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Appendix 7.A – Noise Baseline Survey

NeuConnect: Great Britain to Germany Interconnector

GB Onshore Scheme

Environmental Statement
Appendix 7A – Baseline Noise Survey

NeuConnect Britain Ltd

September 2019

Prepared for:

NeuConnect Britain Ltd
C/O Fulcrum
105 Piccadilly
London, W1J 7NJ
United Kingdom

Prepared by:

AECOM Infrastructure & Environment UK Limited
1 Tanfield
Edinburgh EH3 5DA
United Kingdom

T: +44 131 301 8600
aecom.com

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Glossary & Abbreviations

Glossary

Term	Meaning
$L_{Aeq,T}$	<p>The A-weighted equivalent continuous sound pressure level <i>over period T</i> ($L_{Aeq,T}$).</p> <p>This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the L_{eq} is not a simple arithmetic mean value.</p>
$L_{A90,T}$	<p>Background noise level, The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval, T, measured using the fast time weighting, F, and quoted to the nearest whole number</p>

Abbreviations

Abbreviation	Definition
W	west
dB	Decibel

1. Baseline Monitoring

Sound Monitoring Equipment

- 1.1 The sound monitoring equipment used in the survey is presented in Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..1.
- 1.2 The calibration of the survey equipment was checked before and after all measurements, and no drift greater than ± 0.3 dB was experienced during the monitoring periods.

Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..1 Monitoring Equipment

Monitoring Location	Grid Reference	Sound Level Meter	Calibration Date	Field Calibrator (start)	Field Calibrator (end)
LT1	51°27'34.3"N 0°42'18.5"E	Rion NL-52 Serial No. 743082	03/10/2018	Rion NC-74 Serial No. 50541127	Rion NC-74 Serial No. 50541127
LT2	51°27'39.3"N 0°41'33.8"E	Rion NL-52 Serial No. 743081	28/08/2018	Rion NC-74 Serial No. 50541127	Rion NC-74 Serial No. 50541127
LT3	51°27'39.3"N 0°41'33.8"E	Rion NL-52 Serial No. 420763	04/07/2018	Rion NC-74 Serial No. 50541127	Rion NC-74 Serial No. 50541127

Meteorological Conditions

- 1.3 The weather during the survey period was noted at the beginning and the end of the survey, as well as checked using online weather stations. A summary of meteorological conditions can be seen in Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..2.

Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..2 Meteorological Conditions During Baseline Measurements

Date	Compass Wind Direction	Wind Speed (ms ⁻¹)	Temperature (°C)	Rainfall (mm)
27/03/2019	W	1	9	0
28/03/2019	W	1	10	0
29/03/2019	W	1	9	0
30/03/2019	W	1	11	0
31/03/2019	W	5	9	0
01/04/2019	W	3	9	0
02/04/2019	W	2	7	0
03/04/2019	W	1	5	0

Baseline Noise Results

- 1.4 The results of baseline unattended measurements at LT1 to LT3 are presented below.
- 1.5 For analysis of long-term unattended noise data, the $L_{Aeq,T}$ noise metrics are calculated using the logarithmic average of 15-minute measurements made during each day and night period. The subsequent day and night $L_{Aeq,T}$ noise levels are averaged arithmetically to provide the typical levels presented. The $L_{A90,T}$ is presented as both the statistical mode of all measurements and the 10th percentile of all measurements made during day and night period.

Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..3
Measurement Results Location LT1

Date	Daytime			Night-time		
	$L_{Aeq,16h}$ dB	$L_{A90,15min}$ dB Mode	$L_{A90,15min}$ dB 10 th Percentile	$L_{Aeq,8h}$ dB	$L_{A90,15min}$ dB Mode	$L_{A90,15min}$ dB 10 th Percentile
Wed 27/03/19	54	29	26	51	29	28
Thu 28/03/19	55	37	29	53	39	34
Fri 29/03/19	56	37	34	50	35	34
Sat 30/03/19	54	38	33	49	31	29
Sun 31/03/19	54	43	42	52	35	35
Mon 01/04/19	54	37	31	53	38	34
Tue 02/04/19	55	37	32	51	30	29
Wed 03/04/19	55	33	30	-	-	-
Overall Average	55	36	32	51	34	32

Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..4
Measurement Results Location LT2

Date	Daytime			Night-time		
	$L_{Aeq,16h}$ dB	$L_{A90,15min}$ dB Mode	$L_{A90,15min}$ dB 10 th Percentile	$L_{Aeq,8h}$ dB	$L_{A90,15min}$ dB Mode	$L_{A90,15min}$ dB 10 th Percentile
Wed 27/03/19	49	28	26	41	29	27
Thu 28/03/19	52	36	28	46	38	36
Fri 29/03/19	53	38	34	43	36	34
Sat 30/03/19	53	36	33	48	33	30
Sun 31/03/19	56	47	45	51	39	39
Mon 01/04/19	48	42	32	51	38	37
Tue 02/04/19	51	36	32	45	34	29
Wed 03/04/19	47	30	29	-	-	-
Overall Average	51	37	32	46	35	33

**Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..5
Measurement Results Location LT3**

Date	Daytime			Night-time		
	<i>L</i> _{Aeq,16h} dB	<i>L</i> _{A90,15min} dB Mode	<i>L</i> _{A90,15min} dB 10 th Percentile	<i>L</i> _{Aeq,8h} dB	<i>L</i> _{A90,15min} dB Mode	<i>L</i> _{A90,15min} dB 10 th Percentile
Wed 27/03/19	55	36	33	50	33	31
Thu 28/03/19	55	39	34	53	40	37
Fri 29/03/19	56	40	38	50	37	35
Sat 30/03/19	55	40	35	49	33	33
Sun 31/03/19	56	44	42	54	38	37
Mon 01/04/19	55	38	36	52	36	36
Tue 02/04/19	55	41	36	53	34	34
Wed 03/04/19	56	34	34	-	-	-
Overall Average	55	39	36	52	36	35

Appendix 7.B – Noise Monitoring Information

NeuConnect: Great Britain to Germany Interconnector

GB Onshore Scheme

Environmental Statement

Appendix 7B – Noise Modelling
Information

NeuConnect Britain Ltd

September 2019

Prepared for:

NeuConnect Britain Ltd
C/O Fulcrum
105 Piccadilly
London, W1J 7NJ
United Kingdom

Prepared by:

AECOM Infrastructure & Environment UK Limited
1 Tanfield
Edinburgh EH3 5DA
United Kingdom

T: +44 131 301 8600
aecom.com

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Glossary & Abbreviations

Glossary

Term	Meaning
<i>Li</i>	Internal reverbant sound pressure levels
<i>Rw</i>	The weighted sound reduction index

Abbreviations

Abbreviation	Definition
OS	Ordanance Survey
Hz	Hertz
SWL	Sound Power Level
SRI	Sound Reduction Index
dB	Decibel

1. Modelling Information

Acoustic Modelling Details

- 1.1 Modelling of sound levels from the development have been undertaken using SoundPLAN (version 8.0) acoustic modelling software. This software implements the sound propagation calculation methodology set out in ISO 9613-2.

Acoustic modelling input data

- 1.2 Data sources used for this modelling are shown in Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..1.

Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..1
Data sources

Data	Source file	Received from
OS mapping	OS OpenMap Local (ESRI Shape File) TQ	AECOM
Existing topography	Contour_1m_clip.shp	AECOM
Proposed GB Onshore Scheme layout	Draft UK Onshore Site Layout Drawing Reference NC_190411_P64_v2 – Figure 2.2 of Volume II of the Environmental Statement (ES) Draft UK NGET Converter Station Layout Drawing Reference NC_190514_P76_v1 – Figure 2.3 of Volume II of the ES	AECOM
Proposed building heights	ES Volume II, Chapter 2: Proposed GB Onshore Scheme	AECOM

- 1.3 The octave-band sound power levels for external plant sound sources (each modelled as a point source) included in the acoustic model are set out in Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..2 below.

Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..2
Sound power levels of external plant sound sources

Plant	Number	Sound Power Levels (dB) at Octave Band Centre Frequency (Hz)								Total A-weighted Data Source (dB)	
		63	125	250	500	1k	2k	4k	8k		
Transformer	6	83	85	80	80	74	69	64	57	80	A-weighted SWL from NSN Link ES Chapter, frequency spectrum from published data for this source type ¹
Transformer cooler	6	56	93	85	62	56	56	56	56	80	A-weighted SWL from NSN Link ES Chapter, frequency spectrum from published data for this source type ²
Outdoor cooling fans	66	86	83	80	77	74	71	68	65	80	A-weighted SWL from NSN Link ES Chapter, frequency spectrum from

¹ Engineering Noise Control, Theory and Practice (D A Bies and C H Hansen, 1996)

² National Grid Viking Limited (2017). UK Onshore Scheme Environmental Statement. Available at http://viking-link.com/media/1395/es_c_ch26_noise-and-vibration-cs_revfinal.pdf

Plant	Number	Sound Power Levels (dB) at Octave Band Centre Frequency (Hz)								Total A-weighted (dB)	Data Source
		63	125	250	500	1k	2k	4k	8k		
published data for this source type ²											

The internal reverberant sound pressure levels (L_i) inside the Reactor Hall and AC Filter Hall are shown in Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..3. The sound reduction index (SRI) data used for the building walls and roof are set out in

1.4 Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..4. External sound power levels of building walls and roof have been calculated from these parameters using standard acoustic equations implemented by the modelling software.

Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..3
Internal Reverberant Sound Pressure Levels in Buildings

Building	Internal Reverberant Sound Pressure Levels (dB) at Octave Band Centre Frequency (Hz)								Total A-weighted (dB)	Data Source
	63	125	250	500	1k	2k	4k	8k		
Reactor Hall	77	83	85	80	74	69	64	57	80	A-weighted SWL from NSN Link ES Chapter, frequency spectrum from published data for this source type ³
AC Filter Hall	66	73	75	70	64	59	54	47	70	A-weighted SWL from NSN Link ES Chapter, frequency spectrum from published data for this source type ⁴

Table Error! Use the Home tab to apply Level 1 Heading to the text that you want to appear here..4
Building Sound Transmission Data

Material	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)								Overall R_w (dB)	Data Source
	63	125	250	500	1k	2k	4k	8k		
Composite panel	11	14	19	23	23	23	39	50	24	SoundPlan ⁵ noise modelling software internal library

1.5 External doors to the Reactor Hall and AC Filter Hall are assumed to be closed while the facility is operational. The doors, junction details and large openings for ventilation are assumed to achieve the equivalent acoustic performance as the main wall panels.

Acoustic model settings

1.6 Acoustic modelling has been undertaken using the following model settings:

- Maximum search radius of 5000 m (this is to the maximum source to receiver distance which is considered in the calculations).
- Maximum number of reflections: 3.

³ Engineering Noise Control, Theory and Practice (D A Bies and C H Hansen, 1996)

⁴ National Grid Viking Limited (2017). UK Onshore Scheme Environmental Statement. Available at http://viking-link.com/media/1395/es_c_ch26_noise-and-vibration-cs-_revfinal.pdf

⁵ SoundPlan. (2018). Backnang, Germany: SoundPLAN GmbH

- Noise predictions carried out at a height of 1.5 m and 4 m to represent ground and first floor levels.
- Side diffraction enabled (this setting includes calculation of sound travel not only over an obstacle but also around the sides of it).
- Heights of buildings not included in the GB Onshore Scheme assumed to be 6 m.

1.7 Ground absorption has been set as below:

- Acoustically hard ground ($G=0$) for converter station and substation footprints plus proposed laydown area.
- Remaining areas set to $G=0.8$ representing a mix of 80% soft and 20% hard ground.

Appendix 8.A – Desk-Based Assessment

NeuConnect: Great Britain to Germany Interconnector

GB Onshore Scheme

Appendix 8.A - Cultural Heritage Desk
Based Assessment

NeuConnect Britain Ltd

September 2019

Quality information

Prepared by

Mark Service,
Senior Heritage
Consultant

Loïc Boscher
Archaeological
Consultant

Checked by

Amy Jones,
Associate Director

Annie Calder,
Associate Director

Verified by

Annette Roe,
Regional Director,
Heritage

Approved by

Annette Roe,
Regional Director,
Heritage

Prepared for:

NeuConnect Britain Ltd
C/O Fulcrum
105 Piccadilly
London, W1J 7NJ
United Kingdom

Prepared by:

AECOM Infrastructure & Environment UK Limited
1 Tanfield
Edinburgh EH3 5DA
United Kingdom

T: +44 131 301 8600
aecom.com

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1. Introduction

Instructions

- 1.1 AECOM has been appointed by NeuConnect Great Britain Ltd. (the Applicant) to prepare a Cultural Heritage Desk-Based Assessment (DBA) to accompany its planning application for the development of a converter station and onshore sections of a Direct Current (DC) cable route connecting Great Britain to Germany. The GB Onshore Scheme (the Site) is located on the Isle of Grain, Kent.
- 1.2 The requirement of this assessment is to identify, map, and assess the significance of all designated and non-designated heritage assets that are present within the Site and to determine the potential for the presence of as yet unknown archaeological remains. The assessment also identifies heritage assets beyond the Site and assesses the potential for their settings to change as a result of the scheme. The baseline conditions presented in this document provide the evidence base for the Environmental Impact Assessment (EIA) and therefore provide the evidence base to inform decisions in relation to avoiding, minimising and/or mitigating the impact to both the known and potential cultural heritage assets identified. This DBA will form a technical appendix to the Cultural Heritage Chapter of the Environmental Statement (ES).

Site Location and Description

- 1.3 The proposed development Site is located to the west of the village of Grain, within the boundary of Medway Council, and is centred on the Isle of Grain located at the tip of the Hoo Peninsula between the Thames Estuary to the north and the Medway Estuary to the south (Figure 1). The proposed converter complex is centred on National Grid Reference (NGR) TQ 87599 76431, while the proposed DC cable route would run from TQ 87759 76415 to mean high water springs (MHWS) at TQ 88544 77350.
- 1.4 Land use on the peninsula comprises a mix of industrial development to the south, the small settlement of Grain to the southeast and undeveloped land, much of which is designated for ecological interests, to the north (along the coastline) and to the west. There are also some small areas of brownfield or derelict land and some small areas of agricultural land (some of these coincide with brownfield land). The existing 400 kilovolt (kV) overhead line (OHL) which is broadly routed east to west generally marks the boundary between the extent of industrial or brownfield land and settlement or undeveloped coastal land. The only road access to the peninsula is from the B2001/ Grain Road.
- 1.5 The majority of the proposed development Site is situated within fields currently under cultivation or lying fallow. This includes all above ground structures, the access road, and the southern half of the proposed DC cable route. The northern half of the proposed DC cable route crosses West Lane and runs north along an existing access road that runs towards the coast towards the former White Hall Farm and reaches MHWS. This last section lies in an existing ditch and scrubland to east of the access road.

The Scheme

- 1.6 The proposed development is composed of four components:
 - a converter station, including AC cables and an access road;
 - a substation, including sealing end compound;
 - the DC cable route; and
 - a National Grid Electricity Transmission (NGET) tower, including connections.
- 1.7 The footprint of the proposed converter station at Grain is expected to be up to approximately 250m by 250m (to the perimeter security fence). This area would comprise specialist electrical

equipment, most of which would be located indoors in one or two building units in order to provide protection from the increased levels of salinity of the air. The building units would have maximum height of up to 26m. There would be a 2m exclusion zone around the perimeter fencing.

- 1.8 The footprint of the proposed substation would be expected to be approximately 80m by 80m (to the perimeter security fence). The substation would comprise specialist electrical equipment which would be located within a single building unit, with a maximum height of approximately 14m. The area would be surrounded by palisade security fencing.
- 1.9 Two DC cables and up to six AC cables would be installed as part of the proposed development. The cables would be approximately 20cm in diameter. From the converter station to MHWS, the DC cables would be approximately 1.6km long, after which the scheme would continue as the GB Offshore Scheme. The proposed AC cables may either be underground or above ground. If above ground these would be gas-insulated transmission lines (GIL) tubes. The proposed AC cable will be installed within the footprint of the proposed converter station and substation platforms. At the landfall location, where the subsea cable transitions to the onshore underground cable, a Transition Joint Pit (TJP) would be installed, which would consist of a buried concrete pad where the subsea and underground cables would be connected. The TJP would have an indicative footprint of up to 75m² as a worst case (dimensions approximately 15m by 5m). The proposed DC cable would be installed in lengths of 800m to 1km. In between each length a joint bay would be required to join the lengths together. The joint bays would be similar in scale to the TJP, approximately 15m by 5m, and consist of a concrete slab for jointing to be undertaken.
- 1.10 Access to the proposed converter station would be via the B2001 Grain Road from the development of a new access point and internal road. This would be the primary point of access during construction and operation of the GB Onshore Scheme. Temporary access for construction of the proposed DC cable route would also be taken from Grain Road from the Perry's Farm access track, as well as from West Lane further to the north, which provides access to Rose Court Farm and Peat Way, which may also be used for temporary and/ or permanent access.
- 1.11 An additional working area, beyond the required area to accommodate the permanent footprint of the GB Onshore Scheme, of approximately 1.5ha would be required for the construction compound, laydown and storage areas, and 0.35ha would be required for sub laydown areas. These construction compounds would accommodate temporary construction facilities and include provision for offices, welfare, storage, and parking, waste management, as well as rock crushing and concrete batching facilities. These areas are likely to be topsoil stripped, levelled, and padded early in the construction works and would be entirely reclaimed upon completion.

Scope and Structure

- 1.12 This report has been prepared to determine the cultural heritage baseline to inform the ES chapter for the proposed development, and conforms to the requirements of the National Planning Policy Framework (NPPF) 2019. It describes the site, including the heritage assets within the site and within the study area.
- 1.13 This report is structured in six sections as follows, with illustrations and appendices at the end.
 - The legislative and planning policy framework is provided in Section 2 (Legislation and Planning Policy) which also includes an overview of Historic England policy and guidance.
 - The methodology for assessment and determination of the study area is set out in Section 3 (Assessment Methodology).
 - A description of the Site's historical and archaeological background is set out in Section 4 (Baseline Assessment).
 - Section 5 provides an assessment of known and potential heritage assets within the Site which have the potential to be impacted by the proposed development.
 - Finally, Section 6 summarises the results of the assessment.

2. Legislation and Planning Policy

Legislation

The Ancient Monuments and Archaeological Areas Act (1979)

- 2.1 This Act is the central piece of legislation that protects the archaeological resource. The first section of the Act requires the Secretary of State for National Heritage to maintain a schedule of nationally important sites. For the purposes of the Act, a monument is defined as:
- 2.2 “a) any building, structure or work, whether above or below the surface of the land, and any cave or excavation; b) any site comprising the remains of any such building, structure or work or of any cave or excavation; and c) any site comprising, or comprising the remains of, any vehicle, vessel, aircraft or other moveable structure or part thereof which neither constitutes nor forms part of any work which is a monument as defined within paragraph a) above; d) and any machinery attached to a monument shall be regarded as part of the monument if it could not be detached without being dismantled’ (Section 61 (7)).”
- 2.3 The Act further defines an ancient monument as:
- 2.4 “any Scheduled Monument; and any other monument which in the opinion of the Secretary of State is of public interest by reason of the historic, architectural, traditional, artistic or archaeological interest attaching to it’ (Section 61 (12)).”
- 2.5 A set of criteria, defined as survival/condition, period, rarity, fragility/vulnerability, diversity, documentation, group value and potential, assist in the decision making process as to whether an asset is deemed of national importance and best managed by scheduling.

The Planning (Listed Buildings and Conservation Areas) Act 1990

- 2.6 The Act sets out the principal statutory provisions which must be considered in the determination of any application affecting either listed buildings or conservation areas.
- 2.7 Section 66 of the Act states that in considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses. By virtue of Section 1(5) of the Act a listed building includes any object or structure within its curtilage.

National Planning Policy

National Planning Policy Framework (NPPF; MHCLG 2019)

- 2.8 The NPPF sets out the Government’s planning policies for England and how these should be applied to contribute to the achievement of sustainable development. The NPPF requires plans, both strategic and non-strategic, to make provision for the conservation and enhancement of the historic environment (paragraphs 20d and 28). Section 16 of the NPPF sets out a series of policies that are a material consideration to be taken into account in development management decisions in relation to the heritage consent regimes established in the Ancient Monuments and Archaeological Areas Act 1979 and the Planning (Listed Buildings and Conservation Areas) Act 1990.
- 2.9 The NPPF sets out the importance of being able to assess the significance of heritage assets that may be affected by a development proposal. Significance is defined in Annex 2 as ‘the value of an asset because of its heritage interest. This interest may be archaeological, architectural, artistic or historic and can extend to its setting’. The setting of a heritage asset is defined in Annex 2 as ‘the surroundings in which a heritage asset is experienced’. In determining applications, local planning authorities should require an applicant to describe the significance of any heritage

assets affected, including any contribution made by their setting. The level of detail should be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of the proposal on their significance (paragraph 189). Similarly, there is a requirement on local planning authorities to identify and assess the particular significance of any heritage asset that may be affected by a proposal; and that they should take this assessment into account when considering the impact of a proposal on a heritage asset (paragraph 190).

2.10 In determining planning applications, local planning authorities should take account of the following three points:

- the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;
- the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and
- the desirability of new development making a positive contribution to local character and distinctiveness (paragraph 192).

2.11 Paragraphs 193 to 196 of the NPPF introduce the concept that heritage assets can be harmed or lost through alteration or destruction or development within their setting. This harm ranges from less than substantial through to substantial. With regard to designated assets, paragraph 193 states that great weight should be given to an asset's conservation and the more important the asset, the greater the weight should be. This is irrespective of the level of harm to its significance as a result of any proposals. Distinction is drawn between those assets of exceptional interest (e.g. grade I and grade II* listed buildings), and those of special interest (e.g. grade II listed buildings). Any harm or loss of heritage significance requires clear and convincing justification, and substantial harm or loss should be wholly exceptional with regard to those assets of greatest interest (paragraph 194).

2.12 In instances where development would cause substantial harm to or total loss of significance of a designated asset, consent should be refused unless that harm or loss is 'necessary to achieve substantial public benefits that outweigh that harm or loss' (paragraph 195). In instances where development would cause less than substantial harm to the significance of a designated asset, the harm should be weighed against the public benefits of the proposal including its optimum viable use (paragraph 196). In relation to non-designated assets a balanced judgment is required taking into account the scale of harm or loss and the significance of the asset (paragraph 197). Distinction is made between those non-designated assets of archaeological interest which are demonstrably of equivalent significance to scheduled monuments; the latter should be considered against policies for designated heritage assets (footnote 63).

Planning Practice Guidance (MHCLG 2018)

2.13 The Planning Practice Guidance (PPG; MHCLG 2018) is a government produced interactive on-line document that provides further advice and guidance that expands the policy outlined in the NPPF. It expands on terms such as 'significance' and its importance in decision making. The PPG clarifies that being able to properly assess the nature, extent and the importance of the significance of the heritage asset and the contribution of its setting, is very important to understanding the potential impact and acceptability of development proposals (paragraph 009).

2.14 The PPG states that in relation to setting a thorough assessment of the impact on setting needs to take in to account, and be proportionate to, the significance of the heritage asset under consideration and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it (paragraph 013).

2.15 The PPG discusses how to assess if there is substantial harm. It states that what matters in assessing if a proposal causes substantial harm is the impact on the significance of the asset. It is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed (paragraph 017). Generally, harm to heritage assets can be avoided or minimised if proposals are based on a clear understanding of the heritage asset and its setting (paragraph 019).

2.16 The NPPF indicates that the degree of harm should be considered alongside any public benefits that can be delivered by development. The PPG states that these benefits should flow from the proposed development and should be of a nature and scale to be of benefit to the public and not just a private benefit and would include securing the optimum viable use of an asset in support of its long term conservation (paragraph 020).

Local Planning Policy

Medway Local Plan

2.17 Local policy is defined by the Medway Local Plan adopted by Medway Council on 14th May 2003. Medway Council is currently working on a new Local Plan, Future Medway, which will cover the period up to 2035.

2.18 The Medway Local Plan makes several provisions for the protection and enhancement of the heritage environment. Relevant to this study are the following policies:

2.19 Policy BNE18: Setting of Listed Buildings. 'Development which would adversely affect the setting of a listed building will not be permitted.'

2.20 Policy BNE21: Development affecting potentially important archaeological sites will not be permitted, unless:

- the developer, after consultation with the archaeological officer, has arranged for an archaeological field evaluation to be carried out by an approved archaeological body before any decision on the planning application is made; and
- it would not lead to the damage or destruction of important archaeological remains. There will be a preference for the preservation of important archaeological remains in situ.
- where development would be damaging to archaeological remains, sufficient time and resources are made available for an appropriate archaeological investigation undertaken by an approved archaeological body. Such investigations should be in advance of development and in accordance with a specification and programme of work approved by the council. Resources should also be made available for the publication of the results of the investigation.

Policy Guidance

2.21 Historic England has published a number of relevant guidance documents that should be taken into account when assessing the historic environment.

Historic England Conservation Principles Guidance (EH 2008)

2.22 The primary aim of the Conservation Principles, Policies and Guidance is to support the quality of decision-making, and create a clear, transparent and sustainable management regime for all aspects of the historic environment.

2.23 This document sets out six guiding principles governing the approach to decision making. The principles describe:

How the public values and participates in the historic environment;

- The development process and assessment of harm;
- Articulate an approach to assessing significance of heritage assets based on their evidential, historical, aesthetic and communal values, and balances these with the contribution made by setting;
- The document also sets out how to manage impacts on significance; and,
- How decisions are guided by public policy and the balance to be struck between heritage significance and the impact of change on that significance.

2.24 These principles are intended to be used as a tool to aid analysis rather than be taken as policy.

Historic England Good Practice Advice Notes

- 2.25 Historic England has published a series of Good Practice Advice (GPA) of which those of most relevance to this appraisal are *GPA2 Managing Significance in Decision-taking* (March 2015) and *GPA3 The Setting of Heritage Assets* (Second Edition, 2017).
- 2.26 GPA2 emphasises the importance of having a knowledge and understanding of the significance of heritage assets likely to be affected by the development and that the 'first step for all applicants is to understand the significance of any affected heritage asset and, if relevant the contribution of its setting to its significance' (para 4). Early knowledge of this information is also useful to a local planning authority in pre-application engagement with an applicant and ultimately in decision making (paragraph 7).
- 2.27 GPA3 (Second Edition) provides detail on the setting of heritage assets provides general advice on understanding setting, and how it may contribute to the significance of heritage assets and allow that significance to be appreciated. The document also provides advice on how views contribute to setting.
- 2.28 Paragraph 8 of the advice note confirms that the extent of the setting, as defined in the NPPF, is not fixed and may change as the asset and its surroundings evolve.
- 2.29 Paragraph 9 states that although the setting is not itself a heritage asset, nor a heritage designation, land comprising a setting may itself be designated. The concept of a 'core', 'wider' and 'extended' setting is introduced in the same paragraph (under the section on Designated Views); however, it is acknowledged that there is no formal meaning for these terms and they will only apply in certain cases.

3. Methodology of Assessment

Standards and Guidance

- 3.1 The assessment of baseline conditions was carried out following the guidelines of the Chartered Institute for Archaeologists (CIfA), the Standard and Guidance for Historic Environment Desk-Based Assessment (CIfA 2017) and the Code of Conduct (CIfA 2014).

Study Area

- 3.2 The study area for the collation of information on archaeological assets was defined as a 3km buffer from the Site boundary, but only ends at the MHWS on the Isle of Grain. This distance has been agreed with Kent County Council as appropriate to provide the context of, and potential for, surviving archaeological remains on the Site given the nature of the proposed development and its location. The enlarged study area is specifically targeted to include key Palaeolithic sites on the peninsula, a number of archaeological interventions that have been carried in the south-east of the Isle of Grain, and the high ground on which the village of Grain is located (defined as the Head and River Terrace Gravels geological deposits and margins). Known archaeological assets located on the foreshore or offshore, which consist largely of ship and airplane wrecks, jetties, salting, and post-medieval or modern defensive features, were considered to have little bearing on the potential for archaeological remains onshore. These assets are, however, considered by the offshore aspect of the scheme submitted separately from this document (Wessex Archaeology, XXX). Impact to offshore heritage assets between MHWS and MLWS have been identified in the offshore aspect of the proposed development's cultural heritage desk-based assessment (Wessex Archaeology XXX). Assets identified within the intertidal zone will not be discussed in this desk-based assessment but will be incorporated within the onshore scheme's cultural heritage ES chapter.
- 3.3 The study area for the collation of information on built heritage assets was defined as 1km from the Site boundary. Given the low lying location of the Site the study area was extended to the west to take in the villages of Allhallows and Lower Stoke which are located on higher ground to the west.
- 3.4 Within these study areas, information was collated in relation to all designated and non-designated heritage assets. Heritage assets were identified using the data sources listed below (section 3.3).

Data Sources

- 3.5 The preparation of the baseline was informed by information gathered and collated from various sources, including:
- Kent Historic Environment Record (KHER);
 - National Heritage List for England;
 - Historic England Archive ;
 - Kent Archives at the Kent History & Library Centre;
 - Open Lidar data obtained from the Environment Agency accessed through Lidar Finder (<https://www.lidarfinder.com/>) ;
 - British Geological Survey (BGS) online (<http://www.bgs.ac.uk/geoindex/>);
 - Historic Ordnance Survey maps;
 - Research frameworks for South East England;
 - Geotechnical borehole data; and
 - Other online sources.

Site Visit and Walkover Summary

- 3.6 A Site visit and visual assessment of heritage assets within the study area and Site was undertaken on 7th May 2019. General photographs of the walkover survey are included in Appendix D. The aims of the survey were:
- To identify known archaeological sites and find spots;
 - To identify historic buildings and related assets including listed and locally listed buildings;
 - To identify areas with the potential to contain any previously unidentified archaeological or historical remains;
 - To identify and assess the setting of heritage assets; and
 - To identify the location, extent and severity of modern ground disturbance and previous construction or agricultural impacts.

Analysis Tools

- 3.7 The data gathered through both the Site visit and desk-based review have been collated and the results mapped in ArcView GIS using Ordnance Survey base mapping.
- 3.8 An assessment of the historic development of the Site and its surrounds including a map regression exercise has been undertaken (Figures 6 to 15). This was designed both to provide a context for known assets and to help identify the potential for other archaeological remains to be present.
- 3.9 An assessment of the setting of assets and its contribution to their significance was determined with reference to Historic England guidance on setting (EH 2015c) and the PPG (MHCLG 2018). Statements in relation to the heritage significance of assets are made with reference to their Artistic, Architectural, Archaeological and Historic qualities as stated in the NPPF (MHCLG 2019).

Historic Landscape Characterisation

- 3.10 The sources used to characterise the historic landscape within the Site included:
- Natural England's National Character Areas;
 - Kent Historic Landscape Characterisation (HLC);
 - Published documentation, in particular those of the Hoo Peninsula Historic Landscape Project (see below for list of references); and
 - Walkover and visual inspection of the Site.
- 3.11 For the purpose of this study the GIS data for the Kent Historic Landscape Characterisation (HLC) Study were obtained from Kent County Council (KCC) and have been incorporated into the project under license from KCC. The dataset was in the form of HLC type polygons and is presented in Figure 4 of Appendix C.

Assessment Criteria

Heritage Asset Significance

- 3.12 An assessment of the significance of assets and their setting has been undertaken in consideration of guidance and good practice issued by Historic England. A methodology for the assessment of significance of heritage assets is outlined in *Conservation Principles, Policies and Guidance* (English Heritage, 2008) whilst Historic England GPA3 (2017) provides the basis of a methodology for the assessment of setting.
- 3.13 Annex 2 of the NPPF states that the significance of heritage asset is its value "to this and future generations because of its heritage interest. This interest may be archaeological, architectural,

artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting" (MCHLG 2019, 71).

- 3.14 Significance is often established by statutory designations such as listed buildings, scheduled monuments and conservation areas. More particular advice as to what makes up significance is set out in Conservation Principles, which establish a method for thinking consistently about the heritage values that can be ascribed to a place. When making an assessment of significance numerous aspects are considered including: architectural interest, historic interest, group value, social value, former uses and local distinctiveness. These aspects are grouped into four values: Evidential, Historic, Aesthetic and Communal.
- 3.15 The terminology used in this desk-based assessment relates to the terminology used by both the NPPF and Conservation Principles, referring to significance in terms of heritage interest and not heritage values. Whilst heritage interest and heritage values are not completely interchangeable they are broadly similar.
- 3.16 In the related ES chapter, this value, interest, or significance of a heritage asset will be referred to as its sensitivity; ensuring that these documents' terminology accord with that used under Environmental Impact Assessment methodologies.

Magnitude of Previous Ground Disturbance

- 3.17 The magnitude of impact to buried archaeological remains caused by historic development has been assessed based on available data listed above, with particular attention paid to historic boreholes and available data obtained from previous archaeological evaluations and excavations in the study area.

Archaeological Potential

- 3.18 The potential for an area to contain archaeological remains is rated 'high', 'moderate', 'low', 'negligible', or 'unknown'. This rating is based on an understanding of the archaeological resource as a whole and its national, regional and local context. This includes the number, proximity and significance of known and predicted archaeological/historical sites or find spots within the Site and its surrounding study area.

Consultation

- 3.19 Direct consultation with statutory bodies of Kent County Council and Historic England was carried out by AECOM in lieu of an Environmental Impact Assessment Scoping Report.
- 3.20 Kent County Council's Archaeological Officer's response (Appendix E; dated 12/02/2019) highlighted the potential for Palaeolithic, Iron Age, and Roman remains within the proposed project Site. It was requested that the study area encompass the area of higher gravel terrace grounds and take into account archaeological investigations carried out along the south and south-east coast line of the Isle of Grain. The officer also asked that the report incorporate the findings of Historic England's Hoo Peninsula Project. Lastly, it was requested that preliminary geotechnical investigations borehole logs be made available and subsequent ground investigation works be archaeologically monitored.
- 3.21 Historic England's response (Appendix E; dated 01/03/2019) was largely in agreement with Kent Council's Archaeological Officer, also highlighting the potential for Iron Age, Roman, as well as for Second World War heavy anti-aircraft batteries. Historic England also requested that the intertidal and terrestrial aspects of the projects be well integrated and cross-referenced in order to avoid omitting potential remains.

4. Baseline

Physical Site Conditions

Site Topography

- 4.1 The Site is located on the Isle of Grain, the eastern tip of the Hoo Peninsula. Once separated from the mainland by the Yantlet Creek, a navigable tidal channel between the Thames and Medway estuaries, this channel was infilled sometime in the medieval period, effectively transforming the Isle of Grain from an Island to a peninsula. Nevertheless, the former infilled channels of the Yantlet Creek and its related natural fleets remained low-lying and marshy until the 18th century following extensive reclamation efforts.
- 4.2 The Isle of Grain appears to have been extensively eroded for the last several centuries if not millennia. Historical accounts tell of wide-scale inundation across much of the island in throughout the 15th and 16th centuries until the erection of strong sea wall defences in the 17th century (Carpenter *et al.* 2013, 15). Despite this, the erosion of the northern portion of the Isle of Grain remains rapid even today. This is clearly evident from aerial photographs which show the loss of over 50m of coastline north of the village of Grain since the 1940s, despite the construction of groynes all along that coast. It is likely that historically the Isle of Grain extended as far as the current extent of the mudflats and mean low water mark.
- 4.3 The Site itself is located on the western side of the area of high ground on which the village of Grain is centred. The main proposed complex is located on the south-west edge of this high ground, approximately 8m Ordnance Datum (OD). The cable route running north-east of the complex will follow the western contour of the hill, rising up to approximately 12m OD near West Lane before reaching MHWS to north.
- 4.4 To the west of the proposed electrical converter and substation, the land drops down towards low-lying reclaimed marshes and former Yantlet Creek. On the opposite side of the low-lying area, the land rises again to form the easternmost point of the 'Hundred of Hoo Hills', a central ridge of high land that traverses the Hoo Peninsula north-east to south-west. The open low-lying land that separates these two areas of high ground results in wide views and perspectives linking the two high points. The site of the proposed development and settlements located on the ridge to the west (Lower Stokes and Allhallows) are clearly inter-visible across this span.
- 4.5 The landscape also drops to the south and south-east of the main complex. However, in those directions the Isle of Grain has been heavily industrialised since the post-medieval period and is now dominated by power generation plants, liquid natural gas storage, and the accompanying infrastructure.
- 4.6 Immediately east and north of the main complex, where the proposed DC cables lie, the land is relatively flat and currently either under cultivation as part of Perry's Farm, or lying fallow following extensive sand and gravel extraction.
- 4.7 The proposed DC cable route north of West Lane is situated within an area of former mineral extraction. The area has only been partially reinstated and is now low-lying scrubland.
- 4.8 As the proposed DC cable route approaches the coast, the land drops sharply down to a pebble beach giving onto wide mudflats beneath the MHWS mark.

Site Geology

- 4.9 Although much of the Isle of Grain is formed of London Clay bedrock deposits overlain by alluvium (BGS), the proposed development Site is located on higher ground composed of terrace gravels and related colluvium. Detailed investigation of the Hoo Peninsula has shown that the gravel deposits on the Isle of Grain differ significantly from those to the west of Yantlet Creek (Bridgeland 2003, 42). The similarity of the Grain Gravels to deposits in Southend, on the opposite side of the Thames today, suggests that they belong to the same Thames-Medway

subgroup (*ibid.*). More specifically, the Grain Gravels originate from the Corbets Tey Gravel of the Lower Thames and the Stoke Gravel of the Medway (Bridgland *et al.*, 1993).

- 4.10 The composition of the Grain Gravel is closely comparable to the Low-level East Essex Gravel of the Southend area, of Thames-Medway origin. It had been suggested that the Grain Gravels are a downstream continuation of the Corbets Tey Gravel of the Lower Thames and the Stoke Gravel of the Medway, dating to Marine Isotope Stage (MIS) 8 through 10 (Bridgland *et al.*, 1993). However, more recent direct dating of gravel deposits on the Isle of Grain through Optically-Stimulated Luminescence (OSL) has provided direct dates that place the gravels in MIS 6, roughly 224 ± 25 ka (thousands of years ago) (Wessex 2013) and 196 ± 14 ka (Wenban-Smith *et al.* 2007).
- 4.11 These Grain Gravel deposits have been extracted at several locations across the study area, but given the origin of their formation, areas of undisturbed gravels retain the potential to contain Lower Palaeolithic material. The deposits themselves are also considered to be of research interest in that they may inform on the Pleistocene landscape and the formation processes of the Thames and Medway estuaries.
- 4.12 Ground investigations were carried out in advance of the proposed development within the location of the proposed converter station and its access road. This study included nine boreholes, two trial pits, and four piezocone penetration tests, the results of which are included in Appendix F. The investigations show the presence of made ground deposits below topsoil in six of the boreholes to the west and south of Perry's Farm. In all instances, the logs show that beneath topsoil, or beneath made ground where present, superficial deposits of mixed sand, clay, and gravel are present. These superficial deposits are likely a combination of Grain Gravel with the underlying London Clay bedrock, but may also include a component of alluvial deposits formed by tidal flooding. These deposits appear to be highly variable and may have been redeposited through colluvial processes.

Heritage Assets

- 4.13 There are no World Heritage Sites, scheduled monuments, registered parks and gardens, or registered battlefields within the Site. A single grade II listed building, consisting of Second World War dragon's teeth anti-tank defences, is situated within the Site boundary.
- 4.14 Four non-designated assets have been identified within the Site boundary, all of which are archaeological in nature and date from the medieval period to the modern period. In addition to these assets, the proposed development extends over two Areas of Archaeological Potential (AAP), centred on KHER assets considered by Kent County Council to be of archaeological interest and which have the potential for further remains to have survived in their vicinities. The first is a large AAP overlying the Grain Gravel terrace which is considered to be a geological formation with potential to hold Palaeolithic remains. The second AAP is centred on an Iron Age settlement and late Roman cemetery north of Rose Court Farm.
- 4.15 Five designated assets have been identified within the 1km study area. These consist of two scheduled monuments, one grade I listed and two grade II listed buildings. A further four listed buildings, one grade I and three grade II, are located within the villages of Allhallows and Lower Stoke approximately 4km to the west of the Site.
- 4.16 A total of 143 further non-designated assets lie within the study area, consisting of 11 extant built heritage assets and 132 archaeological assets. The built heritage resource dates from the post-medieval to the modern period, while the archaeological assets date from the Lower Palaeolithic period to the modern period. Twenty-one AAPs are situated within the study area, centred on KHER assets considered to be of particular interest.
- 4.17 Assets identified within the Site and study area have been given unique reference numbers. These are pre-fixed with [A] for archaeological assets, [E] for archaeological investigations, and [BH] for built heritage assets. Each asset will be cross-referenced to the gazetteer in Appendices A and B. The location of archaeological assets is shown in Figure 2, while archaeological events are shown in Figure 3, historical landscape character is shown in Figure 4, and built heritage assets are shown in Figure 5, all of which can be found in Appendix C.

Previous Studies

- 4.18 The location of the Hoo Peninsula and the Isle of Grain, situated as they are between the ancient estuaries of the Thames and Medway, marks them as being of particular archaeological and palaeoenvironmental research interest. This has resulted in a relatively large number of archaeological, geoarchaeological, and landscape investigations over the last two decades.
- 4.19 Several academic research projects have been aimed at cataloguing and characterising the historic landscape in order to produce research frameworks to guide future development and research on the peninsula. The largest and most inclusive of these is the wide-ranging Hoo Peninsula Landscape project (Carpenter *et al.* 2013), which produced a report on the historic landscape of the entire peninsula (Sarah *et al.* 2015), a historic area assessment for the Isle of Grain (Smith 2014), a desk based assessment of the Grain Island Firing Point (Edgeworth 2013), an assessment of Second World War bombing decoys (Small 2014), and a paleoenvironmental study of the Hoo Peninsula (Hazell 2011). Together, these studies provide excellent overviews of relevant geological and historic landscape of the Isle of Grain.
- 4.20 A further research project of direct relevance to this proposed development is the Medway Valley Palaeolithic Project (Wenban-Smith *et al.* 2007), which was aimed at identifying and characterising geological deposits of archaeological and palaeoenvironmental potential. The Grain Gravels that cover much of the proposed development were investigated as part of this project, and a field survey of mineral extraction at Clubb's Pitt uncovered a lower Palaeolithic handaxe near the proposed DC cable route.
- 4.21 Determining the Palaeolithic and later prehistoric archaeological potential of the Isle of Grain has been the subject of a number of developer-led investigations over the last three decades. Most of these were focused on identifying and dating deeply buried deposits through programmes of geoarchaeological investigations. These have confirmed the expected geological deposit model reported by BGS and studies previously mentioned, consisting of Holocene alluvial deposits covering much of the Isle of Grain and gravel terrace deposits dating to the Wolstonian Stage of the Middle Pleistocene restricted to the higher ground in the north-east quadrant of the Isle. While few boreholes were tested for environmental remains, a number of samples taken from the Isle of Grain Power Station revealed palaeo-environmental remains dating to the Late Bronze Age.
- 4.22 In an effort to enhance the Kent Sites and Monuments Record and thereby facilitate strategic coastal planning, management initiatives, and improve services to individual development or works proposals, Kent County Council commissioned a Rapid Coastal Zone Assessment Survey (Wessex 2000; 2002; 2004; 2004a; 2005; 2006). This was carried out over several years and focused on recording, through desk-based research and non-intrusive surveys, the historic environment resource along the Kent coastline. The Isle of Grain features prominently in these reports due to its location along a coastline famous for its treacherous waters and for its military history. Although much of the findings of these studies relate best to the offshore element of this scheme, the monuments recorded by the initiative have recorded a number of onshore and potential resources that are relevant to the Site.
- 4.23 A significant Iron Age to Roman settlement site was investigated within the Clubb gravel extraction pit in the 1970s near Rose Court Farm [E3], which may fall within the footprint of the proposed development's northern onshore cable section. Unfortunately, the excavation reports have since been lost and the details of the excavations are limited to two short summaries that suggest the presence of an existing settlement and cemetery¹.
- 4.24 Iron Age to Roman settlement remains have also been recorded by geophysical surveys [E12], watching briefs, and trial trenching for a gas pipeline running from Grain to Shorne (Site A). This site is not located on the Isle of Grain itself, but near Lower Stoke 4.2km west (Meaton 2008; Dawkes 2009). Along with the extensive remains reported at Rose Court, these two sites suggest that the area was populated and settled from at least the Iron Age onwards.

¹ Repeated contact was made with former staff of Kent Archaeological Research Unit to try to source information relating to the 1970s excavations. Unfortunately, information about the site or site archive has not been provided.

- 4.25 Due to the extent of early 20th century industrial developments on the Isle of Grain, which are likely to have removed much of the archaeological resource, and the focus of more recent developments on these brownfield areas, few developer-led investigations have focused on late prehistoric to medieval archaeology. As such, only six watching briefs [E1, E2, E7, E9, E10, and E11] have been carried out on the Isle of Grain, none of which revealed any archaeological features of interest. A single study [E2], however, noted the presence of organic deposits which had the potential to relate to archaeology at the Isle of Grain Power Station, 1km south of the Site. It should be noted that all of these investigations have been concentrated in the southern half of the Isle of Grain, and therefore are not entirely indicative of the potential for archaeology on the higher gravel terraces on which the proposed development is located.
- 4.26 Nevertheless, a series of geoarchaeological investigations [E4, E5, E6, E8, E13, E14, and E15] on the Isle have clearly detailed the geological landscape of the study area.

Archaeological and Historical Overview

- 4.27 An assessment of the historic development of the Site through the study of a map regression exercise has been undertaken to provide a context for known assets and to help identify the potential for previously unknown assets to be present within the Site.

Palaeolithic (to c. 10,000 BC)

- 4.28 Evidence of the Palaeolithic period is usually limited to individual finds of lithic material, due to the lack of permanent settlement evidence and lack of preservation of organic remains.
- 4.29 The Site is located on a peninsula overlooking the Thames Estuary to the north and the Medway Estuary to the south, both of which have produced gravel deposits in which Palaeolithic finds have been recorded. The Grain gravels on which the Site is located were formed as part of the Thames system (Bridgeland *et al.* 1993; Bridgeland 2003) and which has been dated to MIS 6, roughly 200,000 years ago (Wessex 2013; Wenbau-Smith *et al.* 2007). This period is of particular interest as it corresponds to known Neanderthal occupation in Britain and as such has the potential to contain such remains.
- 4.30 A single flint artefact [A1] of Lower Palaeolithic date was found during a field survey of the J. Clubb mineral extraction pit 150m east of the proposed electrical complex. This confirms the presence of Palaeolithic remains within the Grain Gravels.
- 4.31 Environmental remains comprising ostracods, molluscs, and foraminifera dating to the Lower Palaeolithic [A2] have been reported 2km west of the Site, below Allhallows Marsh.

Mesolithic (c. 10,000-4,000BC)

- 4.32 The Mesolithic of the British Isles is characterised by small nomadic groups of hunter gatherers who moved periodically around the landscape to take advantage of wild and readily available sources of food. This movement is typically seasonal, and is thought to have followed the migratory route of game animals.
- 4.33 It is immediately prior to the Mesolithic that the Rivers Thames and Medway entered their current courses. The Hoo Peninsula's situation between these two major estuaries and the abundance of available resources would have been highly attractive to nomadic hunter gatherers. Geoarchaeological studies of the low-lying areas of the Isle of Grain show that the environment was predictably wetter and marshier than it is today. However, the higher gravel terrace on which the Site is located was likely drier than much as it is today and may have been occupied during this period.
- 4.34 Although no Mesolithic remains have been recorded in the study area, two areas of prehistoric peat have been recorded in the mud flats off the south and east coast of the Isle of Grain that may date to the Mesolithic. Furthermore, alluvium deposits recorded by various boreholes have also been dated to the Holocene that may therefore contain archaeological or environmental deposits dating to the Mesolithic.

Late Prehistoric (c. 4,000 BC–AD 43)

- 4.35 The late prehistoric period covers the Neolithic, Bronze Age and Iron Age, which account for the adoption of farming and more sedentary communities. From c. 4000 BC, the landscape became more representative of sedentary communities, with further ordering of field systems during the Bronze Age and Iron Age.
- 4.36 While the Hoo Peninsula is rich in late prehistoric remains, comparatively little archaeology from this period has been recorded on the Isle of Grain. This may be largely the result of the focus of developer-led archaeology to the southern half of the Isle where the prehistoric landscape was altogether too marshy and low-lying to be suitable for occupation. Few investigations have been carried out on the areas of higher ground that may have a higher potential for prehistoric archaeology, which may account for the scarcity of such remains recorded within the study area.
- 4.37 The two areas of prehistoric peat off the coast of the Isle of Grain and alluvium encountered in several locations already discussed have the potential to contain prehistoric archaeological and/or environmental remains from any period of the late prehistoric. Such peat deposits are expected to be present throughout the low-lying former marshland and coast but are unlikely to extend to the gravel terrace on which the Site is located.
- 4.38 Several undated enclosures and ring ditches, visible as cropmarks, have been recorded within the study area. These may date to any period from the late prehistoric onwards.
- 4.39 The only Neolithic find within the study area consists of a single Neolithic axe [A3], of insecure provenance described vaguely as having been recovered from the junction of the Thames and Medway.
- 4.40 No Bronze Age remains have been identified within the study area. The nearest evidence of Bronze Age activity consists of just over one hundred sherds of pottery recovered from Site A along the Grain to Shorne gas pipeline (Meaton 2008; Dawkes 2009) approximately 4.2 km west of the Site. These sherds are described as being poorly understood local Late Bronze Age types that likely, although not certainly, predate the Iron Age settlement uncovered at this location.
- 4.41 While no evidence of salt production has been recorded within the study area, the industry is well attested in the marshes of the Hoo Peninsula, albeit further west. Late Bronze Age salt production is reported at Hoo St. Werburgh (Moore 2002), 10km south-west of the Site, and at Allhallows (Greatorex, 2005), 3.5km west of the Site. Iron Age production is also attested at Hoo St. Werburgh and Stoke (Miles 1975), 3-10km south-west of the Site. Given the presence of a similar saltmarsh environment on the Isle of Grain to the areas of known prehistoric salt production, it is likely that the salt industry extended east onto the island, although such activities are unlikely to have taken place within the Site itself given that it is situated on higher ground and therefore above the tidal regime needed for salt production.
- 4.42 Although the results of several phases of excavations near Rose Court Farm remain unpublished, the works uncovered a major Iron Age complex [A6] that forms the earliest evidence of permanent occupation on the Isle of Grain. The Iron Age phase included a complex of ditched enclosures and post-hole structures extending over an area of well over 10ha dating to the first centuries BC and AD. Situated on the higher grounds of the Grain gravel terrace, it controlled the approach to both the Medway and Thames estuaries (Philp and Garrod 1980; Philp 1982). Despite the exact location of the site being unknown, it is recorded as located in the Grain gravel pit which covers the area surrounding Rose Court Farm north of West Lane and which is crossed by the proposed development's cable route. The remains are likely to have been entirely removed by mineral extraction associated with the Grain gravel pit, although there may be some residual material within the access road that may not have been subjected to mineral extraction.
- 4.43 Evidence of burnt Iron Age to Roman material [A7] was recorded at Wallend Petroleum Tank Farm, approximately 700m southeast of the Site, which may relate to Roman pottery kilns uncovered in the same area.
- 4.44 Lastly, two Iron Age gold coins [A4 and A5] have been recorded by the Portable Antiquities Scheme in the area of Grain, although their exact provenance is not known.

Roman (AD 43-410)

- 4.45 Despite the Romans landing in AD 43 on the east coast of Kent some 50km southeast of the Site, the Hoo Peninsula appears to have remained largely undisturbed by the conquest itself. This was likely in part due to the inhospitality of the marshy landscape and the area's remoteness. However, the Romans began exploiting the rich resources of the Peninsula soon after the conquest, slowly transforming it into a rural agricultural landscape dotted by salt and pottery production centres.
- 4.46 The Roman period on the Isle of Grain itself is poorly understood. The most significant remains consist of an enclosure, field ditches, and a Roman cemetery containing at least two cremation and 47 inhumation burials uncovered during salvage excavations in 1978-81 [A11]. Although grave goods have been tentatively dated to AD 250-350, the results of the excavations have not been properly assessed or published, and as such these results are based on preliminary summary reports only. The cemetery was recorded during salvage excavations ahead of mineral extraction at the Isle of Grain gravel pit, and while the exact location of the cemetery is not currently known, it may have extended across the area of the proposed cable route north of West Lane. It is, however, unlikely that any remains have survived the extensive mineral extraction in the mid-20th century.
- 4.47 Even less is known about a Roman pottery kiln and scatter of kiln bricks and pottery [A10] purportedly uncovered at 1m OD by workmen digging a trench in 1939. The exact location of this trench is unknown, but is reported by the KHER 1.2km south of the Site. It may or may not relate to Iron Age to Roman burnt material reported at Wallend Farm already mentioned [A7].
- 4.48 Roman salt production, the remains of which tend to be located at the junction between the low-lying marshy ground and higher ground (Carpenter *et al.* 2013, 43), have been reported at Hoo St. Werburgh 10km west of the Site (Miles 1975). Possible evidence of salt production has also been reported closer to the Site, in the form of pottery and 'briquetage' recovered from the marshes east of Allhallows, just beyond the study area and approximately 3.1km from the Site.
- 4.49 Two cordoned flasks findspots [A8 and A9] are also reported within the study area, both of which date to the 1st to 2nd centuries AD. It is highly likely that these two finds are in fact the same given that they are both described as recovered during works at an oil refinery carried out in 1951. The first of these finds is reported as located at Wallend, approximately 200m south of the Site, while the latter is reported at imprecise coordinates 1.3km south of the Site.

Early Medieval (410-1066)

- 4.50 The name Grain is believed to have originated from the Anglo-Saxon word *greon*, meaning gravel and interpreted as referred to a gravelly or sandy shore (MacDougall 1980, 20), long since eroded away (Evans 1954). This does not however necessarily imply the presence of an Anglo-Saxon settlement on the Isle of Grain. The Isle and its parish are not mentioned in the Domesday Book of 1086, suggesting that it was not a significant holding at the time of the Conquest.
- 4.51 Archaeological remains dating to the early medieval period identified within the study area are limited to four isolated findspots. These consist of two copper alloy fittings [A12 and A13] and two Anglo-Saxon silver pennies (sceats) [A14 and A15].

Medieval (AD 1066-1540)

- 4.52 Following its apparent abandonment in the early medieval period, the Isle of Grain was re-occupied sometime in the 12th century when the settlements of Wallend and St James Grain (now known simply as Grain) were founded (Smith 2014, 7). The parish belonged, at the time, to the Hundred of Gillingham, rather than the Hundred of Hoo to which it was later granted. The extant parish church of St. James [BH2] retains some features dating to its 12th century founding, when it is said to have been located in the centre of the medieval settlement. The manor of Grain was held by the Archbishop of Canterbury until it was conveyed to Henry VIII in the early 16th century. A further manor, Rose Court Farm, was reportedly present on the Isle of Grain in the 14th century onwards (*ibid.*). The location of the medieval manors of Grain, Wallend, and Rose Court is not known, their later incarnations being post-medieval in date.

- 4.53 The Isle of Grain is known to have been subjected to devastating and periodic inundations throughout the medieval period. Historical records from the 15th and 16th centuries in particular point to the loss of reclaimed land to extended periods of salt water inundation (Carpenter *et al.* 2013, 15). It is highly probable that the gravel terrace on which the village of Grain is situated today was, at several points during the medieval period, the only part of the Isle of Grain above sea level. This would in effect have confined and concentrated medieval activities to the higher ground on which the proposed development is located.
- 4.54 Archaeologically, the period is evidenced within the study area by remains at just three locations. The first consists of a 13th century midden [A16] found near Wallend in 1950 approximately 750m south-east of the Site. This midden measured approximately 2m by 2m, contained hundreds of shells of oysters, whelk and cockle, together with bones of ox and sheep and sherds of pottery dated to the 13th century. It may relate to the medieval manor of Wallend. The second medieval archaeological asset consists of medieval pottery uncovered in the vicinity of the Roman kiln [A10] 1.2km south of the Site. The third asset is a large area of ridge and furrow [A70] identified in aerial photographs by the National Mapping Project. This area of ridge and furrow lies entirely within the footprint of the planned electrical converter station.

Post-Medieval (1540-1901)

- 4.55 The earliest map to show the Isle of Grain in any detail is Saxton's of 1575 which shows the Yantlet Creek cutting the island off from the rest of the Hoo peninsula. In common with the rest of the Hoo peninsula, the Isle of Grain was predominantly used for marshland grazing and arable farming with some salt panning by the Yantlet Creek and the River Medway on the south-west of the island until the late 18th century.
- 4.56 Reclamation of the salt marshes on the Isle of Grain was an ongoing process, possibly dating back to Roman times. From 1530 responsibility for the sea walls rested with the North and East Kent Sewer Commissions. Flooding and loss of land were a regular occurrence from the 16th to 18th centuries but protection was improved in the 17th to 19th centuries forming an island of approximately 3100 acres by the end of the post-medieval period.
- 4.57 In the late medieval period the manor of Grain was owned by the Brooke family but was forfeit in 1603 when George Brooke, 11th Baron Cobham was executed after being implicated in a plot against King James I. The location of Grain manor house is not known and it was later absorbed into the manor of Gillingham. The other manors on the island, Rose Court and Wallend, are thought to have continued to be in use throughout the post-medieval era, although they are known to have been moved or rebuilt given that they have been recorded as 19th century structures discussed below.
- 4.58 The island was taken by the Dutch in 1667 during the Anglo-Dutch wars, the Dutch fleet proceeding up the Medway to fire several vessels of the English fleet.
- 4.59 In addition to Grain, an untitled chart dating to 1688 shows a place called 'Blackstakes' [A62] on the southern coast of the Isle of Grain approximately 2.3km south of the Site. This name appears again on the southern coastline near Horseshoe Point on the First Edition Ordnance Survey map of 1870 and subsequent maps. It is likely to refer to a feature on the foreshore which has long since been submerged.
- 4.60 Parker's map of 1719 shows the Church of St James [BH2] and a windmill to the south-east of it. On the south coast of the island a building is labelled Red House, although this has now been entirely submerged by erosional forces and will therefore not be further discussed. This farmstead should not be confused with the Red House Farm [A36] shown on later maps. The map also shows a bridge crossing Yantlet Creek, which is probably an earlier form of Grain Bridge [A67] carrying Grain Road shown on later Ordnance Survey maps.
- 4.61 Andrews and Dury's map of 1769 and Hasted's of 1778 have more detail showing two sets of salt pans with their windmills and shallow ponds to the west [A17] and south [A18] of Grain; the parish Church of St James [BH2] and its parsonage; the Cock Inn (later Hogarth Inn) [BH3]; and farms and cottages in and around the village including Wallend [A40 to A43], Perry's and Wilford's farms [A48 and BH11], West Bear [A49], White House Farm [A51 and BH4], St James'

Farm [A52], a farm located on the later Lee's Cottages [A56]; and Red House. A farm labelled Brick House could be White Hall Farm [A47] shown on later maps in an area to be later used for extraction. The 1801 map produced by Mudge and the 1816-19 Ordnance Survey Old Series map of Essex and Suffolk have slightly less detail but both show the village, the surrounding farmsteads, and the salt pans to the south along with the addition of Baytree Farm [A58] and Bethel Chapel [A61] to the south-east of Grain.

- 4.62 In addition to the two large areas of salt extraction marked on Andrew and Dury's map, cartographic and aerial photographs suggest there may be further remains of post-medieval salt production in the marshes on the western periphery of the Isle of Grain [A19, A20] and within the Allhallows marshes west of the Yantlet and beyond the study area.
- 4.63 In 1841 the population of the Isle of Grain was approximately 250. Grain village consisted of a number of farms and farm workers cottages, the church, Bethel Chapel (built c. 1826), the poorhouse, and the Cock Inn. The National School was built in the 1860s. The First Edition Ordnance Survey 25in map of 1870 shows that by that point the town of Grain had grown to include a number of features shown for the first time. A Royal Engineer Office can be seen on this map adjacent to St James' Farm, a detached house is shown to the north of St James's Farm. This is possibly the current house on the site, Rissington which appears to have been much amended and is not treated as a built heritage asset in this assessment due to its lack of architectural or historic value. On the same map Redhouse Farm [A36] is shown in the marshes west of Wallend. Although by this point the town of Grain had begun clustering closer to the Church of St James, it remained largely defined by its dispersed character throughout the 19th century. West Bear is shown and labelled on the 1870 map but all that remains from that time is a dilapidated outhouse which is not recognised as a built heritage asset in this assessment. The map also provides the first detailed layout of White Hall Farm within the proposed development's cable route, including a large enclosure to the north that has since been eroded away and would now lie beyond MHWS.
- 4.64 The second edition of the Ordnance Survey 25in map of 1898 also marks several additions to the Isle of Grain landscape. Rosecourt Farm [A44, A45, and BH10] is shown for the first time with two cottages facing south-west and two farm buildings behind. The new Bethel Chapel of 1895, later Grain United Reformed Church [BH7] is shown on the opposite side of Chapel Road from its predecessor. The National School [A59] and Rectory [A60 and BH6] are labelled to the south and south-west of the parish church respectively, and Parsonage Barn [A53] and a large row plan farm [A54] are also shown to the south-east of the church. A large outfall sewer [A68] is also shown for the first time east of Grain. While Lees Cottages are shown on the 1870 map they are in a different configuration than the building standing today, 1, 3 and 5. West Lane. This row first appears on the 1898 map but the cottages have undergone so much change that they are not treated here as a heritage asset.
- 4.65 In addition to the farmsteads and buildings discussed in and around Grain, the KHER lists a further 8 farmsteads or related buildings in the study area [A35, A37, A38, A39, A46, A50, A55, and 57]. These are all located at least 1km from the Site and will therefore not be discussed in relation to the Site.
- 4.66 From the mid-19th century military fortifications were built on the Hoo peninsula. The first was Grain Tower (1855), one of the last examples of a British Gun Tower. This was followed by fortifications to the south and east of Grain village including Dummy Battery (1867-69); Wing Battery (1895) and Grain Battery (1900-1), all of which form part of the scheduled Coastal Artillery Defences on the Isle of Grain, Immediately East and South East of Grain Village [BH5]. In 1882 the Hundred of Hoo railway [A63] was extended to the ferry port of Port Victoria [A64] on the island's southern marshes with a halt [A65] at Grain Crossing [A66]. Grain Crossing signal box (outside the study area) is a grade II listed building. It was planned to develop Port Victoria as a rail and ferry port for continental and trans-Atlantic travel but despite the Queen using the pier for the Royal yacht the site was never fully developed.
- 4.67 The post-medieval maritime heritage of the Isle of Grain is well attested archaeologically both onshore and offshore. While offshore remains are discussed in a separate desk-based assessment, the onshore remains located on the Isle of Grain are discussed here. They comprise

a wide range of features, including buried features such as jetties and sea wall defences along former channels in the marshes [A23 to A27], former wharves [A28 and A29], a coastguard station [A30], and the sites of former signal beacons [A31 to A34]. Given the Site's location, these maritime remains have little bearing on the potential for archaeological remains within the Site other than the short stretch of shoreline above MHW.

- 4.68 Features of lesser importance are also recorded in the KHER throughout the study area. These include two post-medieval enclosures of unknown purpose [A69 and A70] near the Yantlet Creek, a burial mound or ground [A71] marked on 19th century Ordnance Survey maps 2km south-east of the Site, a circular embanked feature [A72] 2.3km south of the Site, flint foundations and scatters of red brick 1km north-west of the Site [A73], and water management features or pounds [A74] 1.4km south of the Site. Isolated finds dating to the post-medieval period include a rudder [A75] likely forming part of a wrecked vessel in the Yantlet and a post-medieval silver coin [A76] registered by the portable antiquities scheme.

Modern (1901 to present)

- 4.69 The Isle of Grain underwent drastic changes in the 20th century, in part due to the strategic importance of the area to the defence of the Thames and Medway estuaries during the First and Second World Wars, and in part due to the shift from a coal powered to an oil powered navy. These government-led military and industrial developments largely dictated the evolution of the Isle of Grain until the end of the Second World War, after which the military complex quickly declined while the petroleum industry and port facilities established on the southern half of the peninsula during the Second World War continued to thrive, developing into a power station complex and culminating in the landscape present there today.
- 4.70 The military areas are not shown in detail on early Ordnance Survey maps, but a long narrow building to the north-east of St James's Farm first shown on the Second Edition Ordnance Survey map of 1898 may have served a military purpose. The 1908 map is the first to show the Coastguard Station [BH9] which was built in 1900 for the Admiralty and comprises a row of terraced cottages and watch room to the north-east of Whitehouse Farm. A chart from 1910 shows several oil tanks near Hooks Fleet [A94], marking the beginnings of the use of the Isle as an oil depot.
- 4.71 An area of marsh to the south of Grain village was commissioned as a naval seaplane base in 1912 and a Marine Experimental Aircraft Depot at Port Victoria in 1918, the two being known collectively as RNAS Grain [A96]. The 800 personnel were housed in a temporary settlement to the south of Grain village known as Bungalow Town. During the First World War the batteries at Grain were re-used to mount guns. Two searchlight batteries were added to the Grain batteries.
- 4.72 In 1920 plans were drawn by the Admiralty for firing point buildings and structures on the Grain Range Line (also known as Yantlet Battery) on Yantlet Creek [A86 and BH12]. The site was used as a firing point for the velocity testing of artillery from the 1920s to the 1950s. The remains consist of a number of structures [A87] including concrete bases and platforms; a Workshop complex; Powerhouse; Mess building; Guardhouse and Cottages. Artillery was brought on and off-site through via a wharf [A88] and slipway [A89] from Yantlet Creek and a purpose built railway [A90]. In 1928 an oil depot was developed at Port Victoria, although neither the depot nor the port facilities are shown on Ordnance Survey maps, presumably due to the military nature of the assets.
- 4.73 The revised Ordnance Survey map of 1933 shows the expansion of Grain village with the semi-detached Trenchard Cottages on Chapel Road built in the 1920s by Hoo Rural District Council. A new outfarm [A131], south of White Hall Farm and within the footprint of the proposed cable route, is shown on this map for the first time. The map also shows the coastal defences in some detail and Bungalow Town south of Chapel Road on Baytree Farm land. Yantlet Battery is also shown on the former salt pans.
- 4.74 From May 1940 the vulnerable beaches at Grain were protected by obstructions and defences including barbed wire, minefields, anti-tank blocks, dragon's teeth [BH1] and road blocks. Inland, pillboxes and gun emplacements were used. A camp to house the army personnel [A91] needed to man the gun emplacements was built around Whitehouse Farm. These facilities were

defended by batteries themselves [A97]. In 1941 oil bombing decoys [BH13] were built east of Yantlet Creek by the Petroleum Board to deflect the enemy from bombing the oil depot at Port Victoria. The oil depot was an important asset during the Second World War and by 1942 22 oil storage tanks buried under soil [A92 and A93] had been built on the southern coast of the Isle. Pillboxes [A95] were placed near these to defend it. The tanks were connected to a pipeline known as PLUTO which connected the facility with the continent and supplied the Allies after D-Day.

- 4.75 Further Second World War military remains within the study area include two clusters of radio masts [A98 and A99] and a military installation of unknown purpose 700m south of the Site. All of these have since been demolished. Three Second World War German airplane crash sites [A101, A102, and 103] are also recorded within the study area.
- 4.76 Following the end of hostilities, British Petroleum expanded the facilities by building the Kent Oil Refinery in 1950, which was built by 1,000 construction workers housed in a specially built camp on the island. In 1957 Segas set up a facility next to the oil refinery to produce gas from petroleum products and in 1960 a petrochemicals plant was built. British Gas plc's Grain Power Station (oil fired) was constructed between 1971 and 1982 and included a chimney 244m tall and 20m across. The first British North Sea Oil was piped to the Kent Oil Refinery in 1975 and the facility was closed in 1981 and its site demolished. In the late 1980s London Thamesport, a container terminal was built on part of the refinery site. The 1988 Ordnance Survey map shows the extent of the oil refinery which covered the entire south of the island.
- 4.77 In 1961 demolition began of the Grain Fort and Batteries which became a recreation area, St James Park. The 1961 Ordnance Survey map shows further expansion of the village to house workers in the petroleum industry with a number of new road and building plots having been laid out.
- 4.78 Although not shown on historical maps of that century, it is clear from the presence of Gravel Pit House on the 1851 census that gravel extraction was occurring in Grain in the 19th century. Mineral extraction activities increased in the early 20th century with extraction of the Grain Gravel terrace west of the village of Grain visible on the 1908 Ordnance Survey map. That map shows that a tramway [A104] was constructed from the centre of the pit to a jetty to the north, presumably to facilitate shipping. Mineral extraction continued throughout the 20th century. The tramway and jetty were removed by 1933, as inferred from the Ordnance Survey map of that year. White Hall Farm remained in operation as a farm until it was taken over by the gravel pit in the late 20th century, at which point several buildings were demolished. By the 1990s roughly 46 hectares had been removed around White Hall Farm and Rose Court Farm and a small complex of farm buildings south of White Hall Farm had been demolished. While Rose Court Farm was left intact following the land reinstatement, the remaining buildings of White Hall Farm were ultimately demolished between 2007 and 2010. A mound [A105] to the east of the village of grain may relate to small-scale extraction activities.
- 4.79 The extent of 20th century development on the Isle of Grain is reflected in the large number of modern assets reported in the KHER. Although maritime remains were not included in the study area, 11 archaeological assets have been recorded along the shore above the MHW, consisting of wharves, beacons, groynes, and hards [A77 to A87].
- 4.80 The remaining KHER archaeological asset within the study dating to the modern period consists of a former sewage outfall [A106] south-east of Grain marked on 20th century OS maps.

Unknown

- 4.81 Assets of unknown date include former flood defences [A107], borrow pits [A108], possible salt works [A109], buildings of unknown purpose identified in aerial photographs [A110], alignments of stakes on the foreshore near Yantlet Creek [A111 and A112], and an unknown feature identified in aerial photographs [A113]. Given their nature and the evidence that led to their identification, these features are unlikely to pre-date the post-medieval period.

- 4.82 Archaeological assets that may be of older origins include enclosures [A114, A115, and A116], mounds [A117 and A118], a pond cut in the saltmarshes [A119], various ring ditches and field systems visible as cropmarks [A120 to A131].

Historic Landscape

- 4.83 Several documents have been produced which describe the historic landscape character of Kent. These are broad brush in their approach but provide a context from which to assess the historic landscape character of the Site.

Natural England National Character Area 81 Greater Thames Estuary

- 4.84 The Site lies within National Character Area 81 covering the Greater Thames Estuary, described as:

4.85 *'predominantly a remote and tranquil landscape of shallow creeks, drowned estuaries, lowlying islands, mudflats and broad tracts of tidal salt marsh and reclaimed grazing marsh that lies between the North Sea and the rising ground inland. It forms the eastern edge of the London Basin and encompasses the coastlines of South Essex and North Kent, along with a narrow strip of land following the path of the Thames into East London.'*

4.86 *'Despite its close proximity to London, the NCA contains some of the least settled areas of the English coast, with few major settlements and medieval patterns of small villages and hamlets on higher ground and the marsh edges. This provides a stark contrast to the busy urban and industrial areas towards London where population density is high and development pressures are increasing. Sea defences protect large areas of reclaimed grazing marsh and its associated ancient fleet and ditch systems, and productive arable farmland. Historic military landmarks are characteristic features of the coastal landscape.'*

Kent Historic Landscape Character

4.87 The Kent Historic Landscape Characterisation (HLC) forms part of the regional project covering all of Kent County. The Kent HCL is formed of an assessment of historic and current mapping that separated blocks of landscape into Types based on either morphology or land use. A total of seven HLC broad types and fifteen subtypes are present within the study area and listed in Table 1.

4.88 The GIS data for the HCL date within the Site was obtained from the Kent County Council and is presented in Figure 4. HLC types presented in Figure 4 have been used in this study to establish the existing time depth of the historic landscape of the Site and to examine how the surviving historic landscape of the Site relates to that of the surrounding areas, and to the rest of Kent; this enables an assessment of the sensitivity of the historic landscape to change. The HLC types can also be used to examine the evolution of the Site in the post-medieval and modern periods.

Table 1 Kent Historic Landscape Character

Broad Type	Subtype
KHLC 1 - Field Patterns	<ul style="list-style-type: none"> KHLC 1.10 - Medium regular fields with straight boundaries KHLC 1.13 - Prairie Fields
KHLC 5 - Reclaimed Marsh	<ul style="list-style-type: none"> KHLC 5.1 - Small irregular enclosures KHLC 5.2 - Irregular enclosures KHLC 5.2 - Small rectilinear enclosures
KHLC 8 - Coastal	<ul style="list-style-type: none"> KHLC 8.2 - Salt marsh and estuarine resources KHLC 8.7 - Mud Flats KHLC 8.9 - Dunes KHLC 8.10 - Creeks and Fleets
KHLC 9 - Settlements	KHLC 9.6 - Post 1801 settlement (general)

Broad Type	Subtype
KHLC 10 - Parkland and designed Landscape	KHLC 10.2 - 19 th century and later parkland
KHLC 12 - Extractive and other industry	<ul style="list-style-type: none"> • KHLC 12.2 - Active and disused Gravel & Clay • KHLC 12.4 - Modern large scale industry KHLC 12.6 - Dockyards
KHLC 14 - Military and Defence	KHLC 14.4 - 19 th century (1830-1914)

4.89 Within the Site itself, there are only two broad HLC types, each containing a single subtype.

4.90 North of West Lane, the proposed cable route lies entirely within the HLC subtype ‘active and disused gravel and clay workings’ (KHLC 122). These are described by the KHLC as often regular in shape, but with wavy edges landscapes, which, when disused, are often used as refuse tips or form artificial lakes. The combination of reclaimed filled sites, waste disposal, active workings and lakes often combine to form a distinctive landscape character of gravel workings. In this instance, this landscape related to gravel extraction at Clubb pit which was carried out throughout the 20th century. It should be noted that despite the KHLC only placing this landscape north of West Lane, large sections of the fields east of Perry’s Farm have also been subjected to gravel extraction and only partial reinstatement. This landscape therefore extends further south than is shown on Figure 4 and covers much of the proposed DC cable route despite the preservation of the agricultural field boundaries.

4.91 South of West Lane, the proposed development lies within HLC subtype ‘medium regular fields with straight boundaries’, which is defined as field typically created by 19th and 20th century by the enclosure of low lying areas or as enclosures whose boundaries have been straightened. In this case, the fields likely belong to Wilford’s and/or Perry’s farm, which is known to have been in existence since at least the 18th century according to cartographic evidence. As such, it is likely that the enclosures predate the 19th century but were straightened by the mid-19th century as evidenced by the Grain Parish tithe map of 1841. These types of fields are common throughout the country and general form regular grid-like field patterns.

Hoo Peninsula Project

4.92 The historic landscape of the Hoo Peninsula has recently been the subject of a large research project led by Historic England. In addition to a comprehensive study of the landscape of the Hoo Peninsula as a whole (Carpenter *et al.* 2013), the project also produced a historic area assessment for the Isle of Grain (Smith 2014) and individual reports on the Second World War Grain Island Firing Point (Edgeworth 2013) and the scheduled remains of Second World War Bombing decoys (Small 2014).

4.93 Together, these documents define the historic landscape of the study area in depth. They highlight the conventional and historic view of the Isle of Grain’s remoteness, isolation, and bleakness. The post-medieval landscape of the Isle of Grain is described in these documents as composed of a scattered parish village with surrounded dispersed farmsteads supported by maritime activities and exploitation of the saltmarshes prior to late 19th century developments. In the second half of the 19th century, the strategic value of the Isle led to its militarisation and to dramatic changes in the late 19th and early 20th century. The publications of the Hoo Landscape project focus most of their attention on the effects of the First and Second World War and the subsequent industrialisation of the landscape due to the development of the petrochemical and power generation industries on the character of the Isle of Grain.

Historic Landscape Character Summary

4.94 An appraisal of the Kent HLC data, a review of the Hoo Historic Landscape project publications, and the results of the walkover survey show that the Site can be broadly categorised as formed of two landscape types within a patchwork of industrial, military, urban, and agricultural landscapes. The northern and eastern portions of the Site are largely composed of disused gravel workings and reinstated farmland in use by Rose Court Farm and Perry’s Farm. South of West

Lane, the landscape is defined as one dominated by fields created in the 19th century in addition to the disused gravel workings.

- 4.95 The surrounding landscape is dominated by large-scale 20th century industry to the south, urban and military landscapes dating to the 19th and 20th century to the east, and enclosures on reclaimed marshland dating to the medieval to modern periods to the west.

5. Assessment

- 5.1 This desk-based assessment has established the archaeological, built heritage, and historic landscape baseline conditions for the application Site and surrounding study areas. Of these, only a single designated asset **[BH1]** and four non-designated archaeological assets **[A47, A70, A91, and A132]** lie within the Site.

Designated Assets

Scheduled Monuments

Coastal artillery Defences on the Isle of Grain, Immediately East and South East of Grain Village – BH5 (Scheduled Monument, NHLE 1019955)

- 5.2 The scheduled coastal defences commence to the south-east of the Church of St James and continue south, with a break for the road to Grain Tower for approximately 1.25km in six separate areas of protection. The monument includes a gun tower (Grain Tower, outside the study area), a fort and three batteries together with later, 20th century additions including two searchlight emplacements. Grain Tower was built in response to the perceived threat from French invasion in the mid-19th century and was supported from the 1860s by Grain Fort which was built on the recommendation of the 1859 Royal Commission into the Defences of the United Kingdom Fortifications. The fort was formed of a semi-circular keep with a central parade and accommodation for 250 men, the whole being surrounded by inner and outer ditches and defended by bastions and caponiers. The fort's armaments were upgraded up until the Second World War and the fort was decommissioned in 1956 and the keep and caponiers were demolished and the ditch partially filled in in the 1960s. Visible remains today comprise earth banks and platforms but the subterranean passages that linked the keep, caponiers and magazines remain.
- 5.3 A series of open batteries were built to the south of the fort. The first, Grain Battery (renamed Dummy Battery in 1901) was built approximately 1km south of the fort in the 1860s and was linked to it by a communications road on an earthen bank. In 1895 Wing Battery was built immediately to the south of Grain Fort and in 1900 Grain Battery was built to the west of Wing Battery. The upstanding parts of these fortifications were similarly demolished in the 1960s. Finally, during World War II, two searchlight emplacements were built on the esplanade to the east of Grain Fort.
- 5.4 The asset has historic interest as part of Britain's coastal defences for almost 100 years after the middle of the 19th century and archaeological interest in its surface and subterranean features which have the ability to provide information on construction, use and adaptation of the defences. The asset's setting is the estuary of the River Thames and River Medway and the coastal strip behind. Anti-tank cubes to the north-west of asset also contribute to its setting as they form part of the chain of World War II defences along the coastline. Despite the development of the petrochemical plant to the east of the southern end of the asset the setting has not changed substantially and contributes to the asset's significance.

Second World War QF P-Series Oil Bombing Decoy – BH13 (Scheduled Monument, NHLE 1425319)

- 5.5 The asset is located in two areas of protection approximately 1.78km west, north-west of the Site boundary at its nearest point in a wide bend of Yantlet Creek. The asset is one of eleven QF (diversionary fire) P (petroleum division) oil bombing decoy sites developed in Britain in the early years of the Second World War. This example was designed to draw enemy bombing away from the oil storage depot to the south. Aerial photographs and archaeological surveys have found that the asset retains all its above and below ground features. The decoy was designed to burn fuel oil in brick or clay-lined pools to simulate burning oil storage tanks, ignition being controlled from a control building and associated generator building approximately 200m to the west of the pools.
- 5.6 The asset has considerable historic interest as one of only 11 such sites to be built and only two remaining. It has archaeological interest in the complete survival of its original above and below ground features.

- 5.7 The asset's setting is the flat floodplain of Yantlet Creek situated between the higher ground on which Allhallows is located to the west and Grain us located to the east. This extends to the site of the oil depots the asset was designed to protect on the south coast of the island. The post-war development of the petro-chemical site approximately 1km south-east of the asset is within the asset's setting and can be seen as an expansion of the earlier oil depot. The asset's setting therefore continues to contribute to its significance.

Listed Buildings

World War II Anti-Tank Obstacles on the Foreshore – BH1 (Grade II, NHLE 1393145)

- 5.8 The asset comprises a line of concrete anti-tank obstacles erected c. 1940 and running for approximately 570m from north-west to south-east along the north coast of the Isle of Grain. The main type of obstacle is formed by truncated square pyramids known as dragons teeth attached to a concrete grid. The teeth are arranged in rows four deep but every other row is offset so in effect the rows are eight deep. At the north-west end of the line is a double row of anti-tank concrete cubes while at the south-eastern end of the line is a pile of concrete caltrops, designed like medieval caltrops with four arms so that however they are placed one arm will always point upwards.
- 5.9 The asset has historic interest as part of Britain's coastal defences during the Second World War and archaeological interest for their strategic positioning.
- 5.10 Historic aerial photographs show that the obstacles were originally deployed inland some 50 metres from the beach but coastal erosion means that the dragon's teeth are now on the beach and are being undermined by the tides, uncovering the concrete grids below. The asset's setting is now the coastline rather than the coastal strip but the setting still contributes to the significance of the asset by demonstrating its purpose of defending the land from seaborne attack. The Coastal Artillery Defences on the Isle of Grain, Immediately East and South East of Grain Village [BH5] are of 19th century origin but were modified in the First and Second World Wars and contribute both to the asset's setting and its significance.

Church of St James – BH2 (Grade I, NHLE 1085755)

- 5.11 The church has its origins in the 12th century with additions in the 13th and 15th centuries and a south-west tower added in 1903-05. Construction is ragstone rubble and the plan is simple with a nave, chancel, south-west tower, north-east sacristy and south porch. The chancel retains 13th century windows in the Early English style. The aisles have been removed but the remains of the arcade can still be seen with the early 20th century replacement windows inside the blocked up spaces. Brick buttresses were added after the aisles were taken away.
- 5.12 The asset's setting is the village of Grain but is not extensive, being restricted to the less developed part of the village to the north that once formed the village's historic core. Due to the flatness of the topography and the asset's short, squat tower the asset cannot be seen from a wide area. The asset retains a relationship with the school to the south-west (although its 19th century buildings have been removed) and with the old rectory to the west of the school. The presence of the modern school buildings does nothing to enhance the church's setting and the chimney of the power station is a presence as it is in most parts of the village and the island. Apart from these incursions modernity has not encroached unduly and the open nature of the setting around the church contributes to its significance.

The Hogarth Inn – BH3 (Grade II, NHLE 1336496)

- 5.13 The Hogarth Inn is a rendered, timber-framed public house dating to the late 16th century. The asset was built as a house and was later the Cock Inn and then the Post Office and stores before being reinstated as a public house in 1975. The Hogarth name is a reference to William Hogarth who visited the Cock Inn in 1732 during a visit to the Hoo peninsula. The brick outbuilding to the north-west of the asset is shown on the First Edition Ordnance Survey map of 1870 while a further building between the two shown on subsequent Ordnance Survey maps and labelled PO is no longer in place.
- 5.14 The asset has historic interest as the oldest domestic building on the island and historical interest and community value as the village's pub, Post Office and store since at least the early 18th century. The asset's setting is the centre of the village of Grain but has changed considerably in

the last century. In the early 20th century the pub was the first building encountered on entering the village from the west. Over time the asset has become surrounded by modern development and now stands roughly in the centre of the developed part of High Street. The provision of a large area of hard standing immediately to the north-west of the asset has also been detrimental to the asset. This combination of changes to the asset's setting means that it no longer contributes to its significance.

White House Farmhouse – BH4 (Grade II, NHLE 1204482)

5.15 White House Farmhouse is a two-storey, three-bay 18th century weatherboarded farmhouse with timber sash windows with glazing bars and a panelled front door with a fanlight above. The hipped roof is tiled, with brick stacks to the rear elevation. There is a triple-pile back addition to the rear of the main range.

5.16 The asset has historic interest as the last remaining example of what was a number of farmhouses present on the Isle of Grain in the 18th century. Although a small outbuilding shown on the 1898 Ordnance Survey map is extant, all the farms other buildings have been removed and the surrounding land has been developed on all sides. Although much of the asset's former land remains in agricultural use to the south and west these considerable changes to the assets setting mean it contributes only slightly to significance.

Church of All Saints – BH14 (Grade I, NHLE 1085758)

5.17 The Church of All Saints is the parish church of Allhallows and dates from the 12th to 15th centuries with restoration in the late 19th century. Construction is of uncoursed rubble and stone roof. The plan is of aisled nave with cupola, chancel and south porch. The asset has historic and architectural interest as Allhallows' parish church. The asset is located in a raised churchyard surrounded by a brick wall. It retains a village setting but, with the exception of the former Rose & Crown public house to the west with which the asset forms a group the majority of the historic buildings that one stood around the church yard, including two farms, are no longer extant. The predominantly modern buildings within the setting have weakened the sense of place and the setting only contributes moderately to significance.

Rose and Crown Public House – BH15 (Grade II, NHLE 1086504)

5.18 The asset is an 18th century house, formerly the Rose and Crown public house and now a dwelling house again. The two storey building is in painted brick with a hipped, tiled roof with two dormers to the front elevation. Both the roof and timber framed windows are said (list description) to have been replaced in the 20th century. The asset retains a village setting but one that has been largely changed, with only the Church of All Saints remaining from the 19th century and earlier. While the asset retains its important relationship with the church the setting only contributes moderately to its significance.

Non-designated Assets

The Old Vicarage, High Street, Grain Village – BH6

5.19 The Old Vicarage is a 19th century detached house in yellow stock brick with red brick detailing and a concrete tiled roof. The main range faces the High Street with a double-pile addition to the rear. The asset has historic interest as the former parish rectory. While the asset has retained that part of its grounds to the rear of the house the grounds towards the High Street the grounds on the High Street side have been developed, severing the asset's relationship with the church. The wire fencing surrounding the school to the south has a negative influence on setting which does not contribute to the asset's significance.

Grain United Reformed Church – BH7

5.20 The asset is a single storey gable ended structure in yellow stock brick with red brick details and a slate roof. The gabled porch at the south-west end bear a date stone reading 1895 while the name of the chapel, BETHEL CONGREGATIONAL CHAPEL is inscribed above. The door and three windows in the south-west end have pointed arches and replacement fenestration. The asset was a replacement for an earlier chapel on the same street dating to 1827 so it has a considerable amount of historic interest. The asset also serves as Grain's library and has community value for its religious and secular roles. The asset's setting is the village of Grain and

although most of its contemporary buildings have been replaced by modern development the setting continues to contribute to the asset's significance.

Grain Village Hall – BH8

5.21 Grain village hall is a single storey structure constructed of pebble-dashed concrete panels, Crittal style metal windows and a curved roof. The structure dates to the 1950s and has served as the village's hall since. The asset has some architectural interest for its unusual design. The asset's village setting contributes to its significance.

Former Coastguard Station (Medtha House and Coastguard Cottages) – BH9

5.22 The former coastguard station was built by the Admiralty in 1900 facing the River Medway. The building comprised a row of 12 cottages for the coastguards and their families with a larger house at the eastern end for the Chief Officer. A single storey watch room was attached to the house. Construction is in buff brick with red brick detail to the ground floor. The first floor walls are divided into square panels with concrete detaining and the panels are pebble dashed. The roofs are slate with brick stacks to the front and rear and former windows to the front elevation.

5.23 The asset has historic interest as a former coastguard station, architectural interest for its design and potential archaeological interest in its orientation and internal plan form. Whereas once the asset had an open setting with views out to the River Medway it is now surrounded by later development on all sides including houses in the front gardens of the cottages themselves. The watch room is obscured from view eroding the ability to understand the asset's former role. The setting has therefore ceased to contribute to the significance of the asset.

Rosecourt Farm – BH10

5.24 Rosecourt Farm dates to the 1870s and is first shown on the 1898 Second Edition Ordnance Survey map. The map shows a pair of semi-detached cottages with two masonry outbuildings on either side of a courtyard to the north-east. The cottages are in buff brick with a concrete tiled roof while the more northerly of the two out buildings is in buff brick with a corrugated roof. The more southerly of the two outbuildings is not as tall and was obscured from view by modern buildings to the east but appears to be original to the development. The courtyard walls connecting the two outbuildings also appear to be in place. The asset has historic interest as a late 19th century farmstead with all of its original features intact. The asset's setting is the farmland and saltmarshes of the northern part of the Isle of Grain. Modern farm buildings have been added to the complex but do not prevent understanding of the asset. Although much of this landscape has been subject to gravel extraction most of the land has returned to grassland meaning the setting has not changed greatly and contributes to significance.

Perry's Farm and Wilford's Farm – BH11

5.25 The two farms are located within the Site. Both farms are shown on the 1870 Ordnance Survey map as comprising a number of buildings around courtyards. The 1898 Ordnance Survey map shows just two buildings at Perry's Farm with an additional pair of semi-detached cottages and three buildings at Wilford's. At the time of the Site walkover only the rendered brick cottages survive at Perry's and one of the outbuildings in buff brick at Wilford's. Although most of the buildings have gone the remains have some historic interest as the remains of two late 19th century farms. The asset's setting is the surrounding farmland and saltmarshes of the northern part of the Isle of Grain. This has been changed by the presence of the petro-chemical plant less than 1km to the south-west of the asset although the part of the plant closer to the asset to the south has been removed. The land surrounding the asset has been subject to gravel extraction but the majority of the land has returned to grassland and the setting continues to contribute to significance.

Grain Range Line on Yantlet Creek – BH12

5.26 In 1920 the War Office drew up plans for buildings and structures for a firing point on the Isle of Grain to the east of Yantlet Creek. The location was chosen for its remoteness coupled with the fact that it was accessible by rail or water. The firing point's main function was to measure the velocity of heavy artillery shells from the gun emplacement. This was achieved by firing the shell through two wire screens a fixed distance apart. From the 1950s the facility was increasingly used as a demolition range for controlled explosions and continues in that role today. While a number of the facilities original buildings and structures such as the wharf and dock, gantry path and velocity screen bases have been demolished other structures still stand including a workshop

complex, powerhouse, mess building, guardhouse and cottages. The site is not open to the public and was not covered in the Site walkover. The complex has historical significance as an example of a rare type of facility and archaeological interest for its potential to yield information about inter-war and Second World War firing points. The asset's setting is saltmarshes of the northern part of the Isle of Grain which, although the petro-chemical plant is less than 1km to the south, remain remote and inaccessible. The asset's firing zone to the north-east remains unchanged.

Area of Ridge and Furrow – A70

5.27 The significance of features of ridge and furrow is derived from their archaeological and historical interest, which has the ability to inform on, at most, local research aims relating to the rural and agricultural development of the Isle of Grain.

Site of White Hall Farm – A47

5.28 The remains of the post-medieval farmstead of White Hall Farm are of archaeological and historical significance due to the information they may hold on the post-medieval rural landscape and the dispersed farms and the evolution of agricultural practices, following the research aims of the South-East Research Framework (Barber 2013).

Site of 20th Century Outfarm South of White Hall Farm – A132

5.29 The remains of the 20th century outfarm south of White Hall are considered to be of no or, at most, local archaeological and historical interest, based on their ability to inform local research aims. These remains are likely to have been entirely removed by 20th century gravel extraction activities, although it is possible that some features have survived within the former gravel pit's access road.

Site of Second World War Camp west of White Hall Farm – A91

5.30 The significance of the Second World War military barracks is derived from its historical and archaeological interest in the potential for the remains to inform on the research aims of both the Greater Thames Estuary (Heppell 2010, 74-75) and the South-East (Smith 2013, 29) Research Frameworks. A small section of this site is likely to have survived within the former gravel pit's roads.

Potential Archaeological Remains and their Significance

Potential Ground Disturbance

5.31 The main converter station, substation, and access road, NGET tower, working compounds, and lay down areas are situated in a ploughed field on the south-west slope of the Grain Gravel deposit. This area does not appear to have been subjected to post-medieval or modern developments and ground disturbance is likely limited to ploughing and natural erosion of the gravel terrace by tidal action and flooding. It is likely that archaeological remains situated in these sections of the proposed development will have survived below the topsoil.

5.32 With the exception of a 60m stretch immediately east of the converter station, a 50m section north-west of West Bear, and the northernmost 30m which lies on the beach-head, the proposed route of the cable is entirely located within areas of extensive historical mineral extraction. The fields north of West Lane were extracted in the 1970s and 1980s, while those lying to the south and east of Perry's Farm were extracted in the 1990s and 2000s. Where the cable route turns towards the north, it would lie within the footprint of the gravel haulage road. After crossing West Lane, it continues north immediately east of the access road to the former White Hall Farm. It remains unclear whether the area beneath the access road itself was subject to quarrying since it remained in active use as an access road throughout the period of 20th century mineral extraction. The 30m easement to the west of the proposed cable route overlies this access road.

5.33 Where the cable route and easement are located in areas where no mineral extraction has occurred, there is potential for survival of archaeological remains. Where the route crosses areas of mineral extraction, it is unlikely that archaeological features will have survived. Any gravel that has not been extracted beneath the quarried zone retains the potential to contain Lower Palaeolithic remains. However, since the quarried land has been partially reinstated, the pipeline trench is unlikely to reach these deeply buried gravel deposits.

Archaeological Potential

- 5.34 This section assesses the potential for further unrecorded buried archaeological remains to be present within the Site. The assessment of archaeological potential is based on the data available at the time of writing and takes into consideration the known archaeological assets within the Site and study area, as well as historical and cartographic evidence presented in the baseline.
- 5.35 **Palaeoenvironmental:** Despite the presence of alluvium deposits, and in some locations peat deposits, across much of the Isle of Grain, these are confined to the low-lying areas and are not expected to extend to the gravel terrace on which the Site is located. The beach front at the northernmost point of the DC cable route is actively eroding away, exposing deposits which have not been actively formed since the Pleistocene and earlier, and which therefore is unlikely to overly environmental remains. The potential palaeoenvironmental remains to be encountered within the Site is therefore considered to be **low**.
- 5.36 The Grain Gravel deposits on which the proposed development is located are, however, of archaeological interest. They are expected to have survived well in areas outside of the quarrying zones.
- 5.37 **Palaeolithic:** Palaeolithic remains are rare nationally and often consist of residual finds recovered from alluvial deposits, terrace gravels and sediment sequences created by ancient rivers. The proposed development lies on the Grain Gravel deposits of the Thames River dating to the MIS 6 of the Pleistocene. The potential for these deposits to contain Lower Palaeolithic material has been confirmed by a recent targeted survey of disused former gravel extraction workings, which uncovered a single flint artefact. While gravel extraction activities are likely to have removed much of this deposit, the proposed development retains a **moderate** potential for Palaeolithic material where Grain Gravel deposits remain present. Any such material is likely to consist of isolated lithic artefacts in secondary deposition.
- 5.38 **Mesolithic:** The Mesolithic is poorly represented on the Hoo Peninsula and no remains dating to this period have been uncovered within the Isle of Grain or the wider study area. Despite the presence of alluvium and peat deposits that are known to date to the Holocene period, these are located in the low-lying areas and have not thus far revealed any archaeological material dating to the Mesolithic. The potential for Mesolithic remains within the proposed development Site is therefore considered **low**.
- 5.39 **Late Prehistoric:** While only a single Neolithic artefact of insecure provenance and no Bronze Age remains have been recorded within the study area, an extensive Iron Age settlement has been uncovered within the gravel extraction area north of West Lane. Although the exact location and extent of these features is not currently known, it is possible that these remains will have extended across the proposed cable route. The presence of a nearby settlement, however, does suggest that there is a potential for related remains in its vicinity. Furthermore, further evidence of Iron Age activities suggests the possible presence of a kiln in the marshes south of the Site. The potential for late prehistoric remains to be situated within areas where no gravel extraction has taken place within the Site is therefore considered to be **high**, particularly for settlement and agricultural remains dating to the Iron Age.
- 5.40 **Roman:** The Roman period is attested within the study area by the recovery of one or two isolated cordoned flasks and burnt material at Wallend Farm south of the Site, a possible Roman kiln south of Wallend Farm, and an extensive late Roman cemetery in the gravel quarry north of West Lane that may have extended across the proposed cable route. Together, these finds suggest a substantial Roman presence on the Isle of Grain. The potential for Roman period archaeological remains to be present within the proposed development Site is therefore considered to be **high** where no gravel extraction has taken place. Such remains may comprise further funerary remains, a settlement area near the cemetery, and remains of pottery and salt production within and on the boundary of the salt marshes.
- 5.41 **Early Medieval:** Despite the Isle of Grain's name being derived from Anglo Saxon origins, there is little evidence to suggest substantial early medieval occupation of the island. Only four isolated artefacts dating to this period have been identified within the study area. As such, the potential

for early medieval remains to be situated within the proposed development Site is considered **low**.

- 5.42 **Medieval:** The medieval period is poorly attested within the study area. The parish church the village of Grain is known to have been erected in the 12th century, suggesting that a settlement did exist during this time period. However, the only feature of medieval date recorded within the study area consists of 13th century midden and a scatter of medieval pottery uncovered near Wallend Farm south of the Site. Given that historical accounts recount continual flooding and salinization of the surrounding marshland, it is likely that the area was seen as unsuitable for long term occupation beyond the higher ground of the gravel terrace. Ridge and furrow agricultural features have been recorded in the south-west corner of the proposed development, suggesting that least some cultivation was taking place on the gravel landform during the medieval period. Given the presence of ridge and furrow features within the proposed development, but the distance of the Site from the parish church that likely formed the core of the medieval settlement of Grain, the potential for archaeological remains of the medieval period to be located within the proposed development Site is considered to be **moderate**. Any such remains are likely to be of an agricultural nature and consist of ridge and furrow features, field boundaries, or drainage ditches, present only in areas where no mineral extraction has taken place.
- 5.43 **Post-Medieval:** The post-medieval saw a number of significant developments across the Isle of Grain. Following centuries of flooding, efforts to construct and strengthen the flood defences resulted in the silting up of the Yantlet, connecting the Isle of Grain to the mainland of the Hoo Peninsula. Several new farms were erected across the landscape and the dispersed settlement of Grain began to agglomerate and grow during this period. In addition, the strategic position of the Isle of Grain, overlooking both the Thames and Medway estuaries led to the militarisation of the landscape starting in the 19th century. The proposed development is located within the fields of the post-medieval farmsteads of Perry's Farm, Wilford's Farm, and White Hall Farm. Given the agricultural, military, and industrial character of the Isle of Grain and the rapid pace of changes affecting this landscape in the late post-medieval period, there is a **high** potential for archaeological remains dating to this period to be located within the Site. Such remains are likely to be of an agricultural nature and consist of field systems and drainage ditches, but may also include previously unknown military or industrial remains associated with the Grain defences or industrial background.
- 5.44 **Modern:** The landscape of the Isle of Grain underwent extensive developments in the modern era, largely relating to military defences erected during the First and Second World War in the first half of the 20th century, followed by the development of the oil and gas and energy production industries in second half of the century. The Site itself was subject to large scale gravel extraction activities throughout the whole of the 20th century, beginning east of White Hall Farm in the 1900s, expanding to encompass most of the land around both White Hall and Rose Court farms by the 1980s, before reaching the area north-east and east of Perry's Farm in the 1990s and 2000s. The fields west, south, and north of Perry's farm continued to be under cultivation throughout the 20th century. The proposed cable route and easement north of West Lane is in close proximity to, and may overlie, the remains of White Hall Farm, an outfarm south of White Hall Farm, and the eastern edge of Second World War military barracks immediately west of White Hall Farm. In addition, the cable route traverses the listed dragon's teeth Second World War coastal defences, an area that may contain further such defensive works. Given the scale of mineral extraction within the Site and cartographic data showing several modern buildings and military structures within the proposed cable route easement, the potential for archaeological remains dating to the modern period within the Site is considered **high**. These remains are likely to consist of the remains agricultural features such as field boundaries and ditches, and military remains relating to the barracks west of White Hall Farm and coastal defences.
- 5.45 This desk-based assessment has identified the known archaeological resource within the study area and has predicted the archaeological potential of the Site. There is, however, still a risk that unexpected archaeological remains of all periods may be discovered within the Site.

Significance of Potential Archaeological Remains

- 5.46 The NPPF stresses the importance of identifying and assessing the significance of any heritage asset and its setting that may be affected by a proposed development. Once significance has been established, the impact of any proposal can be appropriately assessed.
- 5.47 The significance of potential heritage assets is based on regional research resource assessments and research frameworks, particular those for South East England (Barber 2013; Bates and Corcoran 2018; Smith 2013), the Greater Thames Estuary (Williams and Brown 1999; Heppell 2010), and Historic England guidelines (e.g. EH, 2011, 2012). In addition, reference is made to research aims of thematic and period-specific reviews such as for the prehistoric period (EH, 2010), the Palaeolithic and Mesolithic periods (Pettitt, Gamble & Last (eds), 2008; Prehistoric Society, 1999), the Iron Age (Haselgrove, *et al.*, 2001), the Roman period (James and Millett (eds), 2001; EH, 2012; Van der Veen, *et al.*, 2007), extractive heritage (NAMHO, 2016), and industrial environments (EH, 2010).
- 5.48 This desk-based assessment determined that the Site holds a low potential for palaeoenvironmental, Mesolithic, and early medieval remains, a moderate potential for Palaeolithic and medieval remains, and a high potential for late prehistoric, Roman, post-medieval and modern remains. The potential for Palaeolithic, Iron Age, and Roman period remains is highlighted by the presence of two AAPs, defined by KCC as overlying sections of the Site.
- 5.49 The Grain Gravel terrace deposits on which the Site is located are of archaeological interest in their ability to inform on the Pleistocene landscape and possibly inform on understanding of Palaeolithic activities. In particular, these deposits may inform the regional research aims of the South-East Research Framework (Bates and Corcoran 2018) and the Greater Thames Estuary Framework's objectives 1A and 1B (Heppell 2010, 18-19) aimed at understanding the physical evolution of the Thames estuary during the Pleistocene in order to assess the movement of peoples across the evolving landscape. Such remains would build on the results of a previous regional research project on the Palaeolithic of the Medway (Wenban-Smith *et al.* 2017). Particularly well preserved, well stratified, or abundant remains may be of national significance.
- 5.50 Medieval remains, for which there is a moderate potential within the Site, are likely to be related to rural and agricultural activities. Such remains are of archaeological and historical interest, but given that such remains are common and that they are well recorded through the appearance of cropmarks, they would be considered of local significance at most.
- 5.51 There is a high potential for Late prehistoric and Roman period remains within the Site, which would likely consist of features and artefacts relating to agricultural, settlement, and possibly industrial activities. Such remains would be of archaeological and possibly historical interest in their ability to inform on local and/or regional frameworks (Martyn *et al.* 2018; Champion 2019; Heppell 2010, 30-31 and 54-55). Isolated findspots or poorly preserved remains would be considered of local significance, while *in situ* or well preserved settlement remains would be considered of regional significance.
- 5.52 This report has also identified a high potential post-medieval and modern remains within the proposed development. These are likely to relate to agricultural activities of dispersed farmsteads, and later to gravel extraction activities. Any such remains would be of negligible significance given that they are already well understood and recorded in cartographic and historical archives. There is, however, also the potential for unknown military or sea wall defences dating to either period to be situated within the proposed development, which may be considered to be of local and possibly regional significance based on their historical and archaeological interest. Depending on their preservation, any such remains have the potential to inform on local or regional research frameworks (Smith 2013; Barber 2013; Heppell 2010, 74-75 and 84-85).

Historical Landscape

Historical Landscape Character

- 5.53 The Site is characterised by a combination of agricultural field systems as well as disused and reinstated gravel extraction quarries dating to the 19th and 20th centuries. To the west of the proposed development Site are the low-lying saltmarshes reclaimed and enclosed throughout the post-medieval period. To the east, the historic landscape is defined by the 18th and 19th century village of Grain, coastal defences and other military remains.
- 5.54 This patchwork landscape is the result of the recent history of the Isle of Grain, resulting in its transformation from a rural and sparsely populated dispersed village surrounded by saltmarshes to one dominated by military and industrial activities. These changes have mostly occurred in the last hundred years and have drastically altered the character of the Isle of Grain when compared to what it was pre-18th century.
- 5.55 Although medium regular field with straight boundaries are considered common across the country, the Isle of Grain has only a limited amount of such fields. This is largely due to the scarcity of suitable land on the Isle for such field systems to exist (Smith 2014). In practical terms, the higher and well-drained ground of the gravel terrace overlying the north-east quadrant of the Isle affords the only possible location for such fields.
- 5.56 The lack of farmable land may have played a significant role in keeping population densities on the Isle of Grain relatively low throughout the prehistoric and historic periods. The pre-18th century rural landscape of the Isle of Grain, defined by a number of dispersed farmsteads on the gravel terrace and salt production in the low-lying marshes supporting a small parish village, was therefore likely, at least in part, a consequence of the restricted amount of suitable farmland on the Isle.
- 5.57 The 19th century agricultural landscape is still somewhat legible within the areas of disused gravel quarries, but is at risk of disappearing entirely by urban encroachment from the village of Grain and industrial encroachment from the industrial area to the south.

HLC Sensitivity to Change

- 5.58 The importance and significance of historic landscape character is assessed in terms of sensitivity to change. Those with a high sensitivity to change should be accommodated and preserved where possible within new developments, or should be subject to well managed changes. Historic landscapes with a lower sensitivity to change can be potentially enhanced by new developments and can absorb most types and scales of essential, well-managed change.
- 5.59 There are no historic landscapes within the Site with a very high or high sensitivity to change. Historic landscapes fall within the moderate or negligible categories, as described below.
- 5.60 The disused gravel extraction workings are common throughout the country and considered of no historical or aesthetic interest. This type of landscape, located north of West Lane and in sections south-east and east of Perry's Farm, is considered to be of **negligible** sensitivity to change.
- 5.61 Despite the abundance of 19th century field systems in England as a whole, the fieldscape surrounding the village of Grain is currently at risk of disappearing entirely. This landscape has lost much of its 19th century and earlier relationship to the rural village of Grain and the saltmarshes to the south due to 20th century urban and industrial developments. Nevertheless, this landscape is rapidly disappearing and as such our ability to understand the historical landscape of the Isle of Grain is at risk. The common occurrence of this type of landscape nationally has been weighed against its local significance, and on measure it has been assessed as being of **low** sensitivity to change.

6. Conclusions

- 6.1 AECOM was commissioned by NeuConnect Great Britain Ltd. to prepare a heritage desk-based assessment in support of an Environmental Statement with the aim of obtaining planning permission to construct a new international electrical transmission line and associated electrical converter and substation. This DBA first set out the heritage baseline for the Site in order to identify all known designated and non-designated archaeological assets within the Site, to determine the potential for as yet unknown buried archaeological remains to be present within the Site, and to identify heritage assets within the study area that may have their settings impacted by the proposed scheme. This report includes an assessment of the significance, using NPPF terminology, of the known and potential heritage resources that may be impacted by scheme. Finally, this assessment has assessed the historic landscape within the Site and surrounding study area and determined its sensitivity to change.
- 6.2 There is a single designated asset within the Site boundary and five such assets within the 1km built heritage study area. The asset within the Site is a grade II listed building, while those in the study area comprise two scheduled monuments, one grade I listed and two grade II listed buildings. A further two listed buildings; one grade I and one grade II are located within the village of Allhallows approximately 4km to the west of the Site. Finally, there are eleven non-designated built heritage assets located within the 1km built heritage study area.
- 6.3 This report has identified four non-designated archaeological assets within the proposed development Site boundary and a further 132 such assets within the archaeological study area. It has also determined that there is a low potential for palaeoenvironmental, Mesolithic, and early medieval remains, a moderate potential for Palaeolithic and medieval remains, and a high potential for late prehistoric, Roman, post-medieval and modern remains to be present within the Site. The potential for Palaeolithic, Iron Age, and Roman remains is captured by KCC in two Areas of Archaeological Potential that overly sections of the Site.
- 6.4 Two historic landscapes have been identified within the Site comprising disused 20th century gravel extraction, considered of negligible sensitivity to change, and 19th century medium regular field systems with straight boundaries considered of low sensitivity to change.

The impact of the proposed development on these heritage assets will be discussed within the Cultural Heritage Chapter of the Environmental Statement (Chapter 08), for which this desk-based assessment has been completed.

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Appendix A Archaeological Gazetteer

Table 2 Archaeological Gazetteer Assets

Asset ID	Reference	NGR	Name	Description	Period
A1	MWX20881	TQ 88030 76160	Palaeolithic flint artefact, Clubb's Pit, Isle of Grain	One Palaeolithic flint artefact was found during fieldwork associated with the Medway Valley Palaeolithic Project in 2005.	Palaeolithic
A2	MWX20766	TQ 8548 7745	Pleistocene palaeo-environmental remains from Allhallows	Pleistocene palaeoenvironmental remains from deposits below Allhallows Marsh, especially ostracods, molluscs, and foraminifera.	Lower Palaeolithic
A3	MKE3651	TQ 90 75	Neolithic axe find	Neolithic axe find.	Neolithic
A4	MKE71909	TQ 87000 75000	Iron Age gold coin	Portable Antiquities Scheme find - Iron Age gold coin.	Iron Age
A5	MKE71910	TQ 87000 75000	Iron Age gold coin	Portable Antiquities Scheme find - Iron Age gold coin.	Iron Age
A6	MKE3185	TQ 884 772	Iron Age settlement, Gravel pit near Rose Court Farm, Isle of Grain	An Iron Age settlement with enclosure, discovered during rescue excavations at the Isle of Grain Gravel pit near Rose Court Farm. The excavations revealed circular ditched enclosures containing possible hut structures. The ditches contained pottery dating from the first centuries BC and AD. A Romano-British Inhumation cemetery was found overlying the southern part of this complex.	Iron Age
A7	MWX17261	TQ 878 755	Burnt Roman and iron age material, Wallend Petroleum Tank Farm, Isle of Grain	Burnt Iron Age to Roman material was previously found at Wallend Petroleum Tank Farm.	Iron Age to Roman
A8	MKE3173	TQ 8748 7602	1 st /2 nd century Upchurch flask, near Wallend Farm, Isle of Grain	A 1 st or early 2 nd century cordoned flask vessel of Upchurch ware.	Roman
A9	MWX17253	TQ 87 75	Roman Flask, Found on the Isle of Grain	A 1 st to 2 nd century Cordoned Flask was unearthed by workmen during construction works on the Isle of Grain in 1951.	Roman
A10	MKE3216	TQ 8745 7495	Kiln bricks, Medieval and Roman pottery, Isle of Grain	The remains of a suspected pottery kiln were discovered during excavations by workmen in 1939. The finds included thin kiln bricks and a mixture of Roman and medieval sherds, as well as the handle of a large jug.	Roman

Asset ID	Reference	NGR	Name	Description	Period
A11	MWX19315	TQ 883 772	Late Roman cemetery, Gravel Pit near Rose Court Farm, Isle of Grain	Superimposed across an area of Iron Age occupation examined in advance of gravel working (see TQ 87 NE 14) lay part of a late Roman cemetery with at least forty seven inhumations. Grave goods suggest a tentative date-range of 250-300.	Roman
A12	MKE71351	TQ 87954 76408	Early Medieval copper alloy strap fitting	Portable Antiquities Scheme find - Early Medieval copper alloy strap fitting.	Early medieval
A13	MKE71855	TQ 86800 76100	Early Medieval copper alloy buckle	Portable Antiquities Scheme find - Early Medieval copper alloy buckle.	Early medieval
A14	MKE76591	TQ 8700 7600	Anglo-Saxon silver early penny ('sceat'), Isle of Grain	Anglo-Saxon silver early penny ('sceat'), Isle of Grain.	Early medieval
A15	MKE76592	TQ 8700 7600	Anglo-Saxon silver early penny ('sceat'), Isle of Grain	Anglo-Saxon silver early penny ('sceat'), Isle of Grain.	Early medieval
A16	MKE3175	TQ 8790 7548	Site of a 13th cent midden, near Wallend, Isle of Grain	A 13th century midden found near Wallend in 1950, measuring c.2m by 2m, contained hundreds of shells of oysters, whelk and cockle, together with bones of ox and sheep and sherds of pottery dated to the 13 th century.	Medieval
A17	MKE3172	TQ 8673 7650	Site of salt-pans, windpump and buildings, near Newlands, Isle of Grain	A group of about 10 salt-pans, with a wind-pump and three buildings is shown on Hasted's map of 1782.	Post-medieval
A18	MKE3217	TQ 877 742	Site of salt pans, Isle of Grain	Site of salt pans, marked as 'Old Salt Works' on the Ordnance Survey historic maps (c.1858-1940).	Post-medieval
A19	MWX17942	TQ 86439 78191	Possible salt works, North Levels, Isle of Grain	The remains of a possible salt making site may be suggested by grid pattern in cropmarks and drainage on North Levels.	Post-medieval
A20	MWX19124	TQ 87793 73960	Site of Saltpan House, Saltpan Reach, Isle of Grain	Saltpan House is marked on the 1 st edition Ordnance Survey map (c.1858-1873). On the later edition maps this building appears to have become the Port Victoria Hotel.	Post-medieval
A21	MKE78421	TQ 8745 7698	Old Sea Wall, Isle of Grain	Old Sea Wall, Isle of Grain (Old Counter Wall?).	Post-medieval to modern
A22	MWX0005	TQ 87608 73979	Squared timber feature, Saltpan Reach, Isle of Grain	Four squared timber piles forming a regularly shaped feature. Unknown function.	Post-medieval

Asset ID	Reference	NGR	Name	Description	Period
A23	MWX0376	TQ 85755 77727	Wooden stakes on foreshore by Yantlet Creek, Allhallows	Wooden stakes on foreshore by Yantlet Creek, probably all modern.	Post-medieval
A24	MWX0377	TQ 85815 77665	Landing stage on foreshore by Yantlet Creek, Allhallows	Three eroded wooden piles visible on the foreshore with stones between the piles by Yantlet Creek. Possible remains of a landing stage.	Post-medieval
A25	MWX0378	TQ 86045 77562	Seawall reinforcement on foreshore by Yantlet Creek, Allhallows	Seawall reinforcement comprising a triple row of wooden stakes on foreshore at the base of the sea wall by Yantlet Creek.	Post-medieval
A26	MWX0386	TQ 85573 75214	Wooden stakes on foreshore north of Colemouth Creek, Stoke	Row of eight wooden stakes crossing a branch of Colemouth Creek.	Post-medieval
A27	MWX0387	TQ 85520 75147	Wooden stakes on foreshore north of Colemouth Creek, Stoke	A row of four small wooden squared stakes on the foreshore north of Colemouth Creek.	Post-medieval
A28	MWX18897	TQ 89146 76216	Independent Wharf, Isle of Grain	Independent Wharf marked on the 1 st edition Ordnance survey map (c.1858-1873). No further information.	Post-medieval
A29	MWX0006	TQ 87849 73942	Remains of wharf, Saltpan Reach, Isle of Grain	Substantial remains of former wharf, Saltpan Reach.	Post-medieval
A30	MWX18898	TQ 88749 74330	Site of Cockleshell Hard Coastguard Station, Isle of Grain	Cockleshell Hard Coastguard Station is marked on the 1 st edition Ordnance Survey map (1858-1873) but is not visible on any of the later editions. No further information.	Post-medieval
A31	MWX18597	TQ 8903 7539	Site of White Beacon, Smithfield Marshes, Isle of Grain	White Beacon, marked on a chart of 1836 and also on the 1 st , 2 nd and 3 rd edition Ordnance Survey maps (c.1858-1922). No longer visible above ground at the site.	Post-medieval to modern
A32	MWX18650	TQ 8669 7407	Site of a Beacon, Isle of Grain	Beacon marked on a map of the River Medway from 1910. Also marked on the 2 nd and 3 rd edition Ordnance Survey maps (c.1891-1922). The site has now been developed.	Post-medieval to modern
A33	MWX18660	TQ 8877 7433	Pilot Beacon near Cockleshell Hard, Isle of Grain	Beacon, marking the eastern edge of merchant vessel anchorage shown on a chart from 1910. Also marked on the 1 st , 2 nd and 3 rd edition Ordnance Survey maps (1858-1922).	Post-medieval to modern

Asset ID	Reference	NGR	Name	Description	Period
A34	MKE3177	TQ 87 75	Site of 16th cent Beacon, Isle of Grain	William Lambarde's 'Carde' of c.1570 shows a beacon at 'Grene'. This 'carde' indicates there was a total of 52 beacons in Kent. The Beacon System dropped out of use after 1640 and no further record of this monument is known.	Post-medieval
A35	MKE83387	TQ 8548 7555	Farmstead east south east of Gold Nugget Wharf	A dispersed plan farmstead, demolished.	Post-medieval
A36	MKE83388	TQ 8643 7542	Redhouse Farm, Isle of Grain	A loose courtyard plan farmstead with buildings to two sides of the yard, demolished.	Post-medieval
A37	MKE83389	TQ 8652 7427	Wick	Outfarm with a loose courtyard plan with a building to one side of the yard, demolished.	Post-medieval
A38	MWX18298	TQ 88217 74450	Site of a Wick (pen)/Sheepwash, near Horseshoe Point, Isle Grain	Wick marked on the Ordnance Survey mapping (1858-1940) firstly as 'Wick' and subsequently as a Sheepwash. Also identified from aerial photographs.	Post-medieval to modern
A39	MKE83390	TQ 8711 7412	Red Wick	A regular L-plan farmstead, demolished.	Post-medieval
A40	MKE83391	TQ 8751 7569	Farmstead in Wallend	A regular U-plan courtyard farmstead, demolished.	Post-medieval
A41	MKE83392	TQ 8740 7557	Farmstead in Wallend	A regular multiyard farmstead, demolished.	Post-medieval
A42	MKE83393	TQ 8751 7576	Outfarm in Wallend	A field barn with no associated yard, demolished.	Post-medieval
A43	MKE83394	TQ 8761 7578	Home Farm, Wallend, Isle of Grain	A loose courtyard plan farmstead with buildings to two sides of the yard, demolished.	Post-medieval
A44	MKE83395	TQ 8694 7792	Rosecourt Barn	An outfarm with a regular U-plan, demolished.	Post-medieval
A45	MKE83397	TQ 8805 7696	Rose Court Farm (Rosecourt Farm), Isle of Grain	A loose courtyard plan farmstead with buildings to two sides of the yard. The best example on the Isle of Grain of a historic farmstead still in agricultural use and the only one retaining the majority of its historic structures.	Post-medieval
A46	MKE83396	TQ 8743 7805	Sheepfold on Lees Marshes	A field barn with no associated yard, demolished.	Post-medieval
A47	MKE83398	TQ 8848 7719	White Hall Farm, Isle of Grain	A full regular courtyard plan farmstead, demolished.	Post-medieval
A48	MKE83399	TQ 8786 7653	Perry's Farm, Isle of Grain	A loose courtyard plan farmstead with buildings to two sides of the yard. Still some extant features.	Post-medieval
A49	MKE83401	TQ 8824 7630	West Bear	A loose courtyard plan farmstead with buildings to three sides of the yard. Extant features present.	Post-medieval

Asset ID	Reference	NGR	Name	Description	Period
A50	MKE83402	TQ 8822 7445	Sheepfold north east of Port Victoria	Outfarm with a loose courtyard plan with a building to one side of the yard, demolished.	Post-medieval
A51	MKE83403	TQ 8884 7617	Whitehouse Farm, Isle of Grain	A regular courtyard farmstead with buildings to three sides of the yard incorporating a L-plan element. Farmhouse remains extant, the rest is demolished.	Post-medieval
A52	MKE83404	TQ 8881 7654	St James's Farm, Isle of Grain	A linear plan farmstead, demolished.	Post-medieval
A53	MKE83405	TQ 8881 7670	Parsonage Barn	A field barn with no associated yard, demolished.	Post-medieval
A54	MKE83406	TQ 8891 7666	Outfarm south east of Parsonage Barn	Outfarm consisting of a row plan element, demolished.	Post-medieval
A55	MKE83439	TQ 8750 7436	Outfarm on Stan Marsh	A field barn with no associated yard, demolished.	Post-medieval
A56	MKE83440	TQ 8833 7648	Outfarm adjacent to Lee's Cottages	Outfarm or field barn group consisting of two detached buildings, demolished.	Post-medieval
A57	MKE88529	TQ 8580 7747	Sheepfold on Allhallows Marshes	Outfarm with a loose courtyard plan with a building to one side of the yard, demolished.	Post-medieval
A58	MKE98846	TQ 8879 7633	Baytree Farm, Isle of Grain	A linear plan farmstead, completely demolished.	Post-medieval
A59	MKE98870	TQ 8886 7675	Old School House, Grain, Isle of Grain	Mid-to-late 19 th century structure built next to the National School (c. 1860), on a site now housing a 'post-war replacement' school	Post-medieval
A60	MKE98871	TQ 8883 7674	Site of former National School, Grain, Isle of Grain	Site of a National School, built in 1864, enlarged in 1890 and now demolished. Replaced 'post war' with a new school.	Post-medieval
A61	MKE98872	TQ 8867 7639	Site of a former Bethel Chapel and Sunday School, Grain, Isle of Grain	Site of a congregational chapel opened in 1826, which was converted to use as a Sunday School in 1895, when a new congregational chapel was built nearby	Post-medieval
A62	MWX17550	TQ 872 739	Blackstakes	Name on chart of 1688 AD.	Post-medieval
A63	MKE44047	TQ 7893 7466	HOO JUNCTION AND PORT VICTORIA RAILWAY	Single track railway from Hoo Junction on the North Kent Line to Port Victoria on the Isle of Grain.	Post-medieval
A64	MWX18654	TQ 8795 7393	Port Victoria Railway Landing Pier, Isle of Grain	Built in 1882 as the terminal point for the Hundred of Hoo Railway, Port Victoria Railway Landing Pier was extensively damaged by an explosion on board a naval minelayer in May 1915. It was partially replaced by the Port Victoria Seaplane Slipway.	Post-medieval to modern

Asset ID	Reference	NGR	Name	Description	Period
A65	MKE8342	TQ 8635 7527	Site of Grain railway halt, Isle of Grain	A railway station/halt on the Hoo Hundred Railway line, built 1892, on the Isle of Grain marked.	Post-medieval to modern
A66	MKE8365	TQ 863 752	Site of Grain crossing, Isle of Grain	Grain level crossing, Isle of Grain, visible on 1891 OS map.	Post-medieval to modern
A67	MWX18896	TQ 8581 7549	Grain Bridge, Grain Road, Isle of Grain	Grain Bridge, was first marked on the 1 st edition Ordnance Survey map (1858-1873). It is visible on all the subsequent OS maps.	Post-medieval to modern
A68	MWX19114	TQ 89277 76160	Outfall Sewer/sluiice at Grain, Isle of Grain	Outfall sewer, visible on the 2 nd edition Ordnance Survey map (1891-1898) and marked on all subsequent editions.	Post-medieval to modern
A69	MWX18147	TQ 86681 76650	Enclosure near Old Salt Works, near Yantlet Creek, Isle of Grain	A rectangular enclosure is marked on the Ordnance Survey historic maps (c.1858-1940) near the site of an 'Old Salt Works'. It was also identified from aerial photographs taken shortly after the end of the second World War.	Post-medieval
A70	NMP	TQ 87576 76420	Ridge and Furrow	Area of ridge and furrow as identified from aerial photographs.	medieval
A71	MWX18162	TQ 88668 74263	Burial ground, near Cockleshell Hard, Isle of Grain	A burial ground marked on the 1 st edition Ordnance Survey map (1858-1873). Also marked on the subsequent Ordnance Survey maps as 'Old Burial Ground'.	Post-medieval to modern
A72	MWX19126	TQ 86171 74536	Site of a Circular embanked feature, near Isle of Grain Oil Distribution Terminal	Circular embanked feature visible on the 2 nd and 3 rd edition Ordnance Survey maps on the South Level, now the site of an Oil Distribution Terminal. Date and Function unknown.	Post-medieval to modern
A73	MKE3187	TQ 8790 7795	Flint foundations and red brick scatter, Lees Marshes, Isle of Grain	Flint foundations and scatter of red brick identified in fields by a local farmer. May possibly be the site of Rosecourt Manor, believed to have existed near this location in the 16 th and 17 th centuries.	Post-medieval
A74	MWX17975	TQ 87828 74844	Site of Eldertree Pounds, Isle of Grain	Remains of Eldertree Pounds marked on the Ordnance survey historic maps (c.1858-1940).	Post-medieval
A75	MWX19821	TQ 85960 76701	Isolated rudder	Isolated rudder, probably from one of the vessels close by. The rudder is wooden and just over 2m tall and just under 2m wide with metal fastenings and comprises planks joined together.	Post-medieval to modern
A76	MKE71755	TQ 88400 76800	Post Medieval silver coin	Portable Antiquities Scheme find - Post Medieval silver coin.	Post-medieval
A77	MWX18148	TQ 86789 77198	Wharf/landing stage, Yantlet Creek, Isle of Grain	A possible Wharf/landing stage, on Yantlet Creek. Nothing is marked on the Ordnance Survey maps; during a survey in 2002 a dilapidated wharf frontage, comprising three large vertical timbers and evidence of iron bolts was identified.	Modern

Asset ID	Reference	NGR	Name	Description	Period
A78	MWX18655	TQ 8855 7418	Site of a Beacon at Horseshoe Point, Isle of Grain	One of a set of three beacons forming two consecutive measured half miles shown on a chart from 1910.	Modern
A79	MWX19108	TQ 85762 78219	Hard, North Levels, Isle of Grain	A hard identified on the 3 rd edition Ordnance Survey map and during a 2002 survey. The structure comprises paired, vertical squared timbers joined with large iron bolts.	Modern
A80	MWX19110	TQ 85696 77925	Site of a Groyne, Yantlet Creek, Isle of Grain	Groyne at Yantlet Creek marked on the 3 rd edition Ordnance Survey map (c.1905-1922).	Modern
A81	MWX19111	TQ 85911 77587	Wharf, Yantlet Creek, Allhallows Marshes	A Wharf at Yantlet Creek is marked on the Ordnance Survey 3 rd edition map (1905-1922). The remains of a timber structure, consisting of wooden planks and iron screws, were identified.	Modern
A82	MWX19113	TQ 89232 76080	Site of a Groyne, near Grain, Isle of Grain	A groyne marked on the 3 rd edition Ordnance Survey map (c.1905-1922). No further information.	Modern
A83	MWX19115	TQ 89279 76057	Wharf, near Grain, Isle of Grain	Wharf marked on the 3 rd and 4 th edition Ordnance survey maps (1905-1940) near Grain. No further information.	Modern
A84	MWX19118	TQ 89286 75746	Site of a Beacon, Smithfield Marshes, Isle of Grain	A beacon is marked on the 3 rd edition at Smithfield Marshes. It is in close proximity to a number of other beacons. There is no further trace of the monument on the 4 th edition map (c.1931-1940).	Modern
A85	MWX19808	TQ 85971 74621	Former wharf	Former wharf	Modern
A86	MKE92760	TQ 8685 7746	Grain Island Firing Point, Yantlet Creek, Isle of Grain	The principal function of the firing point was to measure the velocity of shells fired from the gun emplacement.	Modern
A87	MKE16291	TQ 8690 7720	Site of Yantlet firing range, Isle of Grain	Site of Yantlet range firing point and associated structures. A firing range for testing heavy artillery. In use between 1917 and 1950, uncertain if still in use today.	Modern
A88	MKE16289	TQ 8678 7740	Wharf at Yantlet firing range, Isle of Grain	The wharf at Yantlet firing range was constructed in 1917.	Modern
A89	MWX19804	TQ 86744 77335	Slipway, Grain Island Firing Point	Slipway.	Modern
A90	MKE16290	TQ 8690 7720	Embankment of disused military railway, Yantlet Creek, Isle	An embankment on the Right bank of Yantlet Creek was part of the former military railway serving Yantlet Range.	Modern

Asset ID	Reference	NGR	Name	Description	Period
A91	MKE16297	TQ 8845 7725	Site of barracks for an anti-aircraft battery, near White Hall Farm	Remains of Barracks for an Anti-aircraft defensive battery near White Hall Farm. The concrete bases for these huts are no longer present.	Modern
A92	MWX17958	TQ 87183 74190	World War II oil tank farm, Power Station, Isle of Grain	World War II oil tank farm identified from aerial photographs taken shortly after the end of the conflict.	Modern
A93	MWX18166	TQ 86196 74662	World War II oil tank farm, Isle of Grain	World War II oil tank farm, identified from aerial photographs taken shortly after the end of the Second World War. Presumably now part of the oil distribution terminal.	Modern
A94	MWX18652	TQ 8711 7400	Site of Oil Tanks, Hooks Fleet, Isle of Grain	Oil Tanks near Hooks Fleet shown on a chart from 1910. The area has since been developed, now forming part of the Medway Power Station and container terminal.	Modern
A95	MWX18159	TQ 87533 73972	Pillbox, near Grain Power Station, Isle of Grain	A World War Pillbox on the coast, identified from aerial photographs taken after the end of World War II. Located near Grain Power Station, present condition unknown.	Modern
A96	MKE20480	TQ 8861 7441	Site of Grain Air Station, Port Victoria, Isle of Grain	The Royal Naval Air Service established two bases on the Isle of Grain, one at Cockleshell Hard and one at Port Victoria (at neighbouring points on the coast). Known as Grain Air Station, they were used between 1912 and 1924. Few extant remains survive.	Modern
A97	MKE42226	TQ 8885 7699	White Hall Farm battery, Isle of Grain	World War I coastal artillery battery, no structures above ground level. Only concrete aprons visible.	Modern
A98	MKE16293	TQ 8757 7820	Military observation tower, near Cockleshell Beach, Lees Marshes, Isle of Grain	A 20 th century Military observation tower near Cockleshell Beach.	Modern
A99	MWX17943	TQ 86844 77446	Site of probable World War II Radio masts, Grain Marsh, Isle of Grain	Four large radio masts were identified from aerial photographs taken shortly after World War II.	Modern
A100	MWX18161	TQ 87545 75282	Military Installation, Isle of Grain	A Military Installation identified from aerial photographs taken after the end of World War II. Located near Grain Power Station, present condition unknown.	Modern
A101	MKE89755	TQ 8800 7600	Crash site of Dornier Do17Z-3	Crash site of Dornier Do17Z-3	Modern
A102	MKE89756	TQ 8900 7600	Crash site of Messerschmitt Bf109E-4	Crash site of Messerschmitt Bf109E-4	Modern

Asset ID	Reference	NGR	Name	Description	Period
A103	MKE89757	TQ 8700 7600	Crash site of Heinkel He 111H-2	Crash site of Heinkel He 111H-2	Modern
A104	MWX19112	TQ 88828 77116	Site of a gravel pit tramway, Isle of Grain	A gravel Pit tramway is marked on the 3 rd edition Ordnance Survey map. Not visible on any of the later edition maps and no further trace is known.	Modern
A105	MKE20488	TQ 8896 7683	Mound and hollow features, Isle of Grain	A small oval mound and a large oval hollow perhaps connected with the small scale extraction of sand or gravel. These features may be associated with the Grain Fortifications to the south.	Modern
A106	MWX19116	TQ 89288 75870	Site of an Outfall Sewer, Smithfield Marshes, Isle of Grain	Outfall marked on the 3 rd and 4 th edition Ordnance Survey maps (c.1905-1940) at Smithfield Marshes. Not thought to remain today.	Modern
A107	MWX18855	TQ 86367 77294	Old counter sea defence wall, Yantlet Creek, Allhallows	The modern sea defence wall of Yantlet Creek is thought to have been built on the site of the old counter sea defence, possibly incorporating elements of this old wall.	Unknown
A108	MWX17939	TQ 86033 77895	Borrow pits to seaward of the sea wall, North Level, Isle of Grain	Borrow pits to seaward of the sea wall identified from aerial photographs.	Unknown
A109	MWX17941	TQ 85546 77483	Site of possible Salt Works, Allhallows Marshes	Grid pattern in cropmarks and drainage, possibly the remains of a salt making site.	Unknown
A110	MWX18837	TQ 88779 74796	Possible site of former buildings, near Grain Power Station, Isle of Grain	Regular features in a field, identified from aerial photographs. Possibly indicative of former buildings.	Unknown
A111	MWX19802	TQ 86067 78410	Small alignment stakes	Small alignment of stakes.	Unknown
A112	MWX19803	TQ 85960 78305	Double alignment of wooden stakes	Double alignment of wooden stakes.	Unknown
A113	MWX18481	TQ 87665 75384	Unidentified feature, near Wallend, Isle of Grain	Unidentified feature noted from aerial photographs. No further information.	Unknown
A114	MWX18149	TQ 86413 76923	Site of a possible enclosure, near Hooks Fleet, Allhallows	The drainage pattern in a field indicates this was once the site of an enclosure. The boundary is similar on the Ordnance Survey historic maps (c.1858-1940), and a sheepfold is marked within the enclosure on the 3 rd edition map (c.1905-1922).	Unknown
A115	MWX18151	TQ 88436 76576	Site of two circular enclosures, Grain	Two circular enclosures were identified near Grain from aerial photographs taken after the end of the Second World War.	Unknown

Asset ID	Reference	NGR	Name	Description	Period
A116	MWX18165	TQ 86929 74498	Site of a Circular enclosure, Isle of Grain	A circular enclosure, identified from aerial photographs taken shortly after the end of the Second World War. The site has since been developed and is now part of the Medway Power Station.	Unknown
A117	MWX18836	TQ 88475 74641	Mound, near Grain Power Station, Isle of Grain	A mound of uncertain date or function, identified from aerial photographs. No further information.	Unknown
A118	MWX18150	TQ 87251 77044	Possible barrow, near Yantlet Farm, Isle of Grain	A circular mound feature, identified as a barrow. Marked on the Ordnance Survey maps from the 1 st edition to the present (c.1858-2007). Also visible from aerial photographs.	Unknown
A119	MWX18167	TQ 85900 74656	Rectangular pond cut into saltmarsh, Near Colemouth	A rectangular pond cut into saltmarsh was identified from aerial photographs near the foreshore on what is now the site of the Oil Distribution Terminal.	Unknown
A120	MWX18720	TQ 87603 77998	Ring ditches, Lees Marshes, Isle of Grain	Ring ditch features identified from aerial photographs. Interpreted as a possible settlement site of unknown date.	Unknown
A121	MKE77257	TQ 8879 7666	Cropmark of a ring ditch, to the north of Grain	A ring ditch visible as a cropmark in aerial photos of 1990 to the north of Grain. Possible second ring ditch to the south west of this.	Unknown
A122	MKE77258	TQ 8872 7663	Cropmark of a possible ring ditch, to the north of Grain	A possible ring ditch visible as a cropmark in aerial photos 1990 to the north of Grain.	Unknown
A123	MKE77259	TQ 8889 7668	Cropmarks of a field system, to the north of Grain	A field system visible as cropmarks in aerial photos of 1990 to the north of Grain. It is 132m across from east to west and 118m across from north to south and consists of several ditches.	Unknown
A124	MKE77261	TQ 8806 7669	Cropmark of a ring ditch, to the north west of Grain	A ring ditch visible as cropmarks in aerial photos of 1990 to the north west of Grain. It is 22m across and consists of a singular circular ditch with no interruption.	Unknown
A125	MKE77262	TQ 8820 7663	Cropmarks of ring ditch, to the west of Grain	A ring ditch visible of as a cropmark in aerial photos from 1990 to the west of Grain. It is 17m wide and consists of a singular circular ditch. In 1990 a pipe line was built partial truncating the north east.	Unknown
A126	MKE77263	TQ 8807 7663	Cropmarks of a field system, to the north west of Grain	A field system visible as cropmarks in aerial photos from 1990 to the north west of Grain. It is 288m east to west and 182m north to south. It consists of several ditches.	Unknown
A127	MKE77362	TQ 8777 7594	Cropmark of a ring ditch to the west of Grain	A ring ditch visible as a cropmark in aerial photos of 1990 to the east of Grain. It is 22m by 20m and consists of a singular ring with no interruption.	Unknown
A128	MKE91138	TQ 8767 7591	Cropmark of a ring ditch to the west of Grain Road	A ring ditch is visible as cropmark in a Google Earth image of 2013. It is 19m by 19m across and consists of a single circular ditch with one interruption by the road.	Unknown

Asset ID	Reference	NGR	Name	Description	Period
A129	MKE91139	TQ 8753 7599	Cropmark of a ring ditch, to the west of Grain Road	A ring ditch is visible as a cropmark in a Google Earth image of 2013. It is 11m by 12m across and consists of a single circular ditch.	Unknown
A130	MKE91140	TQ 8843 7592	Cropmark of a ring ditch, to the south west of Whitehouse	A ring ditch is visible as a cropmark in a Google Earth image of 2013. It is 14m by 15m and consists of a single circular ditch.	Unknown
A131	MKE97632	TQ 8880 7682	Stone head found in Clubb's Pit, opposite Grain Church	A stone head of slightly less than life size was found at Clubb's Pit, Grain, possibly c. 1983. It is now in the Guildhall Museum, Rochester	Unknown
A132	Aerial Photograph	TQ 88360 77025	Site of 20th Century Outfarm South of White Hall Farm	Outfarm built in the 20 th century as identified from historical maps and aerial photographs. Destroyed in the 1970-80s by gravel extraction.	Post-medieval

Event ID	Reference	Name	Description
E1	EKE9724	Watching brief at Additional LNG Storage Tanks - Grain LNG, Isle of Grain	A watching brief undertaken prior to the sites further development. Nothing of archaeological interest was discovered.
E2	EKE9729	Watching brief at the B2001 Culvert, Isle of Grain	The watching brief was undertaken during the construction of a new pipeline. The pipeline ran through the culvert of the B2001. No archaeological features were discovered, although the site was contaminated with hydro-carbons, and the gravel layers appeared to be intact, giving the possibility that prehistoric remains may exist.
E3	EKE4028	Settlement Site, Rose Court Farm	Iron Age settlement and Late Roman cemetery excavated in advance of mineral extraction north of Rose Court Farm. The excavations took place over a period of 10 years in the 1970s and 1980s but the results have never been fully published and information is sparse.
E4	EKE10128	Grain LNG Second Cryogenic Pipeline - Appendix 10.3: Atkins 2007 investigation extracts	Boreholes and test pits dug along the route of a pipeline.
E5	EKE8105	The AES Medway Site (Alternative Site) Isle Of Grain - Archaeological Assessment Report	Assessment of palaeoenvironmental stratigraphy and archaeological potential using borehole and other observations at the site, and including data from previous evaluations in the area.
E6	EKE12719	Geoarchaeological boreholes, Grain pipeline route	Eight boreholes were dug for geoarchaeological investigation of the route. Pleistocene and Holocene deposits were encountered.

Event ID	Reference	Name	Description
E7	EKE10722	Watching brief along the route of the BritNed Interconnector	A watching brief was organised for the route of a new cable. It largely relied upon non-archaeological contractors identifying potential deposits and calling in archaeologists. No such deposits were reported. A small section of the cable route, where it crossed a Scheduled Monument, was fully monitored. Nothing was observed.
E8	EKE16408	LNG JETTY No 8 Isle of Grain A geoarchaeological borehole monitoring report	A geoarchaeological report on the monitoring of boreholes drilled in Jetty No8. Report was commissioned by National Grid Grain LTD. Samples were taken and sent to MoLAS via the Fugro Consett laboratories for analysis. It was decided further radiocarbon dating would be undertaken.
E9	EKE10138	Watching Brief at Grain Water Treatment Works, Isle of Grain	A negative watching brief.
E10	EKE12631	Negative watching brief at Isle of Grain Power Station, Isle of Grain	Monitoring of groundworks associated with drilling and the removal of contaminated soil. No archaeological finds or features were observed.
E11	EKE16407	Grain Road Isle of Grain an archaeological watching brief	Watching brief by MoLAS was conducted at the Grain Road site which consisted of a number of geotechnical test pits. There were deposits of limited local significance and no archaeology. 13 test pits were dug all 1m square and 0.90 m deep.
E12	EKE17318	Magnetometry survey along route of Grain to Gravesend gas pipeline	Magnetic geophysical survey was undertaken by Stratascan on behalf of Canterbury Archaeological Trust, and overall the results of the survey produced little evidence for archaeological activity. Fourteen scattered responses were detected, although none of these seem to form any coherent pattern, and it was believed that most related to geological or pedological anomalies.
E13	EKE15641	A Geoarchaeological Assessment ahead of a proposed Isle of Grain Windfarm	A geoarchaeological assessment of the site ahead of construction of a proposed wind farm at the Isle of Grain, Kent. The report modelled a sequence of Pleistocene and Holocene deposits with the potential to contain archaeological remains of value despite all investigative boreholes being negative for such material.
E14	EKE14336	Geoarchaeological Evaluation: Land at Grain Power Station, Isle of Grain, Kent	Geoarchaeological Evaluation on land with planning permission to construct a new gatehouse, and visitors centre, security lodge, workshop and car park at Grain Power Station. The fieldwork consisted of machine excavation, recording and sampling of three Geoarchaeological test pits, along with drilling and core sample recovery from three bore holes. Excellent pollen preservation, coupled with radiocarbon dating of the sequence and a paucity of comparable work in the local area for the late Bronze Age, highlights the importance of the pollen assemblage in determining the vegetative composition of the Isle of Grain during the Late Bronze Age. It is recommended that a full pollen analysis is undertaken. Two radiocarbon dates on marine shells taken from a single borehole revealed dates of 1040-730 cal. BC and 1100-770 cal. BC - implying late Bronze age date for the sediment deposition. Optically Stimulated Luminescence (OSL) dates indicated a date of

Event ID	Reference	Name	Description
			224 +/- 25 ka (thousand years) for the River Terrace Gravel- an interesting date archaeologically as it corresponds to known Neanderthal occupation in Britain. However no archaeological material was recovered during the Geoarchaeological evaluation.
E15	EKE10137	Evaluation at Grain Power Station, Isle of Grain	14 auger samples comprising two transects across the site in order to target the projected route of the House Fleet (derived from historic mapping).

Appendix B Built Heritage Gazetteer

Table 3 Built Heritage Gazetteer Assets

Asset ID.	List Entry Number	NGR	Name	Type	Description	Period	Designation
BH1	1393145	588497, 177380 to 588832, 177147	World War II Anti-Tank Obstacles on the Foreshore	Anti-tank obstacles	A line of concrete anti-tank obstacles erected c. 1940 and running for approximately 570m from north-west to south-east along the north coast of the Isle of Grain. The main type of obstacle is formed by truncated square pyramids known as dragons teeth attached to a concrete grid. The teeth are arranged in rows four deep but every other row is offset so in effect the rows are eight deep. At the north-west end of the line is a double row of anti-tank concrete cubes while at the south-eastern end of the line is a pile of concrete caltrops, designed like medieval caltrops with four arms so that however they are placed one arm will always point upwards.	Modern	Grade II
BH2	1085755	588874, 176789	Church of St James	Parish church	12 th century with additions in the 13 th and 15 th centuries and a south-west tower added in 1903-05. Construction is ragstone rubble and the plan is simple with a nave, chancel, south-west tower, north-east sacristy and south porch. The chancel retains 13 th century windows in the Early English style. The aisles have been removed but the remains of the arcade can still be seen with the early 20 th century replacement windows inside the blocked up spaces. Brick buttresses were added after the aisles were taken away.	Medieval and post-mediaeval	Grade I
BH3	1336496	588612, 176588	The Hogarth Inn	Public House	A rendered, timber-framed public house dating to the late 16 th century. The two-storey building has a hipped, tiled roof and sliding sash windows to the first floor. The canted bay windows on the ground floor are a 20 th century addition. The asset was built as a house and was later the Cock Inn and then the Post Office and stores before being reinstated as a public house in 1975. The Hogarth name is a reference to William Hogarth who visited the Cock Inn in 1732 during a visit to the Hoo peninsula. The brick outbuilding to the north-west of the asset is shown on the First Edition Ordnance Survey map of 1870 while a further building between the two shown on subsequent Ordnance Survey maps and labelled PO is no longer in place.	Post medieval	Grade II
BH4	1204482	588850, 176146	White House Farmhouse	House	A two-storey, three-bay 18 th century weatherboarded farmhouse with timber sash windows with glazing bars and a panelled front door with a fanlight	Post medieval	Grade II

Asset ID.	List Entry Number	NGR	Name	Type	Description	Period	Designation
					above. The hipped roof is tiled, with brick stacks to the rear elevation. There is a triple-pile back addition to the rear of the main range.		
BH5	1019955	588972, 176405; 589077, 176559; 589193, 176555; 589231, 175655; 589261, 176119; 589642, 176043.	Coastal artillery Defences on the Isle of Grain, Immediately East and South East of Grain Village	Coastal defences	The scheduled coastal defences commence to the south-east of the Church of St James and continue south, with a break for the road to Grain Tower for approximately 1.25km in six separate areas of protection. The monument includes a gun tower (Grain Tower, outside the study area), a fort and three batteries together with later, 20 th century additions including two searchlight emplacements. Grain Tower was built in response to the perceived threat from French invasion in the mid-19 th century and was supported from the 1860s by Grain Fort which was built on the recommendation of the 1859 Royal Commission into the Defences of the United Kingdom Fortifications. The fort was formed of a semi-circular keep with a central parade and accommodation for 250 men, the whole being surrounded by inner and outer ditches and defended by bastions and caponiers. The fort's armaments were upgraded up until the Second World War and the fort was decommissioned in 1956 and the keep and caponiers were demolished and the ditch partially filled in in the 1960s. Visible remains today comprise earth banks and platforms but the subterranean passages that linked the keep, caponiers and magazines remain. A series of open batteries were built to the south of the fort. The first, Grain Battery (renamed Dummy Battery in 1901) was built approximately 1km south of the fort in the 1860s and was linked to it by a communications road on an earthen bank. In 1895 Wing Battery was built immediately to the south of Grain Fort and in 1900 Grain Battery was built to the west of Wing Battery. The upstanding parts of these fortifications were similarly demolished in the 1960s. Finally, two searchlight emplacements were built on the esplanade to the east of Grain Fort.	Post medieval and modern	Scheduled
BH6	N/a	588723, 176727	The Old Vicarage	House	A 19 th century detached house in yellow stock brick with red brick detailing and a concrete tiled roof. The main range faces the High Street with a double-pile addition to the rear.	Post medieval	Non-designated
BH7	N/a	588628, 176458	Grain United Reformed Church	Chapel	A single storey gable ended structure in yellow stock brick with red brick details and a slate roof. The gabled porch at the south-west end bear a date stone reading 1895 while the name of the chapel, BETHEL CONGREGATIONAL CHAPEL is inscribed above. The door and three	Post-medieval	Non-designated

Asset ID.	List Entry Number	NGR	Name	Type	Description	Period	Designation
					windows in the south-west end have pointed arches and replacement fenestration.		
BH8	N/a	588775, 176277	Grain Village Hall	Village Hall	A single storey structure constructed of pebble-dashed concrete panels, Crittal style metal windows and a curved roof. The structure dates to the 1950s and has served as the village's hall since.	Modern	Non-designated
BH9	N/a	588895, 176218	Former Coastguard Station	House, former coastguard station	Built by the Admiralty in 1900 facing the River Medway. The building comprised a row of 12 cottages for the coastguards and their families with a larger house at the eastern end for the Chief Officer. A single storey watch room was attached to the house. Construction is in buff brick with red brick detail to the ground floor. The first floor walls are divided into square panels with concrete detaining and the panels are pebble dashed. The roofs are slate with brick stacks to the front and rear and former windows to the front elevation.	Post-medieval	Non-designated
BH10	N/a	588056, 176951	Rosecourt Farm	Farm complex	Rosecourt Farm dates to the 1870s and is first shown on the 1898 Second Edition Ordnance Survey map. The map shows a pair of semi-detached cottages with two masonry outbuildings on either side of a courtyard to the north-east. The assets were not accessible during the site walkover but were observed from a distance. The cottages are in buff brick with a concrete tiled roof while the more northerly of the two out buildings is in buff brick with a corrugated roof. The more southerly of the two outbuildings is not as tall and was obscured from view by modern buildings to the east but appears to be original to the development. The courtyard walls connecting the two outbuildings also appear to be in place.	Post-medieval	Non-designated
BH11	N/a	587828, 176485	Perry's Farm and Wilford's Farm	Farm complexes	The two farms are located within the Site. Both farms are shown on the 1870 Ordnance Survey map as comprising a number of buildings around courtyards. The 1898 Ordnance Survey map shows just two buildings at Perry's Farm with an additional pair of semi-detached cottages and three buildings at Wilford's. Only the rendered brick cottages survive at Perry's and one of the outbuildings in buff brick at Wilford's.	Post-medieval	Non-designated
BH12	N/a	587077, 177097	Grain Island Firing Point	Artillery testing station	In 1920 the War Office drew up plans for buildings and structures for a firing point on the Isle of Grain to the east of Yantlet Creek. The location was chosen for its remoteness coupled with the fact that it was accessible by rail or water. The firing point's main function was to measure the velocity of heavy artillery shells from the gun emplacement. This was achieved by firing	Post-medieval	Non-designated

Asset ID.	List Entry Number	NGR	Name	Type	Description	Period	Designation
					the shell through two wire screens a fixed distance apart. From the 1950s the facility was increasingly used as a demolition range for controlled explosions and continues in that role today. While a number of the facilities original buildings and structures such as the wharf and dock, gantry path and velocity screen bases have been demolished other structures still stand including a workshop complex, powerhouse, mess building, guardhouse and cottages.		
BH13	1425319	585766, 177330	Second World War QF P-Series Oil Bombing Decoy	Oil Bombing Decoy	The asset is located in two areas of protection approximately 1.78km west, north-west of the Site boundary at its nearest point in a wide bend of Yantlet Creek. The asset is one of eleven QF (diversionary fire) P (petroleum division) oil bombing decoy sites developed in Britain in the early years of the Second World War. This example was designed to draw enemy bombing away from the oil storage depot to the south. Aerial photographs and archaeological surveys have found that the asset retains all its above and below ground features. The decoy was designed to burn fuel oil in brick or clay-lined pools to simulate burning oil storage tanks, ignition being controlled from a control building and associated generator building approximately 200m to the west of the pools.	Modern	Scheduled
BH14	1085758	584178, 178880	Church of All Saints	Parish church	Dates from the 12 th to 15 th centuries with restoration in the late 19 th century. Construction is of uncoursed rubble and stone roof. The plan is of aisled nave with cupola, chancel and south porch. The asset has historic and architectural interest as Allhallows' parish church. The asset is located in a raised churchyard surrounded by a brick wall.	Medieval and post-medieval	Grade I
BH15	1086504	583566, 177539	Rose and Crown Public House	House, formed public house	18 th century house, formerly the Rose and Crown public house and now a dwelling house again. The two storey building is in painted brick with a hipped, tiled roof with two dormers to the front elevation. Both the roof and timber framed windows are said (list description) to have been replaced in the 20 th century.	Post-medieval	Grade II

Appendix C Figures

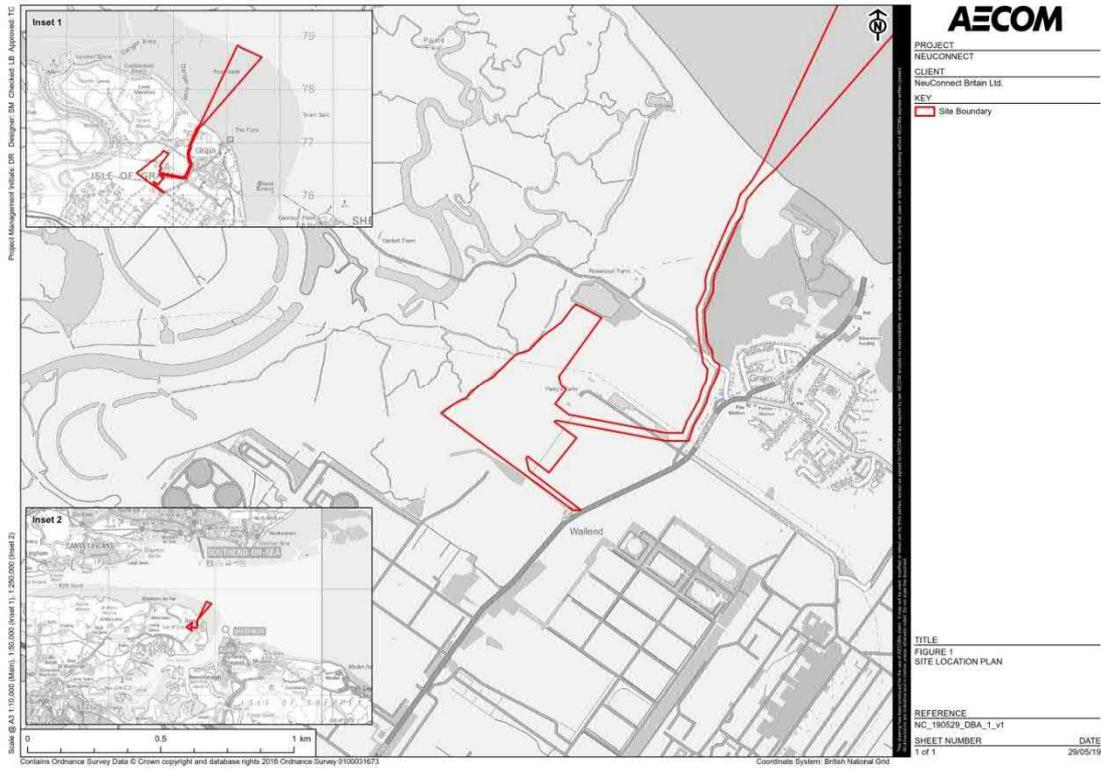


Figure 1 Site location plan.

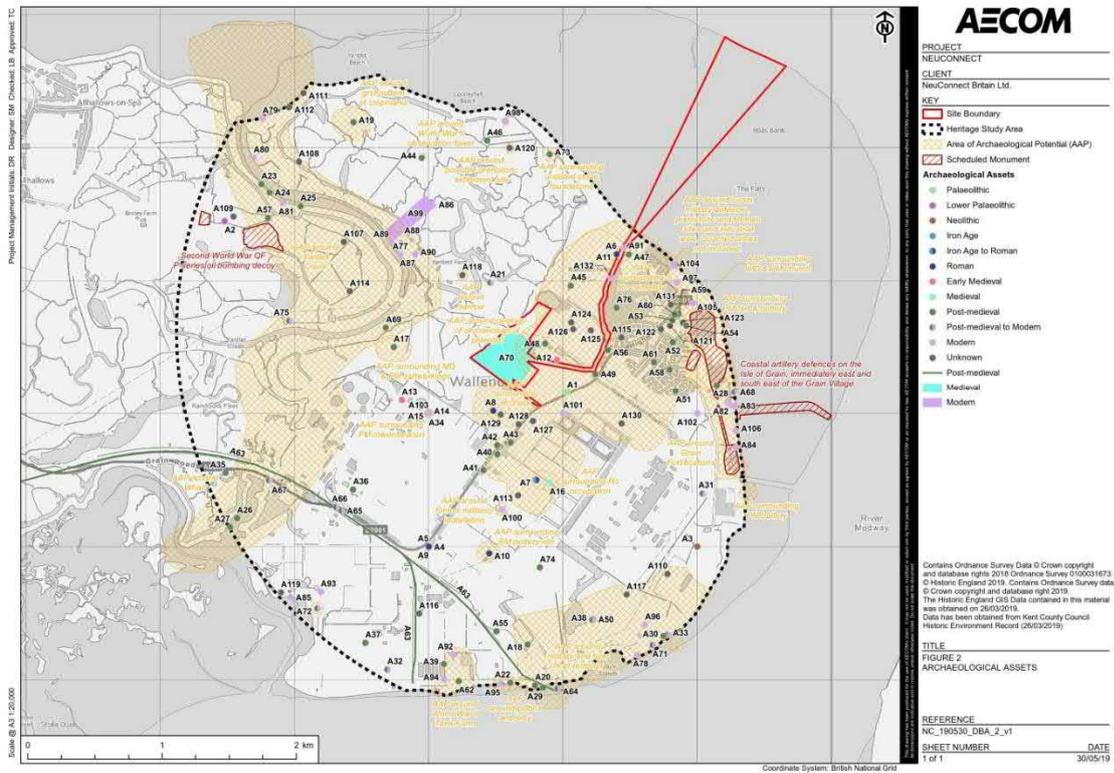


Figure 2 Archaeological Assets

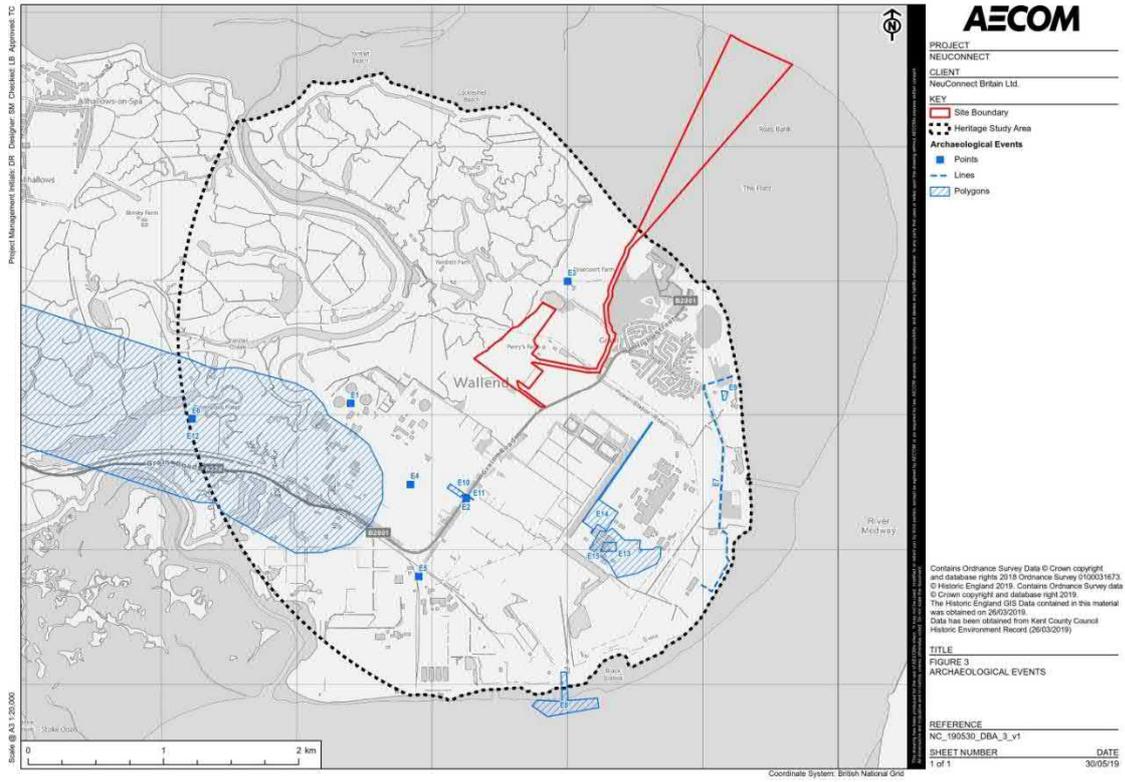


Figure 3 Archaeological Events

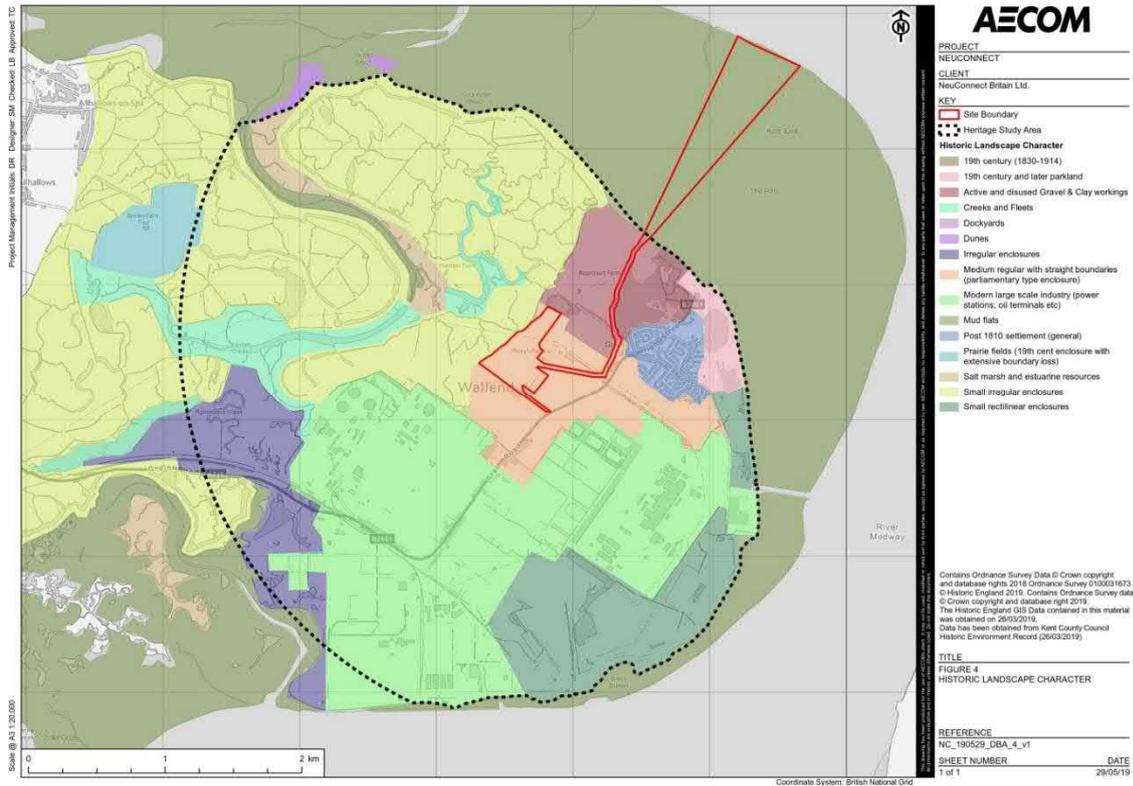


Figure 4 Historic Landscape Character

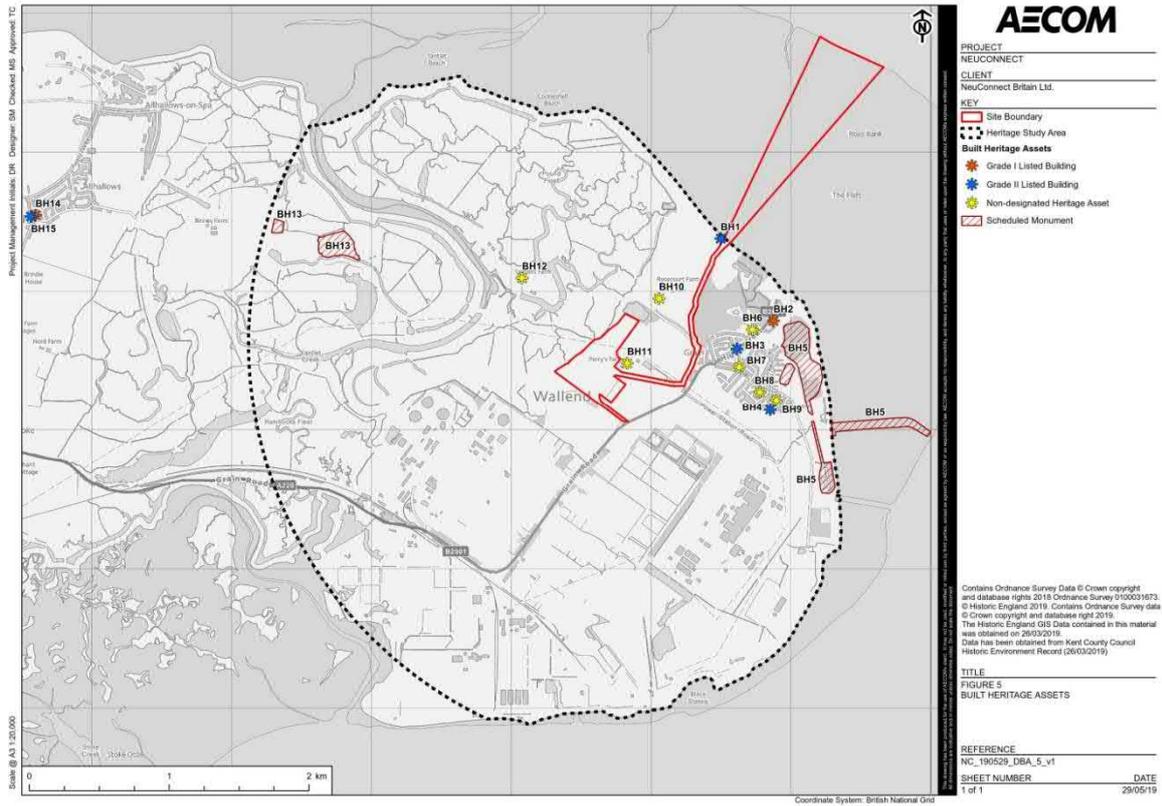


Figure 5 Built Heritage Assets

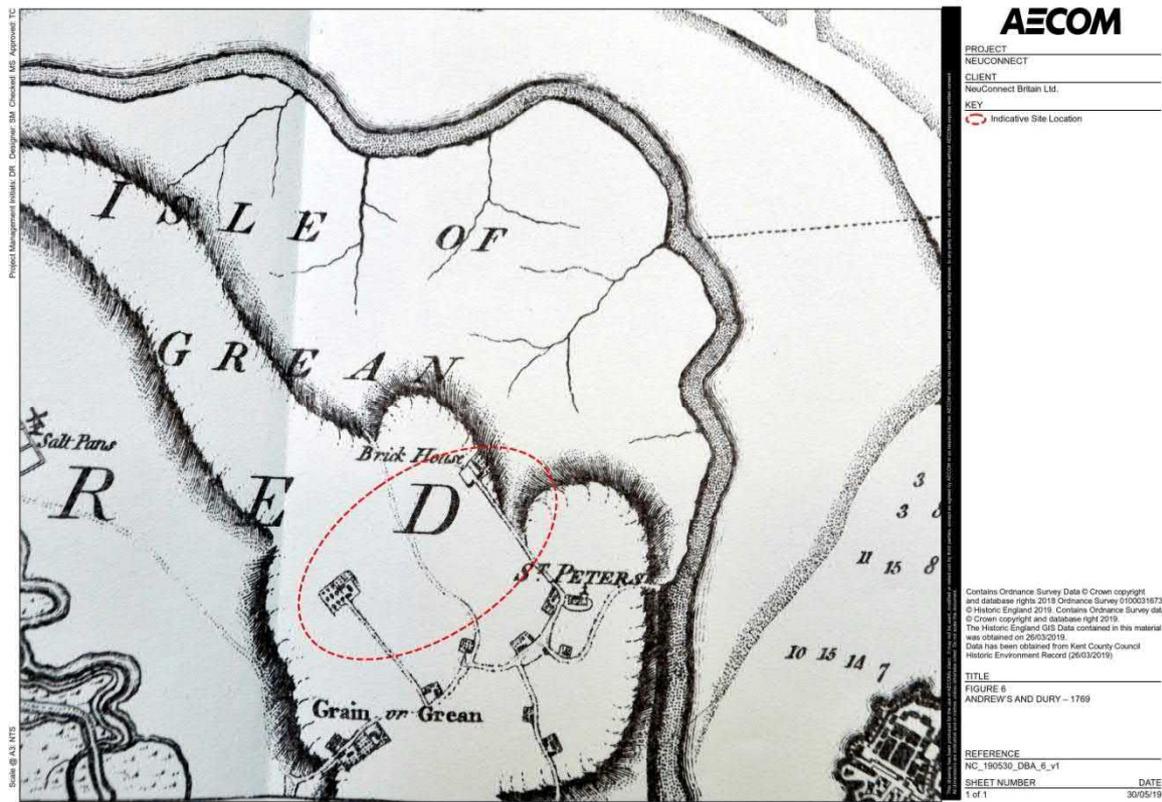


Figure 6 Andrew and Dury's map of 1769

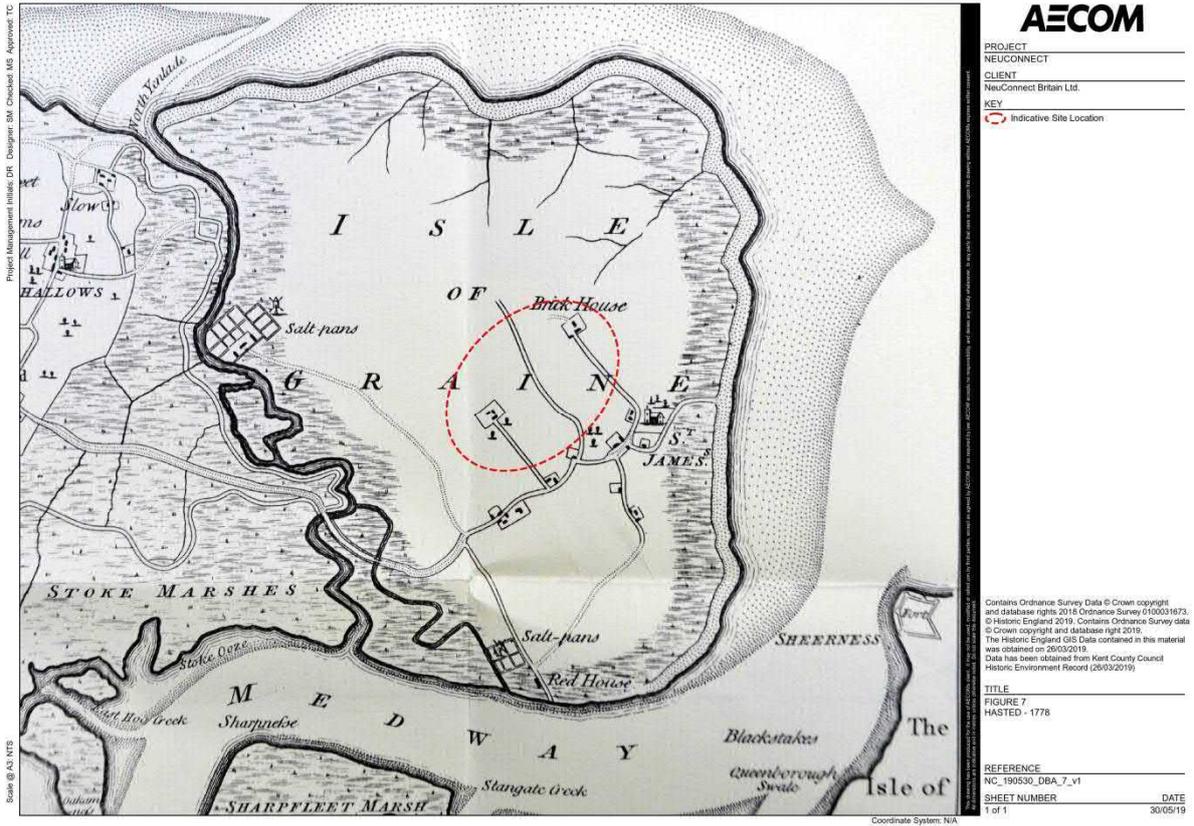


Figure 7 Hasted's map of 1778

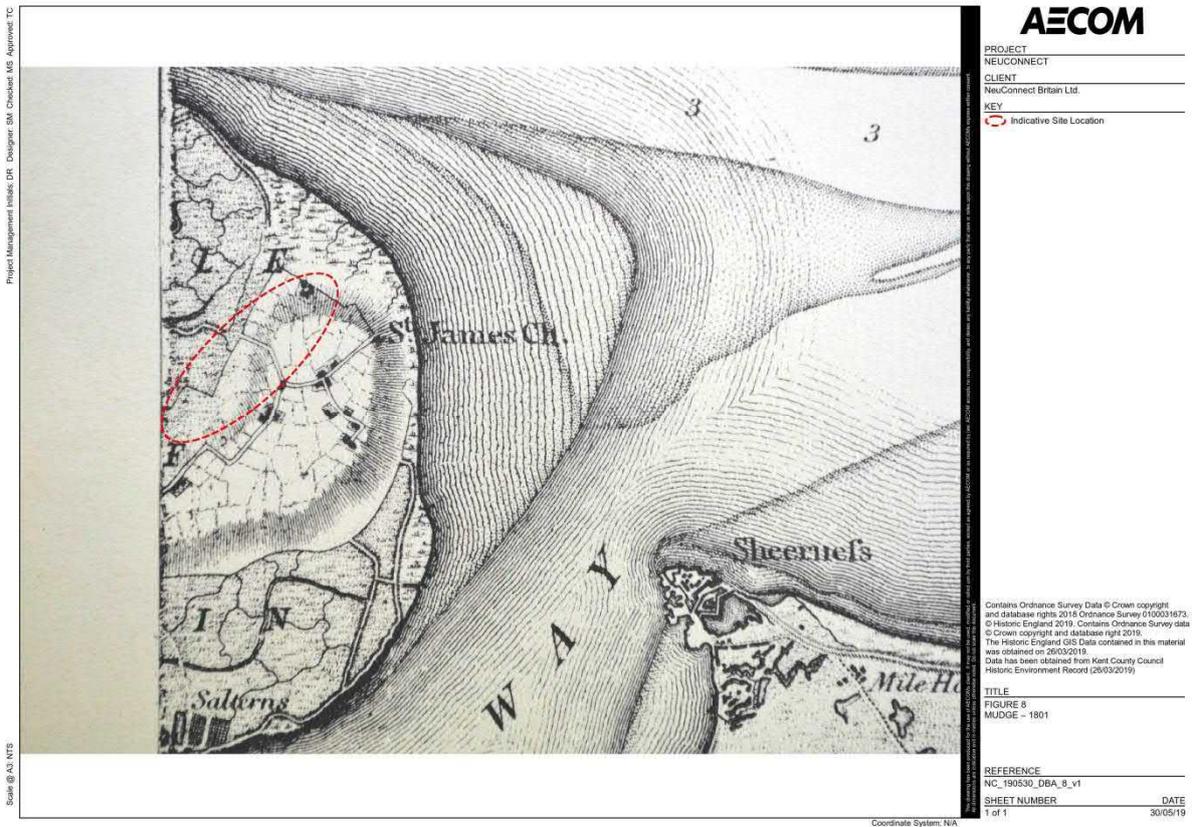


Figure 8 Mudge's map of 1801

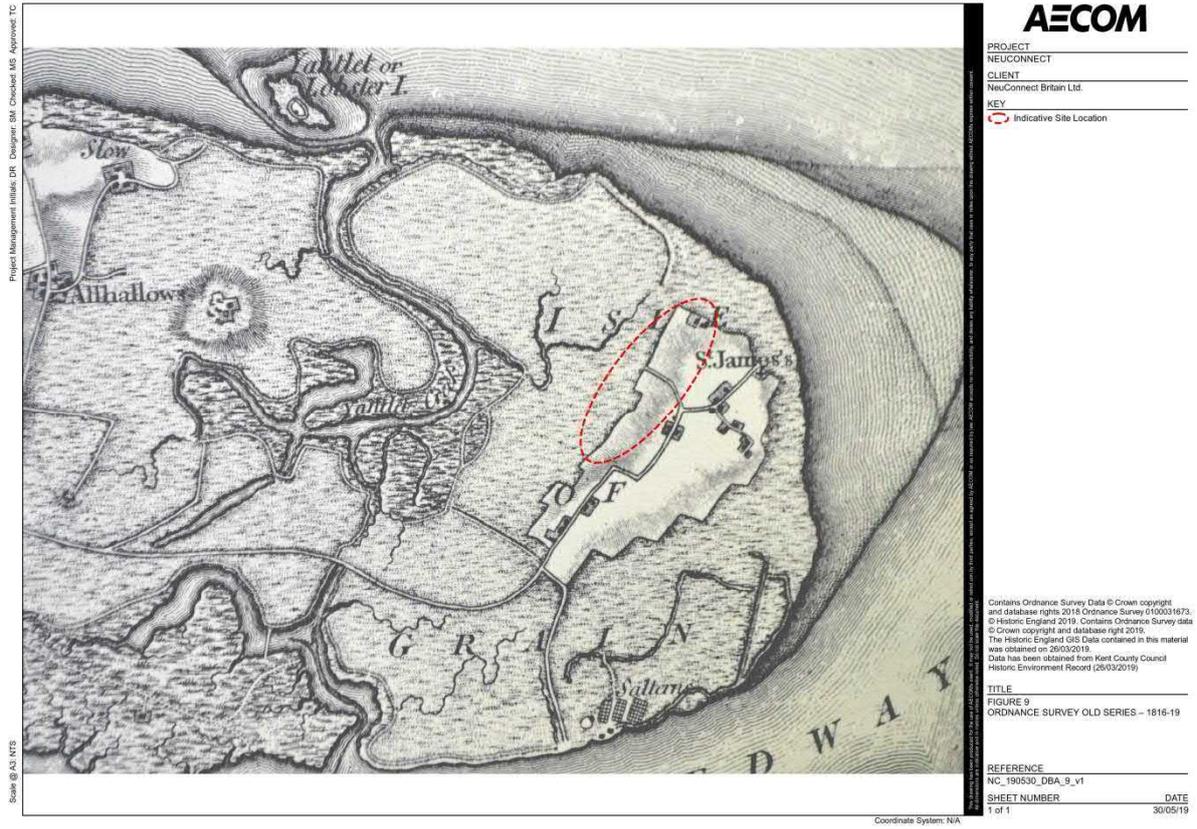


Figure 9 Ordnance Survey Old series map of 1816-9

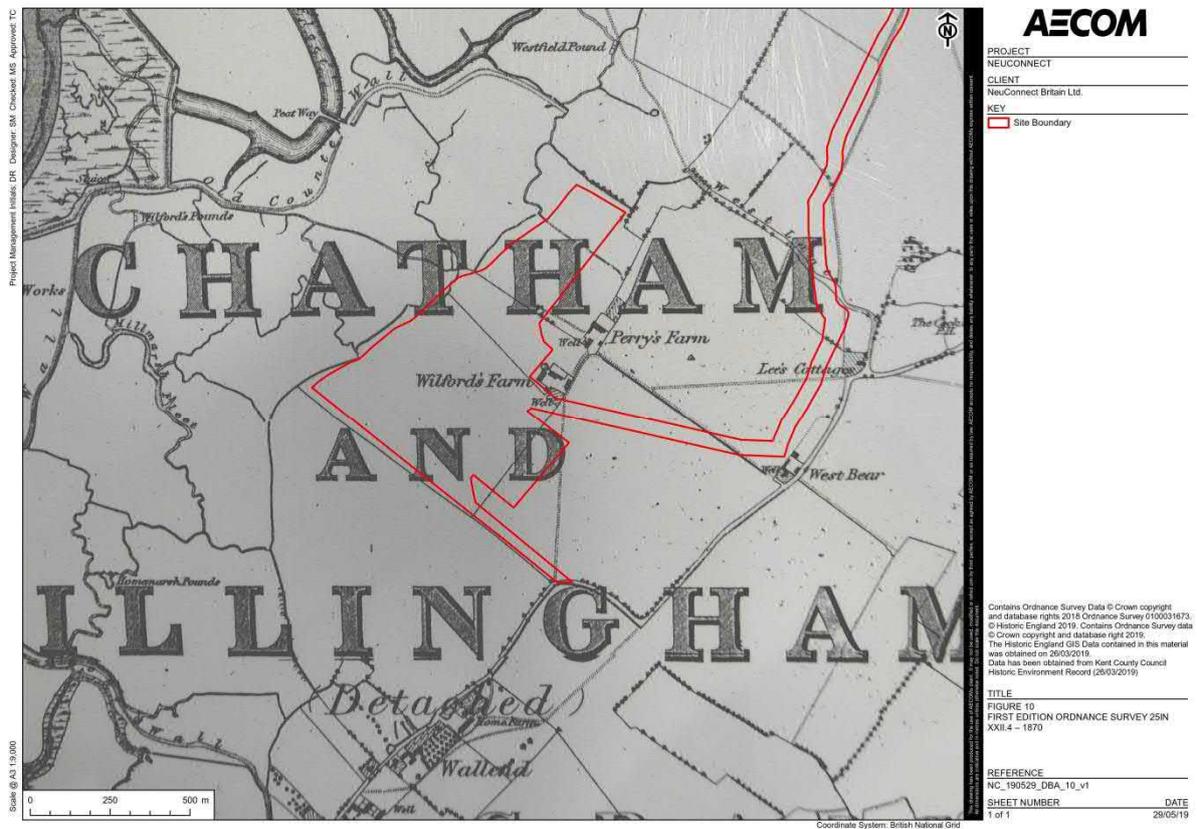


Figure 10 First Edition Ordnance Survey map 25inXXII.4 of 1870

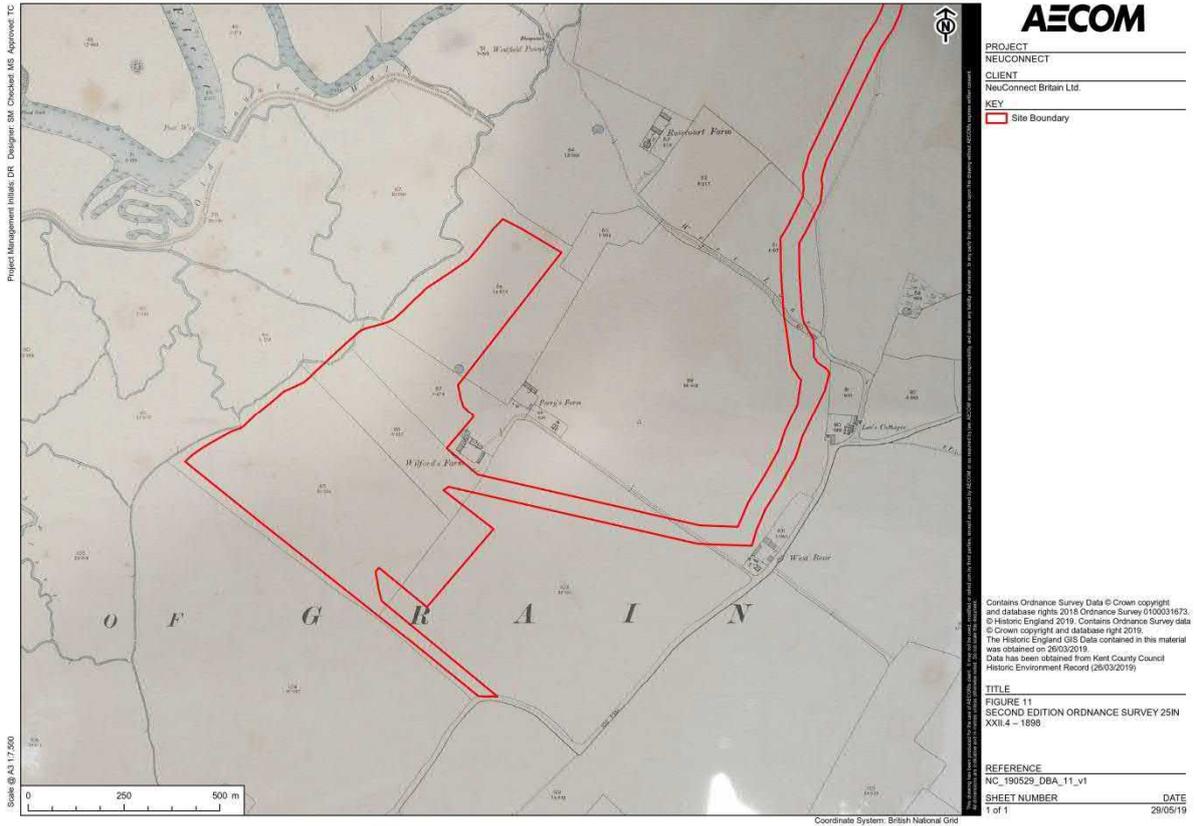


Figure 11 Second Edition Ordnance Survey 25in XXII.4 map of 1898



Figure 12 Third Edition Ordnance Survey XXII.4 map of 1908

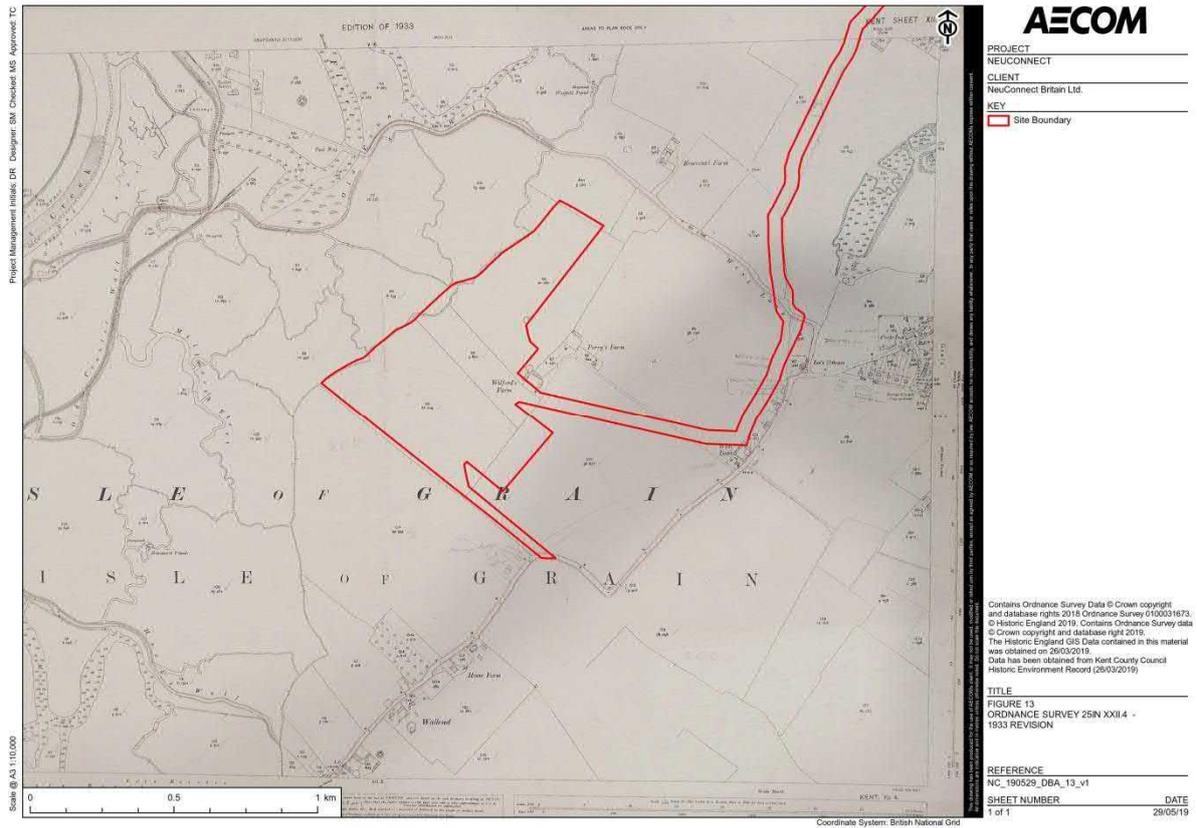


Figure 13 Ordnance Survey 25in XXII.4 1933 revision map



Figure 14 Ordnance Survey aerial photomosaic dated 1947

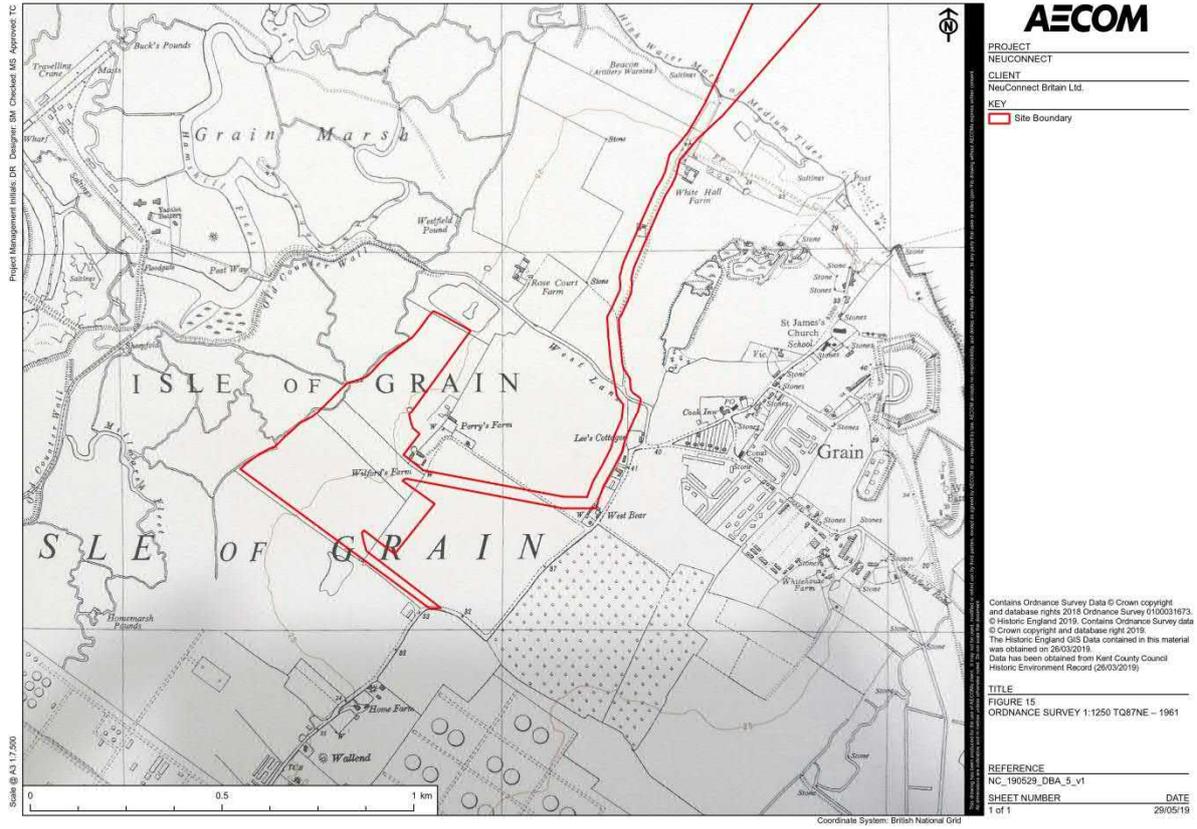


Figure 15 Ordnance Survey 1:1250 TQ87NE map of 1961

Appendix D Plates



Plate 1 View towards the south-east of the attenuation pond area of the proposed development



Plate 2 South-facing view of the proposed location of the converter station



Plate 3 East-facing view of potential military remains within the footprint of the proposed DC cable route

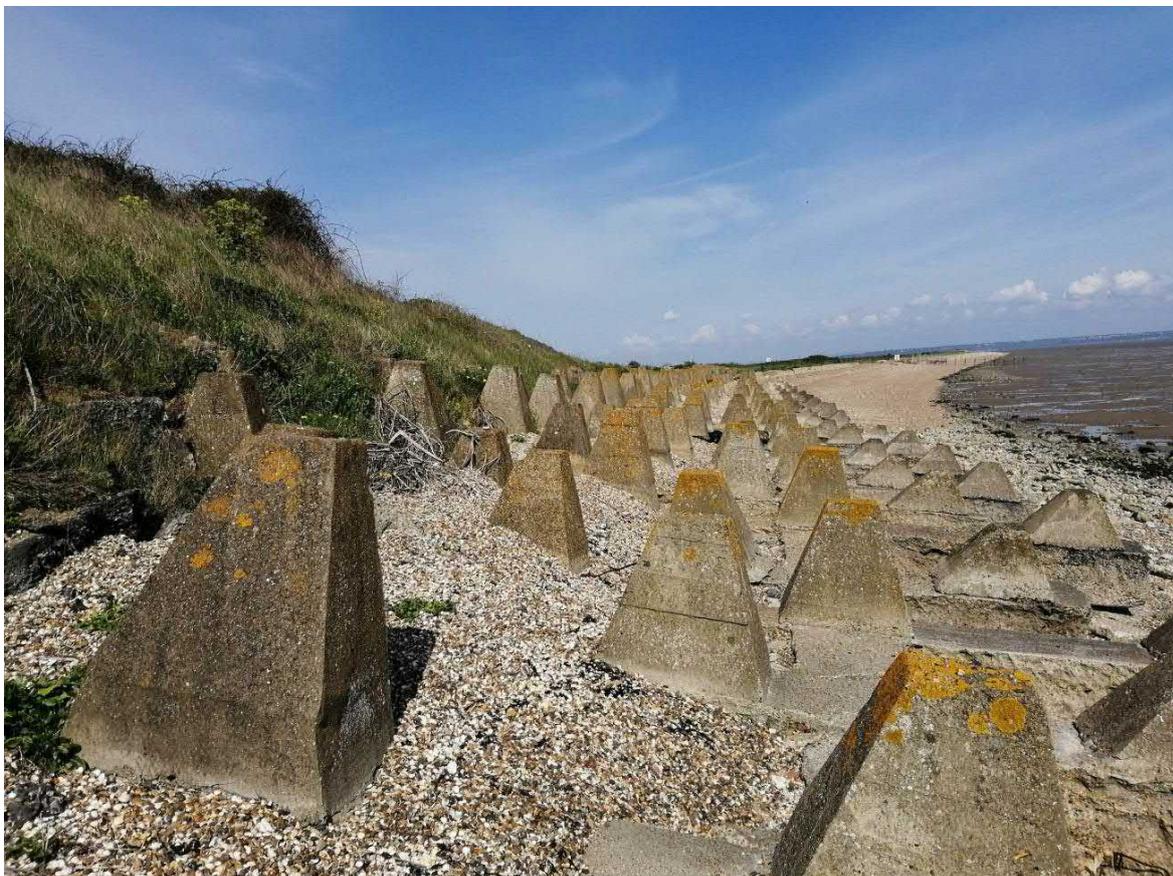


Plate 4 World War II Anti-Tank Obstacles on the Foreshore [BH1] looking northwest



Plate 5 View to Site from Grain Fort [BH5] with Church of St James [BH3] to right side of shot and Old Vicarage [BH6] to left of centre.



Plate 6 View to Rosecourt Farm [BH10] from site



Plate 7 Wilford's Farm [BH11] with Site in background

Appendix E Consultation

Boscher, Loic

From: heritage@kent.gov.uk
Sent: 26 March 2019 10:07
To: Boscher, Loic
Subject: RE: KHER search NeuConnect (Isle of Grain)

Dear Loic,

I have had a look, and discussed this with Ben and with Lis Dyson. Ben has provided me with a detailed description of sites and reports that should be included in the search. I think the simplest way of achieving this is to apply a 3km buffer from the site boundary: your search area will then include the key Palaeolithic sites that Ben and Lis have mentioned, as well as details of all the archaeological interventions on the south-east coast of Grain near Thamesport and the power station sites, and all of the 'higher ground' of the Isle of Grain (the area of Head and River Terrace Gravels and margins). The charge will be £260 in this case due to the size and complexity of the search area. We do not charge VAT.

Kind regards,

Rose

Dr Rose Broadley | Historic Environment Record Officer | Environment, Planning and Enforcement | Heritage Conservation Group
Kent County Council | Maidstone, ME14 1XX | Tel: **03000 419190** | www.kent.gov.uk/HER

From: Boscher, Loic [mailto:Loic.Boscher@aecom.com]
Sent: 25 March 2019 13:53
To: Heritage Conservation - GT
Subject: RE: KHER search NeuConnect (Isle of Grain)

Sorry about that, please find the files attached this time!

Kind regards,
Loic

From: heritage@kent.gov.uk [mailto:heritage@kent.gov.uk]
Sent: 25 March 2019 10:43
To: Boscher, Loic
Subject: RE: KHER search NeuConnect (Isle of Grain)

Dear Loic,

Thank you for your email. I think the attachments are missing though – could you send those over? Then I will consider the processes involved and the sizes of the search areas and come back to you with a quote.

Best wishes,

Rose

From: Boscher, Loic [mailto:Loic.Boscher@aecom.com]
Sent: 22 March 2019 16:02
To: Heritage Conservation - GT
Subject: KHER search NeuConnect (Isle of Grain)

Good afternoon Rose,

Please could you provide me with a quotation for a KHER search comprising a 1km buffer surrounding the attached redline boundary for designated assets and a roughly 500m boundary for non-designated assets. Following advice from Ben Found, we'd like to also include all gravel and head deposits in the area into the 'non-designated boundary' where it extends beyond the 500m buffer. I've attached a jpg of the British Geological Society website showing the extent of these deposits (the orange and pink layers). Let me know if this is something you can do with the pdf and jpg attached or if you need me to provide a shape file. The RLB boundary is defined in this case as both the red line and the dashed purple line extending northeast to the Mean High Water mark (MHW) on the attached pdf.

The site is centred roughly on NGR point TQ 88151 76564.

I will require both SHAPE files for entry into GIS software and the KHER output (preferably as pdf) for the following records:

- full entries for Historic Environment Records;
- full entries for monuments (monuments points, polygons and lines);
- full entries for Previous Archaeological Investigations (events points, polygons and lines);
- full entries for Archaeological Priority Areas/Zones;
- full entries for Ancient/Historic Burial grounds;
- Kent HLC

Following receipt of the quotation I'll confirm whether we wish to proceed with the search and place an order.

I know this is a bit non-standard so please don't hesitate to contact me on my direct dial below if you have any questions.

Kind regards,
Loic

Loïc Boscher MSc, PhD, MCifA
Consultant, Archaeology
D +44(0)207-963-9889
loic.boscher@aecom.com

AECOM

St George's House
5 St George's Road
Wimbledon, London, SW19 4DR
United Kingdom
T +44(0)207-963-9800
aecom.com

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Boscher, Loic

From: Calder, Annie
Sent: 04 March 2019 09:22
To: a.bicket@wessexarch.co.uk
Cc: Cramond, Tom; Boscher, Loic
Subject: FW: NeuConnect cable and associated works.
Attachments: RE: Proposed development of a converter station, substation and underground DC electricity cables on land at Grain, Isle of Grain.

Hi Andrew

AECOM will be producing the cultural heritage chapter for terrestrial impacts. In lieu of a formal scoping report, I've emailed KCC's archaeology officer and HE for their comments to our proposed methodology, and for your reference I've included their responses below, and attached.

We haven't yet commenced with our baseline study, plan to do so in the next few weeks, but if you're more advanced with your baseline, could you forward your constraints mapping for the intertidal zone to MHW mark? We are likely to refer to the same assets in our baseline reports, but I want to make sure, for the impact assessment, that we x-ref to your chapter where relevant and avoid duplicating impacts.

Drop me a line if you have any queries, or if you think we may be able to help with baseline data.

Best regards
Annie

Annie Calder
Associate Director – Heritage
Environment & Ground Engineering, UK
D +44-(0)191-224-6665
annie.calder@aecom.com

AECOM
One Trinity Gardens
Quayside
Newcastle upon Tyne, NE1 2HF, England
T +44-(0)-191-224-6500
aecom.com

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From: Roberts, Paul [mailto:Paul.Roberts@HistoricEngland.org.uk]
Sent: 01 March 2019 17:24
To: Calder, Annie
Cc: ben.found@kent.gov.uk
Subject: RE: NeuConnect cable and associated works.

Dear Annie,

Thanks for consulting Historic England about this Screening Application. We have been formally consulted by the Marine Management Organisation about the offshore and intertidal works, but not by Medway Council regarding the terrestrial component of the project. However, I've seen Ben Founds Screening advice to the Council and I concur with his advice to them.

I note that you mention your liaison with Wessex Archaeology regarding the seabed and intertidal part of the project. During the course of this would you ensure that the potential for the remains of the Second World War heavy anti-aircraft batteries, Roman cemetery and Iron Age settlement north of Rosecourt farm are not overlooked, please? I'm sure that you wouldn't overlook them; it's just that some of them might be beyond your study zone but above Mean High Water, which is presumably the edge of Wessex Archaeology's Project Area.

For information, with respect to the intertidal zone we advised the MMO that:

- Provision should be made to liaise, share information and integrate the works of the intertidal and terrestrial project,
- KCC Heritage Team should also be consulted about the intertidal work and
- The details of the proposed direct drilling, including the details of the route, depth, trajectory, launch pits and breakout points should be carefully considered and amended where necessary in order to avoid harm to archaeological remains.

I hope this is of some assistance

Regards,
Paul

Paul D Roberts MCIfA
Inspector of Ancient Monuments for Kent and Sussex

Development Management Team | Planning Group
Historic England | Eastgate Court, 195-205 High Street, Guildford, GU1 3EH
Direct dial: 07711 095202

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From: Roberts, Paul
Sent: 19 February 2019 12:27
To: 'annie.calder@aecom.com'
Cc: ben.found@kent.gov.uk
Subject: NeuConnect cable and associated works.

Dear Annie,

Thanks for consulting Historic England about this proposal. We would be pleased to provide some initial pre-application advice about the scope of your EIA, although I expect it will be a few weeks before we can respond. We offer a free initial stage of pre-application advice in the first instance; following that, if further advice is required, we can offer our Extended Pre-application service, which is charged on a cost-recovery basis. Charging will only commence after a free cycle of advice and if the service is formally commissioned from us. Further information on

our Extended Pre-application service can be found on our website at the following address:
www.HistoricEngland.org.uk/EAS. While we offer our pre-application advice confidentially to you, we advise that it is usually best to work in partnership with District and County Council conservation staff. I note that you've been in contact with Ben Found at KCC so I'll copy him in to this, for information.

Thank you for sending the Screening Report. We have already commented on a similar report for the intertidal and seabed element of the proposed scheme via the Marine Management Organisation. One of our recommendations is very likely to be that assessment should cover the overlap between the terrestrial and intertidal elements of the scheme.

Regards,

Paul D Roberts MCIFA
Inspector of Ancient Monuments for Kent and Sussex

Development Management Team | Planning Group
Historic England | Eastgate Court, 195-205 High Street, Guildford, GU1 3EH
Direct dial: 07711 095202

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Boscher, Loic

From: Ben.Found@kent.gov.uk
Sent: 11 February 2019 16:01
To: Calder, Annie
Subject: RE: Proposed development of a converter station, substation and underground DC electricity cables on land at Grain, Isle of Grain.
Attachments: KCC Spec Manual B_Generic standard DBA+Pal (DRAFT)_Revised by KCC 12.10.18.docx

Hi Annie

I am sorry that I have not been able to get back to you before now, but have set out some initial thoughts below. I think the outline scope set out in your email below seems reasonable. I have attached a copy of our generic standards for archaeological desk-based assessments (including for areas with Palaeolithic potential) and I would suggest your assessment is prepared in-line with these.

I note you are proposing a 500m study area, I think this is reasonable, provided that this is a true 500m buffer from the red-line boundary, not 500m from a central point. You might however want to consider using a custom search area, such that you take in more of the 'higher ground' of the Isle of Grain (the area of Head and River Terrace Gravels and margins) as this might help you better understand the archaeological character of the area. Our HER team are able to accommodate irregular search areas, including search areas based on custom GIS shapefile. Recent archaeological investigations on the Isle of Grain have mostly been focussed on the southern/south-eastern side of Grain (along the Medway) around the Power Stations, Thamesport, BritNed and the LNG site. You should look at the various reports arising from these works, which although outside your proposed study area will be informative to your study.

There is a significant gap in our HER data around the Isle of Grain as we are aware that major excavations were undertaken by the Kent Archaeological Rescue Unit from the late 1970s over a period of some 16+years around Rose Court Farm (J. Clubb Ltd site). As far as I am aware, these works have never been published (other than in a short 2002 note in Brian Philp's *Archaeology in the Front Line* and mentions in Kent Archaeological Review). We do not have comprehensive plans showing areas investigated or what was exposed. As such the HER entry for this major programme of archaeological investigation is very limited.

Hopefully you will be aware of Historic England's study of the Hoo Peninsula and its landscapes – here is a link to the project summary web-page
<https://historicengland.org.uk/research/current/discover-and-understand/rural-heritage/hoo-peninsula/>

I note the proposed geotechnical works. If you are not proposing to monitor the boreholes directly, then it is essential that the resulting logs are made available to you. If SI test-pits are proposed as a follow-up stage of work, then these would warrant archaeological monitoring (potentially including input from a Palaeolithic/Pleistocene specialist).

I trust that the above comments are helpful and would be pleased to discuss further as required.

Kind regards
Ben

Ben Found | Senior Archaeological Officer | Heritage Conservation | Kent County Council | Invicta House, County Hall, Maidstone ME14 1XX |

Telephone: 03000 413375 | Mobile: 07876 577275 | www.kent.gov.uk |

Please help save paper by NOT printing this email unless absolutely necessary.

From: Calder, Annie <annie.calder@aecom.com>

Sent: 11 February 2019 09:48

To: Found, Ben - GT EPE <Ben.Found@kent.gov.uk>

Subject: RE: Proposed development of a converter station, substation and underground DC electricity cables on land at Grain, Isle of Grain.

Hi Ben

I haven't heard from you so I'm assuming you're fine with our proposed scope of work. I'll be asking the team to commence with the baseline in the next week.

Kind regards

Annie

From: Calder, Annie

Sent: 06 February 2019 10:12

To: ben.found@kent.gov.uk

Subject: RE: Proposed development of a converter station, substation and underground DC electricity cables on land at Grain, Isle of Grain.

Hi Ben

Just to follow up on my earlier email. I have been informed that the GI team plan to carry out preliminary GI on the SE section of the Site, which is the site of the proposed converter station. The works will comprise six boreholes and three cone penetration test areas.

We do not plan to monitor the boreholes on site, as we wouldn't see anything. We may monitor test pitting in the area, but this is scheduled for later in the year. I'll keep you informed.

Annie

From: Calder, Annie

Sent: 04 February 2019 16:52

To: 'ben.found@kent.gov.uk'

Subject: Proposed development of a converter station, substation and underground DC electricity cables on land at Grain, Isle of Grain.

Our ref: MC/18/3363

Your ref: MC 18 3363 LE01

Hi Ben

I'm going to be managing the cultural heritage for a proposed development at the Isle of Grain, and have been forwarded your response to the screening request.

A scoping report is not being prepared, so I've set out a brief scope that we can discuss if you'd like to.

Firstly, just to keep you in the loop, the marine archaeology assessment is being carried out by Wessex Archaeology. We have worked with Wessex a lot on various EIA schemes in the past, including Dogger Bank Offshore wind farm.

Wessex's assessment will stop at MHW, which is where our assessment will begin. I will be responsible for liaising with Wessex and x-ref to their assessment as necessary to ensure that potential impacts aren't double-counted.

There is still a certain amount of flexibility in the design, particularly in terms of where the HDD will start from, so I will be working with the design team to make sure that the GII anti-tank cubes and dragon's teeth are avoided entirely via HDD. In order to help inform the design, we are going to produce a cultural heritage DBA (archaeology/built heritage/historic landscape). The study area for non-designated assets will be 500 from the redline boundary in the screening report, which is, as you may be aware, a lot larger than site area that will be required and be taken forward to planning. A 500m study corridor will also be adopted for the cable system to MHW.

Provisionally, a study area of 1km from the redline boundary will be adopted for the assessment of change to the setting of designated assets. However, this study area will be further informed by a site visit, and assets beyond 1km may be included in the baseline assessment where it is assessed that their setting extends into the Site.

The results of previous investigations, archaeological and geotechnical, will be reviewed and incorporated into the baseline. This preliminary information will be used to understand the depositional sequence from MHW to the Site, and to help ID deposits with archaeological potential.

Once all available information has been collated, we can review the results and gauge whether there are any gaps in knowledge that may compromise the impact assessment process.

Let me know if you'd like to talk this through and I'll give you a call whenever you're free. I should be in the office all this week.

Best regards
Annie

Annie Calder

Associate Director – Heritage
Environment & Ground Engineering, UK
D +44-(0)191-224-6665
annie.calder@aecom.com

AECOM

One Trinity Gardens
Quayside
Newcastle upon Tyne, NE1 2HF, England
T +44-(0)-191-224-6500
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Appendix F Borehole Logs

Borehole Log

PRELIMINARY



Drilled CR	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	2.74 mOD
Logged LF	13/05/2019	Dando 3000 Hand dug pit then cable percussion drilling to 20m.	0.00	20.00	150	2.80	Coordinates (m)	E 587579.97
Checked	End						National Grid	N 176569.45
Approved	14/05/2019							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill	
0.30 0.30 - 0.40	ES 1	PID=2.1 ppmv	13/05/19 0.00	0900 Dry	Dark brown slightly sandy slightly gravelly CLAY. Gravel is angular fine chalk subrounded fine to medium chert and rare angular fine brick. (TOPSOIL)		(0.20) +2.54			
1.00 1.00 1.00 1.20 1.20 - 1.65	ES 2 D 3 HV UT 4	PID=1.7 ppmv p 67kPa, r 29kPa 35 blows 100% rec	0.00	Dry	Soft brown mottled dark reddish brown slightly gravelly CLAY. Gravel is subrounded fine to coarse chert and rare angular fine brick and chalk to 1.20m. Becoming slightly sandy from 1.60m. (MADE GROUND?)		(1.50)			
1.70 - 2.15 1.70 1.70 - 2.15 1.70 - 2.00 2.00 2.00 2.20 - 2.65 2.20 - 2.65	SPTS D 5 D 6 B 7 ES 8 SPTS D 9	N=12 (1,1/2,2,4,4) PID=1.5 ppmv N=8 (1,1/1,2,2,3)	0.00	Dry	Brown clayey fine to medium SAND. (SUPERFICIAL DEPOSITS)		1.70 +1.04			
3.00 3.00 3.20 - 3.65	ES 10 UT 11	PID=1.0 ppmv 35 blows 100% rec	2.80	Dry	Firm to stiff brown with grey mottled CLAY with rare pockets of orangish brown fine sand. (LONDON CLAY)		(0.90) 2.60 +0.14			
3.70 - 4.15 3.70 3.70 - 4.15 4.00 4.00 4.20 - 4.65	SPTS D 12 D 13 ES 14 UT 15	N=13 (1,2/3,2,4,4) PID=1.0 ppmv 45 blows 100% rec	2.80 13/05/19 2.80	Dry 1700 Dry						
4.70 - 5.15 4.70 4.70 - 5.15 5.00 5.00 5.20 - 5.65	SPTS D 16 D 17 ES 18 UT 19	N=12 (1,2/2,3,3,4) PID=<1.0 ppmv 50 blows 89% rec	2.80	Dry			(4.60)			
5.70 - 6.15 5.70 5.70 - 6.15	SPTS D 20 D 21	N=14 (2,2/3,3,3,5)	2.80	Dry						
6.50 6.50 6.70 - 7.15	ES 22 UT 23	PID=<1.0 ppmv 50 blows 100% rec	2.80	Dry		6.50 selenite/gypsum				
7.20 - 7.65 7.20 7.20 - 7.65	SPTS D 24 D 25	N=15 (2,2/3,4,4,4)	2.80	Dry	Stiff dark grey very closely fissured CLAY. (LONDON CLAY)		7.20 -4.46			
8.00 8.00 8.20 - 8.65	ES 26 UT 27	PID=<1.0 ppmv 55 blows 100% rec	2.80	Dry						
8.70 - 9.15 8.70 8.70 - 9.15	SPTS D 28 D 29	N=15 (2,2/3,4,3,5)	2.80	Dry						
9.50 9.50 9.70 - 10.15	ES 30 UT 31	PID=<1.0 ppmv 60 blows 100% rec	2.80	Dry		9.50-11.00 nodule of pyrite and rare shell fragments 9.50-20.00 pyrite stringers				

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used
1	2.00	Driller recorded no flow		0.00 - 2.60	50mm diameter standpipe installed.			

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH108
Scale 1:50	Project No.	G9017-19		
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24/05/2019 11:52:55				

Borehole Log

PRELIMINARY



Drilled CR	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	2.74 mOD
Logged LF	13/05/2019	Dando 3000 Hand dug pit then cable percussion drilling to 20m.	0.00	20.00	150	2.80	Coordinates (m)	E 587579.97
Checked	End						National Grid	N 176569.45
Approved	14/05/2019							

Samples and Tests

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
10.20 - 10.65	SPTS	N=18 (2,2/3,4,5,6)	2.80	Dry	Stiff dark grey very closely fissured CLAY. (LONDON CLAY)					
10.20	D 32									
10.20 - 10.65	D 33									
11.00	ES 34	PID=<1.0 ppmv								
11.00	UT 35	65 blows 89% rec	2.80	Dry						
11.20 - 11.65										
11.70 - 12.15	SPTS	N=21 (2,3/4,5,6,6)	2.80	Dry						
11.70	D 36									
11.70 - 12.15	D 37									
12.50	ES 38	PID=<1.0 ppmv								
12.50	UT 39	80 blows 100% rec	2.80	Dry						
12.70 - 13.15										
13.20 - 13.65	SPTS	N=21 (3,3/4,5,5,7)	2.80	Dry						
13.20	D 40									
13.20 - 13.65	D 41									
14.00	ES 42	PID=<1.0 ppmv					14.00 siltstone gravel	(12.80)		
14.00	UT 43	90 blows 89% rec	2.80	Dry						
14.20 - 14.65										
14.70 - 15.15	SPTS	N=23 (3,4/5,5,6,7)	2.80	Dry						
14.70	D 44									
14.70 - 15.15	D 45									
15.50	ES 46	PID=<1.0 ppmv								
15.50	UT 47	65 blows 100% rec	2.80	Dry						
15.70 - 16.15										
16.20 - 16.65	SPTS	N=24 (3,4/5,5,6,8)	2.80	Dry						
16.20	D 48									
16.20 - 16.65	D 49									
17.00	ES 50	PID=<1.0 ppmv								
17.00	UT 51	65 blows 89% rec	2.80	Dry						
17.20 - 17.65										
17.70 - 18.15	SPTS	N=25 (3,4/5,6,7,7)	2.80	Dry						
17.70	D 52									
17.70 - 18.15	D 53									
18.50	ES 54	PID=<1.0 ppmv								
18.50	UT 55	80 blows 100% rec	2.80	Dry						
18.70 - 19.15										
19.20 - 19.65	SPTS	N=23 (3,4/5,5,6,7)	2.80	Dry						
19.20	D 56									
19.20 - 19.65	D 57									
20.00	ES 58	PID=<1.0 ppmv	14/05/19	1300						
20.00			2.80	Dry	END OF EXPLORATORY HOLE					

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH108
Scale 1:50	Project No.	G9017-19		
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24/05/2019 11:52:55				

Borehole Log

PRELIMINARY



Drilled CR	Start 14/05/2019	Equipment, Methods and Remarks Dando 3000 Hand dug pit then cable percussion drilling to 20m.	Depth from (m) 0.00	to (m) 20.00	Diameter (mm) 150	Casing Depth (m) 3.00	Ground Level 7.19 mOD
Logged LF	End 15/05/2019						Coordinates (m) E 587731.78
Checked							National Grid N 176475.30
Approved							

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.30 0.30 - 0.40	ES 1	PID=1.9 ppmv	14/05/19 0.00	1400 Dry	Soft brown slightly sandy CLAY. (TOPSOIL)		0.15 (0.15) +7.04 0.40 (0.25) +6.79		
1.00 1.00 1.00 1.00 1.20 - 1.65	HV ES 2 D 3 UT 4	PID=1.0 ppmv p 66kPa, r 22kPa 35 blows 88% rec	0.00	Dry	Soft light brown slightly sandy slightly gravelly CLAY. Becoming sandy from 2.00m. Sand is fine to medium. Gravel is subrounded fine to medium chert. (SUPERFICIAL DEPOSITS)		(2.30)		
1.70 - 2.15 1.70 1.70 - 2.15 2.00 2.00 2.20 - 2.65	SPTS D 5 D 6 ES 7 UT 8	N=8 (1,1/2,2,2,2) PID=<1.0 ppmv 30 blows 100% rec	0.00	Dry					
2.70 - 3.15 2.70 2.70 - 3.15 3.00 3.00 3.20	SPTS D 9 D 10 ES 11 UT 12	N=7 (1,1/1,2,2,2) PID=<1.0 ppmv 25 blows 89% rec	0.00	Dry	Soft brown mottled light grey slightly silty CLAY with occasional very closely spaced fissuring from 3.70m and rare relic rootlets in the grey silt. (LONDON CLAY)		2.70 +4.49		
3.70 - 4.15 3.70 3.70 - 4.15 4.00 4.00 4.20 - 4.65	SPTS D 13 D 14 ES 15 UT 16	N=9 (1,2/2,2,2,3) PID=<1.0 ppmv 30 blows 100% rec	2.80	Dry					
4.70 - 5.15 4.70 4.70 - 5.15 5.00 5.00 5.20 - 5.65	SPTS D 17 D 18 ES 19 UT 20	N=13 (2,2/3,3,3,4) PID=<1.0 ppmv 35 blows 100% rec	3.00	Dry		5.00 pockets of fine orangish brown and black sand			
5.70 - 6.15 5.70 5.70 - 6.15	SPTS D 21 D 22	N=12 (1,2/3,3,3,3)	3.00	Dry	Firm to stiff dark grey slightly silty CLAY with occasional pockets of fine black silty sand and occasional pyrite stringers. (LONDON CLAY)		5.70 +1.49		
6.50 6.50 6.70 - 7.15	ES 23 UT 24	PID=<1.0 ppmv 35 blows 100% rec	3.00	Dry					
7.20 - 7.65 7.20 7.20 - 7.65	SPTS D 25 D 26	N=12 (1,3/2,3,3,4)	3.00	Dry					
8.00 8.00 8.20 - 8.65	ES 27 UT 28	PID=<1.0 ppmv 50 blows 100% rec	3.00	Dry					
8.70 - 9.15 8.70 8.70 - 9.15	SPTS D 29 D 30	N=14 (1,3/3,3,4,4)	3.00	Dry					
9.50 9.50 9.70 - 10.15	ES 31 UT 32	PID=<1.0 ppmv 50 blows 100% rec	3.00	Dry					
			14/05/19 3.00	1700 Dry					

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used
1	5.00	Seepage						

Borehole Log

PRELIMINARY



Drilled CR	Start 14/05/2019	Equipment, Methods and Remarks Dando 3000 Hand dug pit then cable percussion drilling to 20m.	Depth from (m) 0.00	to (m) 20.00	Diameter (mm) 150	Casing Depth (m) 3.00	Ground Level 7.19 mOD
Logged LF	End 15/05/2019						Coordinates (m) E 587731.78
Checked							National Grid N 176475.30
Approved							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
10.20 - 10.65	SPTS D 33 D 34	N=17 (1,2/3,4,5,5)	15/05/19	Dry	Firm to stiff dark grey slightly silty CLAY with occasional pockets of fine black silty sand and occasional pyrite stringers. (LONDON CLAY)					
10.20			3.00	Dry						
10.70 - 11.15	D 35 D 36									
11.00	ES 37	PID=<1.0 ppmv								
11.20 - 11.65	UT 38	50 blows 100% rec	3.00	Dry						
11.70 - 12.15	SPTS D 39 D 40	N=16 (2,2/3,3,4,6)	3.00	Dry						
12.50	ES 41	PID=<1.0 ppmv								
12.70 - 13.15	UT 42	60 blows 100% rec	3.00	Dry				(14.30)		
13.20 - 13.65	SPTS D 43 D 44	N=19 (2,3/4,4,5,6)	3.00	Dry						
14.00	ES 45	PID=<1.0 ppmv								
14.20 - 14.65	UT 46	70 blows 100% rec	3.00	Dry			15.70 claystone in top of UT			
14.70 - 15.15	SPTS D 47 D 48	N=23 (3,3/4,5,7,7)	3.00	Dry						
15.50	ES 49	PID=<1.0 ppmv								
15.70 - 16.05	UT 50	100 blows 67% rec	3.00	Dry						
16.10 - 16.55	SPTS D 51 D 52	N=27 (3,4/5,6,8,8)	3.00	Dry						
17.00	ES 53	PID=<1.0 ppmv								
17.20 - 17.65	UT 54	80 blows 89% rec	3.00	Dry						
17.70 - 18.15	SPTS D 55	N=25 (8,5/5,6,6,8)	3.00	Dry			17.70-19.20 subangular coarse claystone recovered as gravel			
18.50	ES 56	PID=<1.0 ppmv								
18.70 - 19.15	UT 57	100 blows 100% rec	3.00	Dry			18.50 shell fragments			
19.20 - 19.65	SPTS D 58 D 59	N=25 (2,4/5,6,6,8)	3.00	Dry						
20.00	ES 60	PID=<1.0 ppmv	15/05/19	Dry						
20.00			3.00		END OF EXPLORATORY HOLE		20.00	-12.61		

Groundwater Entries			Depth Related Remarks		Hard Boring			
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project NeuConnect Isle of Grain	Borehole
Scale 1:50	Project No. G9017-19	BH109
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Borehole Log

PRELIMINARY



Drilled	TL	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	6.74 mOD
Logged	SW	13/05/2019	Dando 3000 Hand dug pit then cable percussion drilling to 20m.	0.00	20.00	150	1.60	Coordinates (m)	E 587583.85
Checked		End						National Grid	N 176420.36
Approved		14/05/2019							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
0.20	HV	p 107kPa, r 26kPa	13/05/19	1223	Brown slightly clayey slightly gravelly SAND. SaAnd is fine to coarse. Gravel is angular to subangular, fine to coarse flint. (POSSIBLE MADE GROUND)		(0.60)	[Pattern]	1	
0.20	D 1		0.00	Dry						
0.30	ES 2	PID=<1.0 ppmv			Orangish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint.		0.60	+6.14	1	
0.30	B 3									
0.30 - 0.60	ES 4	PID=<1.0 ppmv			Soft becoming firm brown mottled bluish grey slightly sandy CLAY. Sand is fine to coarse.		(0.70)		1	
0.60	B 5									
0.60 - 1.00	D 6						1.30	+5.44	1	
1.20 - 1.65	SPTS	N=9 (1,1/2,2,2,3)	0.00	1.10						
1.20 - 1.65	D 7								1	
1.20 - 1.65	B 8									
1.30	ES 9	PID=<1.0 ppmv							1	
1.30	D 10									
2.20 - 2.65	UT 11	25 blows 100% rec	1.60	Damp					1	
2.30	ES 15	PID=<1.0 ppmv								
2.30	D 16								1	
2.65	D 12									
2.70 - 3.15	SPTS	N=10 (1,2/2,2,3,3)	1.60	Damp					1	
2.70 - 3.15	D 13									
2.70 - 3.15	B 14								1	
3.20 - 3.65	UT 17	40 blows 100% rec	1.60	Damp						
3.30	ES 20	PID=<1.0 ppmv					(4.35)		1	
3.30	D 21									
3.65	D 18								1	
3.70 - 4.15	SPTS	N=11 (1,2/2,2,3,4)	1.60	Damp						
3.70 - 4.15	D 19								1	
3.70 - 4.15	B 22									
4.20 - 4.65	UT 23	45 blows 100% rec	1.60	Damp					1	
4.30	ES 26	PID=<1.0 ppmv								
4.30	D 27								1	
4.65	D 24									
4.70 - 5.15	SPTS	N=16 (2,3/3,4,4,5)	1.60	Damp					1	
4.70 - 5.15	D 25									
4.70 - 5.15	B 28								1	
5.20 - 5.65	UT 29	45 blows 100% rec	1.60	Damp						
5.30	ES 32	PID=<1.0 ppmv					5.65	+1.09	1	
5.30	D 33									
5.65	D 30								1	
5.70 - 6.15	SPTS	N=16 (2,3/3,4,4,5)	1.60	Damp						
5.70 - 6.15	D 31								1	
6.30	D 34									
6.70 - 7.15	UT 35	40 blows 100% rec	1.60	Damp					1	
6.80	ES 38	PID=<1.0 ppmv								
7.15	D 36								1	
7.20 - 7.65	SPTS	N=19 (2,3/4,4,5,6)	1.60	Damp						
7.20 - 7.65	D 37						(3.65)		1	
7.30	D 39									
8.20 - 8.65	UT 40	50 blows 89% rec	1.60	Damp					1	
8.30	ES 43	PID=<1.0 ppmv								
8.30	D 44								1	
8.65	D 41									
8.70 - 9.15	SPTS	N=26 (15,8/8,6,6,6)	1.60	Damp					1	
8.70 - 9.15	D 42									
8.70 - 9.10	B 45								1	
9.20	W 46		13/05/19	1800						
9.30	D 47		14/05/19	0800						
			1.60	Damp	Stiff becoming very stiff grey slightly silty CLAY.		9.30	-2.56	1	
9.70 - 10.15	UT 48	60 blows 56% rec	1.60	Damp						
9.80	ES 51	PID=<1.0 ppmv							1	
9.80										

Groundwater Entries				Depth Related Remarks				Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used		
1	1.20	Rose to 1.10 m after 20 minutes. Seepage	1.50	0.00 - 19.00	50mm diameter standpipe installed.					
2	8.60	Rose to 8.55 m after 20 minutes. Seepage								

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH110
Scale 1:50	Project No.	G9017-19		
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Borehole Log

PRELIMINARY



Drilled TL	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	6.74 mOD
Logged SW	13/05/2019	Dando 3000 Hand dug pit then cable percussion drilling to 20m.	0.00	20.00	150	1.60	Coordinates (m)	E 587583.85
Checked	End						National Grid	N 176420.36
Approved	14/05/2019							

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill	
10.15 10.20 - 10.65 10.20 - 10.65 10.30	D 49 SPTS D 50 D 52	N=19 (2,3/3,4,6,6)	1.60	Damp	Stiff becoming very stiff grey slightly silty CLAY.					
11.20 - 11.65 11.30 11.30 11.30	UT 53 ES 56 D 57	65 blows 100% rec PID=<1.0 ppmv	1.60	Damp						
11.65 11.70 - 12.15 11.70 - 12.15	D 54 SPTS D 55	N=22 (3,3/4,5,6,7)	1.60	Damp						
12.30	D 58									
12.70 - 13.15 12.80 12.80	UT 59 ES 62	60 blows 100% rec PID=<1.0 ppmv	1.60	Dry						
13.15 13.20 - 13.65 13.20 - 13.65 13.30	D 60 SPTS D 61 D 63	N=26 (5,5/6,6,7,7)	1.60	Dry						
14.20 - 14.65 14.30 14.30 14.30	UT 64 ES 67 D 68	65 blows 100% rec PID=<1.0 ppmv	1.60	Dry						
14.65 14.70 - 15.15 14.70 - 15.15	D 65 SPTS D 66	N=24 (4,4/6,6,6,6)	1.60	Dry			(10.70)			
15.30	D 69									
15.70 - 16.15 15.80 15.80	UT 70 ES 73	65 blows 100% rec PID=<1.0 ppmv	1.60	Dry						
16.15 16.20 - 16.65 16.20 - 16.65 16.30	D 71 SPTS D 72 D 74	N=29 (5,5/6,7,8,8)	1.60	Dry						
17.20 - 17.65 17.30 17.30 17.30	UT 75 ES 78 D 79	65 blows 100% rec PID=<1.0 ppmv	1.60	Dry						
17.65 17.70 - 18.15 17.70 - 18.15	D 76 SPTS D 77	N=29 (4,5/7,7,7,8)	1.60	Dry						
18.30	D 80									
18.70 - 19.15 18.80 18.80	UT 81 ES 84	65 blows 100% rec PID=<1.0 ppmv	1.60	Dry						
19.15 19.20 - 19.65 19.20 - 19.65 19.30	D 82 SPTS D 83 D 85	N=34 (5,6/7,7,9,11)	1.60	Dry						
			14/05/19 1.60	1749 Dry						
END OF EXPLORATORY HOLE							20.00	-13.26		

Groundwater Entries			Depth Related Remarks		Hard Boring			
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH110
Scale 1:50	Project No.	G9017-19		
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Borehole Log

PRELIMINARY



Drilled CR	Start 10/05/2019	Equipment, Methods and Remarks Dando 3000 Hand dug inspection pit then cable percussion drilling to 20m.	Depth from (m) 0.00	to (m) 20.00	Diameter (mm) 150	Casing Depth (m) 2.50	Ground Level 4.44 mOD
Logged LF	End 13/05/2019						Coordinates (m) E 587400.22
Checked							National Grid N 176412.42
Approved							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
0.40	ES 1	PID=4.3 ppmv	10/05/19	1300	Topsoil.		(0.40)			
0.40			0.00	Dry			+4.04			
1.00	ES 2	PID=1.2 ppmv			Soft orangish brown mottled light grey sandy slightly gravelly CLAY. Sand is medium to coarse. Gravel is subangular to subrounded fine to coarse chert.		(0.60)			
1.00	D 3				(SUPERFICIAL DEPOSITS)		+3.44			
1.00	SPTC		0.00	Dry	Orangish brown slightly gravelly clayey SAND. Sand is medium to coarse. Gravel is subrounded fine to coarse chert.		(1.00)			
1.20 - 1.65	B 4	N=18 (1,3/6,4,4,4)			(SUPERFICIAL DEPOSITS)					
2.00	ES 5	PID=1.6 ppmv			Soft brown slightly gravelly sandy CLAY. Sand is medium to coarse. Gravel is subrounded fine to coarse chert.		(0.40)			
2.00	B 6		1.50	Dry	(SUPERFICIAL DEPOSITS)		+2.44			
2.00 - 2.65	SPTC	N=11 (1,1/2,2,3,4)			Stiff brown with occasional grey mottles CLAY. With localised pockets of orangish brown fine sand and rare rounded fine to medium chert gravel from 2.40-3.00m.		(2.40)			
2.20 - 2.65					(LONDON CLAY?)		+2.04			
3.00	ES 7	PID=2.6 ppmv					(1.60)			
3.00	UT 8	35 blows 100% rec	2.50	Dry						
3.20 - 3.65										
3.70	SPTS	N=9 (1,2/2,2,2,3)	2.50	Dry						
3.70	D 9		10/05/19	1430						
3.70 - 4.15	D 10		2.50	Dry						
4.00	ES 11	PID=2.0 ppmv			Stiff very closely fissured brown CLAY with frequent disseminated mica and occasional pockets of orangish brown fine sand. Possible selenite at 6.50m.		(4.00)			
4.00	UT 12	50 blows 100% rec	13/05/19	1000	(LONDON CLAY)		+0.44			
4.20 - 4.65			2.50	Dry						
4.70	SPTS	N=17 (2,2/4,3,5,5)	2.50	Dry						
4.70	D 13									
4.70 - 5.15	D 14									
5.00	ES 15	PID=<1.0 ppmv								
5.00	UT 16	55 blows 100% rec	2.50	Dry						
5.20 - 5.65										
5.70	SPTS	N=17 (2,3/3,4,5,5)	2.50	Dry						
5.70	D 17									
5.70 - 6.15	D 18									
							(4.70)			
6.50	ES 19	PID=<1.0 ppmv								
6.50	UT 20	50 blows 100% rec	2.50	Dry						
6.70 - 7.15										
7.20	SPTS	N=19 (2,3/4,4,5,6)	2.50	Dry						
7.20	D 21									
7.20 - 7.45	D 22									
8.00	ES 23	PID=<1.0 ppmv								
8.00	UT 24	60 blows 100% rec	2.50	Dry						
8.20 - 8.65										
8.70	SPTS	N=17 (2,4/4,4,4,5)	2.50	Dry						
8.70	D 25									
8.70 - 9.15	D 26				Stiff to very stiff very closely fissured grey CLAY with occasional small pockets of light grey silt. Possible selenite at 11.0m.		(8.70)			
					(LONDON CLAY)		-4.26			
9.50	ES 27	PID=<1.0 ppmv								
9.50	UT 28	70 blows 89% rec	2.50	Dry						
9.70 - 10.15										

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used
1	1.10	Seepage		0.00 - 2.00	50mm diameter standpipe installed.			

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project NeuConnect Isle of Grain	Borehole BH111
Scale 1:50	Project No. G9017-19	Sheet 1 of 2
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Borehole Log

PRELIMINARY



Drilled CR	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	4.44 mOD
Logged LF	10/05/2019	Dando 3000 Hand dug inspection pit then cable percussion drilling to 20m.	0.00	20.00	150	2.50	Coordinates (m)	E 587400.22
Checked	End						National Grid	N 176412.42
Approved	13/05/2019							

Samples and Tests

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
10.20 - 10.65	SPTS D 29 D 30	N=21 (2,3/4,5,5,7)	2.50	Dry	Stiff to very stiff very closely fissured grey CLAY with occasional small pockets of light grey silt. Possible selenite at 11.0m. (LONDON CLAY)					
11.00	ES 31	PID=<1.0 ppmv								
11.20 - 11.65	UT 32	70 blows 89% rec	2.50	Dry						
11.70 - 12.15	SPTS D 33 D 34	N=22 (2,4/4,5,6,7)	2.50	Dry						
12.50	ES 35	PID=<1.0 ppmv								
12.70 - 13.15	UT 36	60 blows 100% rec	2.50	Dry						
13.20 - 13.65	SPTS D 37 D 38	N=22 (3,3/4,5,6,7)	2.50	Dry						
14.00	ES 39	PID=<1.0 ppmv					14.00 pyrite	(11.30)		
14.20 - 14.65	UT 40	70 blows 100% rec	2.50	Dry						
14.70 - 15.15	SPTS D 41 D 42	N=23 (2,3/5,5,6,7)	2.50	Dry						
15.50	ES 43	PID=<1.0 ppmv								
15.70 - 16.15	UT 44	70 blows 100% rec	2.50	Dry						
16.20 - 16.65	SPTS D 45 D 46	N=25 (3,3/5,6,6,8)	2.50	Dry			16.00 angular-medium gravel of possible gypsum/siltstone?			
17.00	ES 47	PID=<1.0 ppmv								
17.20 - 17.65	UT 8	85 blows 88% rec	2.50	Dry						
17.70 - 18.15	SPTS D 49 D 50	N=28 (3,4/5,7,8,8)	2.50	Dry						
18.50	ES 51	PID=<1.0 ppmv					18.50 small siltstone gravels			
18.70 - 19.15	UT 52	85 blows 100% rec	2.50	Dry						
19.20 - 19.65	SPTS D 53 D 56	N=25 (3,4/5,6,6,8)	2.50	Dry						
20.00	ES 55	PID=<1.0 ppmv								
20.00					END OF EXPLORATORY HOLE		20.00	-15.56		

Groundwater Entries			Depth Related Remarks		Hard Boring			
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH111
Scale 1:50	Project No.	G9017-19		
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Borehole Log

PRELIMINARY



Drilled CR	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	8.87 mOD
Logged LF	09/05/2019	Dando 3000 Hand dug inspection pit then cable percussion drilling to 20m. Checked for water flow at 20m started dry and remained dry after 20 minutes.	0.00	20.00	150	2.50	Coordinates (m)	E 587587.18
Checked	End						National Grid	N 176293.54
Approved	10/05/2019							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
0.30 0.30	ES 1	PID=3.3 ppmv	09/05/19 0.00	0915 Dry	Soft to firm brown slightly gravelly, sandy CLAY. Sand is fine. Gravel is sub-angular to sub-rounded, fine to coarse chert. Rare angular fine brick gravel. (MADE GROUND)		(0.90)			
1.00 1.00 1.00 1.20 - 1.65 1.20 - 1.60 1.60	ES 2 D 3 SPTC D 4 D 5	PID=1.1 ppmv N=17 (1,3/4,5,4,4)	0.00	1.05	Brown, gravelly, slightly clayey SAND. Sand is medium to coarse. Gravel is sub-angular to rounded, fine to coarse chert. (SUPERFICIAL DEPOSITS)		0.90 (0.70)	+7.97		
2.00 2.00 2.20 - 2.65	ES 6 UT 7	PID=2.4 ppmv 30 blows 100% rec	2.10	Wet	Stiff, brown mottled grey CLAY. With rare relic roots. Rare pockets of fine orangish brown sand. (LONDON CLAY)			+7.27		
2.70 - 3.15 2.70 2.70 - 3.15 3.00 3.00 3.20 - 3.65	SPTS D 8 D 9 ES 10 UT 11	N=11 (1,2/2,2,3,4) PID=1.7 ppmv 40 blows 100% rec	2.10	Wet						
3.70 - 4.15 3.70 4.00 4.00 4.20 - 4.65	SPTS D 12 D 13 ES 14 UT 15	N=15 (1,2/3,3,4,5) PID=<1.0 ppmv 40 blows 100% rec	2.50	Dry			(5.60)			
4.70 - 5.15 4.70 4.70 - 5.15 5.00 5.00 5.20 - 5.65	SPTS D 16 D 17 ES 18 UT 19	N=15 (2,2/3,3,4,5) PID=1.1 ppmv 50 blows 100% rec	2.50	Dry						
5.70 - 6.15 5.70 5.70 - 6.15	SPTS D 20 D 21	N=17 (2,2/4,4,4,5)	2.50	Dry						
6.50 6.50 6.70 - 7.15	ES 22 UT 23	PID=<1.0 ppmv 50 blows 100% rec	2.50	Dry						
7.20 - 7.65 7.20 7.20 - 7.65	SPTS D 24 D 25	N=20 (2,3/4,5,5,6)	2.50	Dry	Stiff grey very closely fissured slightly silty CLAY. (LONDON CLAY)		7.20	+1.67		
8.00 8.00 8.20 - 8.65	ES 26 UT 27	PID=1.0 ppmv 70 blows 100% rec	2.50	Dry						
8.70 - 9.15 8.70 8.70 - 9.15	SPTS D 28 D 29	N=18 (2,3/3,4,5,6)	2.50	Dry						
9.50 9.50 9.70 - 10.15	ES 30 UT 31	PID=<1.0 ppmv 80 blows 100% rec	2.50	Dry						

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used
1	1.20	Rose to 1.05 m after 15 minutes.		0.00 - 1.60	50mm diameter standpipe installed.			
				1.20 - 1.60	Water added to assist drilling.			

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH112
Scale 1:50	Project No.	G9017-19		
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Borehole Log

PRELIMINARY



Drilled CR	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	8.87 mOD
Logged LF	09/05/2019	Dando 3000 Hand dug inspection pit then cable percussion drilling to 20m. Checked for water flow at 20m started dry and remained dry after 20 minutes.	0.00	20.00	150	2.50	Coordinates (m)	E 587587.18
Checked	End						National Grid	N 176293.54
Approved	10/05/2019							

Samples and Tests

Samples and Tests					Strata Description				
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.20 - 10.65	SPTS	N=19 (2,3/3,5,5,6)	2.50	Dry	Stiff grey very closely fissured slightly silty CLAY. (LONDON CLAY)				
10.20	D 32								
10.20 - 10.65	D 33								
11.00	ES 34	PID=1.3 ppmv							
11.20 - 11.65	UT 35	70 blows 100% rec	2.50	Dry					
11.70 - 12.15	SPTS	N=18 (2,3/3,4,5,6)	2.50	Dry					
11.70	D 36								
11.70 - 12.15	D 37								
12.50	ES 38	PID=<1.0 ppmv							
12.70 - 13.15	UT 39	70 blows 89% rec	2.50	Dry					
13.20 - 13.65	SPTS	N=22 (2,3/4,5,6,7)	2.50	Dry					
13.20	D 40		09/05/19	1700					
13.20 - 13.65	D 41		2.50	Dry					
			10/05/19	0800					
			2.50	Dry					
14.00	ES 42	PID=<1.0 ppmv				14.00-20.00 Small shell fragments.	(12.80)		
14.20 - 14.65	UT 43	65 blows 100% rec	2.50	Dry					
14.70 - 15.15	SPTS	N=23 (3,4/5,6,6,6)	2.50	Dry		14.50-20.00 Very fine grained disseminated pyrite?			
14.70	D 44								
14.70 - 15.15	D 45								
15.50	ES 46	PID=1.1 ppmv							
15.70 - 16.15	UT 47	70 blows 89% rec	2.50	Dry					
16.20 - 16.65	SPTS	N=25 (3,4/5,5,7,8)	2.50	Dry					
16.20	D 48								
16.20 - 16.65	D 49								
17.00	ES 50	PID=<1.0 ppmv				17.00 Nodule of pyrite.			
17.20 - 17.65	UT 51	90 blows 100% rec	2.50	Dry					
17.70 - 18.15	SPTS	N=28 (4,4/7,6,7,8)	2.50	Dry					
17.70	D 52								
17.70 - 18.15	D 53								
18.50	ES 54	PID=<1.0 ppmv							
18.70 - 19.15	UT 55	95 blows 100% rec	2.50	Dry					
19.20 - 19.65	SPTS	N=27 (3,5/7,6,6,8)	2.50	Dry					
19.20	D 56								
19.20 - 19.65	D 57								
20.00	ES 58	PID=<1.0 ppmv	10/05/19	1030					
20.00			2.50	Dry	END OF EXPLORATORY HOLE		20.00 - 11.13		

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used

Borehole Log

PRELIMINARY



Drilled	TL	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	9.15 mOD
Logged	SW	09/05/2019	Dando 3000 Hand dug inspection pit then cable percussion drilling to 15.2m.	0.00	15.20	200	3.00	Coordinates (m)	E 587676.68
Checked		End						National Grid	N 176297.18
Approved		10/05/2019							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
0.10	D 1		09/05/19	0800	Brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse flint, quartzite and chalk. Occasional rootlets. (POSSIBLE MADE GROUND?)					
0.20	ES 2	PID=<1.0 ppmv	0.00	Dry				(0.60)		
0.30 - 0.60	B 3									
0.60	ES 5	PID=<1.0 ppmv			Soft orangish brown slightly gravelly very sandy CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of flint.					
0.60	D 4							0.60	+8.55	
0.70 - 1.00	B 6									
1.10	D 7				Orangish brown sandy slightly clayey GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of flint.					
1.20 - 1.65	SPTS	N=18 (2,2/3,3,5,7)	0.00	1.10				1.20	+7.95	
1.20	ES 10	PID=<1.0 ppmv								
1.20	D 8									
1.20 - 1.65	B 9									
1.80	D 11									
2.20 - 2.65	SPTS	N=26 (3,5/5,7,7,7)	2.20	0.50	Orangish brown slightly gravelly SAND. Sand is fine to coarse. Gravel is angular to subangular fine to medium occasionally coarse flint.					
2.20	ES 14	PID=<1.0 ppmv						2.20	+6.95	
2.20	D 12									
2.20	B 13							(0.50)		
2.20 - 2.70	ES 15	PID=<1.0 ppmv			Firm becoming stiff orangish brown with occasional bluish grey slightly sandy slightly silty CLAY. Sand is fine.					
2.70	B 16							2.70	+6.45	
2.70 - 3.00	D 17									
3.20 - 3.65	UT 18	50 blows 100% rec	3.00	Damp						
3.65	D 19									
3.70 - 4.15	SPTS	N=18 (3,3/4,4,5,5)	3.00	Damp						
3.70	ES 22	PID=<1.0 ppmv								
3.70	D 20									
3.70	B 21									
3.70 - 4.20	UT 23	45 blows 100% rec	3.00	Damp						
4.20 - 4.65										
4.65	D 24									
4.70 - 5.15	SPTS	N=16 (2,2/3,4,4,5)	3.00	Damp						
4.70	ES 27	PID=<1.0 ppmv								
4.70	D 25									
4.70	B 26									
4.70 - 5.20	UT 28	50 blows 100% rec	3.00	Dry						
5.20 - 5.65										
5.65	D 29									
5.70 - 6.15	SPTS	N=16 (2,2/3,4,4,5)	3.00	Dry						
5.70	ES 32	PID=<1.0 ppmv								
5.70	D 30		09/05/19	1815						
5.70	B 31		3.00	Dry						
5.70 - 6.20										
6.50	D 33		10/05/19	0800						
6.50			3.00	Damp						
6.70	UT 34	70 blows 100% rec	3.00	Dry						
7.15	D 35									
7.20 - 7.65	SPTS	N=22 (2,3/4,5,6,7)	3.00	Dry						
7.20	ES 38	PID=<1.0 ppmv								
7.20	D 36									
7.20	B 37									
7.20 - 7.70	D 39									
7.50										
8.20 - 8.65	UT 40	75 blows 100% rec	3.00	Damp						
8.50	D 43									
8.65	D 41									
8.70 - 9.15	SPTS	N=23 (3,4/4,5,7,7)	3.00	Damp						
8.70	ES 44	PID=<1.0 ppmv								
8.70	D 42									
8.70 - 9.15										
9.50	D 45									
9.70 - 10.15	UT 46	75 blows 100% rec	3.00	Damp						

Groundwater Entries				Depth Related Remarks				Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used		
1	1.20	Rose to 1.10 m after 20 minutes. Seepage		0.00 - 2.70	50mm diameter standpipe installed.					
				1.20 - 2.60	Water added to assist drilling.					

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH113
Scale 1:50	Project No.	G9017-19		
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Borehole Log

PRELIMINARY



Drilled TL	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	9.15 mOD
Logged SW	09/05/2019	Dando 3000 Hand dug inspection pit then cable percussion drilling to 15.2m.	0.00	15.20	200	3.00	Coordinates (m)	E 587676.68
Checked	End						National Grid	N 176297.18
Approved	10/05/2019							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
10.15 10.20 - 10.65 10.20 10.20 10.20 - 10.65 10.50	D 47 SPTS ES 49 D 48 D 50	N=25 (3,4/4,5,7,9) PID=<1.0 ppmv	3.00	Damp	Firm becoming stiff orangish brown with occasional bluish grey slightly sandy slightly silty CLAY. Sand is fine. Stiff becoming very stiff bluish grey slightly silty CLAY.		10.20 -1.05			
11.20 - 11.65	UT 51	70 blows 100% rec	3.00	Dry						
11.50 11.65 11.70 - 12.15 11.70 11.70	D 54 D 52 SPTS ES 55 D 53	N=24 (3,3/4,6,7,7) PID=<1.0 ppmv	3.00	Dry		11.65 becoming very stiff (and slightly micaceous)				
12.50	D 56						(5.00)			
12.70 - 13.15	UT 57	75 blows 89% rec	3.00	Dry						
13.15 13.20 - 13.65 13.20 13.20 13.20 - 13.65 13.50	D 58 SPTS ES 60 D 59 D 61	N=27 (4,4/5,6,7,9) PID=<1.0 ppmv	3.00	Dry						
14.20 - 14.65	UT 62	80 blows 100% rec	3.00	Dry						
14.50 14.65 14.70 - 15.15 14.70 14.70	D 65 D 63 SPTS ES 66 D 64	N=27 (4,4/5,6,7,9) PID=<1.0 ppmv	3.00	Dry						
14.70 - 15.15			10/05/19 3.00	1449 Dry						
					END OF EXPLORATORY HOLE		15.20 -6.05			

Groundwater Entries	Depth Related Remarks	Hard Boring
No. Depth Strike (m) Remarks	Depth Sealed (m) Depths (m) Remarks	Depths (m) Duration (mins) Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project NeuConnect Isle of Grain	Borehole
Scale 1:50 © Copyright SOCOTEC UK Limited 24/05/2019 11:52:58	Project No. G9017-19 Carried out for AECOM	BH113 Sheet 2 of 2

Borehole Log

PRELIMINARY



Drilled	TL	Start	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level	9.65 mOD
Logged	SW	15/05/2019	Dando 3000 Hand dug pit then cable percussion drilling to 5.15m. (Hole advanced to 5.7m and abandoned in attempt to retrieve broken spoon)	0.00	5.15	150	3.00	Coordinates (m)	E 587696.73
Checked		End	No groundwater encountered.					National Grid	N 176153.03
Approved		15/05/2019							

Samples and Tests				Strata Description				Depth, Level	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	(Thickness)			
0.10	D 1		15/05/19	0800	Brown gravelly slightly clayey SAND. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint. Some rootlets. (POSSIBLE MADE GROUND)		(0.60)			
0.20	ES 2	PID=<1.0 ppmv	0.00	Dry						
0.20	B 3									
0.20 - 0.60										
0.60	ES 5	PID=<1.0 ppmv			Soft/very soft orangish brown and grey slightly gravelly very sandy CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite and flint. (SUPERFICIAL DEPOSITS)		0.60	+9.05		
0.60	D 4									
0.60	B 6									
0.60 - 1.00										
1.10	D 7				Orangish brown very sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint. (SUPERFICIAL DEPOSITS)		(0.70)			
1.20 - 1.65	SPTS	N=39 (4,5/8,7,12,12)	0.00	Dry						
1.20 - 1.65	D 8									
1.20 - 1.60	B 9									
1.30	ES 10	PID=1.0 ppmv			Firm orangish brown mottled bluish grey slightly sandy CLAY. Sand is fine to coarse. (LONDON CLAY)		1.30	+8.35		
1.30	D 11									
1.50	D 12									
1.70	ES 13	PID=<1.0 ppmv					1.70	+7.95		
1.80										
1.80										
2.20 - 2.65	SPTS	N=7 (1,0/1,2,2,2)	2.20	Damp			(0.60)			
2.20 - 2.65	D 14									
2.20 - 2.60	B 15									
2.40	ES 16	PID=<1.0 ppmv					2.30	+7.35		
2.40	D 17									
2.60										
3.20 - 3.65	UT 18	50 blows 100% rec	3.00	Dry						
3.40	ES 21	PID=<1.0 ppmv								
3.40										
3.60	D 22									
3.65	D 19									
3.70 - 4.15	SPTS	N=11 (1,2/2,2,3,4)	3.00	Dry			(2.85)			
3.70	D 20									
4.20 - 4.65	UT 23	50 blows 100% rec	3.00	Dry						
4.40	ES 25	PID=<1.0 ppmv								
4.40										
4.60	D 26									
4.65	D 24									
4.70 - 5.15	SPTS	N=18 (2,2/3,4,5,6)	3.00	Dry						
			15/05/19	1315						
			3.00	Dry	END OF EXPLORATORY HOLE		5.15	+4.50		

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used
				5.15	Hole terminated due to losing SPT spoons.			

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH114
Scale 1:50	Project No.	G9017-19		
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Borehole Log

PRELIMINARY



Drilled TL	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	9.67 mOD
Logged	15/05/2019	Dando 3000 Hand dug pit then cable percussion drilling to 15m	0.00	15.00	150	3.10	Coordinates (m)	E 587694.40
Checked	End						National Grid	N 176154.85
Approved	16/05/2019							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
0.20	D 1		15/05/19	1448	Brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is angular to subangular fine to coarse flint. Some rootlets. (TOPSOIL)		(0.70)			
0.20 - 0.70	B 2		0.00	Dry						
0.40	ES 3	PID=<1.0 ppmv			Soft/very soft orangish brown and grey slightly gravelly very sandy CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint and quartzite. (SUPERFICIAL DEPOSITS)	1.80 becoming gravelly	0.70			
0.40										
0.70	ES 6	PID=<1.0 ppmv								
0.70	D 4									
0.70	B 5									
0.70 - 1.00	D 7									
1.10	SPTS	N=8 (1,2/2,2,2,2)	0.00	Dry						
1.20 - 1.65	D 8									
1.20 - 1.65	B 9									
1.20 - 1.60										
1.80	ES 10	PID=<1.0 ppmv			Firm becoming stiff brown mottled bluish grey slightly silty CLAY. (LONDON CLAY)	2.30	+7.37			
1.80	D 11									
1.80										
2.20 - 2.65	SPTS	N=10 (2,2/2,2,3,3)	1.60	Dry						
2.20 - 2.65	D 12									
2.20 - 2.60	B 13									
2.50	ES 14	PID=<1.0 ppmv								
2.50										
2.80	D 15									
3.20 - 3.65	UT 16	35 blows 100% rec	1.60	Damp						
3.50	ES 19	PID=<1.0 ppmv			3.70 becoming slightly gravelly (possible fall in?). Gravel is angular to subangular fine to coarse flint					
3.50	D 17									
3.65	SPTS	N=10 (2,2/2,2,3,3)	1.60	Damp						
3.70 - 4.15	D 18									
3.70 - 4.15	B 20									
3.70 - 4.20	D 21									
3.80	UT 22	40 blows 100% rec	1.60	Damp						
4.20 - 4.65										
4.50	ES 25	PID=<1.0 ppmv								
4.50	D 23									
4.65	SPTS	N=16 (3,3/3,4,4,5)	1.60	Damp						
4.70 - 5.15	D 24									
4.70 - 5.15	D 26									
4.80					4.80 becoming greyish brown mottled					
5.20 - 5.65	UT 27	35 blows 100% rec	3.10	Damp						
5.50	ES 30	PID=<1.0 ppmv								
5.50	D 28									
5.65	SPTS	N=16 (3,3/4,4,4,4)	3.10	Damp						
5.70 - 6.15	D 29									
5.70 - 6.15	D 31									
5.80										
6.50	D 32									
6.70 - 7.15	UT 33	35 blows 100% rec	3.10	Damp						
7.00	ES 36	PID=<1.0 ppmv			7.15 becoming greyish brown					
7.00	D 34									
7.15	SPTS	N=21 (3,5/5,5,5,6)	3.10	Damp						
7.20 - 7.65	D 35									
7.20 - 7.65	D 37									
7.50										
8.20 - 8.65	UT 38	50 blows 100% rec	3.10	Dry						
8.50	ES 42	PID=<1.0 ppmv								
8.50	D 41									
8.50	D 39									
8.65	SPTS	N=21 (2,4/4,6,5,6)	3.10	Dry						
8.70 - 9.15	D 40									
8.70 - 9.15					Stiff becoming very stiff bluish grey slightly silty CLAY. (LONDON CLAY)	8.70	+0.97			
9.50	D 43									
9.70 - 10.15	UT 44	50 blows 100% rec	3.10	Dry						

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used
				0.00 - 14.00	50mm diameter standpipe installed.			
				7.70 - 15.00	Water added to assist drilling.			

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH114A
Scale 1:50	Project No.	G9017-19		
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Borehole Log

PRELIMINARY



Drilled TL	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	9.67 mOD
Logged	15/05/2019	Dando 3000 Hand dug pit then cable percussion drilling to 15m	0.00	15.00	150	3.10	Coordinates (m)	E 587694.40
Checked	End						National Grid	N 176154.85
Approved	16/05/2019							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail				
10.00	ES 47	PID=<1.0 ppmv	3.10	Dry	Stiff becoming very stiff bluish grey slightly silty CLAY. (LONDON CLAY)					
10.00	D 45									
10.15	SPTS									
10.20 - 10.65	D 46	N=26 (3,4/5,6,7,8)								
10.20 - 10.65	D 48									
10.50										
11.20 - 11.65	UT 49	50 blows 100% rec	3.10	Dry						
11.50	ES 53	PID=<1.0 ppmv								
11.50	D 52		3.10	Dry						
11.50	D 50									
11.65	SPTS									
11.70 - 12.15	D 51	N=27 (3,4/7,6,5,9)					(6.45)			
11.70 - 12.15										
12.50	D 54									
12.70 - 13.15	UT 55	55 blows 100% rec	3.10	Dry						
13.00	ES 58	PID=<1.0 ppmv								
13.00	D 56		3.10	Dry						
13.15	SPTS									
13.20 - 13.65	D 57	N=26 (4,4/5,7,7,7)								
13.20 - 13.65	D 59									
13.50										
14.20 - 14.65	UT 60	55 blows 100% rec	3.10	Dry						
14.50	ES 64	PID=<1.0 ppmv								
14.50	D 63		3.10	Dry						
14.50	D 61									
14.65	SPTS									
14.70 - 15.15	D 62	N=28 (4,4/7,7,7,7)	16/05/19	1243						
14.70 - 15.15			3.10	Dry						
END OF EXPLORATORY HOLE							15.15	-5.48		

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	NeuConnect Isle of Grain	Borehole	BH114A
Scale 1:50	Project No.	G9017-19		
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Borehole Log

PRELIMINARY



Drilled CR	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	9.68 mOD
Logged LF	15/05/2019	Dando 3000 Hand dug pit then cable percussion drilling to 15m.	0.00	15.00	150	2.80	Coordinates (m)	E 587800.69
Checked	End						National Grid	N 176078.98
Approved	15/05/2019							

Samples and Tests

Samples and Tests				Strata Description				Depth, Level (Thickness)		Legend	Backfill
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill		
0.30 0.30 - 0.40	ES 1	PID=1.1 ppmv	15/05/19 0.00	0900 Dry	Topsoil. Soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gavel is subrounded to rounded fine to coarse flint and chert. (SUPERFICIAL DEPOSITS?)		0.15 (+9.54) (0.55)				
1.00 1.00 1.00 1.20 - 1.65 1.20 - 1.65	ES 2 D 3 SPTC B 4	PID=1.7 ppmv N=13 (1,3/2,3,3,5)	0.00	Wet	Soft light brown mottled greyish white slightly sandy slightly gravelly CLAY. Sand is medium to coarse. Gravel is subangular to subrounded fine chalk(?) (SUPERFICIAL DEPOSITS?) Orangish brown slightly gravelly clayey SAND. Sand is fine to coarse. Gravel is subrounded fine to coarse chert. (SUPERFICIAL DEPOSITS?)		0.70 (+8.98) (0.40) 1.10 (+8.59) (0.35) 1.45 (+8.24)				
2.00 2.00 2.20 - 2.65 2.20 - 2.65	ES 5 SPTS D 6	PID=3.6 ppmv N=10 (1,2/2,3,3)	2.10	Wet	Firm to stiff brown with grey mottles CLAY with occasional relic rootlets. With occasional pockets of orangish brown sand from 2.7m. Becoming grey with very closely spaced fissures infilled with orangish brown fine sand from 7.20m. (LONDON CLAY)						
3.00 3.00 3.20	ES 7 UT 8	PID=1.0 ppmv 30 blows 100% rec	2.80	Dry							
3.70 - 4.15 3.70 3.70 - 4.15 4.00 4.00 4.20 - 4.65	SPTS D 9 D 10 ES 11 UT 12	N=13 (1,2/2,3,3,5) PID=<1.0 ppmv 35 blows 100% rec	2.80	Dry							
4.70 - 5.15 4.70 4.70 - 5.15 5.00 5.00 5.20 - 5.65	SPTS D 13 D 14 ES 15 UT 16	N=15 (2,2/3,3,4,5) PID=<1.0 ppmv 45 blows 89% rec	2.80	Dry			(6.55)				
5.70 - 6.15 5.70 5.70 - 6.15	SPTS D 17 D 18	N=17 (2,2/4,4,4,5)	2.80	Dry							
6.50 6.50 6.70 - 7.15	ES 19 UT 20	PID=<1.0 ppmv 60 blows 89% rec	2.80	Dry							
7.20 - 7.65 7.20 7.20 - 7.65	SPTS D 21 D 22	N=18 (2,4/4,5,5)	2.80	Dry							
8.00 8.00 8.20 - 8.65	ES 23 UT 24	PID=<1.0 ppmv 55 blows 89% rec	2.80	Dry	Stiff grey very closely fissured slightly silty CLAY with occasional pyrite. (LONDON CLAY)		8.00 (+1.68)				
8.70 - 9.15 8.70 8.70 - 9.15	SPTS D 25 D 26	N=21 (2,4/4,5,5,7)	2.80	Dry							
9.50 9.50 9.70 - 10.15	ES 27 UT 28	PID=<1.0 ppmv 65 blows 89% rec	2.80	Dry							

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used
1	1.20	No flow						

Borehole Log

PRELIMINARY



Drilled CR	Start 15/05/2019	Equipment, Methods and Remarks Dando 3000 Hand dug pit then cable percussion drilling to 15m.	Depth from (m) 0.00	to (m) 15.00	Diameter (mm) 150	Casing Depth (m) 2.80	Ground Level 9.68 mOD
Logged LF	End 15/05/2019						Coordinates (m) E 587800.69
Checked							National Grid N 176078.98
Approved							

Samples and Tests

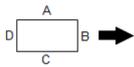
Samples and Tests				Strata Description					
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.20 - 10.65	SPTS	N=22 (3,3/5,5,6,6)	2.80	Dry	Stiff grey very closely fissured slightly silty CLAY with occasional pyrite. (LONDON CLAY)		(7.00)		
10.20	D 29								
10.20 - 10.65	D 30								
11.00	ES 31	PID=<1.0 ppmv							
11.00	UT 32	75 blows 89% rec	2.80	Dry					
11.20 - 11.65									
11.70 - 12.15	SPTS	N=26 (3,3/5,6,7,8)	2.80	Dry					
11.70	D 33								
11.70 - 12.15	D 34								
12.50	ES 35	PID=<1.0 ppmv							
12.50	UT 36	75 blows 89% rec	2.80	Dry					
12.70 - 13.15									
13.20 - 13.65	SPTS	N=26 (3,4/5,6,7,8)	2.80	Dry					
13.70	D 37								
13.70 - 14.15	D 38								
14.00	ES 39	PID=<1.0 ppmv							
14.00	UT 40	85 blows 100% rec	2.80	Dry					
14.20 - 14.65									
14.65 - 15.15	D 42		2.80	Dry					
14.70 - 15.15	SPTS	N=27 (3,4/5,6,7,9)	15/05/19	1700					
14.70	D 41		2.80	Dry					
15.00	D 43								
END OF EXPLORATORY HOLE							15.00 -5.32		

Groundwater Entries			Depth Related Remarks			Hard Boring		
No.	Depth Strike (m)	Remarks	Depth Sealed (m)	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used

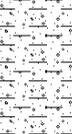
Trial Pit Log

PRELIMINARY



Logged SN Checked Approved	Start 09/05/2019 End 09/05/2019	Equipment, Methods and Remarks Hand dug pit to 1.2m. No groundwater encountered. Hand vane in Superficial Deposits affected by gravel.	Dimension and Orientation Width  Length	Ground Level 4.45 mOD Coordinates (m) E 587649.23 National Grid N 176524.30
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Samples and Tests Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.00 0.00 - 0.40 0.00 - 0.40	ES1 B1	PID=<1.0 ppmv	Friable dark brownish grey slightly sandy, slightly gravelly silty CLAY. Sand is fine to medium. Gravel is fine to medium subangular of chert/flint. (TOPSOIL)		(0.40)		
0.40 - 0.70 0.50	B2 HV	p 77kPa, r 38kPa	Firm orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded to subangular medium to coarse of chert/flint. (SUPERFICIAL DEPOSITS)		0.40 (0.50)		
0.80 0.80	ES2	PID=<1.0 ppmv	Firm fissured brown CLAY. Fissures are extremely closely spaced, slightly polished. (LONDON CLAY)		0.90 (0.30)		
1.00 1.00 - 1.20	HV B3	p 65kPa, r 37kPa			1.20 +3.25		
			END OF EXPLORATORY HOLE				

Groundwater Entries No. Depth Strike (m) Remarks	Remarks Depth (m) Remarks	Stability Stable Shoring None Weather
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Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 © Copyright SOCOTEC UK Limited 24/05/2019 11:52:59	Project NeuConnect Isle of Grain Project No. G9017-19 Carried out for AECOM	Trial Pit <h2>CPT106</h2> Sheet 1 of 1
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Trial Pit Log

PRELIMINARY



Logged SN Checked Approved	Start 10/05/2019 End 10/05/2019	Equipment, Methods and Remarks Hand dug pit to 1.2m No groundwater encountered. Hand vane in Superficial Deposits affected by gravel.	Dimension and Orientation Width Length	Ground Level 4.18 mOD Coordinates (m) E 587502.64 National Grid N 176471.66
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Samples and Tests		Strata Description		
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Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.00 0.00 - 0.30 0.00 - 0.30	ES1 B1	PID=<1.0 ppmv	Friable dark brownish grey sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of chert/flint. (TOPSOIL)		(0.30)		
0.50 0.50	HV B2	p 67kPa, r 45kPa	Firm orange brown sandy slightly gravelly locally gravelly CLAY grading locally to clayey SAND. Gravel is fine to medium rounded to subangular chert/flint. (SUPERFICIAL DEPOSITS)		0.30 +3.88 (0.40)		
1.00 1.00 1.00 1.00 - 1.20	HV ES2 B3	PID=<1.0 ppmv p 68kPa, r 38kPa	Firm fissured brown CLAY. Fissures are extremely closely spaced, slightly polished. (LONDON CLAY)		0.70 +3.48 (0.50)		
			END OF EXPLORATORY HOLE		1.20 +2.98		

Groundwater Entries No. Depth Strike (m) Remarks	Remarks Depth (m) Remarks	Stability Stable Shoring None Weather
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Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 © Copyright SOCOTEC UK Limited 24/05/2019 11:53:00	Project NeuConnect Isle of Grain Project No. G9017-19 Carried out for AECOM	Trial Pit <h2>CPT107</h2> Sheet 1 of 1
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Trial Pit Log

PRELIMINARY



Logged SN Checked Approved	Start 09/05/2019 End 09/05/2019	Equipment, Methods and Remarks Hand dug pit to 1.2m. No groundwater encountered. Hand vane in Superficial Deposits affected by gravel.	Dimension and Orientation Width Length <div style="text-align: center;"> </div>	Ground Level 7.70 mOD Coordinates (m) E 587701.43 National Grid N 176362.88
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Samples and Tests	Strata Description
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Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill	
0.00	ES1	PID=<1.0 ppmv	Friable dark brownish grey slightly sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is fine to medium subrounded of chert/flint. (TOPSOIL)		(0.30)			
0.00 - 0.30	D1							
0.20			Firm light grey mottled orange slightly sandy to sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium subrounded to subangular of chert/flint. (SUPERFICIAL DEPOSITS)		0.30			
0.50	HV	p 61kPa, r 39kPa						
0.70	D2						(0.75)	
1.00			Firm fissured brown CLAY. Fissures are extremely closely spaced, slightly polished. (LONDON CLAY)		1.05			
1.00	HV	PID=<1.0 ppmv						
1.00	ES2	p 51kPa, r 34kPa					(0.15)	
1.20	D3						1.20	
			END OF EXPLORATORY HOLE					

Groundwater Entries No. Depth Strike (m) Remarks	Remarks Depth (m) Remarks	Stability Stable Shoring None Weather
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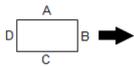
Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 © Copyright SOCOTEC UK Limited 24/05/2019 11:53:00	Project NeuConnect Isle of Grain Project No. G9017-19 Carried out for AECOM	Trial Pit CPT108 Sheet 1 of 1
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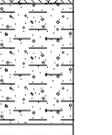
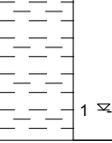
Trial Pit Log

PRELIMINARY



Logged SN Checked Approved	Start 10/05/2019 End 10/05/2019	Equipment, Methods and Remarks Hand dug pit to 1.2m. Hand vane in Superficial Deposits affected by gravel.	Dimension and Orientation Width  Length	Ground Level 6.76 mOD Coordinates (m) E 587486.70 National Grid N 176344.99
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Samples and Tests			Strata Description		
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Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.00 - 0.30	B1		Friable dark brownish grey sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is fine to medium subangular of chert/flint. (TOPSOIL)		(0.30)		
0.30 - 0.50	ES1	PID=<1.0 ppmv	Firm orange brown slightly sandy to sandy slightly gravelly CLAY locally grading to clayey SAND. Sand is fine to coarse. Gravel is fine to coarse subangular of chert/flint. (SUPERFICIAL DEPOSITS)		0.30 - 0.50 +6.46		
0.50 - 0.60	HV B2	p 83kPa, r 55kPa	Firm fissured brown CLAY. Fissures are extremely closely spaced, slightly polished. (LONDON CLAY)		0.50 - 0.60 +6.06		
1.00 - 1.20	HV ES2 B3	PID=<1.0 ppmv p 74kPa, r 37kPa	END OF EXPLORATORY HOLE		1.00 - 1.20 +5.56		1

Groundwater Entries No. Depth Strike (m) Remarks 1 1.10 No flow	Remarks Depth (m) Remarks	Stability Stable Shoring None Weather
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Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 © Copyright SOCOTEC UK Limited 24/05/2019 11:53:00	Project NeuConnect Isle of Grain Project No. G9017-19 Carried out for AECOM	Trial Pit <h2>CPT109</h2> Sheet 1 of 1
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Trial Pit Log

PRELIMINARY



Logged LF Checked Approved	Start 20/05/2019 End 20/05/2019	Equipment, Methods and Remarks Tracked Excavator Hand dug pit followed by machine excavated trial pit to 3m.	Dimension and Orientation Width 1.50 m Length 2.00 m 	Ground Level 6.47 mOD Coordinates (m) E 587625.49 National Grid N 176205.31
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Samples and Tests Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.45 0.45 0.45 0.45 0.55	ES2 D3 B1 HV	PID=<1.0 ppmv p 59kPa, r 28kPa	Brown sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subrounded fine to coarse chert and rare brick. (TOPSOIL) Orangish brown clayey slightly gravelly SAND. Becoming gravelly slightly clayey from 0.80m. Gravel is subangular to subrounded fine to coarse chert. Low cobble content. (SUPERFICIAL DEPOSITS)		(0.50) 0.50 +5.97		
1.00 1.00 1.00	ES4 B5	PID=<1.0 ppmv		1.10 becoming stiff clay (London Clay) on south side of pit. Gravels extend to 2.40m on north side of pit.	(1.50)		
1.50	D6						
2.00 2.00 2.00 2.00	HV ES7 B8	PID=<1.0 ppmv p 80kPa, r 28kPa	Stiff brown mottled bluish grey CLAY with occasional relic rootlets. (LONDON CLAY)		2.00 +4.47		
2.50	D9				(1.00)		
3.00 3.00 3.00	ES10 B11	PID=<1.0 ppmv	END OF EXPLORATORY HOLE		3.00 +3.47		

Groundwater Entries No. Depth Strike (m) Remarks 1 1.80 Slow water ingress to 2.40m from north and east sides of pit.	Remarks Depth (m) Remarks	Stability Stable Shoring None Weather
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Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 © Copyright SOCOTEC UK Limited 24/05/2019 11:53:00	Project NeuConnect Isle of Grain Project No. G9017-19 Carried out for AECOM	Trial Pit <h2>TP111</h2> Sheet 1 of 1
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Trial Pit Log

PRELIMINARY



Logged LF	Start 20/05/2019	Equipment, Methods and Remarks Tracked Excavator Hand dug pit followed by machine excavated trial pit to 3m.	Dimension and Orientation		Ground Level 9.63 mOD
Checked	End 20/05/2019		Width 1.50 m		Coordinates (m) E 587755.27
Approved			Length 2.00 m		National Grid N 176110.52

Samples and Tests			Strata Description				
Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.30 0.30 0.30 0.30 - 0.40 0.50 0.50 0.50 - 0.70 0.60 0.60	ES1 D2 B3 HV D4 B5 ES6	PID=<1.0 ppmv p 44kPa, r 21kPa PID=<1.0 ppmv	Soft brown sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse chert. (TOPSOIL)		(0.40) +9.23 (0.30) +8.93 (0.40)		
1.00 1.00 1.00	ES7 B8	PID=<1.0 ppmv	Soft dark grey mottled reddish brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to subrounded fine to coarse chert. Rare glass fragments and one rounded coarse clinker(?) gravel. Lenses with natural gravels on east side of pit. (MADE GROUND)		+8.53 (0.50)		
1.50 1.50 1.50 1.50	ES11 D9 B10	PID=<1.0 ppmv	Orangish brown slightly gravelly slightly clayey SAND. Becoming gravelly to very gravelly between 1.40 and 1.60m. Gravel is subangular to subrounded fine to coarse chert and rare sandstone. (SUPERFICIAL DEPOSITS)		+8.03 (1.40)		
2.00 2.00 2.00 2.00 2.00	HV ES12 D13 B14	PID=<1.0 ppmv p 86kPa, r 28kPa	Firm to stiff brown mottled grey CLAY with pockets of frequent relic rootlets. (LONDON CLAY)	2.70 pocket of light grey fine sand			
2.50	D15						
3.00 3.00 3.00 3.00	HV ES16 B17	PID=<1.0 ppmv p 97kPa, r 28kPa	END OF EXPLORATORY HOLE				

Groundwater Entries	Remarks	Stability
No. Depth Strike (m) Remarks	Depth (m) Remarks	Stable
1 1.60 Water seepage		Shoring None
		Weather

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project NeuConnect Isle of Grain	Trial Pit TP112
Scale 1:25 © Copyright SOCOTEC UK Limited 24/05/2019 11:53:01	Project No. G9017-19	Sheet 1 of 1
	Carried out for AECOM	

