:
-
-
-
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Paper Size:	Scale:	Sheet:
A3	1:7500	1

CAPACITY:

DRAWING TITLE:
GBR_Hett Moor_LP3 - BDL_11

DRAWING NUMBER:	STATUS:
LP3-BDL	Preliminary

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