

Gate Burton Energy Park

EN010131

Applicant Responses to ExA's Third Written Questions (ExQ3)
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Prepared for:

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1. Introduction

1.1.1 This report responds to the Examining Authority's (ExA) Third Written Questions (ExQ3) published on 25 October 2023 **[PD-0013]**. It responds to each of the questions posed to the Applicant. Where the Applicant considers it may be useful, comments have been provided on questions aimed at other parties.

1.1.2 Section 2 of this report is tabularised to include the ExA's questions and response to each question as follows:

- Principle and Nature of Development (11 questions);
- Biodiversity, Ecology and Natural Environment (including Habitats Regulations Assessment (HRA)) (2 questions);
- Climate Change (1 question);
- Compulsory Acquisition, Temporary Possession and Other Land or Rights Considerations (4 questions);
- Draft Development Consent Order (DCO) (4 questions);
- Human Health and Wellbeing (4 questions);
- Landscape and Visual (5 questions);
- Major Accidents and Disasters (2 questions);
- Socio-economic Effects and Land Use (including Agricultural Land and BMV) (2 questions); and
- Transportation and Traffic (4 questions).



2. Table 2-1: Applicant Comments on Responses to ExA’s Third Written Questions

Question Number	Respondent	Question Summary	Applicant Response
1. Principle and nature of development			
Q3.1.1	The Applicant	Scheme Boundary Please provide updated plans of the scheme boundary to reflect changes in the Scheme boundary resultant from the Change Request.	The Planning Inspectorate confirmed on 27 October 2023 that the document required to be updated was Figure 1.1: Location Plan of the Environmental Statement. A revised copy of Figure 1.1 has been submitted at Deadline 5.
Q.3.1.2	The Applicant	Risk management: 7000 acres in [REP4-070] query whether the Applicant has carried out a Qualitative and Quantitative risk analysis for the project and if so if it and the resultant risk register can be shared. 1) Can the Applicant confirm if it has carried out such an analysis and confirm whether it is prepared to share the outcomes. 2) Comment on whether such an analysis is an important and relevant matter in this examination and if not explain why not.	As any reasonable and prudent developer would, the Applicant keeps risk registers for the project. Risk registers contain commercially sensitive information and are designed as internal project management tools. The Applicant does not therefore consider it appropriate to share these and is unaware of any other solar developer being required to share the risk register(s) for any other nationally significant infrastructure project. The Applicant notes that the applicant for Cleve Hill Solar project submitted a risk register relating to the Medway Estuary and Swale Strategy (MEASS) as an appendix to another submission, on the basis that this risk register mentioned Cleve Hill. However, this was a risk register for MEASS, and the applicant did not submit any risk register for the Cleve Hill Solar Park itself. The Applicant does not consider that the risk register is an important or relevant matter as the relevant environmental risks have already been assessed as part of the application. For example, Chapter 15 of the Environmental Statement [APP-024] includes an assessment of major accidents and disasters. The assessment concluded that the risk of such events occurring is low for the Scheme and significant effects on the environment are therefore not anticipated. However, minimising the risk of major accidents during construction, operation and decommissioning will be addressed through appropriate risk assessments as required in the Framework Construction Environment Management Plan (CEMP) [REP4-035], Operational Environment Management Plan (OEMP) [REP2-035] and Decommissioning



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			<p>Environment Management Plan (DEMP) [REP4-037] (all as amended). The implementation of those plans are secured via Requirements 12, 13 and 19 of the Development Consent Order (DCO) respectively.</p>
Q3.1.3	The Applicant	<p>Cumulative Assessments Comment on WLDC’s suggestion that the cumulative assessment for the Proposed Development and other schemes should include 7 various scenarios to cover the various eventualities of the Proposed Development coming forward with one, some or all of the other NSIPs in the area.</p>	<p>The Applicant refers to the seven scenarios identified by WLDC in its response to the Examining Authority’s Second Written Questions Q2.1.9 [REP4-046].</p> <p>The Applicant’s view is that this is unnecessary due to the cumulative effects assessment having been carried out on the basis of a “worst case scenario” approach, in accordance with standard industry best practice and a precautionary approach to assessment.</p> <p>The Applicant has assessed “Scenario 7” and presented the worst case cumulative effects of Gate Burton, Cottam, West Burton and Tillbridge, together with the other schemes identified within ES Appendix 16-A [APP-181]. Any other scenario (e.g. if one or more schemes did not come forward) described in Scenarios 1 to 6 by WLDC would result in effects which are equal to or less than the worst case scenario presented.</p> <p>The cumulative effects of the four DCO applications referred to by WLDC (Gate Burton, Cottam, West Burton and Tillbridge) are comprehensively assessed and presented, with the approach, consultation, methodology, assumptions and conclusions set out within the Environmental Statement discipline chapters 6: Climate Change [APP-015]; Chapter 7: Cultural Heritage [APP-016]; Chapter 8: Ecology and Nature Conservation [APP-017]; Chapter 9: Water Environment [APP-018]; Chapter 10: Landscape and Visual Amenity [APP-019]; Chapter 11: Noise and Vibration [APP-020]; Chapter 12: Socio-Economics and Land Use [APP-021]; Chapter 13: Transport and Access [APP-022]; Chapter 14: Human Health [APP-023]; Chapter 15: Other Environmental Topics [APP-024]; and within the Environmental Statement Chapter 16: Cumulative Effects and Interactions [APP-025]. These discipline chapters are supported by the following appendices that also address cumulative effects Appendix 2-B: Grid Connection Construction Method Statement [APP-114]; Appendix 10-H: Landscape and Visual Cumulative Effects [APP-151]; and Appendix 13-D: Transport Assessment [APP-166]. Importantly, each discipline chapter sets out the assessment undertaken with clear conclusions identified within Chapter 16: Cumulative Effects and Interactions [APP-025]. In the case of key areas of interaction such as Landscape and Visual and Traffic and Transport for example, further assessment and</p>



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			<p>collaborative work has been undertaken with a focus on identifying opportunities for combined mitigation and commitments to lower overall effects as set out within the Joint Interrelationships Report [REP4-050 and as amended]. The Cumulative Landscape and Visual Assessment Appendix [APP-151] sets out the schemes agreed in consultation with Lincolnshire and Nottinghamshire Council and the basis of the cumulative assessment. Each of the four schemes referred to by WLDC are included along with several other schemes.</p> <p>The decision maker therefore has comprehensive and robust information before them on which to develop an informed view and base decision making. Any assessment of alternative scenarios referred to by WLDC would serve no useful purpose because the worst case cumulative effects have been identified and clearly set out in accordance with standard industry best practice.</p> <p>The Applicant has nevertheless been discussing this issue with WLDC to see whether any minor amendments can be provided to the Interrelationships Report to help resolve their issue.</p>
Q3.1.4	The Applicant	<p>Joint Report on Interrelationships between NSIPs [REP4-050] In the Joint Report on Interrelationships between NSIPs references in Paragraph 1.2.1 refers to table 1.2, however there does not appear to be a table 1.2. The Following Table identified as Table 1.4 albeit this is the second table in the document with the preceding table being Table 1.3. There also appears to be two Table 1.3's one on page 5 and one on page 7. The table numbering in the report is incorrect given the references in the text. The tables or referencing needs to be corrected.</p>	Comments noted. The table referencing has been corrected in the updated Joint Report on Interrelationships between NSIPs submitted at Deadline 5.
Q3.1.5	The Applicant	<p>Joint Report on Interrelationships between NSIPs [REP4-050]</p>	The Applicant has updated the draft DCO at Deadline 5 to include protective provisions for the benefit of Tillbridge Solar Limited, at Part 14 of Schedule 15. These have been included without the definition of the land to which they apply on the basis that the DCO application



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		<p>Paragraph 3.1.4 of the report refers to the DCO's containing reciprocal Protective Provisions for the other schemes at the appropriate time.</p> <ol style="list-style-type: none"> 1) Is it the Applicants intention to include reciprocal Protective Provisions for the Tillbridge scheme?; 2) When will this be included in the dDCO?; 3) Should a place holder be included in the current dDCO to be replaced or deleted if not required?; 4) Is there a possibility that you won't be in a position to include Protective Provisions for Tillbridge in the dDCO by the conclusion of the Examination, and how will this be addressed if they are required after the close of the examination but before the Secretary of State makes their decision? 	<p>for the Tillbridge Solar Project has not yet been made, therefore the proposed Order limits for the Tillbridge Solar Project are not yet defined and so the exact spatial location for the provisions is not yet known (i.e. the area of potential overlap). This is the same approach as was taken in respect of the protective provisions for the benefit of West Burton Solar Project Limited prior to the DCO application for the West Burton Solar Project being made. The Applicant is in discussions with Tillbridge Solar Limited regarding the protective provisions and will confirm the wording once agreed between the parties to the Examining Authority (if they can be agreed prior to the close of the Examination), or to the Planning Inspectorate or the Secretary of State as relevant during the determination period.</p>
Q3.1.7	The Applicant	<p>Joint Report on Interrelationships between NSIPs [REP4-050] [REP4-050] sets out the interrelationships between the Proposed Development and other cumulative schemes. At Appendix E, moderate and potentially significant effects are identified however, impacts are concluded to be negligible on the basis that the Proposed Development would have a 'negligible' input to the cumulative effect without explanation or reference to where evidence is in the application to support this. The Applicant should update their assessment to confirm whether there is potential for</p>	<p>The potential for moderate adverse cumulative effect is identified in the Cottam Environmental Statement (a summary is contained within the Cottam ES column within Appendix E of the Inter-Relationships Report [REP4-050]) and is specifically in relation to the Roman Villa West of Scampton (NHLE 1005041) where the Cottam Environmental Statement states that Gate Burton Energy Park will make negligible contribution to the cumulative effect. The cumulative assessment within the Gate Burton Environmental Statement did not identify any effects resulting from Gate Burton Energy Park with regards to the Roman Villa West of Scampton listed in the Cottam Solar Project Cumulative Assessment. The asset listed falls outside the study area for assessment in the Gate Burton Cultural Heritage Environmental Statement Chapter [APP-016]. This study area was guided by the Scheme's Zone of Theoretical Visibility, but also considered physical and historical connectivity and relationships with other assets and the wider landscape. The extent of the study area, extending 5km for assets of the highest significance, was agreed as appropriate with Historic England and the Local Planning Authority through Scoping as detailed in ES</p>



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		<p>cumulative effects and where there are, the conclusions of likely significant effects should be updated and report the significance of the cumulative effect and not just the input of the Proposed Development to that effect.</p>	<p>Volume 1, Chapter 4: Consultation [APP-013] and in summary in ES Volume 1, Chapter 7: Cultural Heritage [APP-016]. The Roman Villa West of Scampton is located approximately 9.5km southwest of Gate Burton Energy Park. As no effects have been identified to the Roman Villa West of Scampton as a result of Gate Burton Energy Park, no cumulative effect is identified to this asset in relation to other schemes in the vicinity.</p> <p>There is therefore no change and no update to the conclusions of the cumulative assessment as set out within ES Chapter 16 Cumulative Effects [APP-025].</p>
Q3.1.8	The Applicant	<p>Joint Report on Interrelationships between NSIPs [REP4-050] It is stated in [REP4-050] Table 2-2 that it is not possible to confirm whether there is potential for significant cumulative effects and that this will be considered further in ES Chapter 17 Cumulative Effects. However, it is unclear whether the Applicant intends to submit updated information or whether this refers to existing information in the ES. The cumulative effects assessment should be updated to reflect definitive conclusions based on a worst-case scenario; any assumptions should be clearly set out.</p>	<p>The statement regarding ‘it is not possible to confirm whether there is potential for cumulative effects’ is taken from the Tillbridge Preliminary Environmental Information Report (PEIR). For clarity, the statement does not relate to the Gate Burton Environmental Statement. The Applicant does not intend to submit updated information. The Gate Burton Environmental Statement provides definitive conclusions on cumulative effects with these conclusions set out within ES Chapter 16 [APP-025] and based on the list of schemes identified within ES Appendix 16-A [APP-181]. The review of published Environmental Statements for Cottam and West Burton and the PEIR for Tillbridge confirms that the cumulative effects reported in the ES [APP-025] remain unchanged.</p>
Q3.1.9	The Applicant	<p>Cumulative effects: ES Chapter 15 [APP-024], section 15.8 makes a broad assumption on which the assessment of cumulative effects of waste at decommissioning are determined; that appropriate recycling facilities will be in place. This is not a precautionary approach and does not consider a worst-case scenario. Can the Applicant update the assessment to assess likely significant effects from cumulative waste at decommissioning based on an appropriate worst-case scenario. Any</p>	<p>The cumulative impact assessment presented in ES Chapter 15 [APP-024] is based on the assumption that specialist regional or national facilities would be in place at the time of decommissioning, and these would be developed in response to demand generated by the UK-wide PV industry. The Applicant considers that this is a realistic worst-case assumption.</p> <p>An “absolute” worst-case assumption would be that no (or very limited) PV recycling infrastructure would be in place at the time of decommissioning and all (or most) waste would therefore be sent to landfill. The applicant considers that this is not realistic, because:</p> <ol style="list-style-type: none"> 1) UK Government strategy as set out in “Our Waste, Our Resources: A Strategy for England (2018) is “to move to a more circular economy which keeps resources in use for longer”.



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		<p>assumptions used to inform the assessment should be clearly set out and any mitigation measures e.g. Outline Decommissioning Plan, should be appropriately referenced. Please note that, where relevant, the assessment should align with assessments undertaken for other cumulative developments unless differences are sufficiently explained.</p>	<p>2) The Waste Electrical and Electronic Equipment regulations place obligations on those who place PV panels on the market to finance the costs of collection, treatment, recovery and environmentally sound disposal.</p> <p>3) The landfill tax will strongly incentivise reuse, recycling and recovery.</p> <p>There are therefore already strong policy, regulatory and commercial incentives in place that will drive the development of PV recycling infrastructure to meet market demand. Such facilities are not currently in place because the amount of PV panel waste currently generated is low, and hence there is little demand for facilities; but this is very likely to change as the industry matures and waste quantities substantially increase.</p> <p>Different approaches have been followed for cumulative waste assessments for other schemes. It is not unusual to have differences in the methodology and approach adopted within cumulative assessments. For Cottam and West Burton, the assessment compared decommissioning waste quantities against current landfill capacity in Lincolnshire and Nottinghamshire which in the Applicant's professional judgement, is an unlikely scenario because it is reasonable to assume that a form of recycling and recovery facility will be available given the length of time until the decommissioning stage. The Applicant therefore does not consider the approach taken by Cottam and West Burton to be a 'reasonable worst case'. The cumulative waste assessment for Tillbridge is yet to be reported.</p> <p>The Applicant is not aware that other developers have taken an approach as precautionary as has been taken for the Cottam and West Burton projects.</p>
Q3.1.10	The Applicant	<p>Cooperation Agreement: The Joint Report on Interrelationships between NSIPs [REP4-050] contains a copy of the co-operation agreement between the promoters of the various NSIP schemes would it be appropriate to have the co-operation agreement between the parties as a certified document to secure the co-operation between the parties.</p>	<p>It would not be appropriate to condition the cooperation agreement, the effect of which would be to attach criminal liability for breach (further to section 161 of the Planning Act 2008) to a private and voluntary commercial agreement. This would be unnecessary and disproportionate and would have negative implications for future schemes and further efforts between developers to cooperate and to evidence that cooperation.</p> <p>In any case, there is no need for the cooperation agreement to be a certified document. All necessary mitigations for the Scheme are either facilitated through design or secured via DCO requirement. Therefore, even in the unlikely scenario that the cooperation agreement</p>



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		<p>What would prevent the parties from amending or dissolving the agreement at some future point and if that is the case what weight can be given to the co-operation agreement and is it an important and relevant matter?</p>	<p>was amended or dissolved, then the local planning authorities may enforce the requirements set out at Schedule 2 of the DCO.</p> <p>The applicants for Gate Burton, Cottam, West Burton and Tillbridge have been working collaboratively to date. This is demonstrated in practice, for example, by the proposals for a shared cable corridor, agreeing protective provisions for the benefit of each of the other schemes, and coordinating to agree protective provisions with third parties. The Applicant's position is that whilst the cooperation agreement it is not an important or relevant matter for the purposes of the decision making in light of the above, by entering into the legal binding agreement the Applicant is giving transparency into the continued commitment of the applicants to work cooperatively.</p>
Q3.1.11	All Parties	<p>Supporting Environmental Information Report [CR1-043] Does the supporting Environmental Information in relation to the Change request provide sufficient information to support its conclusions and does it alter any of the overall conclusions reached in respect of the Proposed Development that you have previously raised and submitted into the examination. Please explain any response.</p>	<p>The Supporting Environment Information document contains sufficient information to support its conclusions based on the survey work undertaken, the robust identification of the baseline and receptors affected, consultation with relevant statutory stakeholders and assessment and reporting of effects on those receptors.</p> <p>Subsequent to submission of the Supporting Environmental Information Report [CR1-043] at D4, consultation has continued with Historic England and the Archaeological Advisors to the Local Planning Authorities, including LCC and BDC (on behalf of NCC) in order to confirm the scope of the trial trench evaluation in the areas added into the Order limits. Consultation with Historic England was undertaken between 14/09/2023 and 06/11/2023, and consultation with LCC and BDC (on behalf of NCC) was undertaken between 14/09/2023 and 08/11/2023. The scope of the trial trench evaluation was agreed with all mentioned parties and completed between 16-19 October 2023. A total of five trenches were excavated and the results are provided in the updated Appendix 7-E Archaeological Trial Trenching Evaluation Fieldwork Report submitted at Deadline 5. A single feature was identified which comprised a circular pit that likely represents a variation in the natural or bioturbation. No features of archaeological origin were identified.</p> <p>Following completion of the trial trenching, further consultation was undertaken with Historic England and the Archaeological Advisors to the Local Planning Authorities to agree appropriate mitigation strategies. Both Historic England and the Archaeological Advisors to the Local Planning Authorities agreed to a watching brief during construction activities within</p>



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			<p>the extended Order limits. In addition, Historic England have agreed to a 20m buffer zone along the northern boundary of the Scheduled Monument Fleet Plantation moated site (NHLE 1008594). No construction activities will be undertaken within this buffer zone. These mitigation strategies have been set out in the updated Appendix 7.6 Archaeological Mitigation Strategy Part 2 Grid Connection Corridor submitted at Deadline 5.</p>
<p>2. Biodiversity, Ecology and Natural Environment (including Habitats Regulations Assessment (HRA))</p>			
Q3.3.1	The Applicant	<p>Electromagnetic field effects (EMF) on fish:</p> <p>The Environment Agency [REP4-063] has suggested a Risk Assessment in relation to EMF is produced centred on the grid connection corridor crossing of the river Trent to understand the risks during the operation of the Proposed Development and whether it is likely to have any impacts on fish including cumulative risks with other schemes.</p> <p>The EA also suggest this should be added to the potential impacts in areas of discussion so that the Statement of Common Ground can be reissued once the matter has been resolved.</p> <p>1) The Applicant should carry out the requested Risk Assessment and submit it into the Examination at the next deadline, deadline 5. In preparing the Risk Assessment this should be undertaken taking account of input from the Environment Agency and Natural England, with any advice or comment they have before the document is finalised.</p>	<p>1) Please refer to Appendix A, which includes the Risk Assessment in relation to EMF. The Risk Assessment was shared with the Environment Agency and Natural England on 9th November for comment, however no feedback was received. The Risk Assessment confirms that the probability of adverse effects of EMF from cables buried beneath watercourses for the Gate Burton Energy Park and cumulatively with West Burton, Cottam and Tillbridge on fish is extremely low; will be negligible in the wider context of the watercourses; and is therefore not significant.</p> <p>2) Mitigation in the form of burying the cable a minimum of 5m below the lowest point of the riverbed of the River Trent is included within the Outline Design Principles [REP4-004] which is secured by Requirement 5 of the Draft DCO [REP4-023]. No further mitigation is required.</p> <p>3) The Risk Assessment presented in Appendix A confirms that the probability of adverse effects of EMF from cables buried beneath the River Trent for the Gate Burton Energy Park and cumulatively with West Burton, Cottam and Tillbridge on fish is extremely low and therefore, not significant. As such, there are no impact pathways which may affect protected sites, notably the Humber Estuary Special Area of Conservation (SAC). The Applicant's Habitats Regulation Assessment [APP-223/7.2] did not identify any European Sites within the studies search area, i.e., where they may be impacted by the proposed Solar and Energy Storage Park and/or Grid Connection Corridor and concluded that will be No Significant Effects to European Sites either from the construction, operation and decommissioning of the Scheme or in combination with other plans and projects. The Risk Assessment confirms that there are no impact pathways from EMF on fish and therefore, the conclusion of the HRA remains valid and no further updates are required.</p>



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		<p>2) If the Risk Assessment identifies any required mitigation, the Applicant should update the necessary documents or identify any embedded mitigation or prevention, e.g., greater depth of buried cable, update the Outline Design Principles.</p> <p>3) Comment on how this affects the conclusions of your No Significant Effect report and the Habitats Regulation Assessment and whether there are pathways that may affect protected sites, in particular the Humber Special Area on Conservation (SAC). Also refer to and respond to the Report on Implications for European Sites (RIES) published alongside these questions</p>	
Q3.3.2	The Applicant	<p>Electromagnetic field effects (EMF) on fish: The Applicant concludes that burying the cables to a minimum depth of 0.9m and given the limited span of the corridor this would provide sufficient mitigation to prevent adverse effects on aquatic life and in particular protected species. You have updated the Outline Design Principles to provide a minimum buried depth below the bed of the river Trent of 5m to address CRT's comments. How does this affect these conclusions and any comments in respect of the preceding question.</p>	<p>The minimum depth of 5m for the River Trent was agreed with CRT to alleviate concerns of risk of the HDD impacting sediment and resulting effects on navigation. Given the HDD is now deeper (at minimum 5m rather than the previous 2m), the distance between the cables and the fish has increased to be very significantly more than the 0.9m required to mitigate effects on aquatic life. This commitment gives further confidence than the conclusion in the preceding question is correct.</p>
<p>3. Climate Change</p>			
Q3.4.1	The Applicant	<p>Renewable energy crops In terms of the assessment of effects on climate change in the ES has the loss of</p>	<p>The potential impact of foregone biofuel crop cultivation resulting from the Proposed Development has not been taken into account in the GHG assessment.</p>



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		<p>crops used for the production of renewable energy been taken into account. If so, how has this been done and where is this identified.</p>	<p>PV modules are much more efficient than plants in converting sunlight to useable energy, and all objective studies indicate that the annual energy yield per unit area is lower by orders of magnitude for biofuel crops than for photovoltaics, meaning that any area allocated for the cultivation of biofuels instead of PV modules would result in lower net GHG benefits.</p> <p>The Applicant notes the following energy outputs for crops compared to solar, using information available on the Forestry Research website (Potential yields of biofuels per ha p.a. - Forest Research):</p> <table border="1" data-bbox="1010 592 1592 986"> <thead> <tr> <th>Fuel</th> <th>Energy per ha p.a. (MWh/ha.a)</th> </tr> </thead> <tbody> <tr> <td>Miscanthus (@25% moisture content)</td> <td>63</td> </tr> <tr> <td>Wheat straw (@ 20% moisture content)</td> <td>13</td> </tr> <tr> <td>Biodiesel (from rapeseed oil)</td> <td>11.3</td> </tr> <tr> <td>Bioethanol (from sugarbeet)</td> <td>33</td> </tr> <tr> <td>Bioethanol (from wheat)</td> <td>17</td> </tr> <tr> <td>Biogas (from sugar beet)</td> <td>44</td> </tr> <tr> <td>Solar based on Gate Burton Scheme details</td> <td>382</td> </tr> </tbody> </table> <p>The figure provided for solar yield is based on the average predicted yield from the scheme of 449,800MWh per annum divided by 1,176 acres, being the area covered by Work Number 1 (the solar panels and balance of solar system plant). The electricity generated by the Scheme will depend on the final layout of the Scheme and the detailed technology choice.</p>	Fuel	Energy per ha p.a. (MWh/ha.a)	Miscanthus (@25% moisture content)	63	Wheat straw (@ 20% moisture content)	13	Biodiesel (from rapeseed oil)	11.3	Bioethanol (from sugarbeet)	33	Bioethanol (from wheat)	17	Biogas (from sugar beet)	44	Solar based on Gate Burton Scheme details	382
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<p>4. Compulsory Acquisition, Temporary Possession and Other Land or Rights Considerations</p>																			
Q3.5.1	The Applicant, Crown Estate Commissioners	<p>Crown Land: Provide any further update on negotiations between the Applicant and Crown Commissioners and whether there is any</p>	<p>The Applicant and The Crown Estate (TCE) have reached an agreed position and the relevant consents pursuant to s135(1) and (2) are being submitted separately.</p>																



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		greater clarity on when this matter may be brought to a resolution.	
Q3.5.2	Lincolnshire County Council	<p>Financial contribution to Lincolnshire Fire Service: In response to my further written question 2.5.4 Lincolnshire County Council (LCC) have provided further detail of the matters a section 106 legal agreement should secure in respect of a financial contribution towards Battery Energy Storage System Management. The figures and justification are based around a daily rate. LCC should submit the justification or detail as to how the figure for the daily rate of £765 is calculated or justified.</p>	<p>Following discussions with LCC, the Applicant has provided protective provisions for the benefit of Lincolnshire Fire and Rescue service at Part 13 of Schedule 15 of the draft DCO. The form of these protective provisions is similar to that included for the benefit of the East of England Ambulance Service Trust in Part 10 of Schedule 15 of the Longfield Solar Farm Order 2023. Agreement between the Applicant and LCC is recorded in the Draft Statement of Common Ground [EN010131/APP/4.3H] submitted at Deadline 5.</p>
Q3.5.3	The Applicant	<p>Nicholas Hill and Emma Hill In Response to my Further written question 2.5.6 Nick and Emma Hill provided a letter [REP4-073 and 074] suggesting a wayleave or a lease of the land. Explain why these options would not fulfil your requirements for the scheme given that it is suggested it is for a temporary period (albeit 60 years) and why a permanent easement is necessary. Furthermore, detail the alternatives that you have explored to Compulsory Acquisition (CA) of rights, including investigating alternative nearby parcels of land and why this does not resolve your need to CA rights of this land.</p>	<p>The Applicant previously set out why the easement was originally the preferred option and considered beneficial from a landowner perspective. The Applicant has also confirmed with Mr and Mrs Hill that the easement could be agreed on a time limited (the life of the project) basis. At Mr and Mrs Hill's request, the Applicant has also confirmed with Mr and Mrs Hill that they would consider a subsoil lease, and terms for both an easement and a lease have been issued to them for consideration. Discussions are ongoing on the commercial arrangements.</p> <p>It has been explained to Mr and Mrs Hill why a Wayleave would not be appropriate, as it would not give the certainty of rights for the life of the project.</p> <p>The routing of the grid connection was developed following optioneering prior to submission of the application and selected to minimise impacts on the environment, local residents and landowners as far as possible. A report providing further information on the options considered has been presented in document 8.29 submitted at Deadline 5. No options have been identified that would avoid Compulsory Acquisition and no options perform better in environmental terms than the selected option. Most alternative options would affect more landowners in total, many of whom were not willing to enter into negotiations.</p>



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			<p>The Applicant has been working to investigate the potential to obtain the rights over land by negotiation as an alternative to Compulsory Acquisition. The Applicant remains open to exploring options that will increase the possibility of agreement being reached. Most recently this has included discussions on the subsoil lease, as well as being open to exploring options to reduce the impact on the consented barns and future agricultural activities. Details of previous engagement are set out in the Schedule of Negotiations.</p>
Q3.5.4	The Applicant, Mr Ash	<p>Mr Ash withdrawal of objection to Compulsory Acquisition: The Applicants cover letter for the deadline 4 submissions [REP4-001] refers to a joint statement with MR Ash and includes a Joint Position statement which states at the third paragraph "... Mr Ash is willing to withdraw his objection to the Applicant seeking Compulsory Acquisition rights for the scheme" (my underlining) This is not a definitive statement that Mr Ash withdraws his objection.</p> <p>Can either Mr Ash confirm that he withdraws his objection to the Applicant seeking Compulsory Acquisition rights or Both parties have this statement amended and both parties resign and submit again to confirm the objections are now withdrawn. Mr Ash remains an IP and so this would not affect his ability to continue to participate and engage with the examination.</p>	<p>The Applicant has been in liaising with Mr Ash to provide a revised Position Statement confirming the removal of his objection.</p> <p>At the time of Deadline 5 The Applicant and Mr Ash were not able to sign an agreed statement and endeavour to submit one as soon as practicable and in advance of Deadline 6.</p>
<p>5. draft Development Consent Order (DCO)</p>			
Q3.6.1	The Applicant	<p>Article 44 and Schedule 9 Draft Marine Licence:</p>	<p>1) Methodology</p>



Question Number	Respondent	Question Summary	Applicant Response
		<p>1) Confirm that the methodology proposed in the draft Marine Licence is the worst-case scenario and explain why other potential scenarios would not be worst case scenarios or would not be used and how this would be controlled or restricted.</p> <p>2) Given that the Marine Management Organisation (MMO) maintain its position that the matters proposed are covered by an exemption and they do not support the inclusion of a dML in the dDCO there are two options a) remove the provisions; or b) seek to maintain the provisions in the dDCO. Confirm your intentions and if b) provide further justification for the inclusion of the dML including identifying other DCO's where an exemption has applied and a dML has been included in a made DCO. Furthermore, justify each of the suggested conditions in the dML and the basis on which such conclusions are reached.</p>	<p>The Applicant has included all construction, maintenance, operation and decommissioning works (including associated development) for the laying of the 400kV cable within the tidal extent of the River Trent within the scope of the dML. The dML authorises these activities to the extent they are not exempt, and subject to the conditions in Part 2 of the licence. The Applicant notes the Rule 17 request for information from the ExA on this topic [PD-014], and the interactions between the dML with the EIA, and refers to its response to that Rule 17 request submitted at Deadline 5 [document 8.30].</p> <p>2) Applicant's position</p> <p>The Applicant is seeking to maintain the provisions at Article 44 and Schedule 9 in the dDCO.</p> <p>Whilst the activities proposed may currently be interpreted to be covered by an exemption, the Applicant notes the response from the MMO [REP4-064] which supports the Applicant's position that the applicability of the exemption in relation to the licensed activities may change in the future.</p> <p>As discussed at Issue Specific Hearing 2 on the draft DCO [REP3-026], the availability of the exemption does not prevent the inclusion of the dML within the dDCO. The Applicant has the opportunity to include consents within the DCO that may be needed for the Scheme to ensure that it may proceed without unnecessary delay and uncertainty. The inclusion of the dML removes uncertainty and covers the possibility of any other later interpretation of whether the exemption applies to any activities to be carried out within the tidal extent of the River Trent.</p> <p>To clarify, the Applicant is not seeking to disapply the exemption, and the dML has been drafted to apply only if the exemption does not apply (as set out at paragraph 3(1)(b) of Part 1 of Schedule 9 of the DCO). This is the standard approach to offshore wind dMLs and the same drafting is also found in the dML included in the Cleve Hill Solar Farm Order 2020 (see paragraph 2(1)(b) of Part 1 of Schedule 8 to that Order). The MMO's submission on this point is therefore flawed. If the exemption continues to apply to any works, then the dML will not apply to those works. However, if the exemption does not apply, the inclusion of the dML within the DCO would ensure that a separate application for a marine licence would not be</p>



Question Number	Respondent	Question Summary	Applicant Response
			<p>required, enabling the nationally significant infrastructure project to proceed without delay or uncertainty.</p> <p>If the dML were not included, this would be an unnecessary administrative burden on the Applicant, contrary to the “one stop shop” intention of the DCO regime for nationally significant infrastructure projects, and could lead to a delay, noting there are no statutory timescales for the MMO to determine a marine licence application.</p> <p>The Applicant notes the lack of certainty of timescales associated with the marine licensing process, which is one of the key benefits of the DCO regime, and the Applicant assumes, the underpinning rationale for the addition of S149A of the Planning Act 2008 which enables a dML to be granted as part of a DCO.</p> <p>It is noted that offshore wind developers regularly apply for dMLs as part of their DCO, to ensure the delivery of their NSIP schemes, without having to unnecessarily rely on a separate licensing process and seek separate consent(s). Likewise, the Cleve Hill Solar Farm Order 2020 includes a dML for flood defence works, which could have been applied for separately but was more efficiently included within the DCO. It is noted that in relation to that Scheme, it appears the MMO’s preference was for a dML to be included, e.g. paragraph 4.132 of the Secretary of State’s decision letter (BEIS letter London 1VS (planninginspectorate.gov.uk)) states:</p> <p><i>“The Marine Management Organisation suggested that a deemed Marine Licence would be the most appropriate way to deal with those parts of the proposed Development – the flood defences – that extended below the Mean High Water Mark rather than pursuing an option transferring existing Marine Licence exemptions held by the Environment Agency to the Applicant.”</i></p> <p>The MMO’s role in the DCO process, including administering dMLs post-consent, is also recognised in their guidance on NSIPs (Marine licensing: nationally significant infrastructure projects - GOV.UK (www.gov.uk)) which states:</p> <p><i>“If a development consent order (DCO) is granted, this may include provision deeming a marine licence to have been issued under Part 4 of the Marine and Coastal Access Act 2009.</i></p>



Question Number	Respondent	Question Summary	Applicant Response
			<p><i>The MMO is responsible for enforcing, post-consent monitoring, varying, suspending, and revoking any deemed marine licence(s) as part of the DCO.”</i></p> <p>It is therefore clear that there is an ability for the DCO to include the dML requested, that there are clear benefits in terms of certainty and programme for the NSIP in doing so, and the MMO would retain a key role in the process including as regulator of the licence. All of this has been provided for in the dML, which in any case only applies to activities if the exemption does not as clarified above (paragraph 3(1)(b) of the DML)</p> <p>The conditions within the Gate Burton draft dML align with the conditions in Schedule 8 of the Cleve Hill Solar Park Order 2020, which were agreed with the MMO and ultimately found to be acceptable by the Secretary of State. The Applicant’s position is therefore that the proposed conditions are 'enforceable, clear and sufficiently detailed to allow for monitoring and enforcement' and therefore are in accordance with PINS Advice Note 11, Annex B. The Gate Burton draft DCO includes an additional condition relating to decommissioning. This ensures that the MMO has a right of approval over the decommissioning activities proposed. The wording aligns with the maintenance condition, therefore this is also 'enforceable, clear and sufficiently detailed to allow for monitoring and enforcement'.</p>
Q3.6.2	The Applicant	<p>Abatement or abandonment of works: Sturton By Stow Parish Council in its representation [REP4-058] raised the potential for a clause in the DCO related to abatement or abandonment of works. Comment on the applicability of such a clause in this DCO and if not appropriate explain why not.</p>	<p>As previously submitted into Examination orally and in writing, decommissioning is sufficiently secured by Requirement 19 of Schedule 2 of the Order. Prior to decommissioning, the Applicant must submit a DEMP to the relevant local planning authority for approval. The DEMP must be substantially in accordance with the Framework DEMP [REP4-037] which will be a certified document pursuant to Schedule 13 of the Order. A breach of a requirement of a DCO is an offence pursuant to section 161 of the Planning Act 2008. If the Applicant were to decommission the Scheme without preparing, submitting and having the DEMP approved, then this would amount to an offence which is sufficient deterrent to ensure compliance.</p> <p>The Applicant has also submitted a Funding Statement [REP4-033] into Examination. This document sets out the corporate structure of the Applicant, the estimated costs of the project and the funding available for the Scheme. The Applicant maintains that this document</p>



Question Number	Respondent	Question Summary	Applicant Response
			<p>provides sufficient reassurance that there is available funding for the delivery of the Scheme, including decommissioning.</p> <p>There is no reasonable or rational basis on which to determine that the decommissioning risk associated with the Applicant and the Scheme is greater than any other solar DCO scheme consented, none of which include a provision for abatement or abandonment of works. The Applicant therefore considers it unnecessary to include such a provision.</p> <p>Notwithstanding, and without prejudice to this position, if the ExA or the Secretary of State considers that such a provision is required, then the Applicant proposes that the following drafting would be more suitable and is based on more recent offshore wind DCOs such as the Hornsea Four Offshore Wind Farm Order 2023:</p> <p><i>“Where Work Nos 1, 2 or 3 or all of them or any part of them, is abandoned or allowed to fall into decay the Secretary of State may, following consultation with the undertaker, by notice in writing require the undertaker within a reasonable time and at its own expense either to repair, make safe and restore one or any of those Works, or any relevant part of them, or if that is not reasonably practicable, to remove them and, restore the site to a safe and proper condition, to such an extent and within such limits as may be specified by the Secretary of State.”</i></p>
Q3.6.3	The Applicant	<p>Article 7 Defence to proceedings in respect of statutory nuisance Given the cumulative addition of schemes being simultaneously or sequential detail why the removal of the ability for local residents etc to seek Statutory Nuisance redress is reasonable, proportionate and robust. The Explanatory Memorandum should be updated in this respect.</p>	<p>The Explanatory Memorandum [REP4-026] contains extensive justification for the inclusion of the model provision, which is not repeated in full here.</p> <p>In summary, the Applicant requires certainty that it can defend any statutory nuisance claim relating to noise under the defence available in Section 82(9) Environmental Protection Act 1990. This is robust as it ensures that when any noise arises as a consequence of the construction, maintenance or use of the authorised development, then there is a provision to define its consequences in an appropriate and balanced manner. It is also reasonable and proportionate on the basis that the works authorised by the DCO are subject to the appropriate levels of controls and should be permitted to proceed to construction and operation (and eventually decommissioning). For example, noise is controlled via the mitigation secured in Table 3-6 (Noise and Vibration) of the Framework Construction Environmental Management Plan [REP4-035] (Requirement 12), Table 3-6 (Noise and</p>



Question Number	Respondent	Question Summary	Applicant Response
			<p>Vibration) of the Framework Operational Environmental Management Plan [REP2-035] (Requirement 13) and Table 3-6 of the Framework Decommissioning Environmental Management Plan [REP4-037] (Requirement 19).</p> <p>This position aligns with the rationale of paragraph 4.14 of Overarching National Policy Statement for Energy EN-1 (2011) (“NPS EN-1”) and repeated in the latest draft NPS EN-1 (2023). This refers to section 158 of the Planning Act 2008 which confers statutory authority for carrying out development consented to by, or doing anything else authorised by, a DCO for the purpose of providing a defence in any civil or criminal proceedings for nuisance. Article 7 gives specificity to the defence available to the Applicant to proceedings in respect of statutory nuisance for the purposes of the Gate Burton Energy Park.</p> <p>As noted in the Explanatory Memorandum, this article is a model provision and is preceded in all made solar DCOs, including The Cleve Hill Solar Park Order 2020, The Little Crow Solar Park Order 2022 and The Longfield Solar Farm Order 2023. The Applicant has not checked every made DCO but the provision has also been included in all other DCOs granted in 2023 including the Hornsea Four Offshore Wind Farm Order 2023, the Awel Y Mor Offshore Wind Farm Order 2023, the A303 (Amesbury to Berwick Down) Development Consent Order 2023, The Boston Alternative Energy Facility Order 2023, The A38 Derby Junctions Development Consent Order 2023, The A47 Wansford to Sutton Development Consent Order 2023 and The East Northamptonshire Resource Management Facility Order 2023. There is no rational basis for not providing the Applicant with the protection afforded to other undertakers who develop their NSIPs pursuant to the parameters and controls contained within their relevant DCO, and the Applicant should not be put at a disadvantage and at greater risk of attracting liability for statutory nuisance.</p> <p>The Applicant considers that this well preceded position is not altered by virtue of the cumulative relationship with other nearby schemes. As set out in Chapter 16 of the Environmental Statement [APP-025], there are no significant cumulative effects on noise or vibration anticipated for the development. Based on the distances from key project components to cumulative developments, it is considered that any overlapping of construction phases between the Scheme and other developments would not result in any cumulative effects at common noise-sensitive receptors. Further, given the requirement for new developments to achieve operation noise standards, and the relative distance between</p>



Question Number	Respondent	Question Summary	Applicant Response
			<p>cumulative developments and the Scheme, operational noise effects from the Scheme will remain unchanged from the residual effects. In light of this, it remains robust in that it ensures the certainty required when certain noise arises as part of the development. It also remains reasonable and proportionate on the basis that the works authorised by the DCO will be subject to the appropriate levels of controls, for the purposes of Scheme specific effects and cumulative effects. The Applicant submitted a statutory nuisance statement along with its DCO application [APP-184], and the conclusions of that statement remain unchanged. It is not expected that the construction, operation (and maintenance) and decommissioning of the Scheme would cause a statutory nuisance.</p> <p>The Applicant has updated the Explanatory Memorandum to provide further justification in light of the cumulative position.</p>
Q3.6.4	Nottinghamshire County Council, Bassetlaw District Council	<p>Schedules 4, 5, 6, 7, and 8 In relation to the Change Request version of the draft DCO [CR1-016] comment on the proposed additional provisions for streets, works and regulations added to Schedules 4 (Streets Subject to Street Works), 5 (Alteration of Streets), 6 (Streets and Public Rights of Way), 7 (Permanent Means of Access to Works), and 8 (Traffic Regulation Measures) and confirm whether you are content that these cover all necessary matters for these streets and works in respect of the effects resultant from the Change Request.</p>	<p>Bassetlaw District Council and Nottinghamshire County Council have confirmed (as set out the Draft Statement of Common Ground to be submitted at Deadline 5 [EN010131/APP4.3B]) that they are content with the Applicant’s proposed changes to the Order limits, the rationale for the changes and the information provided. Both have confirmed they have no objections to the changes.</p>
Q3.7.1	Historic England, Nottinghamshire County Council,	<p>Updated Archaeological Mitigation Strategy: Given that the Archaeological Mitigation Strategy has been updated at the Change</p>	<p>Further trial trenching has been undertaken in the area added to the Order limits as part of the Change Request. A total of five trenches were excavated and the results are provided in the updated Appendix 7-E Archaeological Trial Trenching Evaluation Fieldwork Report submitted at Deadline 5.</p>



Question Number	Respondent	Question Summary	Applicant Response
	Bassetlaw District Council	Request (in particular see Part 2 related to Grid Connection Corridor [CR1-032]) will Historic England, Bassetlaw District Council and Nottinghamshire County Council confirm that they are still satisfied that the AMS is acceptable and fulfils its aims and addresses any additional impacts resultant from the extension of the Order lands.	Following completion of the trial trenching, further consultation was undertaken with Historic England and the Archaeological Advisors to the Local Planning Authorities to agree appropriate mitigation strategies. Both Historic England and the Archaeological Advisors to the Local Planning Authorities agreed to a watching brief during construction activities within the extended Order limits. Refer also to the response above to Question 3.1.11. In addition, Historic England have agreed to a 20m buffer zone along the northern boundary of the Scheduled Monument Fleet Plantation moated site (NHLE 1008594). No construction activities will be undertaken within this buffer zone. These mitigation strategies have been set out in the updated Appendix 7.6 Archaeological Mitigation Strategy Part 2 Grid Connection Corridor submitted at Deadline 5.
7. Human Health and Wellbeing			
Q3.8.1	The Applicant	<p>Health Impact Assessment:</p> <p>1) Why have you not undertaken and submitted a Health Impact assessment (HIA)?</p> <p>2) If you consider one is not necessary or required, please explain and justify why you have reached this conclusion.</p>	<p>The Applicant respectfully disagrees with the inference that it has not undertaken a Health Impact Assessment. The assessment of effects on human health set out in Chapter 14: Human Health and Wellbeing [APP-023] of the Environmental Statement (ES) was undertaken utilising the NHS London Healthy Urban Development Unit's (HUDU) Rapid Health Impact Assessment Matrix Tool (2019). This constitutes widely recognised guidance in the assessment of impacts on human health, used by both local planning authorities and developers in determining planning applications. At the time of writing the ES, this was considered by the Applicant to provide a robust assessment methodology for the preparation of Human Health and Wellbeing Impact Assessments suitable to the Scheme. A methodology needed to be selected on the basis that there was no consolidated methodology or practice for the assessment of effects on human health. In addition, the assessment also utilised the Health and Wellbeing checklist of the Wales Health Impact Assessment Support Unit (WHIASU), this having been identified as exemplar guidance by the relevant statutory consultee, UK Health Security Agency (UKHSA) in their scoping opinion response, as detailed below. On this basis, a Health Impact Assessment has been completed using this tool and was submitted in the DCO application as Chapter 14 of the ES [APP-023].</p>



Question Number	Respondent	Question Summary	Applicant Response
			<p>In regard to the contention that the guidance is suitable only for urban contexts, the Applicant respectfully disagrees with this on the basis of the Tool being widely applied in England in a range of development contexts, rural and urban. Most pertinently given the location of the scheme within Bassetlaw, the checklist within NCC'S Spatial Planning and Health Framework, which reflects the Tool, makes no distinction on where it can and cannot be applied stating only that <i>“developers should utilise the checklist when assessing development proposals and plans”</i>. The North Northamptonshire Joint Planning and Development Unit also released a Northamptonshire Rapid Health Impact Assessment Tool for Planning in August 2019, which states that <i>“this Rapid Health Impact Assessment (HIA) tool has been produced to enable an assessment of the likely health impacts of spatial planning related proposals- including specific development proposals or planning applications”</i>.</p> <p>The Toolkit is also utilised in local guidance for assessing impacts on health arising from development proposals prepared by various other local planning authorities across England, covering less urban/rural contexts.</p> <p>The outcomes of the scoping opinion process provide justification for it forming the basis of the approach adopted to assess impacts on health. In its Scoping Opinion response, the Office for Health Improvement and Disparities (OHID, formerly Public Health England) and the UK Health Security Agency (UKHSA) acknowledged that the Human Health and Wellbeing assessment warranted a chapter in its own right, giving focus to public health and taking into consideration the impact on the surrounding communities. OHID and UKHSA recommended that this section should: summarise key information, risk assessments, proposed mitigation measures, conclusions and residual impacts relating to human health. Assessing impacts using the Toolkit aligns with these recommendations and no concern was raised by the statutory consultee regarding the use of the Toolkit approach in assessing impacts.</p> <p>NCC in its scoping opinion response refers to The Nottinghamshire Spatial Planning and Health Framework. Their response recommended the use of the checklist contained within it <i>“to enable the potential positive and negative impacts of the planning application on health and wellbeing to be considered in a consistent, systematic and objective way...”</i>. The checklist, provided at Appendix 2 of the Framework, is identical to the NHS HUDU Tool and</p>



Question Number	Respondent	Question Summary	Applicant Response
			<p>Paragraph 6.8 confirms that the checklist is based upon it. NCC's scoping opinion therefore provided direct corroboration of the Applicant's choice of assessment approach which it took forward in the assessment itself. In respect of other scoping opinion responses, no concerns with the proposed approach to the assessment were raised. All responses received were reflected in the development of the assessment of effects presented in the ES.</p> <p>It is recognised that this methodology is termed a 'Rapid Health Impact Assessment'. However, the aspect of the Tool which has been used in the assessment of effects for the Scheme relates to the assessment criteria only. The overall assessment process followed in the assessment of effects on human health and wellbeing in Chapter 14 of the ES is equivalent in detail and rigour to that undertaken for the assessment of all other effects within the ES. This is on the basis of it having been through a scoping process, with potential impacts based on preliminary information identified and statutory consultation on those initial findings has been undertaken.</p> <p>The approach used by the Applicant in its assessment of health impacts set out in Chapter 14 of the ES has also been used to inform the Human Health and Wellbeing impact assessment methodology on similar recent NSIPs both locally and across the country. This includes the Boston Alternative Energy Facility in Lincolnshire (consented in July 2023), Longfield Solar Farm (consented July 2023) and East Anglia One North Offshore Wind Farm (consented in March 2022) amongst others. These schemes are also located outside of a built environment urban area, thereby demonstrating the appropriateness of this methodology for this context within Environmental Statements.</p>
Q3.8.2	The Applicant	<p>Rapid Health Impact Assessment Matrix (HUDU): 7000 Acres raise concern that The Rapid Health Impact Assessment Matrix Tool (HUDU) applies only to urban areas. Please expand on your justification for it forming the basis of the approach adopted to assess impacts on health in Chapter 14 of the ES as identified at paragraph 14.6.3 [APP-023].</p>	See response to 3.8.1



Question Number	Respondent	Question Summary	Applicant Response
Q3.8.3	The Applicant	<p>Deprivation in Gainsborough wards</p> <ol style="list-style-type: none"> 1) Concerns have been expressed with regard to Deprivation in two neighbouring wards in Gainsborough being excluded as these may be affected by the Proposed Development. Explain the basis on which these Wards were excluded given their geographical proximity 2) Is further mitigation required to address potential impacts from the Proposed development. <ol style="list-style-type: none"> a) If yes identify the mitigation and confirm how secured; b) If no explain why not. 	<p>As stated within Chapter 14 [APP-023], the Study Areas are based on the extent and characteristics of the Scheme and the communities/wards directly and indirectly affected by the Scheme. Based on this, it is determined that Human Health impacts are likely to occur in an area which is composed of the following five wards:</p> <ul style="list-style-type: none"> • Rampton and Sturton wards in Bassetlaw District; and • Lea, Stow and Torksey wards in the West Lindsey District. <p>These five wards have been stated as the Study Area for the Human Health and Wellbeing assessment as these are likely to experience direct impacts from the proposed Scheme, being located within the planned footprint of the development. Impacts that occur beyond this are also addressed within the assessment itself, as the Human Health and Wellbeing assessment draws upon the findings of supporting chapters to inform its conclusions. These chapters have their own Study Areas for their own individual assessments, which vary in their extent. Each chapter also sets out mitigation measures relevant to their individual disciplines, such as management plans. Each of these chapters also includes a baseline analysis section, which includes a review of the existing surrounding area.</p> <p>As stated in paragraph 14.9.1 of Chapter 14 of the ES, <i>“Embedded mitigation measures are incorporated and secured into the Scheme as set out in the respective ES chapters to reduce other construction, operational and decommissioning effects, such as noise and vibration, air quality, transport and access and socio-economics and land use”</i>. This will in turn mitigate the effects on the local community and existing facilities from a Human Health and Wellbeing perspective.</p> <p>In terms of disruption during the construction and operational phase and in recognition of the potential for impacts on mental health that could arise from activities on site, and surroundings, there are measures set out in the Framework CEMP [REP4-036], Framework OEMP [REP2-035] and Framework DEMP [REP4-037] to reduce or avoid human health and wellbeing related impacts during the construction and operational phase, respectively.</p> <p>The Applicant will work with the Local Authorities to ensure that the local community is affected as little as possible, whether that be targeting contractors with social value commitments during construction or wider community benefit initiatives.</p>




Question Number	Respondent	Question Summary	Applicant Response
Q3.8.4	The Applicant	<p>Human Health Impacts: Explain and justify the 500m buffer incorporated in the Assessment of impacts on health and wellbeing including on the potential for cumulative effects and people moving through the area rather than static receptors.</p>	<p>The Human Health and Wellbeing assessment [APP-023] draws upon the findings of supporting chapters to inform its conclusions. These chapters have their own Study Areas for their own individual assessments, including the cumulative assessments.</p> <p>As stated in para 14.12.10 “500m” was referred to in relation to the cumulative noise assessment and states that <i>“based on professional judgement, at distances of greater than 500m, any interaction of noise emissions from multiple developments would be attenuated and so normally no combined effect. The precise scale of noise effects will depend on works taking place at any one time, however, mitigation measures presented in the Framework Construction Environmental Management Plan (CEMP) [EN010131/APP/7.3] and Decommissioning Environmental Management Plan (DEMP) [EN010131/APP/7.5] seek to minimise this as far as possible.”</i></p> <p>This is also supported by Chapter 11: Noise and Vibration [APP-020] in paragraph 11.5.2, which states that <i>“For the Solar and Energy Storage Park, the wider 500m operational Zone of Influence (Zol) has been used for both the construction and operational noise and vibration assessment as it is considered that receptors further than 500m will experience considerably lower levels of noise and vibration emissions as these will attenuate over distance, resulting in negligible noise and vibration effects from the Scheme; this is confirmed by the modelling output and conclusions in this chapter. This Zol was agreed through a meeting with West Lindsey District Council on 12 April 2022”.</i></p>
<p>8. Landscape and Visual</p>			
Q3.9.1	The Applicant	<p>Framework Decommissioning Environmental Management Plan (FDEMP): The FDEMP [REP4-037] at Table 3-13 b states that tree protection method will be adhered to as set out in Appendix A. However, in that document Appendix A only has a cover sheet entitled Soil Resource Management Plan and no other document. Should this be similar to Appendix B in the Framework Construction Environmental</p>	<p>The Framework Decommissioning Environmental Management Plan has been updated to correct the reference error. Appendix C is the Outline Tree Protection Plan, with Table 3-13 now referring to such, and the Soil Management Plan (Appendix A) has also been inserted into the updated document submitted at Deadline 5.</p>



Question Number	Respondent	Question Summary	Applicant Response
		Management Plan which is entitled Outline Tree Protection Measures or is it a different document. Correct the reference and attach appropriate document to the FDEMP.	
Q3.9.2	The Applicant	<p>Mitigation measures for landscape effects: What measures are included to address potential failures of planting or proposed mitigation and how is this to be managed and secured. Either provide an explanation or signpost the appropriate measures in the Framework Construction Environmental Management Plan, Outline Landscape and Ecology Management Plan or other documentation that secure such matters.</p>	<p>As stated within the OLEMP [REP2-037] the Contractor appointed by the Applicant to construct the Scheme will be responsible for establishing, managing and monitoring the implementation and establishment of landscape and ecological mitigation within the five-year establishment aftercare period. The Applicant will inspect and report on the success of establishment during this period. Any long-term biodiversity monitoring and management requirements will be carried out by the Applicant and/or a Contractor appointed by the Applicant.</p> <p>As stated within para 3.4.7 any failed or defective plants will be replaced with matching species of the same size during the next planting season after failure.</p> <p>This is secured by Requirement 7 of the Draft DCO [REP4-022].</p>
Q3.9.3	The Applicant	<p>Mitigation measures for landscape effects: Explain why a continued management plan has not been secured beyond the initial 5 years when vegetation planting is anticipated to mature at year 15 of operation.</p>	<p>As stated within the OLEMP [REP2-037] the Applicant will be responsible for establishing, managing and monitoring the implementation and establishment of landscape and ecological mitigation within the five-year establishment aftercare period. The Applicant will inspect and report on the success of establishment during this period. Any long-term biodiversity monitoring and management requirements will be carried out by the Applicant and/or a Contractor appointed by the Applicant.</p> <p>This is secured by Requirement 7 of the draft DCO [REP4-023] which states that no development can take place until a written landscape and ecology management plan has been submitted and approved by the relevant planning authority, and that the landscape and ecological management plan must be substantially in accordance with the OLEMP. Requirement 7(2) specifically requires the Applicant to maintain the LEMP throughout the operation of the Scheme, which was incorporated following feedback from WLDC. The Applicant has sought the temporary use powers required for maintenance in accordance with the LEMP as set out in Article 30(11) of the draft DCO.</p>

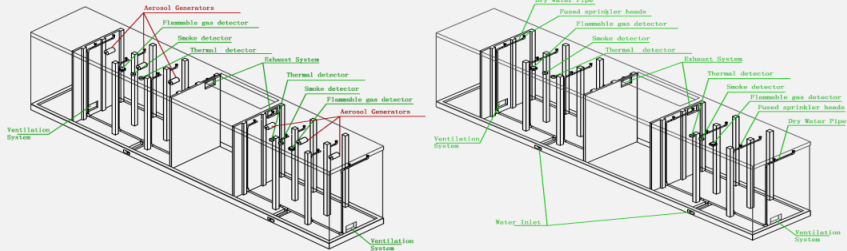


Question Number	Respondent	Question Summary	Applicant Response
Q3.9.4	The Applicant	Mitigation measures for landscape effects: Explain what monitoring is in place to ensure the success of mitigation planting in light of changing climatic conditions.	See response to Q3.9.2 above. This is also relevant to monitoring to ensure the success of mitigation planting in light of changing climatic conditions.
Q3.9.5	The Applicant	Mitigation measures for landscape effects: Explain who is responsible for undertaking any required monitoring and ensuring any changes to management plans are undertaken in response to the results of any monitoring and how they are empowered and secured to take any necessary changes.	See response to Q3.9.2 above. This process also applies to ensuring any changes to management plans are undertaken in response to the results of any monitoring.
9. Major Accidents and Disasters			
Q3.10.1	The Applicant	Battery Energy Storage System fire suppression system: Given the concerns expressed that the potential fire suppression system is not an appropriate method to address a Thermal Runaway event rather than a conventional fuel air fire which should be addressed through cooling by water. The BESS Frequently Asked Questions does not directly address this point. Update the FAQ to explain how the fire suppression system would be employed in combination with other controls or whether alternative strategies are proposed to deal with a thermal runaway.	The BESS note has been updated at Deadline 5 to include the following answer at section 4.18 [REP4-048] : As explained in the FAQ Note on the BESS at section 4.1.1 [REP4-048] , thermal runaway refers to a self-perpetuating and uncontrollable increase in temperature within a battery. Due to the nature of such an event, prevention is the main focus. The safety measures designed to minimise the effects of overheating can vary depending on the selected supplier (as explained in FAQ 4.5.1 [REP4-048]). Prevention/mitigation measures may include (non-exhaustive list): <ul style="list-style-type: none"> - Robust battery management systems (BMS) capable of adequately monitoring and controlling cell temperature and voltage. They would then send alarm signals if any of the thresholds are exceeded. - Thermal management: this can include liquid cooling at container, rack or cell level. For cabinet sized battery enclosures liquid cooling is a common solution, for larger sizes such as 20ft or 40ft containers HVAC may be more effective (see illustration of HVAC system below). - Separator design: separators are used to prevent short circuits

Question Number	Respondent	Question Summary	Applicant Response
			<ul style="list-style-type: none"> - Cell design: optimum cell arrangement for better heat distribution and improved fire safety - Cell venting: pressure relief vents that release gas in the event of an accumulation of explosive gases, reducing the risk of explosions. - Over-current protection at cell level - Charging practice: limiting the maximum charge and discharge rate - Monitoring and regular maintenance: preventive maintenance has become an industry standard <p><u>Illustration of HVAC airflow (SYL)</u></p>  <p>Figure 5-3: Airflow in Battery Racks</p> <p>In the event that a thermal runaway occurs, the “direct response” to it would be to let the affected unit burn out (due to the nature of the thermal runaway). Regarding the likelihood of</p>



Question Number	Respondent	Question Summary	Applicant Response
			<p>fire spreading or two or more enclosures going into thermal runaway, as set out in the note on Frequently Asked Questions about the BESS [REP4-048], the Applicant will liaise with Lincolnshire Fire and Rescue Service (LFRS) to develop a defensive firefighting strategy as part of its Emergency Response Plan, allowing a cabinet to burn but ensuring separation between cabinets is more than sufficient to facilitate cooling of the surrounding cabinets and hence prevent fire spread.</p> <p>However, the above does not mean that the fire detection and suppression systems are of no use in a thermal runaway event. The fire detection system plays a crucial part in the response to the thermal runaway by setting off the alarm (acoustic signals, SCADA signals, strobe etc). The fire suppression system can also communicate with the EMS so that the concerned battery rack can be electrically isolated. Further details on typical fire suppression systems appear below.</p> <p><u>Fire detection and suppression system</u></p> <p>Suppliers have different approaches, but Tier 1 manufacturers usually include heat, smoke, and gas sensors. If smoke, heat or gas is detected and alarms are triggered, some solutions comprise the release of aerosols into the enclosure (usually when water is not available).</p> <p>Example of a suppression design in a containerised solution (Sungrow)</p>

Question Number	Respondent	Question Summary	Applicant Response
			<p style="text-align: center;">AEROSOL & WATER FIRE SUPPRESSION SYSTEM</p>  <p>Aerosol FSS can be used alone in some areas where water resources are relatively scarce. Aerosol FSS and water based FSS can exist in the system at the same time. Above figures are for reference, the actual product may be different (location and quantity) Water Based FSS is the standard configuration of Sungrow Liquid Cooled ESS. The battery cabinet has 2 separate battery chambers, and each battery chamber has a water based FSS. The water inlet is reserved for a quick-connect water inlet that meets local standards. The pipe network specification is designed according to hydraulic calculations, drawings and flow requirements. Sungrow will provide hydraulic calculations reports.</p>
Q3.10.2	The Applicant	<p>Battery Energy Storage System layout: The Applicant confirms at 3.6.1 of the Frequently Asked Questions regarding the BESS [REP4-048] that 6m separation of modules will be observed unless certain factors apply. Can the Applicant confirm that there is sufficient space available within the area allocated for the BESS area to satisfy the 6m separation if required to be applied and explain how this is the case if the Indicative Site layout and the BESS layout attached to the FAQs is based on 240 units and illustrates a layout where many of the units appear to be spaced at less than 6m.</p>	<p>The Indicative Site Layout is for illustrative purposes only and is intended to show that there is sufficient room to accommodate the BESS and likely fire suppression measures within the Works Plan for the BESS (Work No.2). It is based on the Applicant using 240 40ft containerised BESS units at a distance of 2m apart to achieve the total capacity of 500MWh. However, the final design of the BESS (including spacing), will be determined at the detailed design stage.</p> <p>As set out in the Note of Frequently Asked Questions Regarding the BESS [REP4-048], the NFCC FRS guidance states that a minimum spacing of 6 metres is suggested unless suitable design features can be introduced to reduce that spacing, therefore it is possible to adopt narrower spacing. The Applicant has confirmed that 6m spacing will be observed unless it can be demonstrated that the spacing can be reduced in accordance with the relevant safety standards. Test data and separation distances will be assessed by an independent Fire Protection Engineer.</p>



Question Number	Respondent	Question Summary	Applicant Response
			<p>If a spacing of 6m is required, the Applicant is confident that there is sufficient space within the Works Plan area to accommodate this. Whilst the final system and design is not yet determined and by way of example only, if the Applicant was to utilise a TRINA (Elementa) BESS solution, which involves 20ft containers as opposed to 40ft containers, there would be sufficient space to allow 6m spacing between containers whilst still achieving the proposed 500MWh capacity within a total area of 2.8ha. This is comfortably within the 3.2ha surface area available for the BESS according to the Works Plan for Work No.2.</p> <p>20ft container, cabinet-based systems have their opening on one side of the container, allowing the designer to group containers (or the cabinets) into a group of x4 units. Access to the cells and air inlets/outlets is maintained. This configuration will be one of the options considered at the detailed design stage.</p>
<p>10. Socio-economic Effects and Land Use (including Agricultural land and BMV)</p>			
Q3.12.1	The Applicant	<p>Agricultural Land Classification survey in Grid Connection Corridor: It is confirmed in the cover letter for the deadline 4 submissions [REP4-001] and the updated Framework Construction Environmental Management Plan [REP4-035] that an Agricultural land classification survey in the grid connection corridor has now been carried out.</p> <ol style="list-style-type: none"> 1) Provide a copy of the survey results report; 2) Confirm and explain if this affects the assumptions and conclusions in the ES with regard to Best and Most Versatile land including the quantum of various grades of agricultural land 	<ol style="list-style-type: none"> 1) The Agricultural Land Classification Report of the grid connection route is provided in Appendix B. 2) The surveys showed that 61.6 ha (34%) of the land was Best and Most Versatile (BMV) land and 6.8 ha (4%) was estimated BMV land, making a total of 38% BMV land within the cable corridor (including the additional area south of Torksey Ferry Road). This compared to 74.8 ha (43%) of the land within the cable corridor that was estimated to be BMV land in the desk study. Therefore, the amount of BMV land within the Order limits was slightly less than previously assumed. The survey results and associated report do not change the assumptions and conclusions of the Environmental Statement as regards ALC. 3) The survey results will be used to inform the detailed soil management plan by including measures to ensure the soil is returned to the landowner in like for like condition. 4) The soil survey was completed by Land Research Associates (LRA) who have over 29 years' experience in conducting ALC surveys. The ALC Report is an objective assessment by an experienced soil scientist who is a member of the British Society of Soil Science (BSSS). BSSS Code of Conduct requires that all members discharge their professional responsibilities with integrity and due scientific and technical competence.



Question Number	Respondent	Question Summary	Applicant Response
		<p>affected. And if it does explain the effect and consequences;</p> <p>3) Explain how the survey results will be used to inform the detailed soil management plan that is to be produced; and</p> <p>4) Explain how the conclusions and results have been tested or verified to ensure they are robust and independent.</p>	
11. Transportation and Traffic			
Q3.13.2	The Applicant	<p>Framework Construction Transport Management Plan (FCTMP): Paragraph 7.6.2 of the FCTMP refers to “... <i>the following condition wording is proposed</i>”. What does this mean? It is not secured as a Requirement in the DCO and it is not a commitment in the FCTMP, but suggests it is proposed. This is not a Planning Permission and a ‘condition’ in that respect is not imposed or inserted by a reference in the FCTMP. Please clarify how it is anticipated that this wording is included and secured with an appropriate form of wording in the FCTMP. If the Applicant is agreeing to include these matters, they should be set out as commitments within the FCTMP in appropriate terms or included as a requirement in schedule 2 of the dDCO.</p>	<p>To confirm, the measures are commitments that will be implemented. Paragraph 7.6.2 of the Framework Construction Traffic Management Plan (CTMP) has been updated to reflect this wording and provide further clarity. This updated version has been submitted at Deadline 5.</p>
Q3.13.3	The Applicant	<p>Framework Construction Transport Management Plan FCTMP and potential for</p>	<p>The wording included in the Interrelationships Report [REP4-050] does not undermine the change within the FCTMP (latest version has been submitted at Deadline 5) as both</p>



Question Number	Respondent	Question Summary	Applicant Response
		<p>joint Construction Transport Management Plan (CTMP) The Applicant has sought to accommodate a joint CTMP by way of including wording suggested from a Host Authority. See above question. The Gate Burton Energy Park FCTMP if including appropriate wording could thereby secure a joint CTMP at a future date in co-operation with the other promoters with similar provisions included in each of the other promoters CTMP's for their respective schemes. The Report on Interrelationships between NSIPs suggests that such a commitment cannot be made. Is this undermining the suggested change to the FCTMP? Which at paragraph 7.6.3 seeks to include such a provision and Appendix D and at section 1.6 on the shared grid connection corridor states that “ <i>For example Joint CTMP could be prepared between the scheme, the IGP projects and Tillbridge solar post consent to manage and mitigate cumulative effects if necessary once further details are known on project time frames and the approach for a shared grid connection corridor. This would be secured as part of the detailed CTMPs</i>”</p>	<p>documents' state that further information to manage and mitigate cumulative effects would be provided as part of the detailed CTMP or potentially as part of a joint CTMP if the construction schedules for West Burton, Cottam and Gate Burton overlap and agreement can be reached.</p> <p>Para 7.6.1 of the FCTMP states (our emphasis): <i>'The opportunity to combine mitigation (including some of the above measures) for the West Burton Solar Project and Cottam Solar Project schemes (see Section 3) will be explored in order to reduce cumulative impacts during the construction phase. This could include sharing the shuttle service to transport construction workers to/ from multiple sites or sharing the Grid Connection Corridor and construction compounds to consolidate trips. Further details will be set out within the Detailed CTMP(s) or potentially as part of a joint CTMP post-consent once further details in relation to the Cottam and West Burton solar projects schemes are known e.g. project timeframes and the approach for the shared Grid Connection Corridor.'</i></p> <p>Para 5.4.2 of the Interrelationships Report: <i>'In the event the construction schedules are overlapping, a joint Construction Traffic Management Plan (Joint CTMP) would be produced that will set out construction traffic management and control measures relevant to those areas where vehicle routes overlap.'</i></p> <p>The commitment suggested by Nottinghamshire County Council was included within the Deadline 4 FCTMP on this basis i.e. to provide a list of items that would be included within the detailed CTMP / potentially a Joint CTMP should the construction schedules for West Burton, Cottam and Gate Burton overlap. The text within the interrelationships report at paragraph 5.4.3 which explains why the Applicant cannot <u>commit</u> to preparing a Joint CTMP at this stage still stands.</p>
Q3.13.4	Lincolnshire County Council, Nottinghamshire County Council	<p>Appendix D to the Joint Report on Interrelationships between NSIPs Comment on Appendix D (Cumulative Impacts on Traffic Technical Note) to the Joint Report on Interrelationships between NSIPs</p>	N/A



Question Number	Respondent	Question Summary	Applicant Response
		[REP4-050] including on its approach and conclusions.	

Appendix A – Risk Assessment of EMF impacts on Fish

1. Introduction

1.1.1 This technical note has been prepared in response to the Examining Authority's Third Written Questions (ExQ3), specifically Q3.3.1, and also in response to a request from the Environment Agency which was submitted at Deadline 4 [REP4-063] concerning the impact of Electromagnetic Fields (EMF) on fish.

1.1.2 Q3.3.1 is provided below:

'Electromagnetic field effects (EMF) on fish:

The Environment Agency [REP4-063] has suggested a Risk Assessment in relation to EMF is produced centred on the grid connection corridor crossing of the river Trent to understand the risks during the operation of the Proposed Development and whether it is likely to have any impacts on fish including cumulative risks with other schemes.

The EA also suggest this should be added to the potential impacts in areas of discussion so that the Statement of Common Ground can be reissued once the matter has been resolved.

1) The Applicant should carry out the requested Risk Assessment and submit it into the Examination at the next deadline, deadline 5. In preparing the Risk Assessment this should be undertaken taking account of input from the Environment Agency and Natural England, with any advice or comment they have before the document is finalised.

2) If the Risk Assessment identifies any required mitigation, the Applicant should update the necessary documents or identify any embedded mitigation or prevention, e.g., greater depth of buried cable, update the Outline Design Principles.

3) Comment on how this affects the conclusions of your No Significant Effect report and the Habitats Regulation Assessment and whether there are pathways that may affect protected sites, in particular the Humber Special Area on Conservation (SAC). Also refer to and respond to the Report on Implications for European Sites (RIES) published alongside these questions.'

1.1.3 The relevant text included within the Deadline 4 submission [REP4-063] from the Environment Agency is as follows:

'We have reviewed the detail provided within the application documents in relation to electromagnetic fields (EMF) and ecology. The Environmental Statement (ES) does not have any specific reference to EMF and suggests "There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect fish." (ES, Volume 1, Chapter 8: Ecology and Nature Conservation, EN010131/APP/3.1, page 100). Given that the potential impact of EMF on ecology is an emerging issue and not assessed within the ES we would suggest a risk assessment is carried out, centred on the grid connection corridor to fully understand the risks during the operation

of the Scheme. As the potential impacts of EMF are dependent on the intensity of the emission, current type, cable characteristics, power transmitted and other surrounding environmental factors a risk assessment would evaluate whether the EMF associated with the proposed development is likely to have any impacts on fish.

*Atlantic salmon *Salmo salar* (hereafter salmon), Sea Trout, European Eel, River Lamprey and Sea Lamprey all use the River Trent to complete migratory journeys. The Humber Special Area of Conservation (SAC) lists River Lamprey and Sea Lamprey, and we know that both species use the River Trent to spawn, laying their eggs in suitable gravels upstream of the proposed cable corridor. Research suggests that the strongest effects from EMF will most likely occur during the embryonic or larval stages of species settling on the bottom of the river (Gill and Desender, 2020). Additionally, the behavioural and physiological responses to EMF in salmon have the potential to impact long-distance migrations due to the increased sources of artificial EMF from renewable energy installations within riverine and marine environments (Gillson et al., 2022). The extent of risks to juvenile Lamprey and migratory salmon from EMFs should be explored in a risk assessment to determine whether the risk from the project, or cumulative risk if the project is to share the cable crossing with other projects, is significant enough that it needs to be mitigated. In relation to the signed Statement of Common Ground (SoCG) [REP-013 – paragraph 1.1.5] we would ask that the applicant adds potential impact from the presence of EMF to areas of discussion between the parties so that we may re-issue the SoCG once this issue has a satisfactory resolution.'*

- 1.1.4 The purpose of this technical note is to provide a Risk Assessment to establish if there is the potential for adverse impacts on fish within the River Trent associated with EMF during the operational phase of the Scheme, including cumulatively with the Cottam, West Burton and Tillbridge schemes. Cottam and West Burton are installing 400kV cables within the same location underneath the River Trent as part of a shared grid connection corridor. The Tillbridge grid connection cable may also cross at the same location; however, this is not yet confirmed. There are no other cumulative schemes of relevance.
- 1.1.5 This response should be read in conjunction with other EMF responses submitted to the Examination which include:
- Response to the UKHSA submitted at Deadline 4 which was subsequently accepted by the UKHSA (see Appendix A to the **Deadline 4 Applicant Letter**) [REP4-001];
 - Response to the Roy Clegg submission (see Appendix B) as part of the **Applicants Response to Written Representations submitted at Deadline 3** [REP3-033]; and
 - **Written Summary of the Applicant's Oral Submissions at the Issue Specific Hearing 3** [REP3-027].

2. Response

2.1 Context

- 2.1.1 EMFs are emitted when electricity is transported through a power cable (Gill and Bartlett, 2010). Overhead power lines are a source of two fields: the electric field (produced by the voltage and measured in volts per metre, $V m^{-1}$) and the magnetic field (produced by the current and measured in microTeslas, μT) (National Grid, 2015; Taormina et al., 2018). Underground power cables eliminate the electric field altogether because it is screened out by the sheath around the cable, but they still produce a magnetic field (National Grid, 2015) – hence, the magnetic field is the focus of this review. However, where there is water movement or the movement of an organism (e.g., swimming fish) through the magnetic field, an induced electric field can be generated (Gill and Bartlett, 2010).
- 2.1.2 The River Trent at the proposed cable crossing location is tidally-affected. As such it does not provide suitable spawning habitat for Atlantic salmon, brown/sea trout, sea lamprey, or river lamprey, all of which typically spawn in clean gravels within freshwater reaches that occur a significant distance upstream of the proposed crossing. European eel spawn in the marine environment in the Sargasso Sea. The River Trent at the proposed crossing location provides a transitory and migratory corridor rather than a habitat in which the species will reside for any significant periods of time, especially considering the tidal nature of the Trent at this point (the tidal limit being Cromwell Weir). Data are presented pertaining to these and similar species to inform the risk assessment.
- 2.1.3 As stated within Response to the UKHSA submitted at Deadline 4 which was subsequently accepted by the UKHSA (see Appendix A to the **Deadline 4 Applicant Letter**) [REP4-001] the Government sets guidelines for exposure to EMFs in the UK on advice from the Health Protection Agency (HPA). However, there are no legal requirements for shielding EMFs from underground cables to protect human health in the UK because these cables are, by industry-standard, compliant with the ICNIRP 1998 exposure limits in the terms of the 1999 EU Recommendation even when measured directly on top of them¹.

2.2 Potential impacts

- 2.2.1 Natural electromagnetic fields provide important ecological cues to magneto-receptive and electro-receptive species (Hutchison et al., 2020). For example, many species obtain locational and directional cues important for navigation from Earth's geomagnetic field and associated motion-induced electric fields

¹ In practical application this means:

- an electric field of 9 kV/m
- a magnetic field of 360 μT
- both applying where the [time of exposure is significant](#), essentially homes, other places where people might stay overnight, and schools.

(Gill et al., 2014), and bioelectric fields help predators detect prey (Bedore and Kajiura, 2013). Since natural fields provide cues to identifying and locating resources, it is feasible that modifications of these fields by anthropogenic EMFs could have ecological consequences (Hutchison et al., 2020), if on a sufficient scale in the context of the environment impacted.

- 2.2.2 Most of the research conducted to date on the effect of EMFs on fish is based on subsea cables and marine species or marine life-stages of catadromous and anadromous migratory species (Copping *et al.*, 2020; Gill and Bartlett, 2010; Hutchison *et al.*, 2020; Taormina *et al.*, 2018). A range of responses to EMFs have been reported on marine life-stages of European eel (*Anguilla anguilla*) (Westerberg and Lagenfelt, 2008; Tesch *et al.*, 1992; Öhman *et al.*, 2007; Westerberg and Langenfelt, 2008), Atlantic salmon (*Salmo salar*) (Wyman *et al.*, 2018; Richardson *et al.*, 1976), and sea trout (*Salmo trutta*) (Formicki *et al.*, 1997, 2004), which are migratory species that may be present in the River Trent in the vicinity of the Gate Burton Energy Park. However, it is difficult to translate the limited knowledge about individual-level EMF effects into assessments of biologically or ecologically significant impacts on populations (Boehlert and Gill, 2010; Gillson *et al.*, 2022; Hutchison *et al.*, 2020). As such, the precautionary approach is to reduce the exposure to background levels as far as practicable through burial of the cable at the appropriate depth.

2.3 Design mitigation

- 2.3.1 Government planning policy relating to electricity infrastructure can be found in three National Policy Statements (NPS) – the Overarching NPS for Energy (EN-1) and, more specifically, the NPS for Renewable Energy Infrastructure (EN-3) and the NPS for Electricity Networks Infrastructure (EN-5). Section 3.8.264 of EN-3 states that '*burial of the cable increases the physical distance between the maximum EMF intensity and sensitive species.*' No recommended burial depth is provided. The National Grid (2015) states that '*cables are typically installed 1 m below ground*'.
- 2.3.2 The Gate Burton Energy Park 400 kV DC XLPE grid connection cable will be buried to a depth of a minimum of 5 m below the lowest point of the riverbed. This is included in the **Outline Design Principles [REP4-004]** which is secured by Requirement 5 in the **Draft DCO [REP4-023]**. This depth of burial will significantly reduce the EMF exposures compared with a typical installation and represents a precautionary approach.
- 2.3.3 The grid connection cables for West Burton and Cottam will also be buried to a minimum depth of 5 m below the riverbed and therefore the cumulative EMF exposure will also be significantly reduced. Information is not yet available on the burial depth of the Tillbridge cable, but it is considered likely that a similar approach would be adopted given the approach agreed on the other three projects.

2.4 Risk Assessment

2.4.1 Table 1-1 presents EMF levels monitored under similar buried-cable scenarios, and those calculated for the Gate Burton Energy Park, in the context of background levels, reference levels, and permitted public exposure limit.

Table 1-1 Typical EMF values in relation to background levels

Health Thresholds	EMF value (µT)	Notes
Background (geomagnetic) levels (ENA, 2012)	50 µT	Natural sources
Vacuum cleaner (ENA, 2012)	800 µT 2 µT	Close to appliance 1 m distance
Permitted Public Exposure Limit (National Grid, 2023)	360 µT	ICNIRP 1998 exposure limits in the terms of the 1999 EU Recommendation
Evidence (from monitoring) (National Grid, 2023)	24 µT	On top of the cable
TYPICAL 400kV effect (for a shallow, 0.9m depth underground cable) ²	3 µT	At 5 m from centreline
	0.9 µT	At 10 m from centreline
	Gate Burton Energy Park 400 kV cable, 800 A	32 µT

2.4.2 The EMF values above illustrate that EMF levels associated with buried cables are below EMF reference levels and permitted public exposure limits. The strength of the field decreases as the distance away from the cable increases – the strength of the magnetic field is inversely proportional to the distance away from the cable. The field strength reduces to zero as distance becomes very large, with a reduction to 12.5% at 5 m from the top of the cable, and 3.75% at 10 m from the top of the cable.

3. Summary

3.1.1 The evidence presented above provides an overview of the risks associated with EMF and the likelihood of EMF causing adverse impacts to fish against the context of background and regulatory levels. Specific information pertaining to impacts in the freshwater environment is somewhat limited, but studies have been undertaken that allow an assessment of the potential impacts of buried cables beneath watercourses for Gate Burton Energy Park.

3.1.2 A summary of the key points is provided below:

- A range of responses to EMFs have been reported on marine life-stages of European eel (*Anguilla anguilla*), Atlantic salmon (*Salmo salar*), and sea trout (*Salmo trutta*), i.e., migratory species that may be present in the River Trent in the vicinity of Gate Burton Energy Park. However, it is difficult to translate the limited knowledge about individual-level EMF effects into

² Data presented from National Grid (2023) for EMF values are in relation to A/C cables. However, the EMF for A/C and D/C cables are broadly comparable, so these data are provided for comparison.

assessments of biologically or ecologically significant impacts on populations. As such, the precautionary approach is to reduce the exposure to background levels as far as practicable through burial of the cable at the appropriate depth.

- As per the commitment within the **Outline Design Principles [REP4-004]** which is secured by Requirement 5 of the **Draft DCO [REP4-023]** the cable will be installed under the River Trent at a minimum of 5 m below the lowest surveyed point of the riverbed, which is 5 x deeper than the depth stated by the National Grid (2015) for typical cable installation: 'typical cable burial depths are 1 m below ground'. There are no reports of cables buried at 1 m leading to any adverse effects on freshwater life. By committing to burying the Gate Burton Energy Park cable at 5m below the river bed this demonstrates a commitment to go beyond standard practice and is aligned to the precautionary principle.
- Monitored and calculated EMF levels (in microteslas, μT) around buried cables, of the type to be used for Gate Burton Energy Park, are below background levels, reference levels, and permitted public exposure limits at 0 m distance from the centreline of the cable.
- The strength of the EMF decreases as the distance away from the cable increases, to 12.5% at 5 m from the cable (400 kV cable at 800 A as for Gate Burton Energy Park).

3.1.3 In conclusion, based on the above evidence, and in particular the depth of the cable beneath the lowest point of the river bed, from a risk perspective it is considered that the probability of adverse effects of EMF from cables buried beneath watercourses for the Gate Burton Energy Park and cumulatively with West Burton, Cottam and Tillbridge on fish is extremely low (especially given the tidal nature of the Trent at this location and the transitory nature of species present), and will be negligible in the wider context of the watercourses, and is therefore not significant.

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Appendix B – Agricultural Land Classification Survey for the Grid Connection Corridor

**SOIL RESOURCES
AND AGRICULTURAL QUALITY
OF LAND BETWEEN GATE BURTON
AND COTTAM POWER STATION**

Report 1901/3

15th November, 2023

**SOIL RESOURCES AND AGRICULTURAL QUALITY
OF LAND BETWEEN GATE BURTON AND COTTAM POWER STATION**

L Thomas, MSc, MISoilSci

Report 1901/3
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15th November, 2023

SUMMARY

A soil resources and agricultural land quality survey has been undertaken of 180.5 ha of land between Gate Burton and Cottam Power Station in September and November 2023. The survey area covers the cable route of the proposed Gate Burton Energy Park.

The purpose of this assessment was to provide more detailed information of the soil resources and land quality within the survey area to inform the development of the cable corridor. This report corroborates the findings of the initial desk study (report reference: 1901/2) which used published information to estimate the soil resources and land quality within the cable corridor. An additional area of land to the south of Cottam Substation was added to the Order limits in October 2023 and so was not included in the previous report.

The land has three main soil types: sandy soils, loamy over slowly permeable soils and heavy slowly permeable soils. The survey area is a combination of grade 2, subgrade 3a and 3b agricultural quality, variably limited by wetness/workability and droughtiness.

1.0 Introduction

1.1 This report provides information on the agricultural quality of 180.5 ha of land between Gate Burton and Cottam Power Station, Lincolnshire. The report is based on a survey of the land in September and November 2023.

1.2 Previous desk study of the site (report reference: 1901/2) was carried out in October 2022 and used published geological and soils maps and experience of the Main Site survey to estimate land grades and soil resources. It estimated the land to comprise a mixture of permeable loamy and coarse loamy soils giving higher quality land of Grade 2 and Subgrade 3a and heavy slowly permeable soils giving lower quality land of Subgrade 3b quality.

SITE ENVIRONMENT

1.3 The survey area covers land running from the east of Marton southwards to Cottam Power Station. The land within the survey area is mainly in arable production, with grassland fields flanking the River Trent.

1.4 The land is level with an average elevation is approximately 10 m AOD.

PUBLISHED INFORMATION

1.5 British Geological Survey 1:50,000 scale information records the basal geology as mainly Mercia Mudstone Group, with Penarth Group Mudstone and Scunthorpe Mudstone Formation (interbedded mudstone and limestone) in the north-east. Patches of sand and gravel deposits are recorded to overly the bedrock in the north-east and centre of the survey area, with alluvial deposits overlying land west of the River Trent.

1.6 The National Soil Map (published at 1:250,000 scale)¹ records the land within the survey area to be within the following Associations:

- Wickham 2 Association in the north-east: typically slowly permeable seasonally waterlogged fine loamy over clayey, fine silty over clayey and clayey soils
- Fladbury 2 Association flanking the River Trent: typically stoneless clayey soils variably affected by groundwater with some sandy subsoils

¹Ragg, J.M., et al., (1984). *Soils and their Use in Midland and Western England*, Soil Survey of England and Wales Bulletin No. 12, Harpenden.

- Blackwood Association in the west: typically deep permeable sandy and coarse loamy soils, with groundwater controlled by ditches
- Compton Association in the south: typically stoneless mostly reddish clayey soils affected by groundwater

2.0 Soils

2.1 A detailed soils and agricultural quality survey was carried out in September and November 2023 in strict accordance with MAFF (1988) guidelines². It was based on observations every 100 m in the linear sections of the cable route and at intersects of a 100 m grid at the grid connection point (where access was available). During the survey, soils were examined by a combination of pits and augerings to a maximum depth of 1.0 m. A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report.

2.2 The soils were found to vary in texture and drainage. The soils are described below and their distribution shown on Map 4A&B in an appendix to this report.

SANDY SOILS

2.3 These soils occur mainly in the west of the site. They typically comprise stoneless or very slightly stony sandy loam topsoil over an upper subsoil of similar texture, which becomes sandier with depth. The soils are permeable but affected by groundwater (shown by gleying in the subsoil). The underlying slowly permeable clay is often not encountered within 1 m depth.

2.4 An example profile from a pit at location 26 (Map 1B) is described below:

0-31 cm	Brown (10YR 4/3) medium sandy loam; 1% very small subangular flint stones; moderately developed medium and fine subangular blocky structure; friable to firm; many very fine fibrous roots; common medium and fine pores; clear smooth boundary to:
31-68 cm	Brown (10YR 5/3) medium sandy loam with many strong brown (7.5YR 5/8) mottles; 1% very small subangular flint stones; moderately developed medium subangular blocky structure; friable; common very fine fibrous roots; common fine pores; merging to:
68-90+ cm	Yellowish brown (10YR 5/4) stoneless medium sand with many strong brown (7.5YR 5/8) mottles; structureless (single grain); loose; a few very fine fibrous roots.

²MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

2.5 An example of an unmottled profile is described below from a pit at location 34 (Map 1B):

0-37 cm	Dark brown (7.5YR 3/3) medium sandy loam; stoneless; moderately developed fine subangular blocky structure; very friable; few very fine roots; porous; smooth clear boundary to:
37-100 cm	Strong brown (7.5YR 4/6) loamy medium sand with few fine diffuse reddish yellow (7.5YR 6/6) mottles; stoneless; weakly developed fine subangular structure; very friable; porous.

2.6 These soils are freely draining where they are unmottled (Soil Wetness Class I) and moderately freely-draining where subsoils show evidence of groundwater effect (Soil Wetness Class II).

LOAMY OVER SLOWLY PERMEABLE SOILS

2.7 These soil occur where superficial deposits thin over the mudstone geology. They typically comprise a medium or coarse loamy topsoil over a permeable upper subsoil of a similar texture, which shows grey colours and ochreous mottling indicative of seasonal wetness. This overlies a dense slowly permeable clay.

2.8 An example profile from a pit at location 22 (Map 1B) is described below:

0-30 cm	Brown (10YR 4/3) medium sandy loam to sandy clay loam; 2% very small subangular flint stones and small rounded quartzite pebbles; moderately developed medium and fine subangular blocky structure; friable to firm; many very fine fibrous roots; common medium and fine pores; clear smooth boundary to:
30-52 cm	Brown (10YR 5/3) medium sandy loam with many strong brown (7.5YR 5/8) mottles and ferruginous concentrations; 1% very small subangular flint stones; moderately developed medium subangular blocky structure; friable; common very fine fibrous roots; common fine pores; sharp smooth boundary to:
52-90+ cm	Dark red (2.5YR 3/6) stoneless clay with common yellowish red (5YR 5/6) and few grey (N 6/0) mottles; weakly developed coarse prismatic structure, firm; a few very fine fibrous roots; 0.1% very fine pores.

2.9 The soils are imperfectly-draining with some seasonal wetness (Soil Wetness Class III).

HEAVY SLOWLY PERMEABLE SOILS

2.10 These soils mainly occur on land to the east of the River Trent and typically comprise clay or heavy clay loam topsoil directly overlying dense slowly permeable clay subsoils. The topsoil is calcareous in places. The subsoils are gleyed (pale colours with greyish and ochreous coloured mottles), indicating the land suffers seasonal waterlogging to shallow depth. Where the soils are developed in mudstone, the clays are reddish.

2.11 An example profile from a pit at location 45 (Map 1A) is described below:

0-29 cm	Dark reddish brown (5YR 3/2) heavy clay loam; stoneless; well developed fine subangular blocky structure; friable; few fine roots; smooth clear boundary to:
29-100 cm+	Reddish brown (5YR 5/3) clay with reddish grey (5YR 5/2) ped faces and common distinct yellowish red (5YR 5/8) mottles; stoneless; weakly developed very coarse prismatic structure; very firm; <0.5% macropores.

2.12 These soils are imperfectly-draining under the local climate (Soil Wetness Class III).

3.0 Agricultural land quality

3.1 To assist in assessing land quality, the Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF ALC system classifies land into five grades numbered 1 to 5, with grade 3 divided into two subgrades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988.

3.2 The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification³. The relevant site data ranges from northern, central and southern points within the cable route is given below for an average elevation of 10 m.

- Average annual rainfall: 571-584 mm
- January-June accumulated temperature >0°C 1417-1419 day°
- Field capacity period (when the soils are fully replete with water) 112-117 days early Dec-early Apr
- Summer moisture deficits for: wheat: 115-117 mm potatoes:108-111mm

3.3 The survey described in the previous section was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for ALC issued in 1988 by MAFF⁴. There are no overriding climatic limitations at this locality.

SURVEY RESULTS

3.4 The agricultural quality of the land is primarily limited by droughtiness and wetness/workability. Other factors were assessed but do not affect the land grade. Land of grades 2 and 3 has been identified.

³Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

⁴MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Grade 2

- 3.5 This includes land with slight wetness limitations due to moderately high topsoil clay content limiting land access in winter and restricting flexibility of cultivations.

Subgrade 3a

- 3.6 This land grade comprises the sandy soils in the western part of the site which are limited by droughtiness restrictions: the high sand content of the subsoils means they will store sub-optimal moisture for crop uptake under the local climate, reducing average yields of arable crops.
- 3.7 Also included in this subgrade are the loamy over slowly permeable soils with imperfect drainage (Soil Wetness Class III), and heavy slowly permeable soils with calcareous topsoils. The calcareous nature of the topsoils is reported to improve workability compared with non-calcareous soils of similar clay content. On this land access with machinery will be restricted in winter and early spring in most years, although late spring (and autumn) sowings are usually possible.

Subgrade 3b

- 3.8 This land includes the heavy slowly permeable soils across most of the eastern half of the survey area. The high topsoil clay content combined with imperfect drainage (Soil Wetness Class III) means access with machinery is restricted in winter and spring. Arable cropping of the land is therefore mainly limited to autumn-sown crops.

Non agricultural

- 3.9 This includes Cottam Power Station, roads, farm tracks and buildings.

Grade areas

3.10 The land grades are shown on Map 5A & B and the areas occupied shown below.

Table 1: Areas occupied by the different land grades ad comparison to the desk study

<i>Grade/subgrade</i>	<i>Field survey</i>		<i>Desk study</i>	
	<i>Area (ha)</i>	<i>% of the land</i>	<i>Area (ha)</i>	<i>% of the land</i>
Grade 2	8.1	4	-	-
Subgrade 3a	53.5	30	-	-
Subgrade 3b	55.7	31	-	-
Non agricultural	45.5	25	38.8	23
Estimated BMV	6.8	4	74.8	43
Estimated Subgrade 3b	10.9	6	58.4	34
Total	180.5	100	172.0	100

Desk Study Comparison

3.11 The desk study estimated a similar distribution of land grades (see Table 1), showing only a slightly higher amount of best and most versatile land (BMV) than the field survey found.

**APPENDIX
DETAILS OF OBSERVATIONS
DROUGHTINESS CALCULATIONS
MAPS**

Land at Gate Burton: Soils and ALC survey – Details of observations at each sampling point

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
1	0-32	HCL	2	32-70	r C	xx(x)	70-90 90-110	SCL to MS r C	xxx xxx	0	III	3b	W
2	0-30	MSL	1	30-90	LMS	xx(x)	90-120	MS	xxx	0	II	3a	D
3	0-25	HCL	2	25-60	rb C	xxx	60-90	gr C	xxx	0	III	3b	W
4	0-30	SCL	2	30-60	MS	xx	60-110	MS	x	0	II	3b	D
5	0-30	SCL-MSL	2	30-80	MSL	xxx	80+	stop on stones		0	II	2/3a	D
6	0-30	SCL	2	30-50	LMS	xx	50-100 100-120	MS r C	x xxx	0 0	II II	3b	D
7	0-28	SCL	1	28-65	SCL	xx(x)	65-90 90-110	HCL+r C r C	xxx xxx	0	II/III	2/3a	W
8	0-25	C	1	25-65	C	xxx	65-85 85-100	SC-SCL rb C+S	xxx xxx	0	III	3b	W
9	0-30	C	1	30-50	C	xxx	50-85 85-100	HCL r C	xxx xxx	0 0	III III	3b	W
10	0-30	SCL	1	30-55	LMS	xxx	55-110	MS	xxx	0	II	3a	D
11	0-30	SCL	1	30-80	SCL	x	80-110	SCL	xx	0	I/II	2	D,W
12	0-30	HCL	1	30-80	C	xxx				0	III	3b	W
13	0-32	HCL-C	1	32-50	MSL	xxx	50-100 100-120	LMS r C	xxx xxx	0	II	3a	W,D
14	0-30	C	1	30-50 50-70	SCL LMS	xxx xxx	70-100 100-120	LMS+C mix r C	XXX xxx	0	II	3a	W,D
15	0-30	SCL	3	30-50	SCL	xxx	50-70 50+	r C stop in skerry	xxx	0	III	3a	W
16	0-30	C	0	30-70	gr SCL	XXXX	70-100 100-120	br SCL C	xxx xxx	0	II	3a	W
17	0-25	MSL	1	25-110	MSL	xxx	110-120	r C	xxx	0	II	2	D
18	0-32	SCL	1	32-65	LMS	xxx	65-120	MS	xxx	0	III	3a	D
19	0-28	MSL	1	28-70	LMS	xx	70-110	MS	xxx	0	II	3a	D
20	0-30	SCL	1	30-60	SCL	xxx	60-75 75-110	LMS MS	xxx xxx	0	II	3a	D
21	0-33	HCL	1	33-90	rb C	xxx				0	III	3b	W
22	0-30	MSL-SCL	2	30-50	MSL	xxx	50-90	r C	xxx	0	III	2/3a	D,W
23	0-32	HCL	1	32-60	LMS	xxx	60-110	MS+C lumps	xxx	0	II	3a	D
24	0-30	MSL-SCL	1	30-60	SCL	xxx	60-110	MS	xx	0	II	3a	D
25	0-30	MSL	1	30-45	MSL	xxx	45-90 90-120	LMS gr MS	xx xxxx	0	II	3a	D
26	0-30	MSL-SCL	1	30-70	MSL	xx	70-110	MS	xxx	0	II	2	D
27	0-30	SCL	1	30-60	SCL	xx(x)	60-90 90-110	LMS r C	xxx xxx	0	II	2	D
28	0-30	MSL-SCL	1	30-60	LMS	xx	60-110 110-120	LMS r C	xxx XXX	0	II	2	D
29	0-40	SCL	<5	40-100+	MS	xxx				0	I	3a	D

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
30	0-40	SCL	<5	40-50	SCL	xxx	50-100+	M/CS with bands of clay		1	I	3a	D
31	0-34	C	1	34-59	SCL	xxx	59-100+	C	xxx	0	II/III	3a/b	W
32	Bank												
33	0-38	MSL	1	38-100+	LMS	x				0	I	3a	D
34	0-37	MSL	1	37-100+	LMS	x				0	I	3a	D
35	0-46	MSL	1	46-70+	SCLr	o	70+	Stopped on stone		0	I	2	D
36	0-45	MSL	1	45-60+	LMSr	o				0	I	3a	D
37	0-45	MSL	<5	45-90+	MSr	o				0	I	3a	D
38	0-40	SCL/C	<5	40-100+	MS	xxx				0	I	3a	D
39	0-35	C	<5	35-100+	Cr	xxx				0	III	3b	W
40	0-32	C	<5	32-95+	Cr	xxx				0	III	3b	W
41	0-32	C	<5	32-60+	Cr	xxx				0	III	3b	W
42	0-33	C	<5	33-90+	C	xxx				0	III	3b	W
43	0-20	MZCL	<5	20-58	MZCL	xxx	58-100+	ZC/HZCL	xxx	0	II/III	2/3a	W
44	0-33	HCL	<5	33-90+	C	xxx				0	III	3b	W
45	0-29	HCL/C	<5	29-90+	C	xxx				0	III	3b	W/FI
46	0-31	C	<5	31-50+	C	xxx				0	III	3b	W
47	0-34	C	<5	34-100+	C	xxx				0	III	3b	W
48	0-41	SCL	<5	41-70+	SCL/SC	xxx				0	II/III	2/3a	W
48a	0-40	MSL	<5	40-100+	MSr	o				0	I	3a	D
49	Scrub												
50	0-40	HCL	<5	40-90+	C	xxx				6	III	3b	W
50a	0-41	C	<5	41-90+	SC	xxx				0	II/III	3a/3b	W
51	0-40	HCL	<5	40-90+	C	xxx				2	III	3b	W
52	0-32	SCL	<5	32-50	SCL	xxx	50-100+	C	xxx	2	III	3a	W
52a	0-28	C	<5	28-90+	C ca	xxx				0	III	3b	W
53	0-30	HCL	<5	30-100+	C	xxx				0	III	3b	W
54	0-31	HCL	<5	31-100+	C	xxx				0	III	3b	W
55	0-31	C	<5	31-70+	C	xxx				0	III	3b	W
56	0-33	C	<5	33-90+	C ca	xxx				0	III	3b	W
57	0-32	C	<5	32-100+	C	xxx				0	III	3b	W
58	0-32	C ca	<5	32-100+	C x ca	xxx				1	III	3a	W
59	0-29	C v sl ca	<5	29-100+	C ca	xxx				3	III	3b	W
60	0-28	C	<5	28-100+	C ca	xxx				2	III	3b	W
61	0-28	C ca	<5	28-100+	C ca	xxx				3	III	3a	W
62	0-28	C	<5	28-100+	C	xxx				2	III	3b	W
63	0-30	C	<5	30-90+	C	xxx				1	III	3b	W
64	0-28	C	<5	28-100+	C	xxx				0	III	3b	W
65	0-30	HCL	<5	30-91+	C	xxx				0	III	3b	W
66	0-30	HCL	<5	30-51	SCL	xxx	51-100+	SCL/MSL	xxx	0	II	3a	W
67	0-30	SCL/HCL	<5	30-100+	HCL/SCL	xxx				0	II	2/3a	W

Key to table

Gley indicators¹

o	unmottled
x	a few ochreous mottles (or a few to common root mottles (topsoils)) ³
xx	common to many ochreous mottles and/or dull structure faces (slightly gleyed horizon)
xxx	greyish or pale matrix common to many ochreous mottles (gleyed horizon)
xxxx	dominantly grey or blueish matrix often with some ochreous mottles (gleyed horizon)

Slowly permeable layers⁴

a depth underlined (e.g. 50) indicates
the top of a slowly permeable layer
A wavy underline (e.g. 50) indicates
the top of a layer borderline to slowly permeable

Texture²

C	- clay
ZC	- silty clay
SC	- sandy clay
CL	- clay loam (H-heavy, M-medium)
ZCL	- silty clay loam (H-heavy, M-medium)
SZL	- sandy silt loam (F-fine, M-medium, C-coarse)
LS	- loamy sand (F-fine, M-medium, C-coarse)
SL	- sandy loam (F-fine, M-medium, C-coarse)
S	- sand (F-fine, M-medium, C-coarse)
SCL	- sandy clay loam
P	- peat (H-humified, SF-semi-fibrous, F-fibrous)
LP	- loamy peat; PL - peaty loam

Wetness Class⁵

I-VI

Limitations:

W - wetness/workability
D - droughtiness
De - depth
F - flooding
St – stoniness
SI – slope
T –
topography/microrelief

Suffixes & prefixes:

r-reddish, gn – greenish
o - organic
(v)st – (very) stony, chky-chalky
ca – calcareous: x-extremely, v-very, sl-slightly

Other abbreviations

fmn - ferri-manganiferous
concentrations
dist - disturbed soil layer;
R – bedrock (CH – chalk, SST – sandstone
LST – limestone, MST – Mudstone)

¹Gley indicators in accordance with Hodgson, J.M., 1997. Soil Survey Field Handbook (third edition). Soil survey technical monograph No. 5

²Texture in accordance with particle size classes in Hodgson (1997)

³Occasionally recorded in the texture box

⁴Permeability is estimated for auger borings and must be confirmed by full pit observations in accordance with the definitions in Hodgson (1984)

⁵These classes are defined in Hodgson (1997)

SITE: Cable route
Location: 26

Layer	Lower depth (cm)	Texture symbo (or stop)	Structure Good, Moderate or Poor)	% stones	Stone type (see table)
Topsoil	31	msl		1	1
Subsoil 1	68	MSL	G	1	1
Subsoil 2	120	MS	M	0	1
Subsoil 3	120	stop	M	0	1

(Lowest horizon depth must be 120 and topsoil cannot be greater than 70 cm (potatoes) or 50 cm (wheat))

DATA USED FROM MASTER TABLE

	Fine earth	Stones
Topsoil Av	17	1
Subsoil 1 TAv	17	1
Subsoil 1 EAv	13	0.5
Subsoil 2 TAv	7	1
Subsoil 2 EAv	5	0.5
Subsoil 3 TAv	0.1	1
Subsoil 3 EAv	0.1	0.5

(ERR = no data)

Stone codes	
0	No stones
1	Hard rocks or stones
2	Soft, medium or coarse grained sdst
3	Soft weathered ign or metamorph
4	Soft oolitic or dolomitic limestones
5	Soft fine-grained sandstone
6	Soft argillaceous or silty
7	Chalk
8	Gravel with non-porous stones
9	Gravel with porous stones

PROFILE CALCULATIONS

	Ap potatoes	Ap wheat
Topsoil	522.0	522.0
Subsoil 1	0.0	0.0
Subsoil 1	623.1	551.7
Subsoil 2	14.0	0.0
Subsoil 2	0.0	260.0
Subsoil 3	0.0	0.0

TOTAL AP (mm)	116	133
MD (mm)	109	115
AP-MD (mm)	7	18

AGRICULTURAL LAND GRADE

Class	Potatoes	Wheat
1		
2	*	*
3a		
3b		
4		

SITE: Cable route
Location: 34

Layer	Lower depth (cm)	Texture symbo (or stop)	Structure Good, Moderate or Poor)	% stones	Stone type (see table)
Topsoil	37	msl		0	1
Subsoil 1	120	LMS	m	0	1
Subsoil 2	120	stop	G	0	1
Subsoil 3	120	stop	G	0	1

(Lowest horizon depth must be 120 and topsoil cannot be greater than 70 cm (potatoes) or 50 cm (wheat))

DATA USED FROM MASTER TABLE

	<i>Fine earth</i>	<i>Stones</i>
Topsoil Av	17	1
Subsoil 1 TAv	9	1
Subsoil 1 EAv	6	0.5
Subsoil 2 TAv	0.1	1
Subsoil 2 EAv	0.1	0.5
Subsoil 3 TAv	0.1	1
Subsoil 3 EAv	0.1	0.5

(ERR = no data)

Stone codes	
0	No stones
1	Hard rocks or stones
2	Soft, medium or coarse grained sdst
3	Soft weathered ign or metamorph
4	Soft oolitic or dolomitic limestones
5	Soft fine-grained sandstone
6	Soft argillaceous or silty
7	Chalk
8	Gravel with non-porous stones
9	Gravel with porous stones

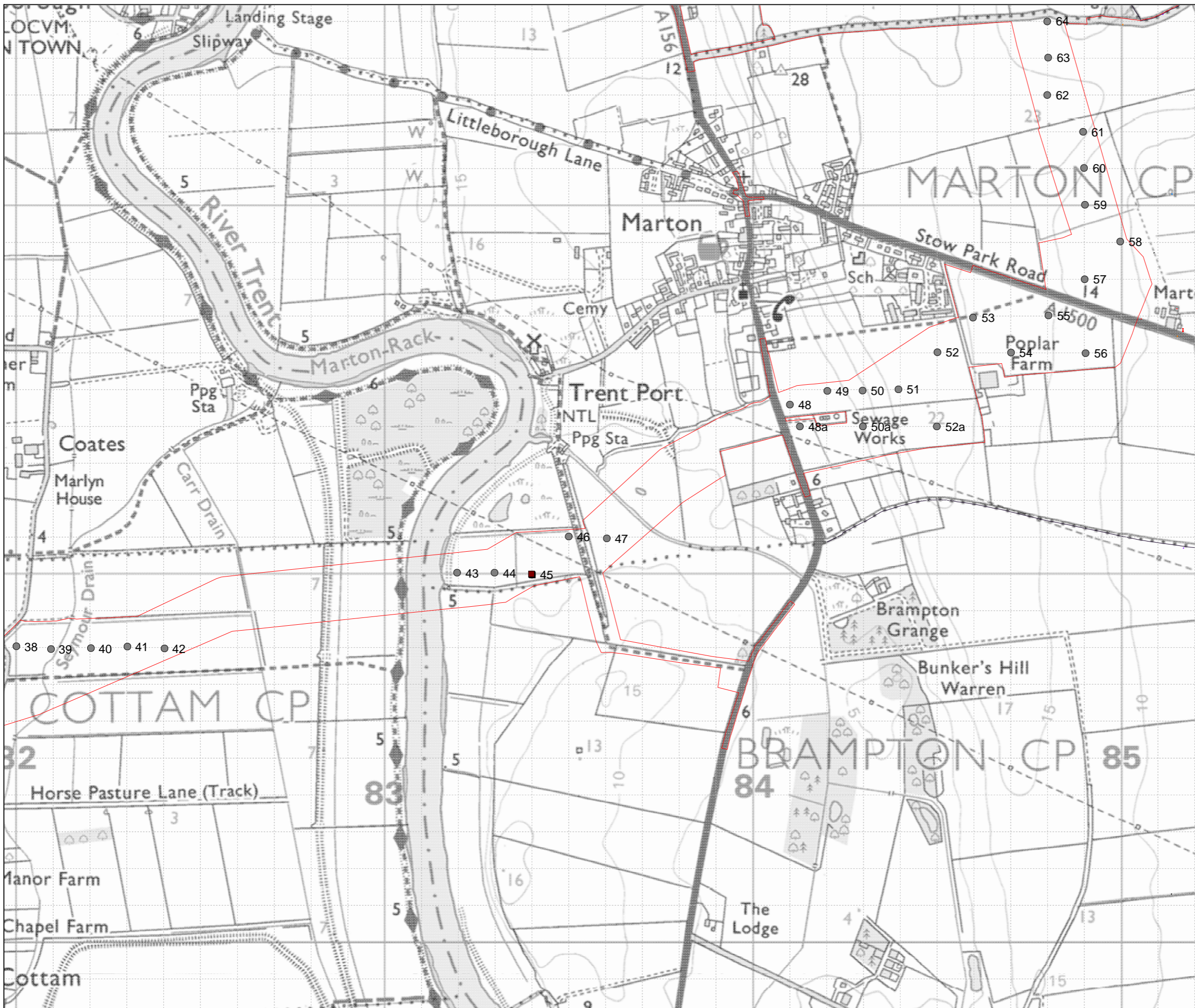
PROFILE CALCULATIONS

	<i>Ap potatoes</i>	<i>Ap wheat</i>
Topsoil	629.0	629.0
Subsoil 1	297.0	537.0
Subsoil 1	0.0	0.0
Subsoil 2	0.0	0.0
Subsoil 2	0.0	0.0
Subsoil 3	0.0	0.0

TOTAL AP (mm)	93	117
MD (mm)	109	115
AP-MD (mm)	-16	2

AGRICULTURAL LAND GRADE

Class	Potatoes	Wheat
1		
2		
3a	*	*
3b		
4		



KEY

- Auger observation
- Soil/land grade description pit
- Survey area

Client:



Site:

Land at Gate Burton

Map title:

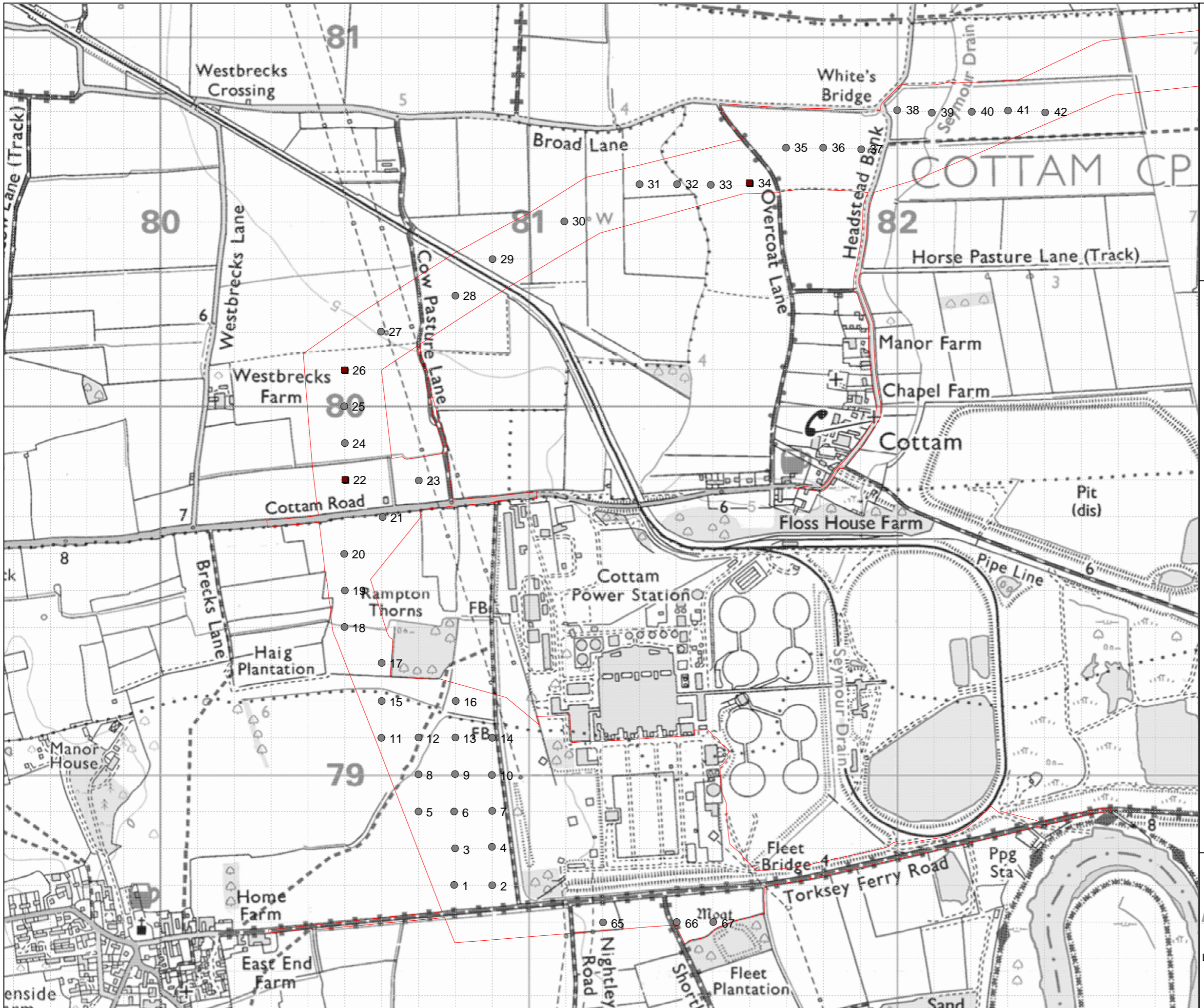
**Map 1A
Survey observations
(Cable Route)**



Land Research Associates
Tapton Park Innovation
Centre, Chesterfield
S41 0TZ
www.lra.cxo.uk

Scale: 1:10,000

Date: 17/11/2023



KEY

- Auger observation
- Soil/land grade description pit
- Survey area

Client:



Site:

Land at Gate Burton

Map title:

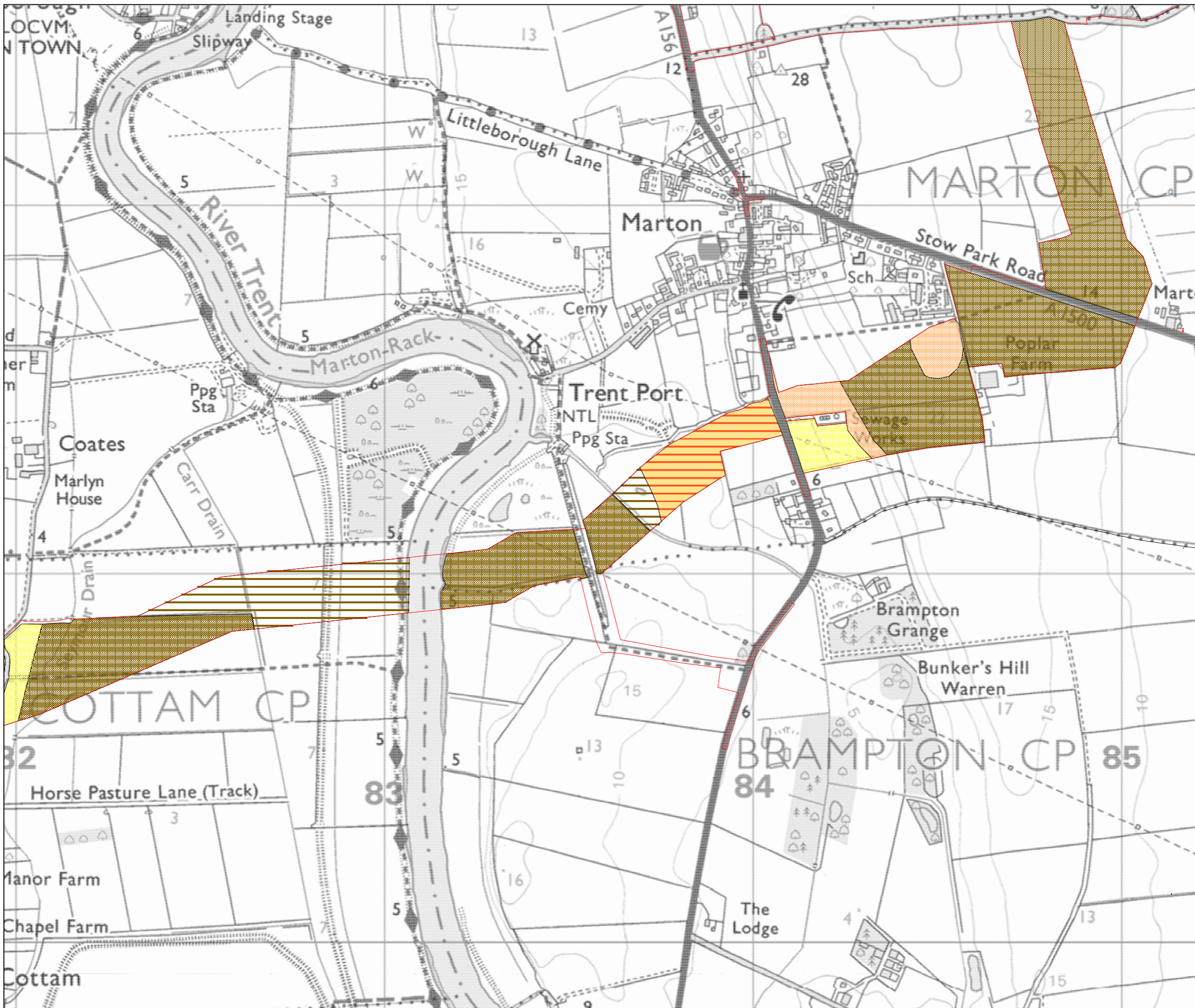
**Map 1B
Survey observations
(Cable Route)**









Scale: 1:10,000

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Date: 17/11/2023



KEY

-  Heavy slowly permeable soils
-  Sandy soils
-  Loamy over clayey soils
-  Predicted heavy slowly permeable soils
-  Predicted lighter permeable soils
-  Survey area

Client:



Site:

Land at Gate Burton

Map title:

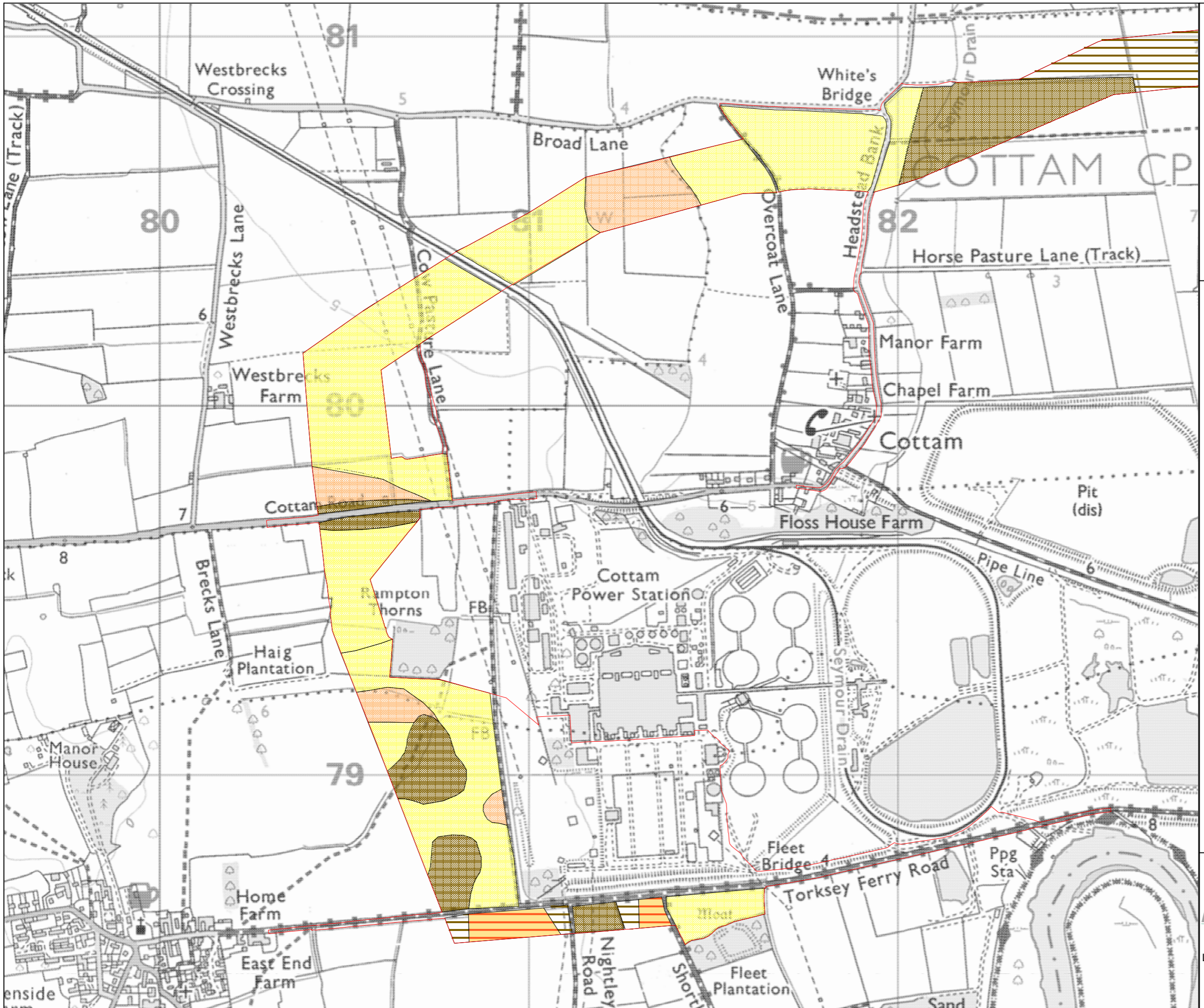
**Map 4A
Soil types
(Cable Route)**









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- KEY**
-  Heavy slowly permeable soils
 -  Sandy soils
 -  Loamy over clayey soils
 -  Predicted heavy slowly permeable soils
 -  Predicted lighter permeable soils
 -  Survey area

Client:



Site:

Land at Gate Burton

Map title:

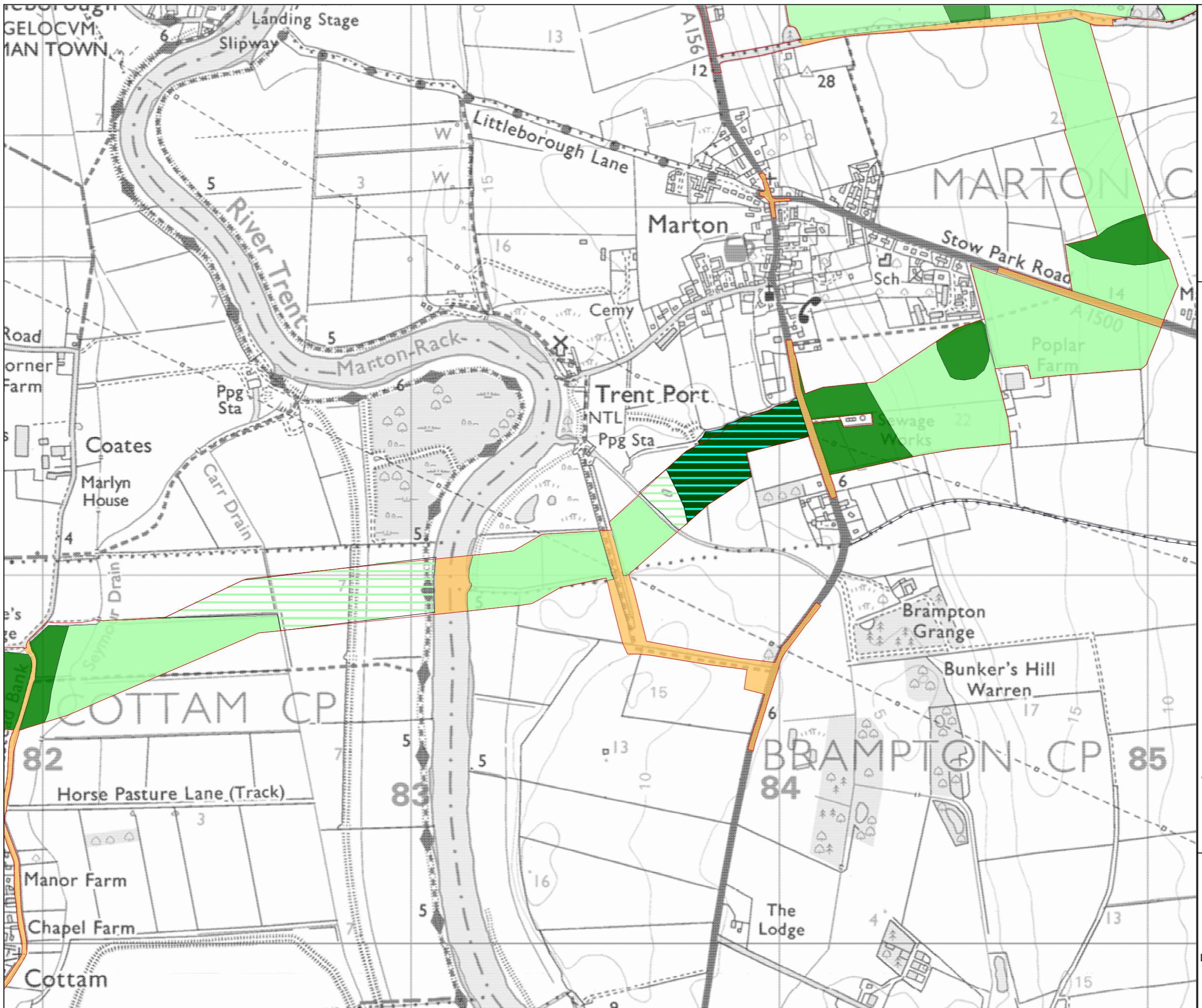
**Map 4B
Soil types
(Cable Route)**



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KEY

- Subgrade 3a
- Subgrade 3b
- Predicted best and most versatile land
- Predicted subgrade 3b land
- Non agricultural
- Survey area

Client:



Site:

Land at Gate Burton

Map title:

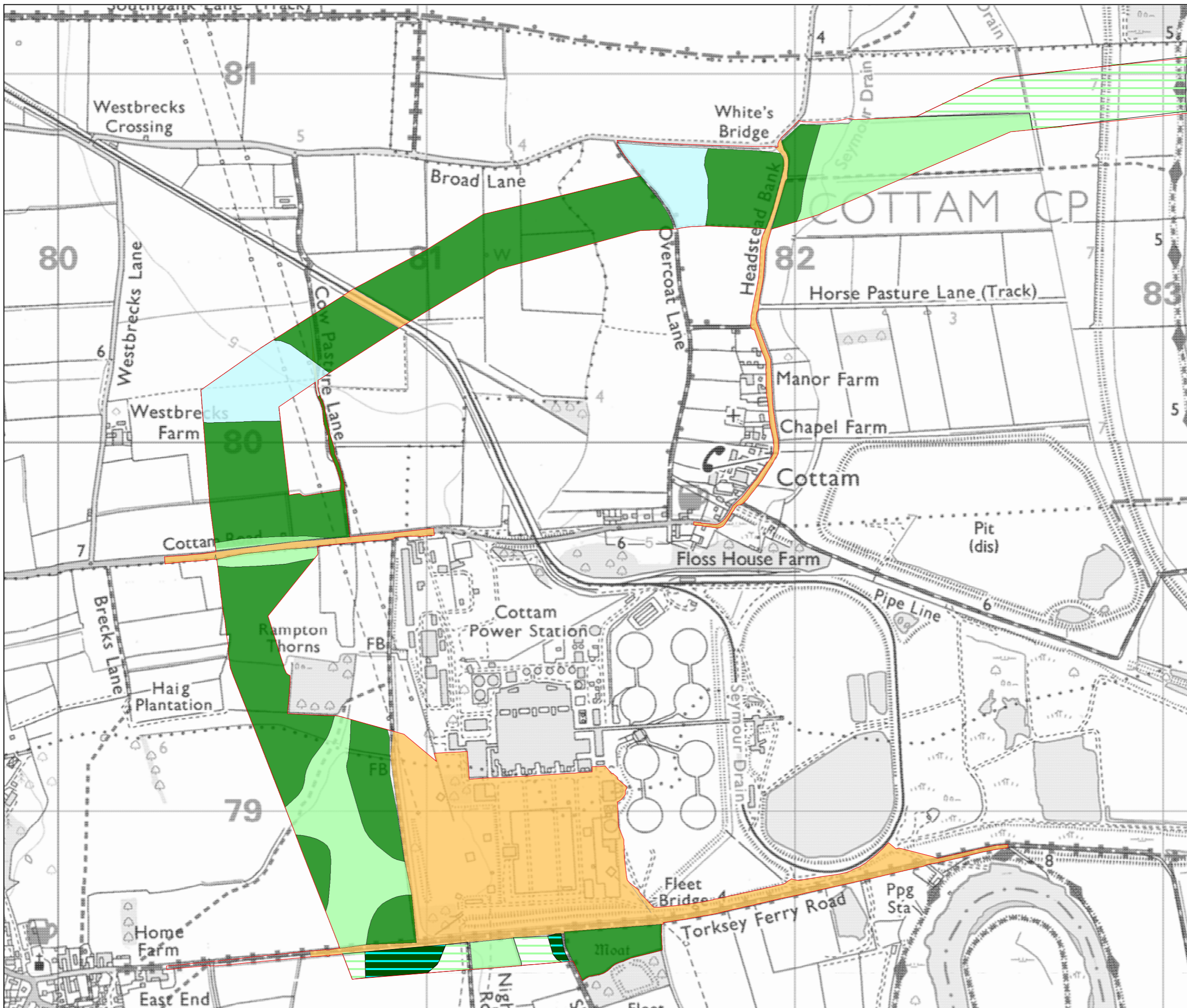
**Map 5A
Agricultural Land Classification
(Cable Route)**



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KEY

	Grade 2
	Subgrade 3a
	Subgrade 3b
	Predicted best and most versatile land
	Predicted subgrade 3b land
	Non agricultural
	Survey area

Client:



Site:

Land at Gate Burton

Map title:

**Map 5B
Agricultural Land Classification
(Cable Route)**



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