RWE

Folder 1 of 12

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Tween Bridge Solar Farm

Preliminary Environmental Information Report
Non-Technical Summary

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A Nationally Significant Infrastructure Project

Contents.

Appendices Contents

1. INTRODUCTION

1.1. This document is a Non-Technical Summary (NTS) of the draft Preliminary Environmental Information Report (PEIR) for the proposed Tween Bridge Solar Farm (hereafter referred to as the Scheme), located circa 10km to the northeast of Doncaster. The scheme is being developed by RWE Renewables (the "Applicant").

1.2. The NTS provides a summary detail of the Scheme, as well as a description of the existing environment in and around the development area. The NTS also presents a summary of the key findings of the Environmental Impact Assessment (EIA) undertaken for scheme to date. The NTS is intended to act as a standalone document that will provide an overview of the environmental effects of the proposed development using non-technical language. For more detailed information, the full draft PEIR should be referred to, which is available on the project website https://tweenbridgesolar.co.uk/.

Overview of Scheme

1.3. The main element of the proposal is the construction, operation, maintenance and decommissioning of a ground mounted solar farm with an export capacity of over 50MW with associated development.

1.4. An operational lifespan of 40 years is proposed. The Scheme will progress in accordance with a phasing plan. The Scheme may be carried out thorough a single continuous phase or in multiple phases. A single main substation compound will serve the whole development, and this will be required for the duration of the Scheme and retained thereafter. The substation compound would be located within the main development area, to the north of the Stainforth and Keadby Canal, adjacent to the existing overhead electricity pylons which traverse the site.

1.5. At this stage of the project, it is anticipated that the Scheme would comprise the following works:

- Arrays of Ground Mounted Solar Panels
- Battery Energy Storage System
- Formation of Ecological Corridors and Green Infrastructure
- Substation Building and Compounds
- Upgrade to Main Access Track
- Temporary Construction and Decommissioning Compounds
- Open trench cabling works
- Directional drilling for cable works for various crossing including: rhynes; canal; railway; and, the M180
- Fencing and Security Measures

- Electrical Car ('EV') charging point
- Culverts & upgrades to existing culverts

1.6. During the construction phase, one or more temporary construction compound(s) will be required as well as temporary roadways to facilitate access to all parts of the site.

Consultation & Purpose of this NTS

1.7. This working draft NTS is being published to accompany an informal pre-application consultation with the community and other consultees including statutory bodies and landowners. The information contained in this NTS is 'preliminary' and may not represent the final project design or include the final environmental assessment considerations and conclusions. The Applicant is seeking consultation responses to the information presented in order to continue to refine the development design and to continue to obtain information that will inform the final PEIR which will be used to accompany the formal statutory pre-application consultation which will take place in 2024.

The Consenting Process and Nationally Significant Infrastructure Projects

1.8. The Scheme represents a significant planning and investment project and is a Nationally Significant Infrastructure Project (NSIP). The development consent regime for determining NSIPs is known as the Development Consent Order ('DCO') regime. The Planning Act 2008 dictates that the Secretary of State is responsible for determining the DCO applications, with the Planning Inspectorate appointed to manage, examine the application and make a recommendation to the Secretary of State who will then decide whether to grant a DCO, which authorises and permits the development. The Applicant will therefore be making an application for a DCO to the Planning Inspectorate, which will then be determined by the Secretary of State for Energy Security and Net Zero.

1.9. The Planning Act 2008 defines the key stages in the application process for NSIPs. These are summarised below and further information on the Planning Inspectorate and the planning process can be found here https://infrastructure.planninginspectorate.gov.uk.

- Pre-application – Applicant notifies and consults the public, statutory consultees and those with an interest in the affected land on its proposed application. Pre-application is typically split into informal phase of consultation followed by the formal phase of pre-application consultation. This Scheme is currently at the informal stage of pre-application consultation.
- Submission – Applicant will review the feedback received during consultation and finalise the proposals taking the feedback into account. A DCO application will then be submitted to the Planning Inspectorate, who will appoint the examination team for the application.
- Acceptance – after the application is submitted, the Planning Inspectorate will decide whether it is suitable for examination.

- Pre-examination – if accepted for examination, there will be an opportunity for people to register their interest in the application with the Planning Inspectorate. Anyone registered will be kept informed of the progress of the application by the Planning Inspectorate, including how they can provide comments. The Planning Inspectorate will invite all those registered to a preliminary meeting that will explain the timetable and format of the examination.

- Examination – the examination lasts around six months. People who have registered their interest will be able to take part in the examination and send their comments to the Planning Inspectorate.

- Decision – following the examination, the Planning Inspectorate will make its recommendation on the application to the Secretary of State, and the Secretary of State has the final decision as to whether consent is to be granted.

The Applicant

1.10. RWE Renewables is one of the world's leading producers of renewable energy. RWE Renewables is now the world's second largest offshore wind developer and third largest provider of renewable electricity across Europe. The Applicant has the necessary knowledge and experience in renewable energy to develop the Scheme. In March 2023, RWE Renewables significantly expanded its solar and battery capabilities by acquiring JBM Solar. For the purpose of the DCO submission, RWE Renewables may set up a specific legal entity for the Scheme and this would be put in place before the start of any formal consultation process.

The Site

1.11. The proposed Scheme is located within the Yorkshire and Humber regions. The site extends to over 1500 hectares, centred at approximately 10 kilometres to the northeast of Doncaster and 14 kilometres to the west of Scunthorpe. The Scheme straddles the administrative boundaries of Doncaster Council and North Lincolnshire Council. At a local level, the Scheme is located on land east of Thorne; south of Tween Bridge Moors; west of Crowle; north and northwest of Sandtoft & Sandtoft Industrial Estate; north of Hatfield Moors; and, northeast of Hatfield. The Scheme is located on land either side of the M180, High Level Banks (the A18) and the Stainforth and Keadby Canal.

1.12. The Draft Order Limits (Site Location Plan) is provided at **Appendix 1.**

Next Steps

1.13. At the end of the informal consultation, all responses received will be considered and taken into account in the development of the Scheme, as we prepare for formal pre-application consultation currently scheduled for summer 2024.

2. Scheme Description

2.1. The main element of the proposal is the construction, operation, maintenance and decommissioning of a ground mounted solar park with an intended design capacity of over 50MWp (megawatts peak), and a Battery Energy Storage System (BESS) with an export/import connection to the National Grid.

2.2. An operational lifespan of 40 years is proposed. The Scheme will be refined during the iterative design process, taking into account the environmental constraints and opportunities of the site, together with consultation responses from consultees and the community. The need for flexibility in design, layout, and technology is acknowledged in a number of National Policy Statements to address uncertainties inherent to a scheme. This is very pertinent to solar and battery developments due to the rapid pace of change in technology. As a result, any forthcoming DCO application for this Scheme will require a degree of flexibility to allow the latest technology to be utilised at the time of construction.

The Works Components of the Operational Scheme

2.3. The components of the Scheme comprise several zones, these are: -

- Work No. 1: Solar Photovoltaic Arrays
- Work No. 2: Battery Energy Storage System
- Work No. 3: RWE 132kv/ 33KV Substations
- Work No. 4: Ecological and Landscape Mitigation and Enhancement Corridors
- Work No. 5: Electrical Car (EV) Charging Point

2.4. These draft Work Zones are presented on the drawing "Works Plan" presented as Appendix 2. The detailed layout drawings are provided at Appendix 3.

Work No. 1: Solar Photovoltaic Arrays

2.5. The design principles of the solar photovoltaics are:

- A generating station comprising arrays of ground-mounted solar panels with a gross electrical output of over 50 megawatts peak.
- All solar panels will be located within the Work No. 1 area as defined on the draft Works Plan.
- Total land coverage of the ground-mounted solar panels would be c 3.8 square km. Based on a wattage output of 570Wp panel, the potential maximum range for energy generation is up to 818 MWp of direct current (DC) capacity. This would equate to around 600 MW of alternating current (AC) capacity. It is noted that the environmental design parameters of the Schem is based on the land take of panels and not their overall capacity.

- An array is a galvanised steel and anodised aluminium mounting structure with the solar panels attached to it.
- The maximum top height of the arrays from the ground will be 3.6m.
- The minimum height of the lowest part of the arrays from the ground will be 1m.
- All solar panels will be south facing.
- Panels may be mono-facial or bifacial.
- Solar panels will be either dark blue, grey, black or similar in colour.
- Indicative slope of the solar panels from horizontal would be 15 to 35 degrees.
- Internal access track of permeable construction with provision of new culverts or low level bridges to cross existing ditches.
- Typical minimum distance between edge of the arrays, to the 1.8m high perimeter fencing, would be 3m.
- Biodiversity would be promoted within and around the arrays.
- CCTV positioned along the perimeter of the arrays on 3m high poles.
- Installation of arrays by driving steel pin piles, screw piles or ballast/concrete pads.
- Planting and ecological works between and underneath the panels, incorporating the biodiversity objectives and management prescriptions in accordance with a proposed Outline LEMP.
- Central inverters and Medium Voltage ('MV') Power Stations
- Set back distance of 15m in relation to woodland habitats
- Set back of 9m to drains managed by the Internal Drainage Board

2.6. The solar panels would convert solar irradiance into direct current (DC) electricity. A solar panel consists of a layer of silicon cells, an anodised aluminium frame and various wiring to allow current to flow from the silicon cells. Silicon is a non-metal with conductive properties that allow it to absorb and convert sunlight into electricity. When light interacts with a silicon cell, it causes electrons to be set into motion, which initiates a flow of electric current[1]. The solar panels are connected in series and set out on south facing arrays. The arrays will be laid out in multiple parallel rows running east to west across the various field enclosures. The mounting structure and solar panels will be static. The distance / gap between the arrays

[1] It was first discovered in 1839 by Edmond Becquerel and can be generally thought of as a characteristic of certain materials (known as semiconductors) that allows them to generate an electric current when exposed to sunlight.

would respond to topography but would typically be around 4m. Land between and beneath the arrays will be used for biodiversity enhancements and seasonal sheep grazing. If sheep grazing is not possible then grassland will be managed through a grass cutting regime.

2.7. The mounting structure will be supported at intervals by double mounted posts set approximately 3.75m apart. The posts will be pushed into the ground with a small plant rig, to depths between 1.5m to 3m and this will be guided by localised ground conditions. Ballast foundation design could also be used.

2.8. If any areas of archaeological interest are identified within the work area, then consideration will be given to the use of non-intrusive installation method, where the posts will be fixed into concrete pads resting on top of the ground.

2.9. The insulated DC cables from the solar panels will be routed in channels fixed on the underside of the mounting structure. The DC string cables will run along the entire underside of each row. The electrical cabling from each array will be concealed through shallow trenches linking the solar panels to the inverters and transformers and then to the main substation. The cable trench will typically be between 0.5m to 1.1m in depth and up to 1.0m wide. The cable trench may also carry earthing and communications cables and will be backfilled with fine sands and excavated materials to the original ground level.

2.10. The inverters, transformers and associated substation & switch gear are required to convert the DC energy produced by the arrays into AC energy, these will be located across the Works area. The AC cable will also be laid in trenches and would run directly to the client substation compound. The cabling from arrays will be connected to Central Inverter & MV Power Stations. Cabling, from here would continue to the relevant RWE substation (see Work No. 3).

2.11. The arrays would be set within perimeter fencing up to 1.8m in height with wooden supporting posts placed at intervals of c. 3.5m.

2.12. The perimeter fencing would be either green or galvanised aluminium in finish and would typically follow the outer field boundaries containing the solar panels. The minimum distance between the edge of the arrays and the perimeter fence would be 3m. A CCTV system mounted on poles will be positioned at intervals along the inside face edge of the perimeter fencing (between the fence and the arrays).

Work No 2: Battery Energy Storage System (BESS)

2.13. A Battery Energy Storage System ("BESS") will be an associated part of the electrical infrastructure of the scheme. A BESS is an electrochemical device that is charged by collecting energy from the grid or a power plant, such as the solar arrays, and then discharges that energy at a later time to provide electricity or other grid services when needed.

2.14. The BESS consists of containerised battery units that can store energy and are able to release or absorb energy from the power network. Being able to absorb and release energy, the battery energy storage system at Tween Bridge would be used to contribute towards the frequency balancing services, where the power is being generated or absorbed statically or dynamically depending on the system frequency. When there is not enough power, batteries are discharged to balance under frequency preventing black and brown outs. To balance over frequency batteries are charged to prevent dangerous spikes across electricity infrastructure. The candidate BESS would be connected directly to the substation and is

therefore termed an AC-coupled system. The Applicant is also exploring the option of providing a DC-coupled BESS, these are batteries located between the solar arrays and their inverters.

2.14 The design principles of the BESS are: -

- A BESS contained within a gated compound.
- The candidate storage capacity is up to 400MW/800MWh.
- Total land coverage of the BESS compound would not exceed 89,400 m sq.
- The BESS would be made secure by a 3m high gated palisade fence.
- The BESS would comprise battery storage containers. The specific plant arrangement of the BESS system is not yet fixed, typically, the battery containers would have a maximum length of 17m, maximum width of 3m and a maximum height of 4m.
- The battery containers could be dark green or similar in colour.

2.15. For geotechnical design purposes a range foundations are available, dependent on the soil conditions in various parts of this very large site. Piled foundations are the most likely option for the battery energy storage system.

Work No. 3: RWE 32kv/33kv Substations

2.16. The candidate design provides for 5 satellite RWE substations and one main RWE substation which is currently positioned to the immediate south of the BESS (Work No. 2). Each satellite substation will have a development footprint of c. 36m by 36m. These are necessary to step up the voltage of the electricity delivered by the Solar PV from 33kV to 132kV for onward transmission to the main RWE substation where the 132kV is converted to 400kV for connection to the National Grid circuit.

2.17. Electric cabling will be laid to link together the five satellite substations to the RWE's main (or primary) substation located next to the BESS. RWE's main substation would have a development footprint of c. 220m by 156m. From here, cabling works would continue to connect to the proposed National Grid major substation. Electrical cabling connecting the client substations would be underground. The majority of the cabling linking the client substations would be laid by open trench technique. The dimensions and depth of the trenches would vary depending on the amount of cabling and ground conditions, typically they would be up to 1.5m in depth. The process will follow a soil management plan to ensure that the soil structure and quality are not degraded as part of the construction process. The location of RWE's main substation may alter subject to the location of the National Grid substation which is to be confirmed by National Grid. Piled foundations are the most likely option for RWE's substations. A defensive bund is also proposed to be sited around the vulnerable infrastructure on site, alternatively their finished floor levels can be raised above the flood risk levels.

Work No. 4. Ecological and Landscape Mitigation and Enhancement Corridors

2.18. The Scheme presents considerable opportunities for landscape and biodiversity mitigation and enhancements.

2.19. Ecological and biodiversity measures are promoted across the entire Order Limits area and this is augmented within Work No. 4. Within this area, a number of measures and features are proposed for the benefit of biodiversity. This includes the planting of new hedgerows and bolstering of existing field boundaries to increase coverage of this habitat, provide effective landscape screening, and to improve connectivity of the hedgerow and woodland network across and beyond the Order Limits. An Outline Landscape and Ecological Management Plan (LEMP) will be prepared, and this will apply to the entire site. The objectives for the Outline LEMP will be discussed with the host local planning authorities and Natural England. The Applicant envisages that the Outline LEMP will provide measures:-

- To create new grassland habitats through seeding existing arable land with locally appropriate native species which complement and contribute towards the biosphere / biodiversity management plan of host planning authorities.
- For hedgerow planting.
- To manage the grassland to establish a diverse sward beneath the arrays.
- To manage grassland outside the array for wildlife.
- To manage areas to provide suitable conditions for arable flora.
- To manage hedgerows to provide habitat for a range of species and ensure visual screening of the site from the footpath.
- To manage aquatic habitats as necessary.
- To provide sheltering features around the site for nearby populations of bats, birds and other notable faunal species.
- To monitor the site and assess the success of management and adherence to the prescribed management.
- Provision of a 15m buffer where the development site adjoins Scheduled Ancient Woodland.

Work No. 5. Electrical Car (EV) Charging Point

2.20. The Applicant is exploring the option of providing an EV charging point within the Order Limits. The Applicant has set aside land to the immediate east of Moor Edges Road and north of Moor Owners Road for the provision of an EV charging hub and vehicle parking. Access to the EV charging station would be secured via the creation of a new vehicular access off Moor Edges Road. Design principles for the EV charging point are: -

- Off street EV parking bays.
- New dedicated access off Moor Edges Road.
- EV cabinets.
- Road Signage.
- Street lighting.

2.21. The EV charging points would be made available to the local community. Consideration would be given to the use of a canopy for the charge points.

National Grid Substation

2.22. RWE Renewables have accepted a grid connection offer from National Grid; this confirms that the energy generated by the Scheme can be fed into the National Grid at the existing 400kV Drax to Keady overhead line. This will be achieved by National Grid developing their own new 400kV substation.

2.23. The connection date to the new National Grid substation is currently scheduled to be in 2029. This is subject to construction of the new substation and completion of the necessary grid reinforcement works by National Grid. A 400kV underground cable will be used to connect the Scheme to the new National Grid substation.

2.24. The authorised transmission export capacity will be 400MW with a further 200MW available in 2032, giving a total export capacity of 600MW. The exact location of the new National Grid substation will be subject to a separate location study and consenting application by National Grid.

Trenchless Cable Works

2.25. Within the Order Limits, there are a number of locations that may require trenchless approach to the laying of cables. At these locations trenchless techniques, such as boring, micro-tunnelling, or moling methods are likely to be undertaken. The Applicant has commissioned technical assessments and ground investigations works to inform final design detail. The potential locations where trenchless techniques may be utilised are listed below.

- M180 motorway crossing.
- Stainforth and Keadby Canal.
- South Humberside Main Line Railway.
- High Level Bank Road (A18).

Operational Phase

2.26. During the operational phase, the activities on site would amount to servicing and maintenance of plant and equipment associated with the Scheme, including solar panels,

inverters, transformers, substation compound and vegetation and biodiversity management. Landscape, ecological and biodiversity benefits could include the installation of barn owl boxes, bird nesting boxes, bee hives, log piles and other hibernacula such as small buried rubble piles suitable for reptile species, amphibians and insect life. Land between and beneath the panels would be used for biodiversity enhancements and agricultural use would continue through sheep grazing. Tree planting would be introduced along field boundaries where required.

Temporary Diversion of Public Right of Way ('PRoW')

2.27. Temporary diversion of a sections of Public Rights of Way (PRoWs) Thorne 19 and CROW 21, which traverse the site, may be required during the construction and decommissioning periods in order to separate and keep apart members of the public from the construction / decommissioning vehicles and machinery. If required, it is proposed that any temporary closure would be secured through the DCO and during the duration of the temporary closure an alternative path would be provided. Alternatively, where construction vehicles crossing the PRoW cannot be prevented, a banksman can be used to ensure the continued safe passage of the public on the definitive right of way.

Construction Period

2.28. The Environmental Statement will consider the options of the scheme being constructed through either a single phase or a multiple of phases (i.e., phased approach to the construction of the solar arrays / development parcels). If all elements were constructed at the same time, then the construction phase would last up to 30 months. Alternatively, the construction of the Scheme would coincide with the phased connection dates from National Grid. The Environmental Statement will provide a full description of the potential construction, operational and decommissioning variances. All variances will be assessed within the Environmental Statement.

2.29. A main temporary construction compound will likely be established close to the site entrance for each area of development. Smaller temporary compounds will be located across the site as the scheme is built out. Detailed description of the construction compounds including their size and duration required on site will be presented in the next iteration of the PEIR. Depending on weather conditions during construction, temporary roadways (e.g., plastic matting) may be utilised to access parts of the Scheme.

Decommissioning Phase

2.30. Within 12 months of the planned end to energy generation and storage at the site, a Decommissioning Strategy would be submitted to the relevant planning authority(s) for approval. The Decommissioning Strategy would detail how plant and machinery located within the Order Limits would be removed. The Decommissioning Strategy will follow the principles laid out in an Outline Decommissioning Strategy which will be submitted as part of the DCO application. The decommissioning period is expected to take up to 2 years.

3. Site Description

3.1 Tween Bridge Solar Farm broadly lies between the settlements of Thorne and Crowle, occupying separate parcels of land within a relatively flat agricultural landscape predominantly in arable use for the cultivation of cereal crops with some areas of modified grassland and short rotation coppice. Many of the field boundaries are subdivided into rectilinear parcels by long linear drainage ditches., some with partial or sporadic hedgerows. The Schemes development parcels are dissected by several major roads and routes, including the M180 motorway, the A18, the South Humberside Main Line railway route and Stainforth & Keadby Canal.

3.1 Numerous other minor roads cross the landscape connecting scattered residential properties and farmsteads, many of which lie adjacent or in proximity to the site. Tween Bridge Wind Farm and substation lies in the northern part of the site[2]. Overhead power lines and lattice pylons runs across the northern part of the Scheme which creates other vertical elements within the landscape. There are wooden pole lines and masts within the Draft Order Limits.

3.1 Bar the two areas of significant woodland to the north and south of the site associated with former peat extraction at Hatfield Moors and Thorn Moors, the landscape contains relatively limited areas of vegetation, largely limited to field boundaries in the form of hedgerows, which many are incomplete and gappy. There are occasional scattered trees or groups of trees and some small woodland copses.

3.2. There are four number Public Rights of Way (PRoW) that are located within or close to the Scheme. (See Figure 6.4 Recreation Plan). Public Footpath FP19 (Thorne) lies in the central northern part of the site forming part of the access to Tween Bridge Solar Scheme. Public Footpath FP15 (Thorne) lies just beyond the most north western boundary of the Scheme. In the north eastern part of the Scheme Public Right of Way (Footpath 17) lies beyond the Scheme area forming a continuation of an unnamed north-east/south west Byway. Footpath 18 runs from the unnamed byway south eastwards into the western side of Crowe.

[2] Tween Bridge wind farm, also known as Tween Bridge Moor, was commissioned in 2012. It consists of 22 Vestas V90/2000 wind turbines with a combined rated output of 44 MW.

4. Legislation and Policy Context

4.1. This section summarises the legislative and planning policy framework applicable to the Scheme. The process for applying for a Development Consent Order is set out in the Planning Act 2008 (the 'Act')[3].

4.2. The Act introduced a new system for consulting on, applying for, examining and determining NSIPs as defined by Section 14 of the Act. A non-exhaustive list of the main legislative and procedural requirements relating to NSIPs are presented within the following:

- The Act;
- The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) (the APFP Regulations);
- The Infrastructure Planning (Examination Procedure) Rules 2010;
- Infrastructure Planning (Interested Parties and Miscellaneous Prescribed Provisions) Regulations 2015; and
- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 2017 EIA Regulations).

4.3. The development consists of a solar photovoltaic (PV) generating station with an output in excess of 50 megawatts (MW) and this currently comprises an NSIP to which sections s14(1)(a) and s15(2) of the Act apply.

4.4. Section 104(1) of the Act applies if 'a NPS has effect in relation to development of the description to which the application relates' (a 'relevant National Policy Statement'). In such a case, the SoS would have to determine an application in accordance with the relevant National Policy Statement (NPS), subject to where specific exceptions apply (s104(3)).

4.5. Where s104 does not apply, an application falls to be decided under s105 of the Act. Section 105(2) requires the SoS to have regard to:

- any Local Impact Report (within the meaning given by the Act s60(3)) submitted to the SoS before the specified deadline for submission;
- any matters prescribed in relation to development of the description to which the application relates; and

[3] The Project constitutes a Nationally Significant Infrastructure Project (NSIP) by virtue of section 14 (1)(a) and section 15 of the Act which includes within the definition of an NSIP any onshore electricity generating station in England or Wales of 50 Megawatt capacity or more. Under section 31 PA 2008 a development consent order (DCO) is required to develop a NSIP. Under section 37 PA 2008 this can only be granted if an application is made to the Secretary of State (SoS).

- any other matters which the SoS thinks are both important and relevant to the decision.

4.6. Solar generation is excluded from the scope of the extant Overarching National Policy Statement for Energy (EN-1) and the extant National Policy Statement for Renewable Energy Infrastructure (EN-3) (NPS EN-3). Accordingly, at the time of consultation of this draft PEIR NTS, there is no designated NPS that has effect with respect to the consideration of the proposed solar arrays. Similarly, energy storage systems do not come within the scope/ coverage of the suite of designated energy NPSs. However, Section 105 of the Act enables policy included in an NPS that is not designated for solar generation to be considered amongst the matters that are considered to be important and relevant for the purposes of decision making.

4.7. In the recent decision for Longfield Solar Farm , granted on 26 June 2023, the Examining Authority's Report considered that the NPS EN-1 and EN-5 were both important and relevant to the decision of that application. The Examining Authority also considered that the National Planning Policy Framework and the National Planning Practice Guidance were also relevant to the determination of the application.

4.8. In September 2021, the Government commenced a consultation on revised versions of the energy NPSs. That consultation involved the issuing of draft versions for revisions to NPS EN-1 to NPS EN-5 inclusive. While these draft NPSs have not been designated and do not have effect for decision making under s104 of the Act, draft NPS (dNPS) EN-1 makes clear that:

> **"... any emerging draft NPSs (or those designated but not having effect) are potentially capable of being important and relevant considerations in the decision-making process. The extent to which they are relevant is a matter for the relevant Secretary of State to consider within the framework of the Planning Act and with regard to the specific circumstances of each development consent order application."**

4.9. With reference to the recent Longfield decision, the Examining Authority's Report to the Secretary of State, the appointed Inspector considered that the earlier published draft versions of EN-1, EN-3 and EN-5 are important and relevant consideration to the determinisation for that application under Section 105 and should be afforded considerable weight. The same must therefore apply for the latest draft NPSs that were published for consultation in March this year (March 2023).

4.10. The key planning policy relevant to the determination of the scheme are:-

- Overarching National Policy Statement for Energy (EN-1) (July 2011)
- National Policy Statement for Electricity Networks (EN-5) (July 2011)
- Draft Overarching National Policy Statement EN-1 (March 2023)
- Draft National Policy Statement for Renewable Energy EN-3 (March 2023)
- National Planning Policy Framework (September 2023)
- Planning Practice Guidance (PPGs)

- Climate Change;
- Renewable and Low Carbon Energy;
- Historic Environment;
- Natural Environment;
- Open Space, Sports and Recreation Facilities, Public rights of Way and Local Green Space; and

- City of Doncaster Development Plan:-
  - Doncaster Local Plan 2015 to 2035 (adopted 23 September 2021)
  - The Barnsley, Doncaster and Rotherham Joint Waste Plan (adopted March 2012)
  - Thorne-Moorends Neighbourhood Plan
- North Lincolnshire Council Development Plan
  - The North Lincolnshire Local Development Framework:
  - The Core Strategy (adopted June 2011)
  - Housing and Employment Land Allocations Development Plan Document (adopted March 2016)
  - Lincolnshire Lakes Area Action Plan Development Plan Document (adopted May 2016)
  - SuDS and Flood Risk Guidance Document (April 2017)
  - Planning for Renewable Energy Development Supplementary Planning Document (November 2011)
  - Planning for Solar Photovoltaic Developments Supplementary Planning Document (January 2016)

5. Assessing Environmental Impact

5.1. The working draft PEIR presents the latest findings of the Environmental Impact Assessment undertaken for the scheme. The EIA assesses the likely impacts – both positive and negative – of the scheme on local communities and the environment during construction, operation and decommissioning. The working draft PEIR has been prepared having regard to the information that will need to be provided in the subsequent Environmental Statement which would be submitted with the future DCO application.

5.2. Central to the delivery of the EIA has been and will continue to be the focus of engagement with consultee bodies, community stakeholders and other interested parties. A scoping Report was submitted to the Planning Inspectorate in January 2023. The Scoping Report identified the potentially significant effects requiring assessment, determines the subject matter of the assessment and the methodologies for undertaking the assessment. The Planning Inspectorate subsequently provided a Scoping Opinion, which included comments from a range of stakeholders, on behalf of the Secretary of State (SoS), in March 2023. The Scoping Opinion and the statutory consultee responses have subsequently informed the assessment work and further design evolution undertaken to date. The technical themes covered in the working draft PEIR are: -

- Landscape and Visual Impact Assessment
- Nature Conservation and Biodiversity
- Cultural Heritage and Archaeology
- Ground Conditions
- Water Resource
- Socio Economic
- Transport and Access
- Noise and Vibration
- Air Quality
- Agricultural Circumstances
- Other Environmental Topics (including waste and climate change)

6. Landscape and Visual Impact Assessment

6.1. Chapter 6 of the working draft PEIR presents the preliminary assessment of the likely significant effects on Landscape and Visual receptors during construction, operation (including maintenance), and decommissioning.

Baseline Conditions

6.2. The Scheme comprises of an area of predominantly agricultural land between the settlements of Thorne and Crowle. Tween Bridge Wind Farm is located within the northern part of the Draft Order Limits. The Stainforth and Keadby Canal crosses the Draft Order Limits from west to east.

6.3. The landscape is predominantly flat and low lying. Vegetation consists of eroded hedgerows which are often gappy in parts. There are occasional hedgerow trees and isolated trees often along field boundaries which follow drainage ditches. There are occasional small blocks of woodland in the northern part of the Draft Order Limits.

6.4. The M180 and A18 cross through part of the Draft Order Limits from west to east. There is a network of minor roads which are within the Draft Order Limits or adjacent to the Draft Order Limits. There are a network of footpaths and recreational routes that are within the Draft Order Limits or lie close to the Draft Order Limits. The Stainforth and Keadby Canal provides recreational use for both walkers, cyclists and boat users along the canal.

6.5. There are several settlements which vary in size that are situated close to the Scheme, with a number of individual or clusters of properties situated within or close to the Scheme.

Likely Significant Effects

Landscape Character

6.6. Potential Landscape construction phase effects associated with the Scheme would be temporary and medium term.

6.7. During the operational phase of the Scheme there would be likely significant effects on the Peat Moorlands Landscape Character Type and Thorne and Hatfield Peat Moorlands Landscape Character Area G2, Flat Open Remote Farmland Landscape Character Type, Flat Wooded Farmland Landscape Character Type, and Flat Drained Tree Farmland Landscape Character Type as much of the Scheme would occupy these character areas and types. These likely significant effects would be permanent in terms of some of the elements or long term for the life of the Scheme. It is likely there would be significant effects during the construction and decommissioning stages of the Scheme, however these would be short - medium term and temporary.

6.8. There would be inevitable significant effects on the landscape character of the Scheme as there would be a change from agricultural use to areas of solar modules and associated infrastructure.

6.9. At the decommissioning stage the effects are likely to be similar to those set out in the construction phase and would be temporary and medium term.

Visual Amenity

6.10. Potential visual effects during the construction phase associated with the Scheme would be temporary and medium term. There would be visibility of the construction operations from a number of receptors including footpath users, road users and people at residential properties within or close to the Scheme.

6.11. There would be likely significant effects from Stainforth and Keadby Canal during the construction, operational and decommissioning stage of the Scheme.

6.12. There would be likely significant effects from Footpath 19 (Thorne), Footpath 15 (Thorne), Footpath 17, 21 and 22. There would be likely significant effects from the Isle Greenway (Thorne-Crowle-Ealand-Keadby-Scunthorpe) which follows part of the Stainforth and Keadby Canal and local road network. These effects would be experienced at all stages of the Scheme. The effects would long term and permanent for some of the elements but the majority would be temporary.

6.13. The effects on receptors at residential properties will be considered in detail as part of the Residential Amenity Study and will be included in the subsequent chapter of the PEIR. Imbedded mitigation includes consideration of an initial 100m minimum offset of panels from residential properties. This has been refined and further adjusted in response to individual property locations, existing screening vegetation and local landscape character.

6.14. At the decommissioning stage the effects are likely to be similar to those set out in the construction phase and would be temporary and medium term.

Mitigation and Enhancement

6.15. As the proposals for the Scheme evolve, opportunities to enhance mitigation which combine landscape and ecological measures will be explored. This will form a mitigation strategy that will be included within the subsequent chapter of the PEIR.

Conclusion

6.16. There would be significant landscape effects on the area of the Scheme within the Draft Order Limits, as well as Peat Moorlands Landscape Character Type and Thorne and Hatfield Peat Moorlands Landscape Character Area G2, Flat Open Remote Farmland Landscape Character Type, Flat Wooded Farmland Landscape Character Type, and Flat Drained Tree Farmland Landscape Character Type as much of the Scheme would occupy notable portions of these character areas and types.

6.17. There would be significant effects on users of Footpath 19 (Thorne), Footpath 15 (Thorne), Footpath 17, 21 and 22. There would be likely significant effects from the Isle Greenway (Thorne-Crowle-Ealand-Keadby-Scunthorpe) which follows part of the Stainforth and Keadby Canal and local road network. These effects would be experienced at all stages of the Scheme. The effects would be long term and the majority of the elements would be temporary with some permanent elements would remain.

6.18. Further detailed assessment will be carried out and included within the subsequent chapter of the Environmental Statement which will aim to mitigate for these effects where possible and reduce the potential effect, so they would no longer be significant.

7. Nature Conservation and Biodiversity

7.1. Chapter 7 of the working draft PEIR assesses the potential effects on biodiversity during construction, operation and decommissioning of the Scheme.

Baseline Conditions

7.2. The Scheme comprises an area of predominantly agricultural land between the towns of Thorne and Crowle. The Tween Bridge Wind Farm is located within the Draft Order Limit, and consists of twenty-two operational wind turbines. The Stainforth and Kneadby Canal crosses the Draft Order Limit from west to east. The River Torne is present adjacent to the south west of the Draft Order Limits.

7.3. Habitats within the Draft Order Limits are dominated by arable farmland, associated with species-poor hedgerow systems and watercourses with ponds and a parcel of plantation broad-leaved woodland. The Draft Order Limits comprise of open fields of limited biodiversity value, and subject to intensive farmland management.

7.4. The Draft Order Limit lies outside designated sites with the exception of Thorne & Hatfield Moors Special Protection Area (SPA), Thorne Moor Special Area of Conservation (SAC), Thorne, Crowle and Goole Moors Site of Special Scientific Interest (SSSI) and Hatfield Chase Ditches SSSI. Whilst the Moors SPA/SAC/SSSI lies within the Draft Order Limit, they are outside the development footprint.

7.5. Comprehensive ecological surveys have been undertaken since 2022 and are continuing to be undertaken to inform this assessment. With the aim of providing the required information regarding habitats along with protected species, such as breeding and non-breeding birds, badger, otter, water voles, amphibians and invertebrates. These surveys were used (and continue to be used, as results are returned) to inform the iterative design of The Scheme and avoidance of ecological features of value, such as hedgerows, woodland and watercourses, has been a core design principle.

Likely Significant Effects

7.6. Potential construction phase ecological effects associated with The Scheme are considered to be temporary and short term. Higher value habitats including woodlands, watercourses, trees and hedgerows are retained and protected, with construction phase effects largely confined to arable land of low ecological value.

7.7. The Scheme also includes embedded habitat enhancement provisions; which will be managed for the benefit of wildlife over the long term and will provide biodiversity gains for a wide variety of species. Additionally, the proposed creation of diverse grasslands and hedgerow planting will deliver a quantifiable Biodiversity Net Gain. The commitment to a BNG above mandatory or policy requirements, and adopted as a fundamental design principle ensures that The Scheme will deliver a substantial ecological benefit.

7.8. Effects from the construction phase have been assessed as not significant in relation to non-statutory designated sites, habitats and species with the exception of statutory designated sites, ground nesting species and non-breeding birds.

7.9. Further detailed assessment on the effects of The Scheme on statutory designated sites is proposed and will be included within an Information to Inform and HRA, as well as the final ES Chapter.

7.10. A significant population of ground nesting species was recorded within the Draft Order Limits. A ground nesting mitigation strategy is proposed that will utilise both on and off-site mitigation measures. A draft of this detailed strategy will be included within the next iteration of the PEIR and also included within the consultation process and will seek to ensure the favourable conservation status of these species. However, it is considered that not all 250 skylark territories can be mitigated for, and as a result there is likely to be a Significant effect.

7.11. Once operational, solar farms function with little intervention or disturbance required. This is limited to occasional maintenance visits and ongoing management of grassland and other habitats around the Draft Order Limits, including cutting or grazing the grassland and periodic hedgerow cutting. Habitat creation, which forms part of the operational design, includes extensive areas of grassland attractive to a range of species which maintains habitat connectivity within and around the Draft Order Limits and provides enhanced opportunities for wildlife.

Mitigation

7.12. The includes BNG for habitats, combined with other measures, will provide new and enhanced features that can be used for breeding, foraging, overwintering and refuge by a range of species, from birds and bats to amphibians, reptiles and invertebrates. The cessation of the use of agricultural chemicals across the Draft Order Limits (following removal from farming use) will provide further benefit, in particular for invertebrate populations.

7.13. The habitat enhancements across the Draft Order Limits will provide benefits by increasing opportunities for many of the species associated with designated sites and increase and improve ecological connectivity.

7.14. Measures are set out to avoid or mitigate against potentially adverse effects during both the construction, operation and decommissioning periods of The Scheme and these measures will be detailed within the CEMP, LEMP and DEMP.

7.15. Additional measures have been identified where required to ensure legislative compliance and the protection of wildlife, including pre-commencement/construction surveys and, where necessary, mitigation licences issued by Natural England which will ensure that the favourable conservation status of relevant species will be maintained.

Enhancement

7.16. Further species enhancements are proposed including an area to the north of Stainforth & Keadby Canal which will be enhanced for a range of breeding and non-breeding bird species, with specific bird focused habitats created such as 'scrapes' (shallow wetlands). In addition, a number of boxes will be installed for birds, bats and hedgehogs as well as insect hotels, beetle banks, hibernacula and bee hives across the Draft Order Limits.

7.17. Where possible, habitat enhancements in line with biosphere aspirations will be set out within the next iteration of the PEIR.

Conclusion

7.18. With embedded design measures and mitigation in place as described, The Scheme will not result in any significant adverse effects on any habitats or species, or non-statutory designated sites, with the exception of statutory designated sites, ground nesting birds and non-breeding birds. Further detailed assessment will be carried out and included within the next iteration of the PEIR and final ES Chapter, which will aim to mitigate and/or compensate for these effects and where possible, reduce the effect, so it is no longer significant.

7.19. Major beneficial effects are anticipated as a result of habitat creation and diversification accompanied by long-term habitat management for the benefit of biodiversity.

8. Cultural Heritage and Archaeology

8.1. Chapter 8 of the working draft PEIR assesses the likely significant effects on the scheme on cultural heritage and archaeology.

Baseline Conditions

8.2. The heritage resource which has been considered within this Chapter includes the known and potential buried archaeological remains which may be affected as part of the construction stage and heritage assets, located within and in the environs of the Draft Order Limits, which could potentially be affected as a result of change within the settings of these assets introduced following the completion of the Scheme.

Likely Significant Effects

Construction Phase

8.3. It has been established that the construction phase of the Scheme has the potential to affect known, non-designated, archaeological remains associated with possible prehistoric and Romano-British archaeological remains as well as potential previously unrecorded archaeological remains. The groundworks associated with the construction of the Scheme have the potential to truncate or totally remove the archaeological remains within their footprint. Such effects would result in harm to or total loss of significance of these buried archaeological features. An appropriate programme of mitigation by design and additional mitigation (as required) will allow the magnitude of effect to be Moderate harm (not significant).

8.4. The construction phase of the Scheme has the potential to affect the settings of three designated heritage assets and 11 non-designated built heritage assets. Such effects would result in harm to the significance of these assets, leading to Less than Substantial Harm in relation to the designated assets and minor harm in relation to the non-designated assets.

Operational Phase

8.5. The operational phase of the Scheme has the potential to affect the settings of three designated heritage assets and 11 non-designated built heritage assets. Such effects would result in harm to the significance of these assets, leading to Less than Substantial Harm in relation to the designated assets and minor harm in relation to the non-designated assets.

Decommissioning Phase

8.6. The decommissioning phase of the Scheme has the potential to affect the settings of three designated heritage assets and 11 non-designated built heritage assets. Such effects would result in harm to the significance of these assets, leading to Less than Substantial Harm in relation to the designated assets and minor harm in relation to the non-designated assets.

Mitigation and Enhancement

8.7. The exact nature of the designed mitigation in relation to built heritage assets has yet to be agreed but it is anticipated that it will entail a combination of screening through appropriate

boundary treatments and offsets to retain suitable margins around/or views from the assets to minimize the adverse effects upon their settings.

8.8. Opportunities to minimize adverse effects upon the buried archaeological resource are also under consideration. It is envisaged that buried remains may be able to be preserved in situ in some parts of the draft order limits through the use of ballast foundations.

8.9. A proportionate programme of archaeological survey and mitigation, by means of field investigation and recording, will be followed by an appropriate and proportionate mitigation strategy that will ensure that they are subject to preservation by record at an appropriate stage in the development process. This will partially offset their loss through the knowledge gained through the investigations. For the archaeological remains the mitigation may include, as appropriate, excavation, strip map and sample investigation, or archaeological monitoring of ground works during construction (known as a watching brief), with appropriate post-excavation analysis and dissemination of results.

Conclusion

8.10. The Scheme, as defined by the Draft Order Limits, if the mitigation measures identified are implemented, is considered acceptable and there would be no adverse significant residual effects. The conclusions will be reviewed for the next iteration of the PEIR

9. Ground Conditions

9.1. Chapter 9 of the working draft PEIR assesses the likely significant effects on the scheme on ground conditions.

Baseline Conditions

9.2. This very large site is predominantly large agricultural fields with isolated farmsteads, crossed by a network of roads, railway and canal. It forms part of the lowland basin of the former Rivers Don and Idle, being low-lying at typically 1-4mOD, with very low to Negligible natural gradients. The fields are typically bounded by a grid of numerous drainage ditches and larger water courses.

9.3. The area is underlain by thick sequences of complex superficial deposits including former lake laminated silt/clay deposits, sands and gravels and infill sediments to deep glacial period channels. Thick alluvial clay and silt blankets these and overlap marginal peat deposits. The old rivers have been historically diverted and artificial alluvium (floodwarp) deposited to provide better draining agricultural soils.

9.4. Surface soils are loamy or clayey, slowly to moderately permeable, or relatively impermeable and seasonally wet with impeded drainage. This helps maintain a naturally high groundwater table. There are no bog peat soils mapped.

9.5. There is no requirement to consider coal mining legacy within the Draft Order Limits. Peat soils were formerly more extensive, but peat cutting, drainage, ploughing and floodwarping has lowered and compacted the relatively thin surface peats, such that they are classed as 'wasted' within the Draft Order Limits area. Parts of the western and eastern areas are included in Minerals Safeguarding Zones for sands and gravels, although these do not include any operational extraction sites, consented, proposed or search areas within the current Local Plans.

9.6. The Scheme area lies beyond the Hatfield Moors gasfield and two Petroleum Exploration and Development Licence areas cover parts of the western Draft Order Limits.

9.7. The area has a prolonged agricultural history with isolated farmsteads. Peat working is not specifically mapped but has likely occurred historically, with peat works beyond the boundaries. A World War II airfield and bomb stores in the extreme southeast has been returned to agriculture.

9.8. Permeable alluvial superficial deposits typically form a Secondary A Aquifer, whilst the peat and laminated silt/clay deposits are Unproductive. Sherwood Sandstone at depth forms a Principal Bedrock Aquifer. Groundwater levels are maintained below ground level for much of the year by drainage and there is likely hydraulic continuity between groundwater and water courses. The overall level and flow will also be controlled by local factors such as former drainage courses or historical features. The western and central zones are in Source Protection Zone (SPZ) 3, due to a SPZ 1 at a pumping station 600m west of the Draft Order Limits, and SPZ 2, 250m West. Groundwater vulnerability to pollution is typically Medium, with parts being High where sands of the Secondary Superficial Aquifer occur.

9.9. Former landfills at Tudworth and a waste transfer station at Brier Hills lie adjacent to the western and southern boundaries respectively. Two past pollution incidents within the Draft

Order Limits are considered as plausible contaminant sources and a Contaminated Land Determination 600m west has been considered within the conceptual modelling.

9.10. Potential Source-Pathway-Receptor linkages identified for assessment can be summarised as: dermal and inhalation exposure and UXO risk to construction workers at the former sand workings, adjacent waste site and airfield; leaching or migration of liquid or mobile contamination to surface water or groundwater; fines laden run-off to water courses if heavy machine working in adverse weather conditions; migration of abnormal ground gases to sensitive structures; direct contact of construction materials with contaminated soils; directional drilling at crossing points adjacent water courses.

9.11. Assessment concludes that the shallow construction for solar arrays will not create an adverse or worsening effect. A Construction Environmental Management Plan (CEMP) will be required and included as part of the DCO application.

9.12. Further consideration is required for structures, confined spaces and sensitive plant. Specific targeted contamination investigation at critical locations during detailed design stage is proposed, in combination with geotechnical investigation for foundation design and directional drilling.

Likely Significant Effects

9.13. The assessment indicates that during construction the majority of effects can be controlled by CDM Regulations and the CEMP as they are well understood and practiced. The limited and shallow groundworks create low likelihoods of exposure. Those potential effects deemed Moderate or Substantial and Adverse comprise: UXO risk at the former airfield/bomb stores; potentially polluting construction plant and materials working near water courses; disturbance of any contaminated soils where deeper or larger scale construction proposed for substations and BESS area; fines run-off to water courses if heavy machinery working during adverse weather; and directional drilling at surface water crossing points.

Mitigation and Enhancement

9.14. Environmental effects determined as Moderate or Substantial would be mitigated within the design measures of the Scheme to prevent, reduce and offset those effects. Those embedded mitigation measures will be secured by adoption of agreed Framework and Detailed CEMP's.

9.15. With the adoption and implementation of the agreed embedded mitigation measures, the effects identified for construction, operation and decommissioning of the Scheme are Negligible or Minor. There is no requirement for additional mitigation measures.

Conclusion

9.16. The short duration construction period and shallow depth intrusive construction method for the majority of the Scheme are determined as creating only localised and temporary environmental effects. Those elements determined as potentially giving rise to Moderate or Substantial effects would be mitigated by adoption of a well understood and practiced CEMP and controlled under CDM Regulations. The residual effects are therefore Negligible or Minor and Not Significant, the conclusions will be reviewed for the next iteration of the PEIR.

10. Water Resource

10.1. Chapter 10 of the working draft PEIR identifies the potential impacts on the water environment from the construction, operation and decommissioning of the Scheme.

Baseline

10.2. The site lies east of Thorne and west of Crowle, bounded north by the Humberhead Peatlands National Nature Reserve and south by Hatfield Moors and the Isle of Axholme. Ground levels within the site are typically set between 1 to 4 meters above Ordinance Datum, with very low or negligible gradients, drained by ditches and larger Drains, with the River Torne forming the southeast boundary. The majority of the site is located within Flood Zone 3, at High risk of flooding, impacted by a 1 in 100 year fluvial flood event.

Likely Significant Effects

Effects on Flood Risk and Drainage

10.3. There is the potential for mud and debris arising from the construction works to enter the existing surface water / land drainage system, causing blockages and restricting flow. This could result in localised flooding on the Site, especially after heavy or prolonged rainfall resulting in a potential risk to people and property. The development phasing and the area of development increases this potential construction effects will become an increasing consideration.

10.4. The sensitivity of construction workers and equipment to mud and debris blockages is considered to be Medium. The potential for mud and debris to block drainage networks is considered to have an effect of Low Adverse magnitude on flooding to the Site itself and surrounding area which would result in flood risk to construction workers and equipment at the Site. The significance of effect is Minor to Moderate Adverse. The effects would be temporary and short term. The sensitivity of construction workers and equipment is considered to be Medium with the temporary effects considered to have an effect of Medium Adverse magnitude to people working within the Site as it could occur at a time of high flood risk (e.g. during a large storm event). The significance of effect is Moderate Adverse.

10.5. During the operational phase, an increase in the volume of water discharged to local watercourses as a result of increased hard standing area has the potential to increase the flood risk to areas downstream of the Scheme. The sensitivity of people and property is considered Medium. Whilst the effects would be temporary and short term, this is considered to have an effect of Medium Adverse magnitude to people and property (considered to be up to very high importance) occurring at time of high flood risk (e.g. during a large storm event). The significance of effect is Major Adverse.

Effects on Water Resources

10.6. The Site is likely to involve construction of temporary access tracks. Access roads are expected to be constructed with compacted self-binding aggregate fill materials. Access roads would form long linear features that, in the event of rainfall, could become temporary drainage routes for surface water. With the potential for soil erosion and movement of sediment from shallow road excavations it would be necessary to ensure that pollution

prevention measures within the Site are appropriate to prevent migration of silt to surface watercourses and groundwater bodies.

10.7. The sensitivity of surface water and groundwater bodies to silt contamination is considered to be Medium. Without mitigation, potential effects are considered of a Medium magnitude. The significance of the effect is Moderate Adverse on a temporary short-term basis.

10.8. The sensitivity of surface water and groundwater bodies to spillages, leakages and pollutants is considered to be Medium. Without mitigation measures spillages of chemicals/fuel stored could cause short term temporary effects of a Medium magnitude on the local watercourses (medium importance). The significance of effect is Moderate Adverse on a temporary short-term basis.

10.9. During the operational phase, spillages of pollutants (e.g. oil) on access tracks from maintenance vehicles can be transported to watercourses via runoff, where they could impact upon ecological life, or infiltrate to ground. The receptors at risk are surface watercourses and groundwater bodies which are considered to be of Medium sensitivity. Without mitigation the increase in highway spillage risk is considered to have an effect of a Low Adverse magnitude. The significance of effect is Minor Adverse which is considered permanent if left unmitigated.

Mitigation and Enhancement

10.10. Where practical, it is recommended that runoff from equipment and access tracks will be directed to permeable sustainable drainage systems (SuDS) with contributions being made from permeable surfacing, wildflower planting and linear infiltration trenches. Future maintenance of the SuDS scheme should pass to a management company. Raising of panels above the designed flood water levels will be implemented where applicable. Bunding will be provided to battery storage units that are unable to be raised higher than the designed flood water levels. Following the implementation of mitigation measures the residual effect is considered to be Negligible.

10.11. Where necessary a temporary drainage network will be installed prior to the commencement of construction and a maintenance plan, confirmed through a Construction Environmental Management Plan (CEMP), should be maintained throughout the duration of construction works on the Site.

10.12. During the construction phase easements of 9m should be preserved adjacent to all receptors to ensure that there is a sufficient buffer from the sensitive receptor to the construction stages of development.

10.13. The likely significant effects of the Scheme during decommissioning are likely to be similar to those encountered during the construction phase

Conclusions

10.14. The Scheme, as defined by the Draft Order Limits, if the mitigation measures identified are implemented, is considered acceptable and there would be no adverse significant residual effects. The conclusions will be reviewed for the next iteration of the PEIR.

11. Socio Economic

11.1. Chapter 11 of the working draft PEIR has analysed the baseline socio-economic conditions and then gone on to assess the likely socio-economic effects of the Scheme.

Baseline Conditions

11.2. Doncaster experienced population growth of 2.1% between 2011 and 2021 and in North Lincolnshire there was a lower population growth of 1.4%. Relative to the benchmark areas of East Midlands and the United Kingdom, Doncaster's and North Lincolnshire's population grew at a slower rate over this timeframe. Employment growth in Doncaster over the last six years has been fairly strong with 5.4% increase in job numbers, this was higher than the regional figure (4.4%) but lower than the national figure (5.6%), whilst the highest jobs growth was seen in North Lincolnshire (7.2%). The construction sector, which is likely to see increased employment opportunities during the Scheme build phase represents 9.4% of total employment in Doncaster and 6.5% in North Lincolnshire, which is above the proportion of total jobs at the regional scale (5.7%) and the United Kingdom (5.9%). Both Doncaster and North Lincolnshire have a net outflow of commuters. The claimant count in Doncaster is currently above all other comparator areas at 4.7 whilst the claimant count in North Doncaster is below all other comparator areas at 3.4.

Likely Significant Effects

11.3. With the exception of accommodation demand, likely significant effects are expected to be beneficial in respect of socio-economics. Significant beneficial effects are expected in relation to employment and economic contribution during both the construction and decommissioning phases, and business rates during the operational phases.

Mitigation and Enhancement

11.4. Most effects of the Scheme are beneficial, and therefore no mitigation is required. The accommodation demand effects as a result of the construction and decommissioning phase of the Scheme are adverse and may require an Accommodation Strategy to reduce the impact.

11.5. It is noted that, to maximise the beneficial impacts identified by the Scheme, an Outline Supply Chain, Employment and Skills Plan will be produced to optimise the number of local people who will have access to employment and training opportunities arising from the Scheme. The Applicant is looking to make this document available for the next iteration of the PEIR. Related to this, the Applicant is seeking to hold a supplier engagement event.

Conclusion

11.6. The Scheme will result in beneficial socio economic effects. Business rates are an important economic contributor to an area. It is estimated that the solar project element of the proposed scheme could generate around £2million per annum in business rates. Over the intended 40-year lifespan of the scheme, business rates generated could total around £44.4million (present value). Economic benefits will arise through the provision of temporary jobs during the construction phase at the Site. Based on previous experience of similar

projects, it is estimated that the total cost of the Scheme is in the region of £500million. Investment in the Scheme is likely to create opportunities for local businesses through the supply chain, during the construction process. It is estimated that there will be around 609 on-site jobs [4] generated across the Scheme during the construction period, which is estimated to be up to 30-months[5]. In terms of solar powered growth in the UK report[6], Cebr give an employment multiplier for large-scale solar PV investments of 2.33 – i.e. for every job supported on-site, 1.33 indirect/induced jobs are supported in the wider economy. Applying this multiplier to the 609 on-site jobs, the Scheme could support 810 temporary jobs in the wider economy during the 30-month build phase

11.7. The Applicant is preparing an Outline Supply Chain, Employment and Skills Plan to optimise the number of local people who will have access to employment and training opportunities arising from the Scheme. It is expected that this Plan will be available for the next iteration of the PEIR.

[4] Estimated number of jobs associated with the construction phase (1 job per MW) of the Scheme is based on a review of the number of construction workers generated as a result of a solar farms previously assessed by Pegasus, as well as benchmarking of publicly available information in other similar scale projects.
[5] Duration provided by Applicant.
[6] Solar powered growth in the UK – the macroeconomic benefits for the UK of investment in solar PV: Cebr (report for the Solar Trade Association), September 2014.

12. Transport and Access

12.1. Chapter 12 of the working draft PEIR assesses the potential effects relating to transport and access. It considers the potential effects on vehicular traffic flows, accidents and safety, severance, driver delay, hazardous and dangerous loads and dust and dirt.

Baseline Conditions

12.2. The Scheme is centred at approximately 10 kilometres to the northeast of Doncaster and 14 kilometres to the west of Scunthorpe. Access to the Site during the construction and operational phases is anticipated to be provided from Moors Edge Road; High Bridge Road; the A18 Tudworth Road; Marsh Road; an unnamed access road which links the A161 and High Levels Bank; High Levels Bank; Sandtoft Road and Low Levels Bank.

12.3. Data from the most recent five-year period shows that there are not any existing highway safety issues on the local highway network that would be exacerbated by the Scheme.

Likely Significant Effects

12.4. Impact magnitudes have been defined for the construction phase with regard to 'Guidelines for the Environmental Assessment of Road Traffic', which states that a significant environmental impact may occur when traffic flows increase by more than 10% where the study area is of high sensitivity significance.

12.5. The impact of the construction phase traffic is considered to be of negligible to low significance. This position will be reviewed following assessment of the detailed design.

Mitigation and Enhancement

12.6. Mitigation has been provided in the form of a Draft Construction Traffic Management Plan to reduce the impacts of the construction phase.

Conclusion

12.7. It is concluded that the proposed package of mitigation measures will ensure that the Scheme is acceptable and that there will be no adverse significant effects.

12.8. There are therefore no highways or transportation reasons which should prevent the Scheme, the conclusions will be reviewed for the next iteration of the PEIR.

13. Noise and Vibration

13.1. Chapter 13 of the working draft PEIR identifies the potential effects of The Scheme in terms of noise and vibration.

Baseline Conditions

13.2. An environmental noise survey will be undertaken as part of the full technical works to ascertain the current noise climate of the site and the results will be used to derive appropriate noise limits at the identified noise sensitive receptors.

Likely Significant Effects

13.3. An assessment of the potential construction noise and vibration effects will be undertaken when a phase program is known. Construction noise and vibration is temporary in nature, and it is anticipated that, with the use of the CEMP, the impacts will not be adverse.

13.4. In terms of the operational noise impact, it is likely that, with the use of required mitigation measures, the noise levels will not exceed the proposed noise limits and should result in a negligible impact.

Conclusion

13.5. With the use of ongoing mitigation measures, the Scheme is unlikely to result in a significant adverse effects on any of the identified noise sensitive receptors, the conclusions of this chapter will be reviewed for the next iteration of the PEIR.

14. Air Quality

14.1. Chapter 14 of the working draft PEIR identifies the potential effects of the Scheme on air quality and greenhouse gases. The assessment has considered the potential for effects to occur during the construction and operational phases of the Scheme; effects from decommissioning have been scoped out since emissions beyond 2050 should be netzero.

Baseline Conditions

14.2. The assessment has demonstrated that air quality conditions in the local area are generally good, with pollutant concentrations below the relevant air quality objectives.

14.3. The Site is currently used for agricultural purposes which are a small source of GHGs emissions; there is, however, peatland throughout the Scheme which is able to sequester CO2, and therefore acts as a carbon sink. The volume of peat that will be disturbed as part of the construction of the Scheme will be determined for the next iteration of the PEIR. For the purposes of the assessment, baseline GHG emissions have been assumed to be zero.

Likely Significant Effects

14.4. The assessment has demonstrated that, with mitigation, the effect of construction dust on sensitive receptors will be 'not significant'. Traffic generated by the Scheme during both the construction and operational phases will be below published screening thresholds, and thus will be 'not significant'.

14.5. The assessment has demonstrated that the Scheme will lead to residual GHG emissions across its lifetime; these mainly arise during the construction phase. However, once operational, the Scheme will generate electricity with a lower carbon factor than other non-zero fuels, such that its operation will lead to net reductions in GHG emissions and facilitate a transition to net-zero. The overall GHG effects are judged to be beneficial and therefore significant.

Mitigation and Enhancement

14.6. A suite of mitigation measures will be in place throughout the duration of the construction phase to ensure that the residual air quality effects are 'not significant'.

14.7. The Scheme incorporates a number of best practice measures to minimise its GHG footprint; no additional mitigation is required beyond these measures.

Conclusion

14.8. The Scheme will not lead to significant effects on either air quality or GHG emissions; the conclusions of this chapter will be reviewed for the next iteration of the PEIR.

15. Agricultural Circumstances

15.1. Chapter 15 of the working draft PEIR assesses the likely significant effects on the scheme on agricultural land, soils, and agricultural businesses.

Baseline Conditions

15.2. Survey work is currently underway, but the expectation is that the Site will involve a mixture of lands of Grades 2, 3a and 3b. Soils are loamy or sandy. There are 43 farm businesses and/or landowners with land in the Draft Order Limits.

Likely Significant Effects

15.3. There will be a main substation, five subsidiary substations, and a Battery Energy Storage System area, and whilst these areas will be restored at the decommissioning phase, there is the potential for the operational phase for the loss of Grades 2 and 3a land to be adversely affected. There is the potential for in excess of 20 ha of such land to be involved, which would be a major adverse effect, albeit reduced to negligible on decommissioning.

15.4. There are no other significant agricultural effects anticipated.

Mitigation and Enhancement

15.5. A Soil Management Plan will be required to minimise damage to soils and ensure that any damage is ameliorated. The restoring of arable soils with grassland for the duration of the operation phase will produce benefits for the soil resource.

Conclusion

15.6. A major adverse effect from the loss of BMV soils for the duration, is expected, but that can be fully restored at decommissioning.

16. Other Environmental Topics (including waste and climate change)

16.1. Chapter 16 of the working draft PEIR assesses major accidents and disasters and waste. None of these warrant individual chapters in the PEIR, either due to the brevity of the assessment or the small impact associated with the Scheme.

Major Accidents and Disasters

16.2. This section summarises the potential effects of the project on the risks of major accidents or disasters occurring and affecting the Scheme. 'Accidents' are an occurrence resulting from uncontrolled developments in the course of construction, operation and decommissioning (e.g., major emission, fire or explosion). 'Disasters' are naturally occurring extreme weather events or ground related hazard events (e.g., subsidence, landslide, earthquake).

Baseline

16.3. A number of receptors are present in the vicinity of the Scheme which could be vulnerable to major accidents or disasters, either because of their proximity to the Scheme or their importance to the surrounding area. These include towns, villages, farms and residential homes; Commercial sites and buildings; Roads; Canal; Railways; Underground and overhead infrastructure services.

Likely Significant Effects

16.4. There are various health and safety considerations particularly for workers during construction and decommissioning of the Scheme. Construction workers are considered to be the most at-risk group. However, the risk to both construction workers and the general public is low and not significant during the construction and decommissioning phases.

16.5. The design of the Scheme's infrastructure, such as batteries, could lead to a fire risk if there was equipment failure. Routine maintenance, system testing, fire protection design for battery equipment would result in the risk of major disaster or accident as not significant.

16.6. The cable route corridor crosses a railway line, the M180 and a canal. The underground cable crossing will be managed to the specific requirements of Network Rail, Canal Trust and National Highway, thus the risk of accidents as a result of the crossing will be minimised and considered not significant.

Mitigation and Enhancement

16.7. Minimising the risk of major accidents during construction and decommissioning will be addressed through appropriate risk assessments as required in the CEMP.

Conclusion

16.8. The Scheme is not expected to increase the risk of major accidents or disasters during construction, operation and decommissioning. Therefore, the effects on major accidents and disasters are considered not significant.

Waste

16.9. This section discusses the expected waste streams during each phase of the Scheme.

Baseline Conditions

16.10. Waste within the Draft Order Limits area is currently associated with agricultural practice. Potential waste streams currently could include left over crop and straw bales, fertiliser sacks and chemical containers.

Assessment of potential for likely significant effects

16.11. The nature of the Scheme and the known construction processes indicate no significant quantities of waste are anticipated. The generation of construction-related waste can be significantly reduced through the choice of materials and other opportunities pre-construction phase will be explored as far as possible. Possibilities to reuse or recycle materials will be explored before resorting to disposal.

16.12. During the operational phase, waste arising is expected to be substantially less than during the construction phase and would include: welfare facility waste; equipment needing replacing; waste metals; and general waste (paper, cardboard, wood, etc.).

16.13. During decommissioning, waste streams are expected to include, but not be limited to, solar infrastructure, batteries, cables, welfare facility waste, waste metals, and waste water. Prior to decommissioning, opportunities to minimise waste as far as possible will be explored. There is a new industry emerging for recycling solar panels and it is expected that this industry will be mature by the time this scheme reaches its decommissioning phase.

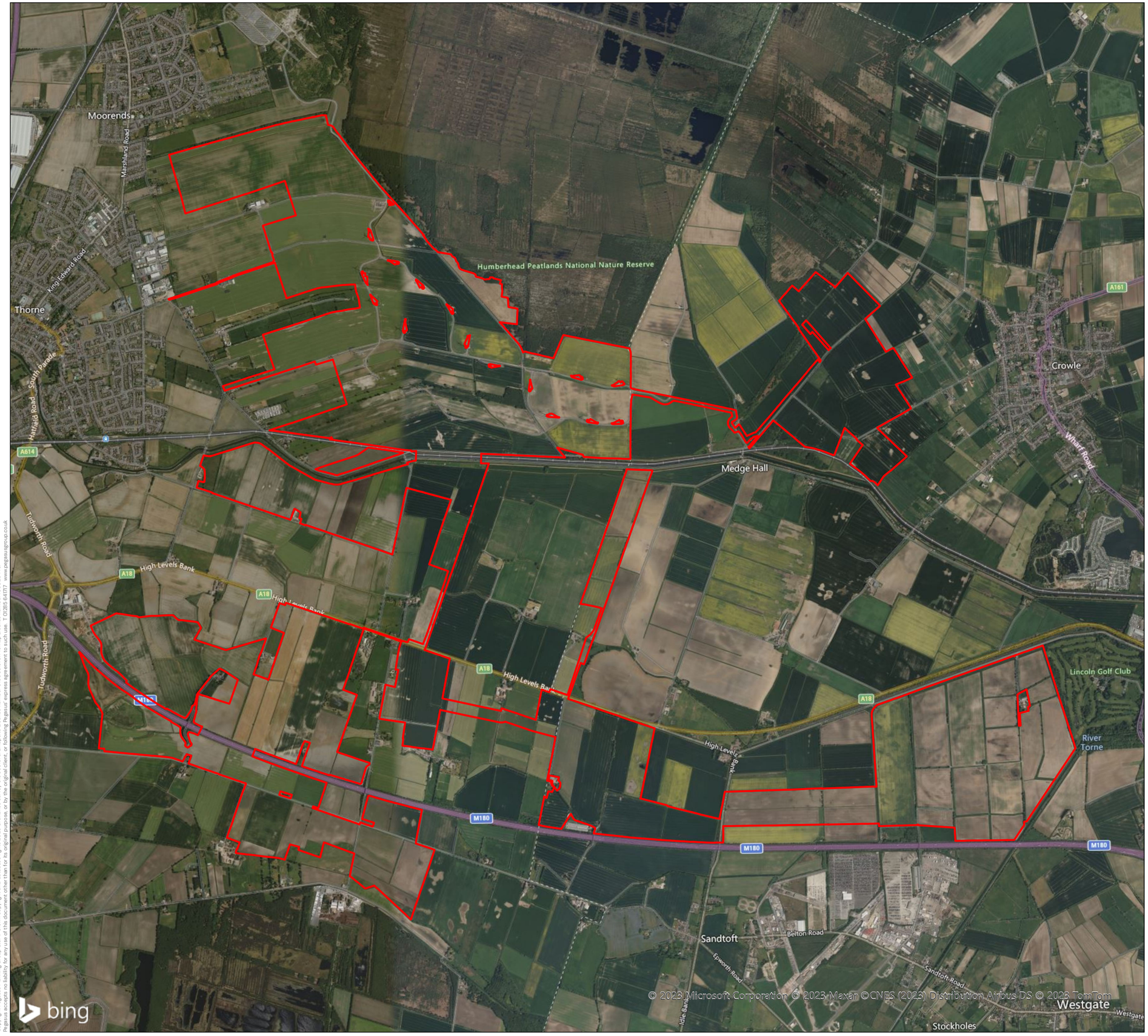
Mitigation and Enhancement

16.14. A Construction Environmental Management Plan (CEMP) will be in place for the construction and decommissioning phases. These will include measures to control and manage waste on-site. Waste arisings will be prevented and designed out where possible. Opportunities to reuse material resources will be sought where practicable. Where re-use and prevention are not possible, waste arisings will be managed in line with the Waste Hierarchy.

Conclusion

16.15. The Scheme is not expected to create a significant amount of waste during construction, operation, and decommissioning. Therefore, the effects on waste are considered not significant.

APPENDIX 1 – DRAFT ORDER LIMITS (SITE LOCATION PLAN)



KEY

DRAFT ORDER LIMITS (REV P – 13/06/23)

REVISIONS:
A – 21/09/22 – ADDED EASEMENTS
B – 29/09/22 – ADDED EASEMENTS & PARCELS
C – 11/10/22 – REMOVED PARCEL
D – 21/10/22 – ADDED PARCELS
E – 25/10/22 – ADDED AND REMOVED PARCELS
F – 29/11/22 – REMOVED PARCEL
G – 19/12/22 – ADDED ACCESS TRACK & AMMENDED BOUNDARY
H – 05/04/23 – ADDED AND REMOVED PARCELS
I – 12/04/23 – REMOVED PARCELS
J – 13/04/23 – REMOVED PARCEL & ADDED ACCESS
K – 19/04/23 – ADDED ACCESS TRACK
L – 04//05/23 – REMOVED PARCEL
M – 23/05/23 – ADDED AND REMOVED PARCELS
N – 25/05/23 – REDUCED CABLE EASEMENT
O – 08/06/23 – MULTIPLE EDITS
P – 13/06/23 – REMOVED PARCELS

DRAFT ORDER LIMITS

TWEEN BRIDGE SOLAR

FIGURE 4.1

RWE

DATE	DRAWN	APPROVED	SCALE
13/06/2023	RL	HS	1:32,000@A3
SHEET	REVISION	DRAWING NUMBER	
–	P	P21-3484_06	

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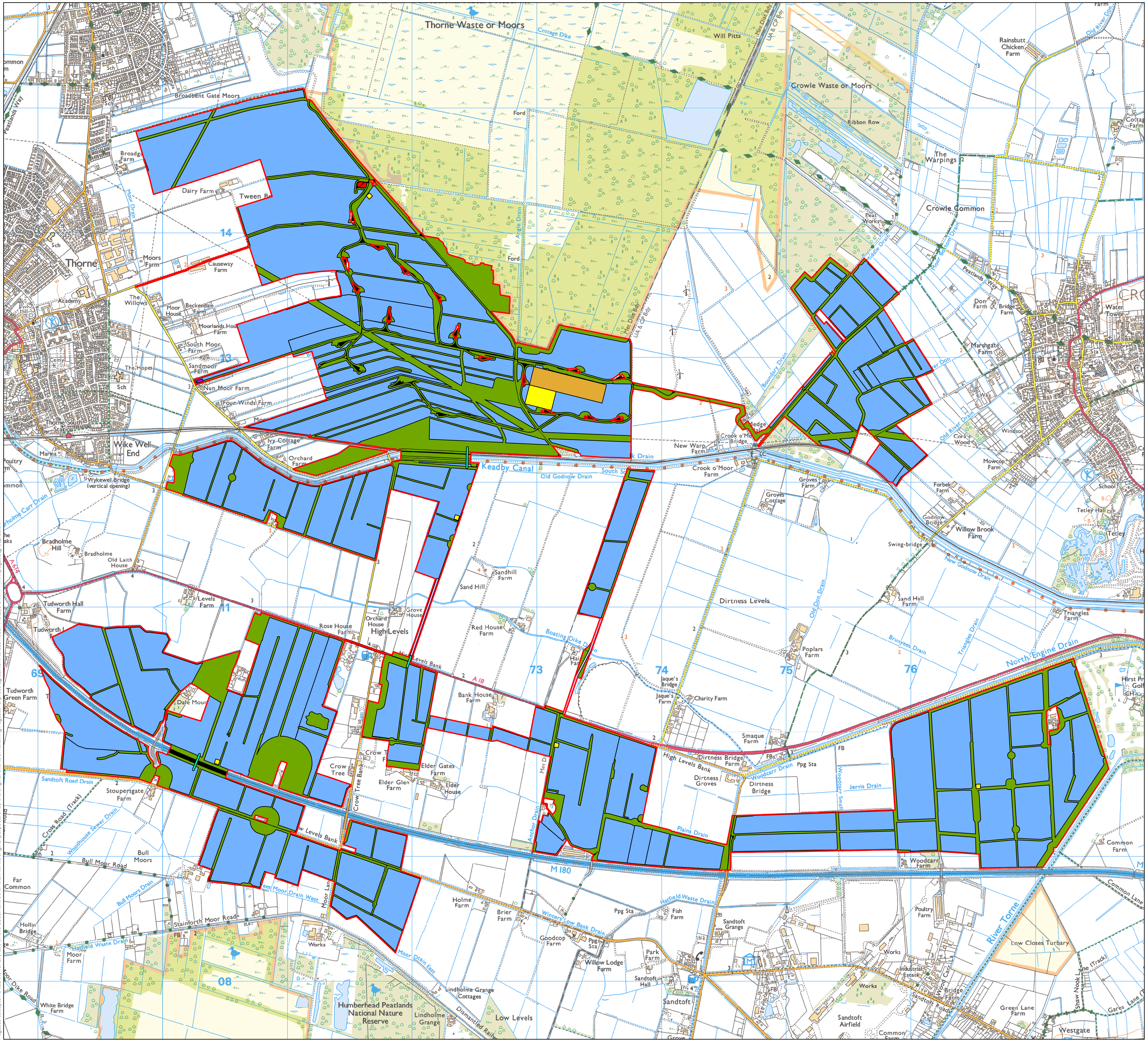
APPENDIX 2 – DRAFT WORKS PLAN



KEY

- DRAFT ORDER LIMITS (APPLICANT'S OWN REFERENCE REV P - 13/06/23)
- EXISTING WIND TURBINE SUBSTATION
- EXISTING ROADS, TRACKS AND HARDSTANDINGS
- WORK NO. 1: SOLAR PHOTOVOLTAIC ARRAYS INDICATIVE COMBINED SOLAR ARRAYS AND ECOLOGICAL AND LANDSCAPE ENHANCEMENT AREAS.
- WORK NO. 2: INDICATIVE BATTERY ENERGY STORAGE SYSTEM
- WORK NO. 3: INDICATIVE CLIENT SUBSTATIONS
- WORK NO. 4: INDICATIVE ECOLOGICAL AND LANDSCAPE MITIGATION AND ENHANCEMENT AREAS
- WORK NO. 5: ELECTRICAL CAR (EV) CHARGING AREA

OTHER PROPOSALS

- TRENCHLESS CABLE WORKS
- OPEN TRENCH CABLE WORKS

REVISIONS:
A - 23/08/23 - REMOVED DRAFT NGET SUBSTATION
B - 31/08/23 - AMMENDED SITE LAYOUT AND CLIENT SUBSTATION
C - 12/09/23 - UPDATED CLIENT SUBSTATIONS

WORKS PLAN

TWEEN BRIDGE SOLAR

CLIENT
RWE

DATE	DRAWN	APPROVED	SCALE
12/09/2023	RL	HS	1:30,000@A3
SHEET	REVISION	DRAWING NUMBER	
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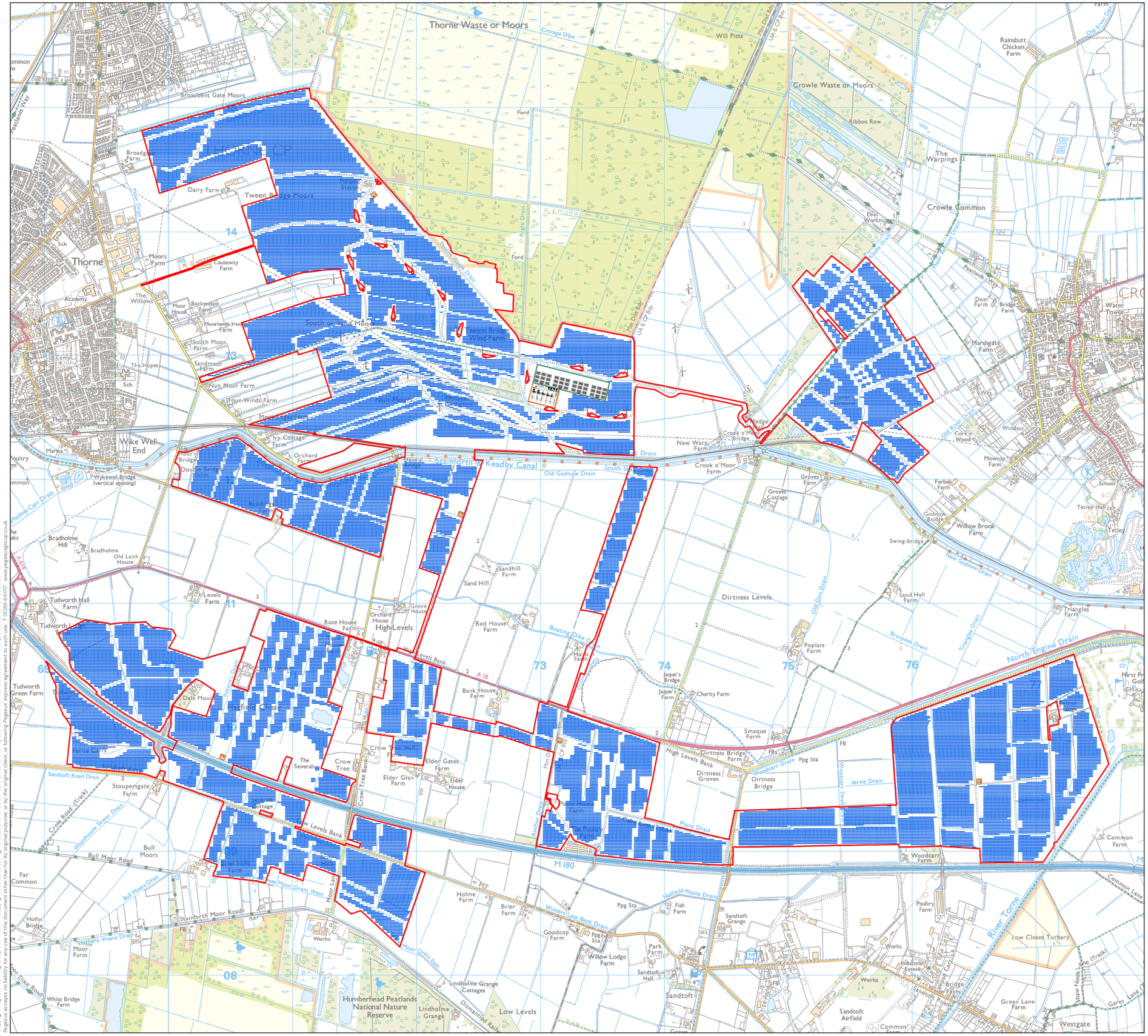
APPENDIX 3 – PRELIMINARY DETAILED DESIGNS



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KEY

🟥 DRAFT ORDER LIMITS

— SITE LAYOUT

🟩 INDICATIVE BATTERY ENERGY STORAGE SYSTEM

🟧 INDICATIVE CLIENT SUBSTATIONS

REVISIONS:
A - 12/09/23 - UPDATED SUBSTATIONS AND BESS

CANDIDATE LAYOUT PLAN

TWEEN BRIDGE SOLAR

CLIENT
RWE

DATE	DRAWN	APPROVED	SCALE
12/09/2023	RL	HS	1:30,000@A3

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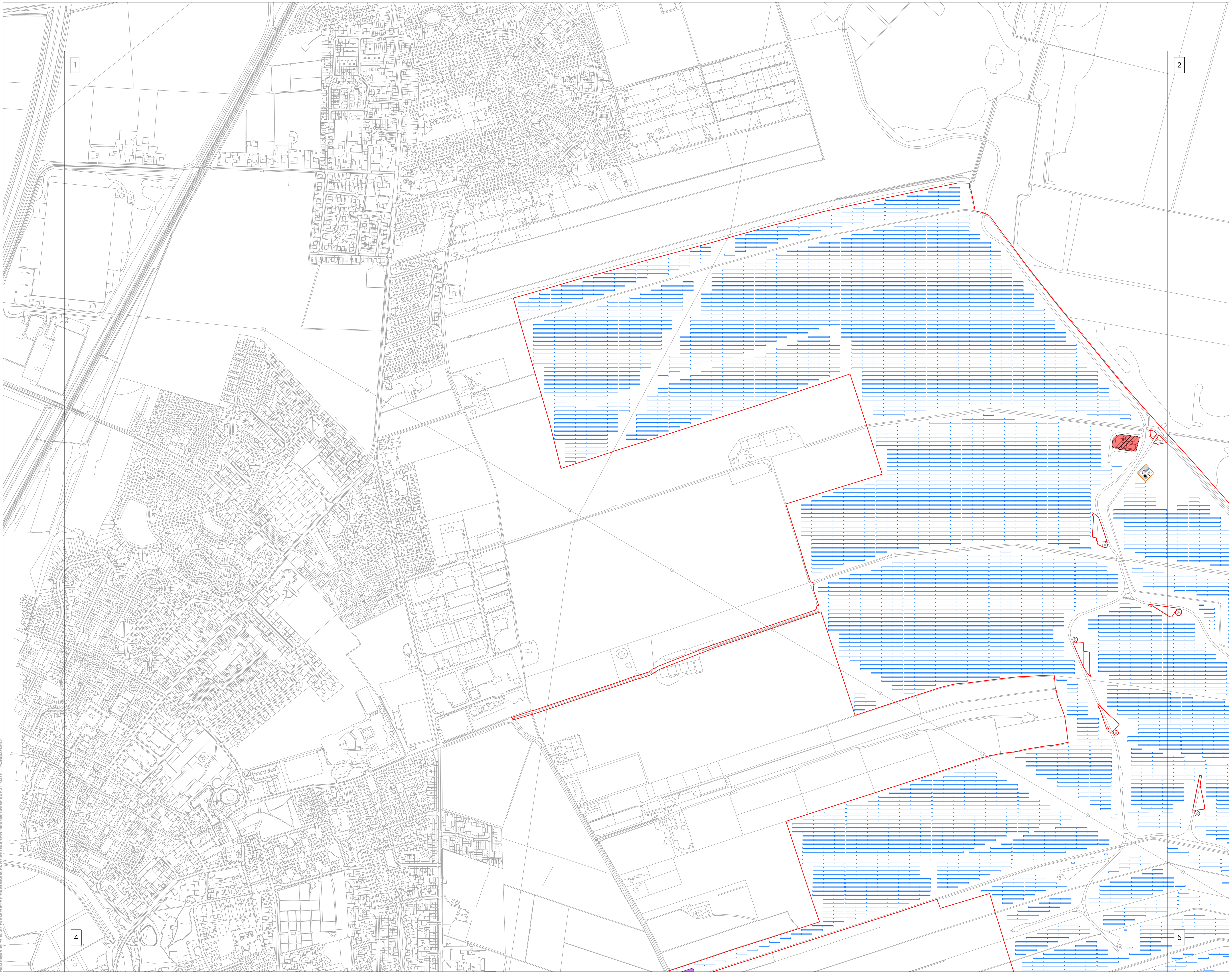
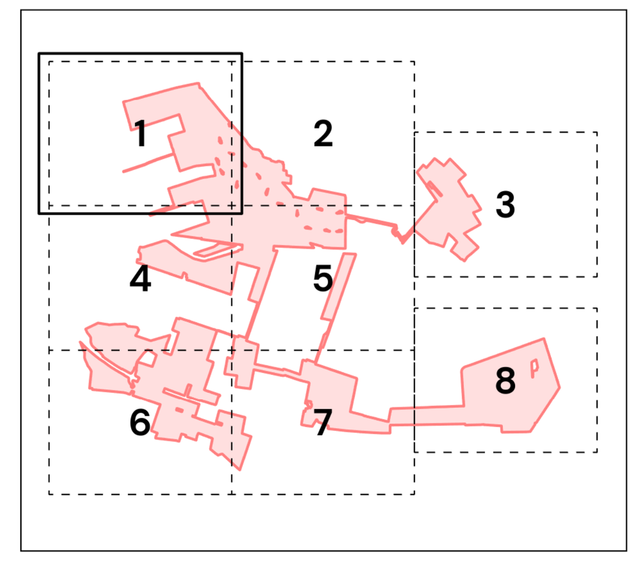


KEY

- DRAFT ORDER LIMITS (REV P - 13/06/23)
- SITE LAYOUT
- INDICATIVE BATTERY ENERGY STORAGE SYSTEM
- INDICATIVE CLIENT SUBSTATIONS
- Existing Wind Turbine Substation
- Electrical Car (EV) Charging Area



REVISIONS:
A - 23/08/23 - AMMENDED SITE LAYOUT, REMOVED DRAFT NGET SUBSTATION
B - 31/08/23 - AMMENDED SITE LAYOUT
C - 11/09/23 - ADDED SUBSTATION AND BESS DETAIL
D - 28/09/23 - DETAILED SITE INFRASTRUCTURE

DETAILED SITE LAYOUT MAP SERIES

TWEEN BRIDGE SOLAR

CLIENT
RWE

DATE	DRAWN	APPROVED	SCALE
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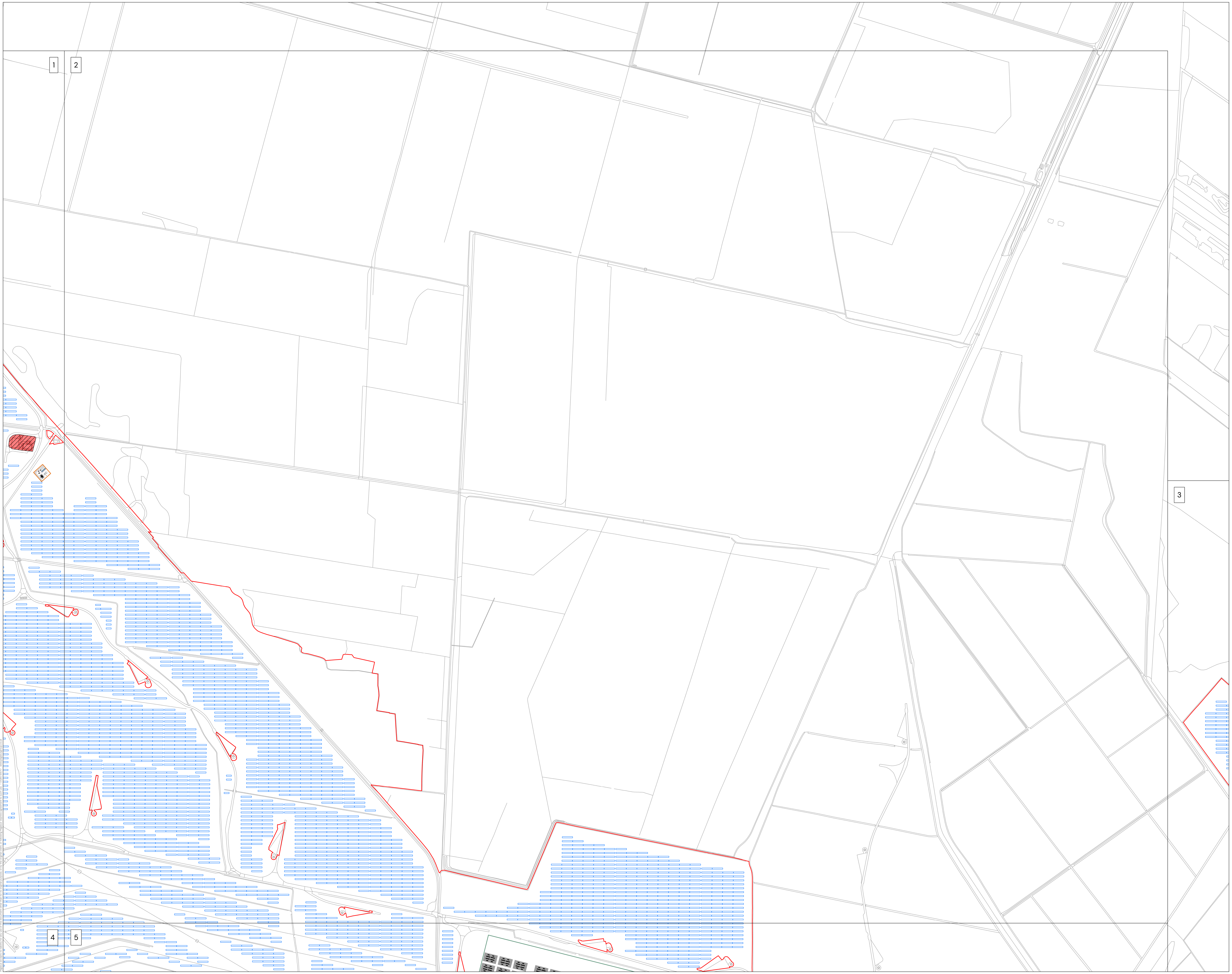

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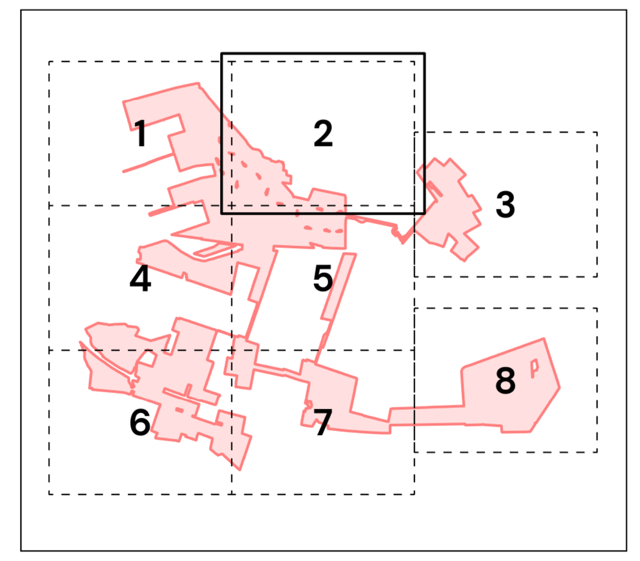
- Existing Wind Turbine Substation
- Electrical Car (EV) Charging Area



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B - 31/08/23 - AMMENDED SITE LAYOUT
C - 11/09/23 - ADDED SUBSTATION AND BESS DETAIL
D - 28/09/23 - DETAILED SITE INFRASTRUCTURE

DETAILED SITE LAYOUT MAP SERIES

TWEEN BRIDGE SOLAR

CLIENT
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DATE	DRAWN	APPROVED	SCALE
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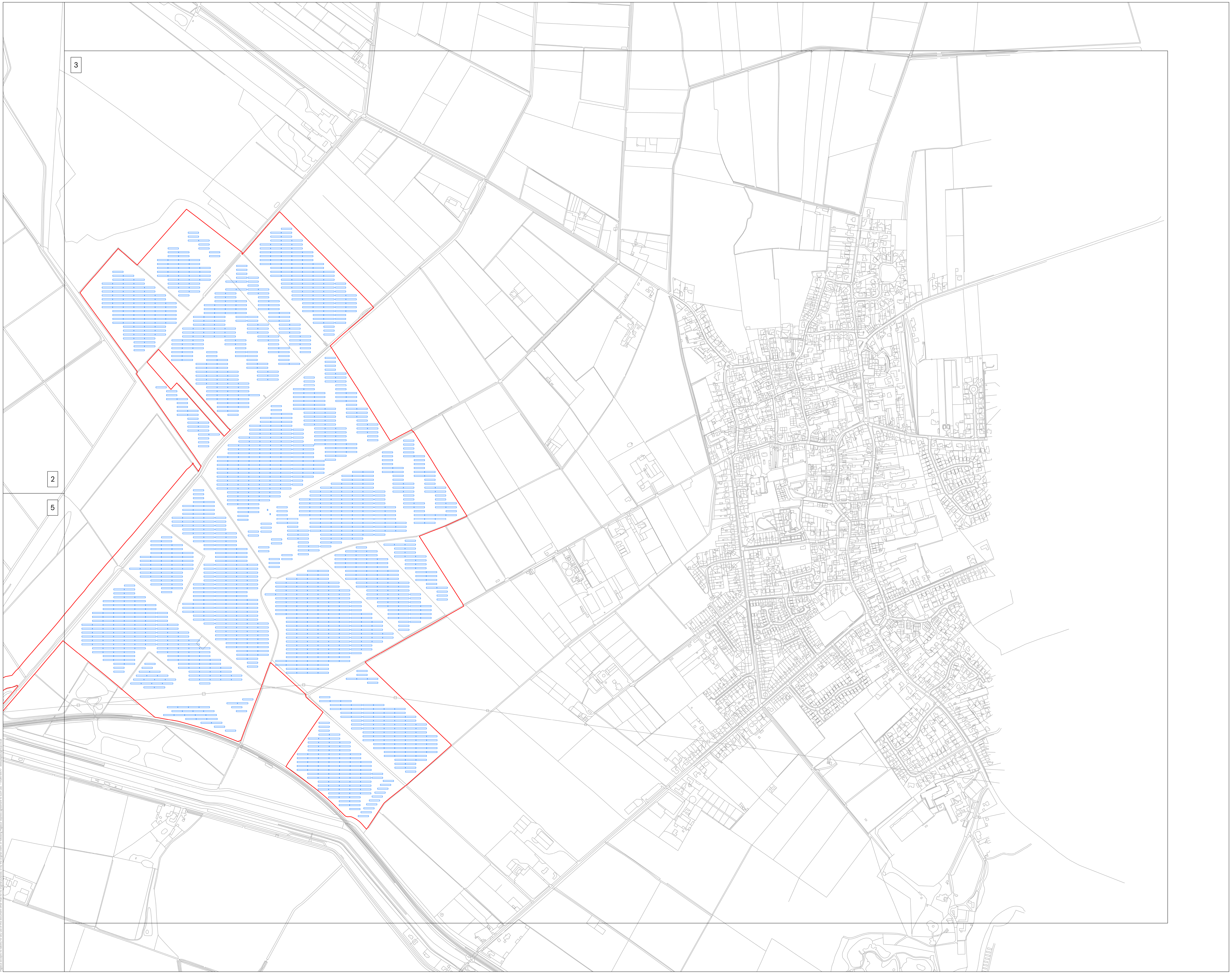

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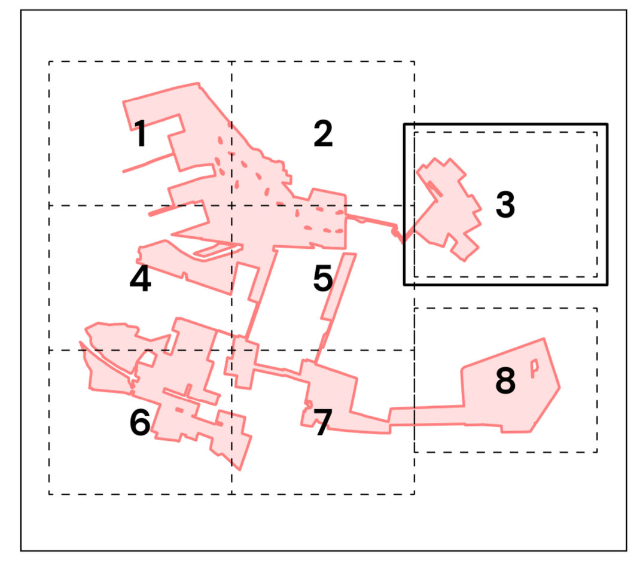
- Existing Wind Turbine Substation
- Electrical Car (EV) Charging Area



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D - 28/09/23 - DETAILED SITE INFRASTRUCTURE

DETAILED SITE LAYOUT MAP SERIES

TWEEN BRIDGE SOLAR

CLIENT
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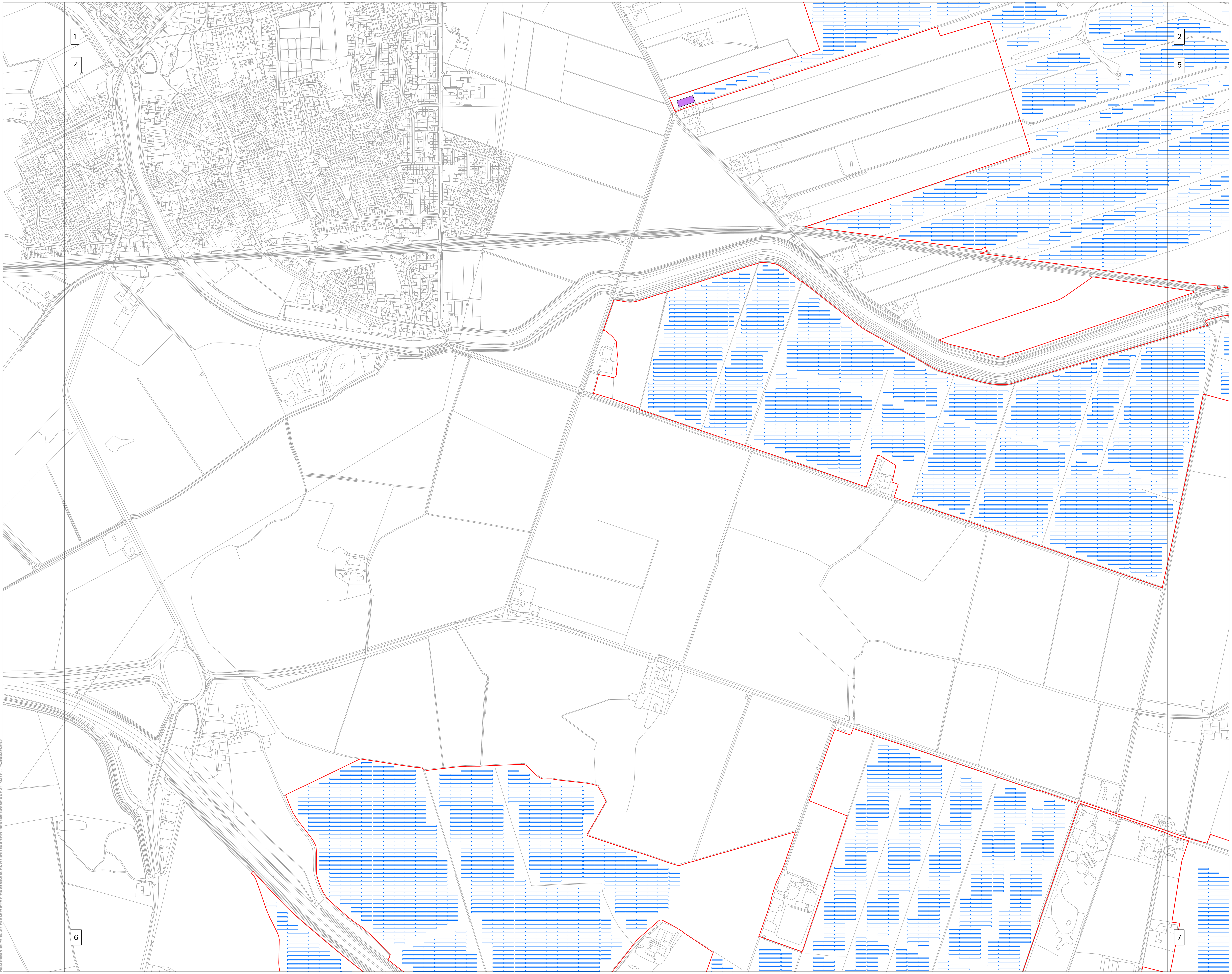

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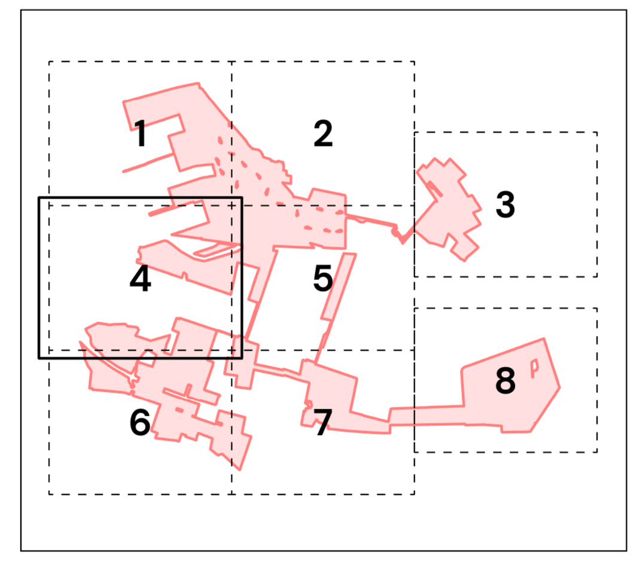

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C - 11/09/23 - ADDED SUBSTATION AND BESS DETAIL
D - 28/09/23 - DETAILED SITE INFRASTRUCTURE

DETAILED SITE LAYOUT MAP SERIES

TWEEN BRIDGE SOLAR

CLIENT
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DATE	DRAWN	APPROVED	SCALE
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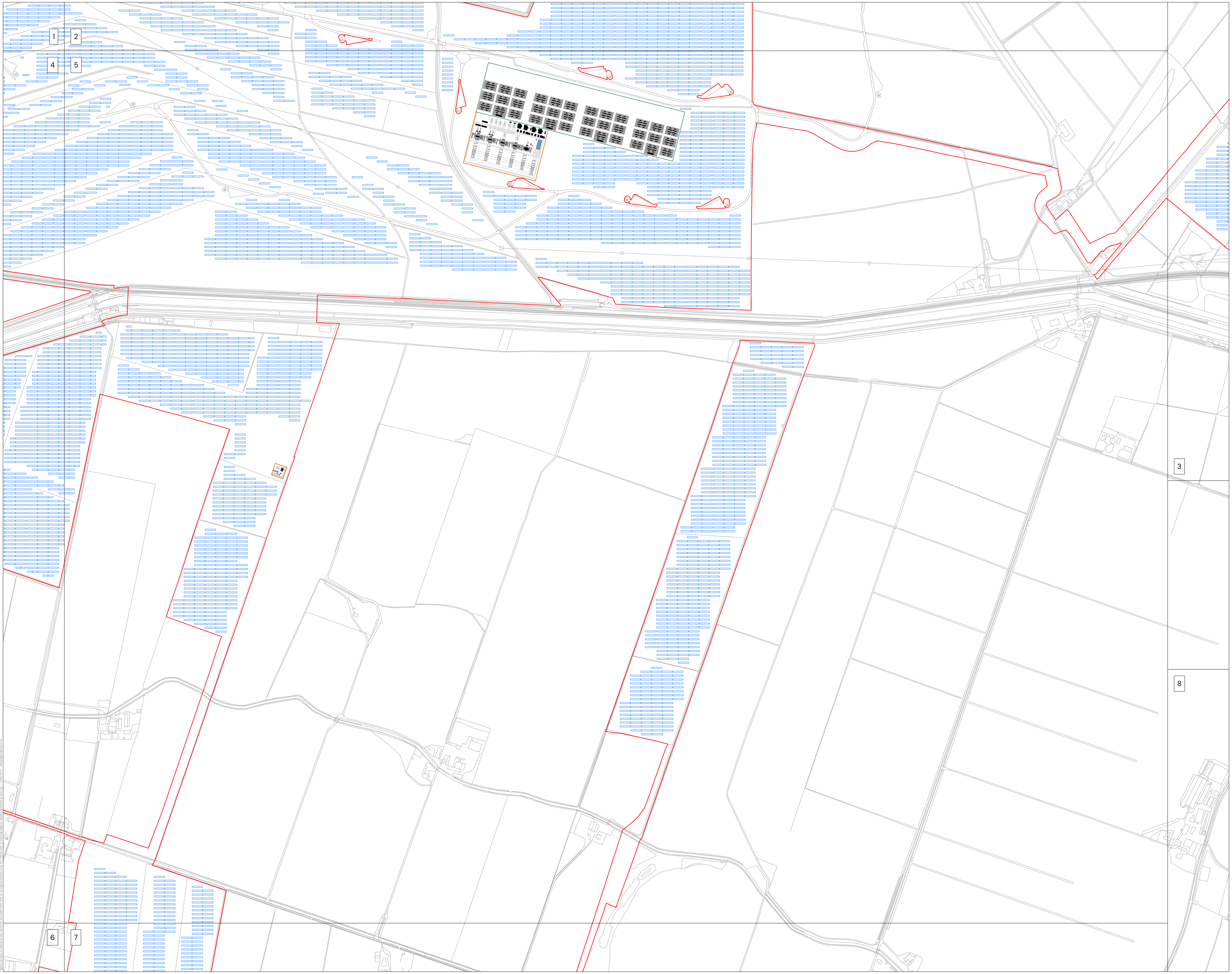

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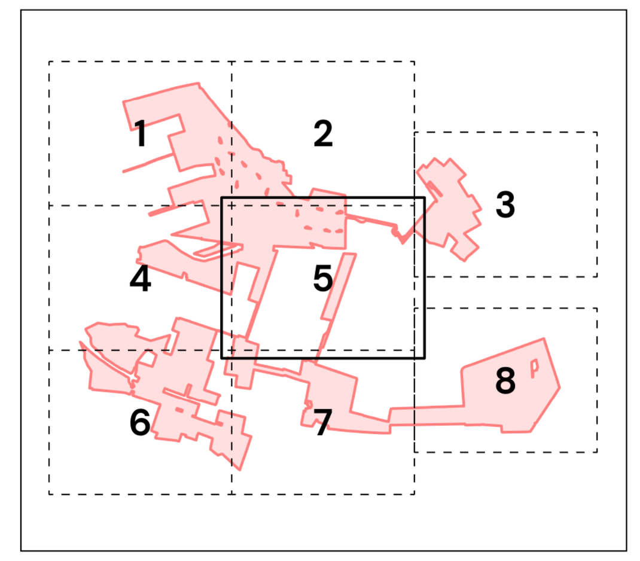

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DETAILED SITE LAYOUT MAP SERIES

TWEEN BRIDGE SOLAR

CLIENT
RWE

DATE	DRAWN	APPROVED	SCALE
28/09/2023	RL	GR	1:5,000@A3

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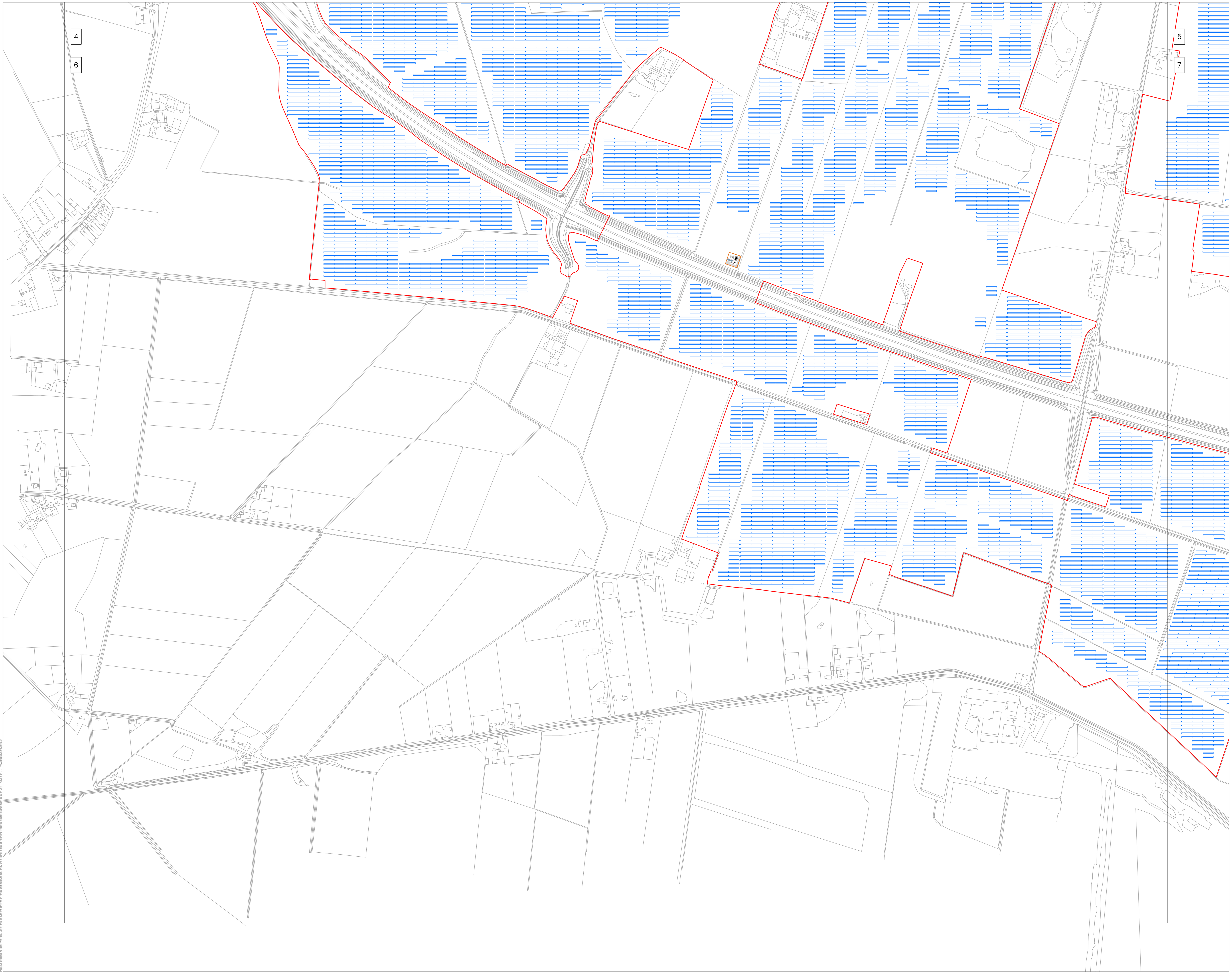

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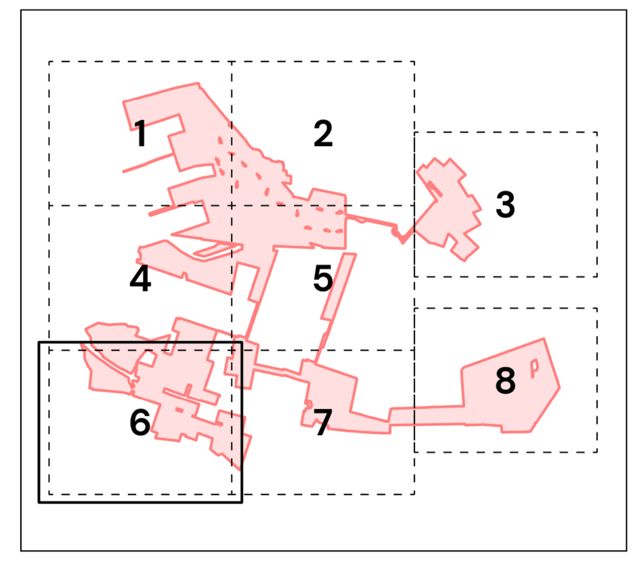

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DETAILED SITE LAYOUT MAP SERIES

TWEEN BRIDGE SOLAR

CLIENT
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DATE	DRAWN	APPROVED	SCALE
28/09/2023	RL	GR	1:5,000@A3

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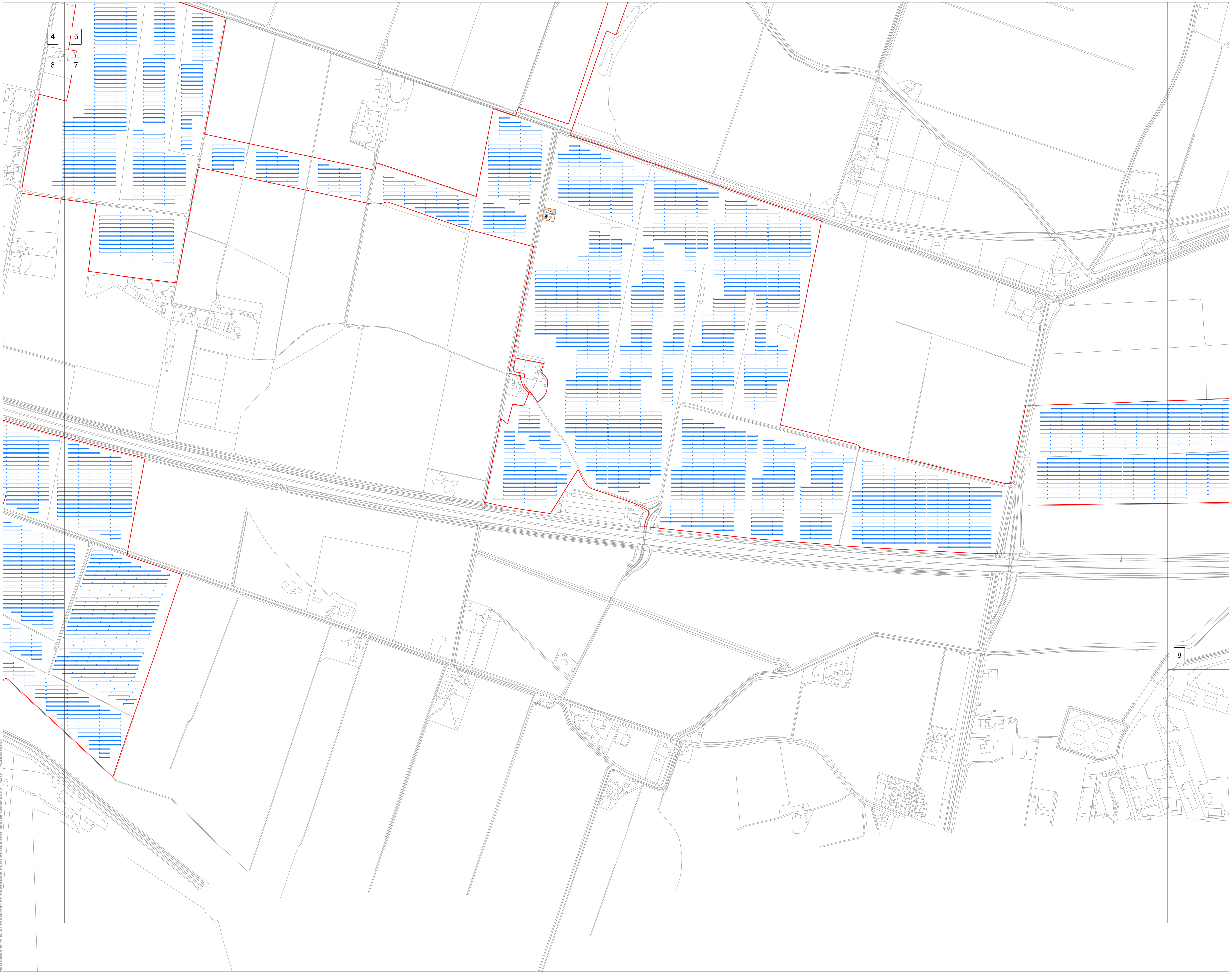

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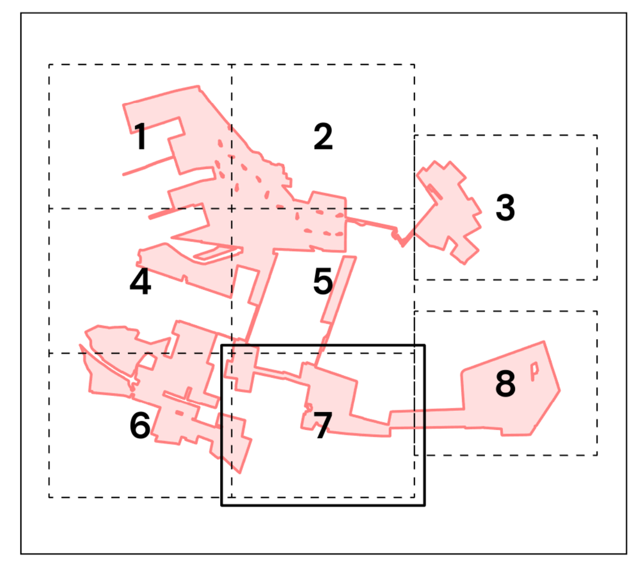

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B - 31/08/23 - AMMENDED SITE LAYOUT
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DETAILED SITE LAYOUT MAP SERIES

TWEEN BRIDGE SOLAR

CLIENT
RWE

DATE	DRAWN	APPROVED	SCALE
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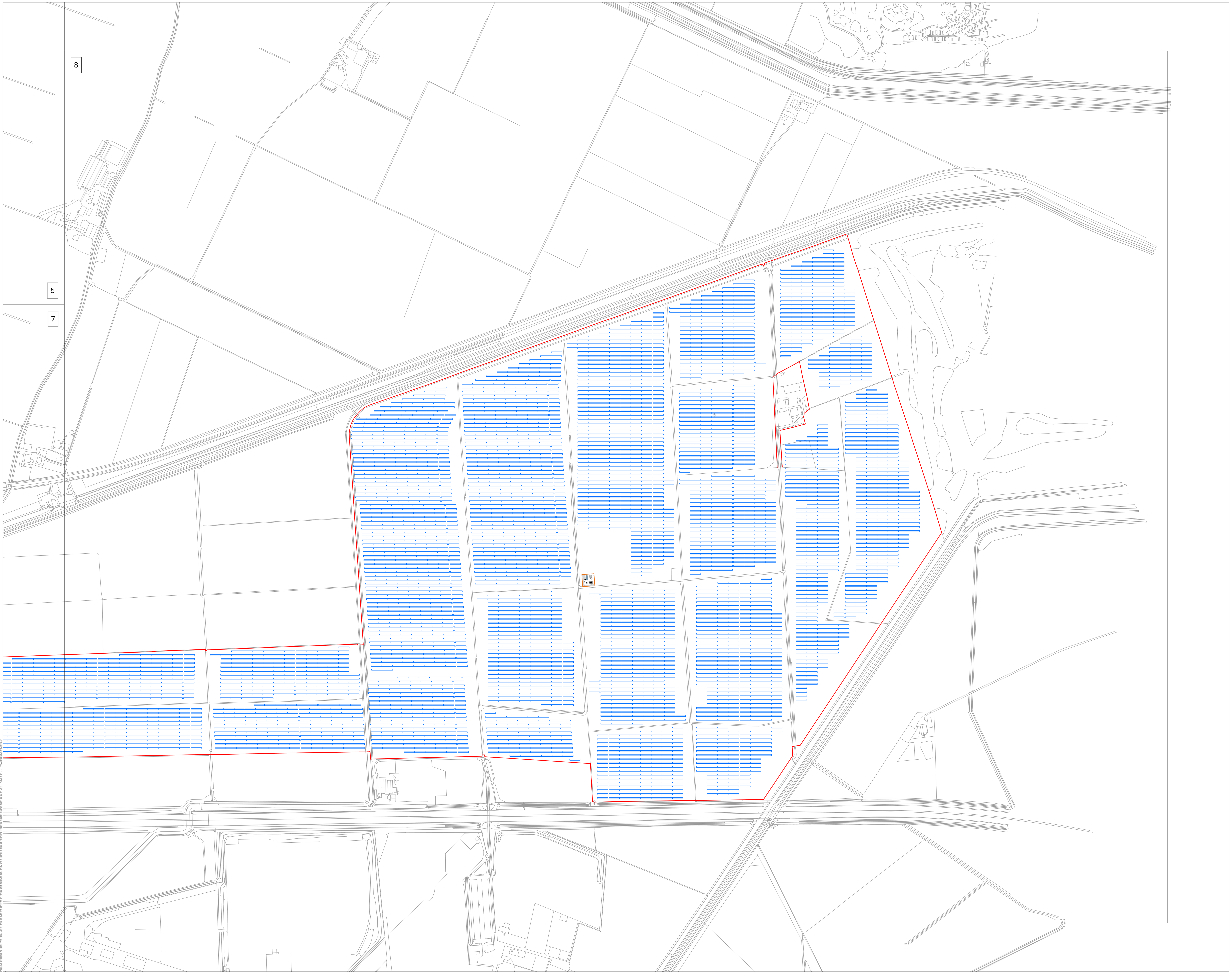

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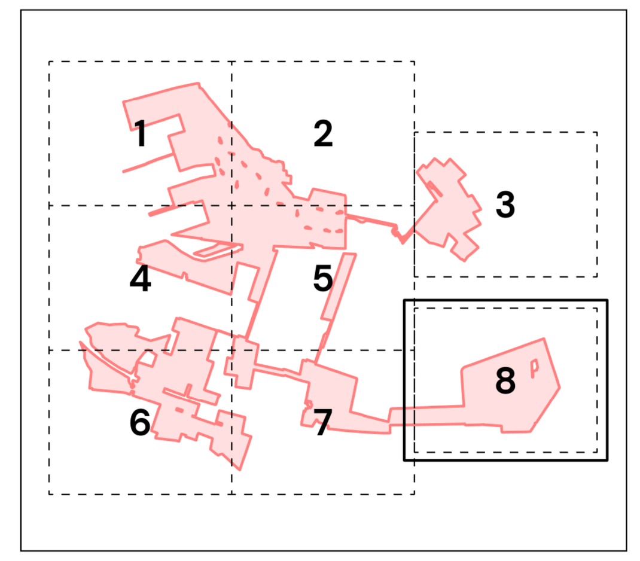

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DETAILED SITE LAYOUT MAP SERIES

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CLIENT
RWE

DATE	DRAWN	APPROVED	SCALE
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