



Thurrock Flexible Generation Plant

**Environmental Statement Volume 3
Chapter 7: Historic Environment – Terrestrial and Marine**

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Environmental Impact Assessment

Environmental Statement

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Chapter 7

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Summary

This chapter provides an assessment of the potential effects of the Thurrock Flexible Generation Plant development on the historic environment, including known and potential above-ground, below-ground and intertidal/underwater heritage assets and the historic landscape.

Qualifications

This document has been prepared by Dr Nikki Cook, Member of the Chartered Institute for Archaeologists, who has 20 years' experience of assessing terrestrial and marine archaeology, built heritage and historic landscape impact assessment.

1. Introduction

1.1 Purpose of this chapter

1.1.1 This chapter presents a summary of the historic environment baseline within and surrounding the application site. This includes terrestrial and marine archaeology, the historic landscape and built heritage assets.

1.1.2 It then provides an assessment of the potential direct and indirect effects of the proposed development on the historic environment, both in terms of the potential for physical disturbance and effects on the settings of heritage assets.

1.1.3 The principal objectives of the assessment are:

- to describe, classify and evaluate the existing historic environment likely to be affected by the proposed development during its construction, operational and decommissioning phases;
- to identify sensitive receptors to the proposed development;
- to identify the likely significant effects on the historic environment (above-ground, below-ground and underwater), taking into account measures proposed to reduce or avoid any effects identified.

1.2 Planning policy context

1.2.1 Planning policy for energy generation Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to the historic environment, is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1; DECC, 2011a) and the NPS for Fossil Fuel Electricity Generating Infrastructure (EN-2, DECC, 2011b).

1.2.2 NPS EN-1 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 1.1 below.

Table 1.1: Summary of NPS EN-1 and NPS EN-2 provisions relevant to this chapter.

Summary of NPS EN-1 and NPS EN-2 provision	How and where considered in the ES
Summary of NPS EN-1 policy relevant to the assessment of effects on the historic environment	
Applicants should provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset.	The significance of all heritage assets affected by Thurrock Flexible Generation Plant is assessed in Section 4 of this chapter, including the contribution that their setting makes to that significance.
As a minimum the applicant should have consulted the relevant Historic Environment Record (or, where the development is in English or Welsh waters, English Heritage or Cadw) and assessed the heritage assets themselves using expertise where necessary according to the proposed development's impact (paragraph 5.8.8).	Relevant Historic Environment Records have been consulted. See Volume 6, Appendix 7.1: Historic Environment Desk-Based Assessment.
Where a development site includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out an appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation (paragraph 5.8.9).	A desk-based assessment has been prepared (Volume 6, Appendix 7.1) and a terrestrial geophysical survey (Volume 6, Appendix 7.2) has been undertaken for part of the application site. A geoarchaeological deposit model has also been prepared for the site (Volume 6, Appendix 7.2).
Where proposed development will affect the setting of a heritage asset, representative visualisations may be necessary to explain the impact (paragraph 5.8.9).	Appropriate visualisations have been prepared for the built part of the application site in order to demonstrate how the proposed works could affect the settings of heritage assets. These are shown in Volume 3, Chapter 6: Landscape and Visual Resources.

1.2.3 NPS EN-1 also highlights a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 1.2 below.

Table 1.2: Summary of NPS EN-1 policy on decision making and mitigation relevant to this chapter.

Summary of NPS EN-1 and NPS EN-2 provision	How and where considered in the ES
<p>In considering applications, the decision-maker should seek to identify and assess the particular significance of any heritage asset that may be affected by the proposed development, including by development affecting the setting of a heritage asset, taking account of:</p> <ul style="list-style-type: none"> evidence provided with the application; any designation records; the Historic Environment Record, and similar sources of information; the heritage assets themselves; the outcome of consultations with interested parties; and where appropriate and when the need to understand the significance of the heritage asset demands it, expert advice. <p>(paragraph 5.8.11, NPS EN-1).</p>	<p>The evidence outlined in paragraph 5.8.11 of NPS EN-1 is provided in this chapter (and detailed in Volume 6, Appendix 7.1: Historic Environment Desk-Based Assessment; Volume 6, Appendix 7.2: Geoarchaeological Deposit Model Report and Geophysical Survey Report)</p>
<p>In considering the impact of a proposed development on any heritage assets, the decision-maker should take into account the particular nature of the significance of the heritage assets and the value that they hold for this and future generations. This understanding should be used to avoid or minimise conflict between conservation of that significance and proposals for development (paragraph 5.8.12, NPS EN-1).</p>	<p>An assessment of the significance of those heritage assets which may be affected by Thurrock Flexible Generation Plant has been made in Section 4 of this of this chapter.</p>
<p>The decision-maker should take into account the desirability of sustaining and, where appropriate, enhancing the significance of heritage assets, the contribution of their settings and the positive contribution they can make to sustainable communities and economic vitality. The decision-maker should take into account the desirability of new development making a positive contribution to the character and local distinctiveness of the historic environment. The consideration of design should include scale, height, massing, alignment, materials and use. The decision-maker should have regard to any relevant local authority development plans or local impact report on the proposed development (paragraph 5.8.13, NPS EN-1).</p>	<p>Mitigation measures have been proposed where appropriate to ensure that the significance of heritage assets is sustained as far as possible. Mitigation measures are identified in Table 2.9 of this chapter.</p>

Summary of NPS EN-1 and NPS EN-2 provision	How and where considered in the ES
<p>There should be a presumption in favour of the conservation of designated heritage assets and the more significant the designated heritage asset, the greater the presumption in favour of its conservation should be. Once lost heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Loss affecting any designated heritage asset should require clear and convincing justification. Substantial harm to or loss of a Grade II listed building park or garden should be exceptional. Substantial harm to or loss of designated assets of the highest significance, including SMs; registered battlefields; Grade I and II* listed buildings; Grade I and II* registered parks and gardens; and World Heritage Sites, should be wholly exceptional (paragraph 5.8.14, NPS EN-1).</p>	<p>Appropriate visualisations have been prepared for the Zone A of the application site in order to demonstrate how the proposed works could affect the settings of designated heritage assets. These are shown in Volume 3, Chapter 6: Landscape and Visual Resources.</p>
<p>Any harmful impact on the significance of a designated heritage asset should be weighed against the public benefit of development, recognising that the greater the harm to the significance of the heritage asset, the greater the justification will be needed for any loss. Where the application will lead to substantial harm to or total loss of significance of a designated heritage asset, the decision-maker should refuse consent unless it can be demonstrated that the substantial harm to or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm (paragraph 5.8.15, NPS EN-1).</p>	<p>Significance of effects on designated heritage assets are included in Section 4 of this chapter.</p>
<p>Not all elements of a World Heritage Site or Conservation Area will necessarily contribute to its significance. The policies set out in paragraphs 5.8.11 to 5.8.15 (see above) apply to those elements that do contribute to the significance. When considering proposals, the decision-maker should take into account the relative significance of the element affected and its contribution to the significance of the World Heritage Site or Conservation Area as a whole (paragraph 5.8.16, NPS EN-1).</p>	<p>Significance of effects on Conservation Areas are included in Section 4 of this chapter. There are no World Heritage Sites or elements of in the Thurrock Flexible Generation Plant historic environment study area.</p>
<p>Where loss of significance of any heritage asset is justified on the merits of the new development, the decision-maker should consider imposing a condition on the consent or requiring the applicant to enter into an obligation that will prevent the loss occurring until it is reasonably certain that the relevant part of the development is to proceed (paragraph 5.8.17, NPS EN-1).</p>	<p>Appropriate mitigation measures are summarised in Table 5.1.</p>

Summary of NPS EN-1 and NPS EN-2 provision	How and where considered in the ES
When considering applications for development affecting the setting of a designated heritage asset, the decision-maker should treat favourably applications that preserve those elements of the setting that make a positive contribution to, or better reveal the significance of, the asset. When considering applications that do not do this, the decision-maker should weigh any negative effects against the wider benefits of the application. The greater the negative impact on the significance of the designated heritage asset, the greater the benefits that will be needed to justify approval (paragraph 5.8.18, NPS EN-1).	Effects on designated heritage assets, including effects on their settings are included in Section 4 of this chapter.
Where the loss of the whole or a material part of a heritage asset's significance is justified, the decision-maker should require the developer to record and advance understanding of the significance of the heritage asset before it is lost. The extent of the requirement should be proportionate to the nature and level of the asset's significance. Developers should be required to publish this evidence and deposit copies of the reports with the relevant Historic Environment Record. They should also be required to deposit the archive generated in a local museum or other public depository willing to receive it (paragraph 5.8.20, NPS EN-1).	Appropriate mitigation measures are summarised in Table 2.9.
Where appropriate, the decision-maker should impose requirements on a consent that such work is carried out in a timely manner in accordance with a written scheme of investigation that meets the requirements of this Section and has been agreed in writing with the relevant Local Authority (where the development is in English waters, the Marine Management Organisation and English Heritage, or where it is in Welsh waters, the MMO and Cadw) and that the completion of the exercise is properly secured (paragraph 5.8.21, NPS EN-1)	Appropriate mitigation measures are summarised in Table 2.9. An Outline Written Scheme of Investigation (WSI) has been produced (application document A8.11)
Where the decision-maker considers there to be a high probability that a development site may include as yet undiscovered heritage assets with archaeological interest, the decision-maker should consider requirements to ensure that appropriate procedures are in place for the identification and treatment of such assets discovered during construction.	Appropriate mitigation measures are summarised in Table 2.9. An Outline Written Scheme of Investigation (WSI) for terrestrial and marine archaeological mitigation has been produced (application document A8.11).

Summary of NPS EN-1 and NPS EN-2 provision	How and where considered in the ES
Summary of NPS EN-2 policy relevant to the assessment of effects on the historic environment	
All of the energy NPSs have been subject to an Appraisal of Sustainability (AoS) incorporating the requirements of the regulations that implement the Strategic Environmental Assessment Directive. Neutral effects were identified for Noise, and Traffic and Transport, which are considered to be localised and therefore neutral at national level. Neutral effects were also identified for Archaeology and Cultural Heritage, and Soils and Geology, as they are likely to be site related, but with some uncertainty. Effects on equality were assessed as neutral, balanced between potential positive economic impacts and potentially negative localised impacts (paragraph 1.7.1 and 1.7.2, NPS EN-2).	Noted

1.2.4 A number of other policies are relevant to the historic environment including:

- National Planning Policy Framework (NPPF) (first published by the Department for Communities and Local Government (DCLG), 2012; revised February 2019 and published by the Ministry of Housing, Communities and Local Government (MHCLG));
- Web-based planning practice guidance provided by the MHCLG: Conserving and enhancing the historic environment (last updated July 2019);
- Marine Planning Act 2011; and,
- Infrastructure Planning (Decisions) Regulations 2010.

1.2.5 The relevant national and local policies are summarised below in Table 1.3, and detailed in full within Volume 6, Appendix 7.1: Historic Environment Desk-Based Assessment.

Table 1.3: Summary of other relevant policies relevant to historic environment.

Summary of provision	How and where considered in the ES
National Planning Policy Framework 2019	
Paragraph 189 notes that in determining applications local planning authorities should require an applicant to provide a description of the significance of any heritage assets affected and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage asset and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset.	An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter.

Summary of provision	How and where considered in the ES
A heritage asset is defined in the NPPF glossary as a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage assets include designated heritage assets and assets identified by the local planning authority (including local listing).	A description of the method used to identify heritage assets, including consultation with local planning authorities and Historic England (HE), is included in Section 2 in this chapter.
Paragraph 193 notes that when considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be. This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.	The relative importance of the historic environment assets assessed in this chapter is discussed in Section 2 in this chapter.
Paragraph 197 notes that the effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non-designated heritage assets, a balanced judgement would be required having regard to the scale of any harm or loss and the significance of the heritage asset.	The undesignated heritage assets considered in this chapter are described in detail in Volume 6, Appendix 7.1: Historic Environment Desk-Based Assessment. An assessment of the potential impact of the scheme on undesignated heritage assets is laid out in Section 4 in this chapter.
National Planning Practice Guidance	
On 6 March 2014 DCLG launched the National Planning Practice Guidance as a web-based resource. The guidance includes 'Conserving and enhancing the historic environment' (April 2014) which provides advice on several areas of historic environment practice, including on the assessment of the settings of heritage assets. This was last updated on 23 rd July 2019.	How the National Planning Practice Guidance has been used to inform the assessment of setting is outlined in Section 1.2 in this chapter.

Summary of provision	How and where considered in the ES
Marine Planning 2011	
<p>The UK Marine Policy Statement sets out High Level Marine Objectives for ensuring that marine resources are used in a sustainable way. It was published by the government in 2011.</p> <p>Section 2.6.6 relates to the Historic Environment in marine planning and advises that heritage assets should be conserved through marine planning in a manner appropriate and proportionate to their significance.</p> <p>Designated heritage assets in coastal/intertidal zones are inshore/offshore waters may include Scheduled Monuments, Protected Wreck Sites and sites designated under the protection of Military Remains Act 1986. Non-designated heritage assets of equivalent status should be considered under the same policy principles as designated heritage assets.</p> <p>Where the loss of the whole or material part of a heritage asset's significance is justified suitable mitigation measures should be in place. Requirements should be based on advice from relevant regulators and advisors.</p>	<p>The significance of known and potential assets has been considered in the baseline assessments and these judgements and the appropriate mitigation measures will be agreed through ongoing consultation with Historic England and the MMO.</p> <p>The non-designated marine and intertidal heritage assets considered in this chapter are described in detail in Volume 6, Appendix 7.1: Historic Environment Desk-Based Assessment.</p> <p>An assessment of the potential impact of the scheme on undesignated heritage assets is laid out in Section 4 in this chapter.</p> <p>An Outline Written Scheme of Investigation (WSI) for terrestrial and marine archaeological mitigation has been produced (application document A8.11).</p>
Infrastructure Planning (Decisions) Regulations 2010	
<p>It is noted that:</p> <p><i>"(1) When deciding an application which affects a listed building or its setting, the decision maker (a) must have regard to the desirability of preserving the listed building or its setting or any features of special architectural or historic interest which it possesses.</i></p> <p><i>(2) When deciding an application relating to a Conservation Area, the decision-maker must have regard to the desirability of preserving or enhancing the character or appearance of that area.</i></p> <p><i>(3) When deciding an application for development consent which affects or is likely to affect a scheduled monument or its setting, the decision-maker must have regard to the desirability of preserving the scheduled monument or its setting."</i> (paragraph 3)</p>	<p>The potential impacts of Thurrock Flexible Generation Plant on Conservation Areas, listed buildings, SMs, and their settings are considered in Section 4 in this chapter.</p>

Thurrock Local Development Framework

1.2.6 The development plan for the proposal site comprises policies from the Thurrock Local Development Framework, adopted in 2011. Relevant policies are as follows:

"CSTP24: Heritage Assets and the Historic Environment

1. Protecting and Enhancing Heritage Assets

1. The Council will preserve or enhance the historic environment by:

- i. Promoting the importance of the heritage assets, including their fabric and their settings;*
- ii. Encouraging the appropriate use of heritage assets and their settings;*
- iii. Supporting increased public access to historic assets, including military and industrial heritage;*
- iv. Reviewing the designation of local heritage assets, including considering the designation of new Conservation Areas;*
- v. Retaining non-designated heritage assets which are considered locally important as well as those with statutory protection; and*
- vi. Encouraging proposals that include enhancement of surrounding landscapes and integration between priority heritage assets and the Greengrid.*

2. Proposed Development

1. All development proposals will be required to consider and appraise development options and demonstrate that the final proposal is the most appropriate for the heritage asset and its setting, in accordance with:

- i. The objectives in part 1 above;*
- ii. The requirements of PMD 4 Historic Environment;*
- iii. Conservation Area Character Appraisals and Management Proposals as appropriate; and*
- iv. Relevant national and regional guidance.*

3. Priorities for Heritage Regeneration and Enhancement

1. The Council will work collaboratively with owners and partners to encourage the appropriate regeneration and use of priority heritage assets to secure their long-term future. The Council will identify priority heritage assets from:

- i. English Heritage's national Heritage at Risk Register;*
- ii. The Thurrock Heritage at Risk Register, which will be reviewed annually;*
- iii. The Conservation Area Management Proposals, which will be reviewed at least every five years, and*

iv. A local list of heritage assets once produced.

v. The Historic Environment Record

II. Of priority heritage assets already identified, the Council will:

- i. Ensure that the setting of Tilbury Fort, including views of it from the river, are appropriately protected and enhanced, and that encroachment on the open land around it is not permitted.*
- ii. Ensure that the setting of Coalhouse Fort is appropriately protected from development and that its fabric is conserved.*
- iii. Resist development that undermines an understanding of the role the river Thames has played in the historic development of Thurrock.*
- iv. Promote public access between Tilbury Fort and Coalhouse Fort through riverside links.*
- v. Ensure that any new development close to, or within, Bata Village or the Bata Factory complex is well designed and contributes positively to their settings.*
- vi. Ensure that Thurrock's historic landscapes, and the contribution made to them by ancient woodland, hedgerows and trees, are appropriately considered in all development proposals.*

Policy HC1 PMD4: Historic Environment

The Council will ensure that the fabric and setting of heritage assets, including Listed Buildings, Conservation Areas, Scheduled Ancient Monuments and other important archaeological sites, and historic landscape features are appropriately protected and enhanced.

- 1. The Council will also require new development to take all reasonable steps to retain and incorporate non-statutorily protected heritage assets contributing to the quality of Thurrock's broader historic environment.*
- 2. Applications must demonstrate that they contribute positively to the special qualities and local distinctiveness of Thurrock, through compliance with local heritage guidance including:*
 - i. Conservation Area Character Appraisals;*
 - ii. Conservation Area Management Proposals;*

iii. Other relevant Thurrock-based studies, including the Landscape Capacity Study (2005), the Thurrock Urban Character Study (2007) and the Thurrock Unitary Historic Environment Characterisation Project (2009).

iv. Further local guidance as it is developed.

3. The Council will follow the approach set out in 'PPS 5: Planning for the Historic Environment' in the determination of applications affecting

Thurrock's built or archaeological heritage assets. This will include consideration of alterations, extensions or demolition of Listed Buildings or the demolition of unlisted buildings within Conservation Areas, and requirements for pre-determination archaeological evaluations and for preservation of archaeology in situ or by recording."

Gravesham Local Plan Core Strategy and Local Plan First Review Saved Policies

1.2.7 Relevant policies of the Gravesham Local Plan Core Strategy are as follows:

Policy CS20: 'Proposals and initiatives will be supported which preserve and, where appropriate, enhance the significance of the Borough's heritage assets, their setting where it contributes to the significance of the asset and their interpretation and enjoyment, especially where these contribute to the distinct identity of the Borough.'

Policy TC2 (Listed Buildings) outlines that in the case of applications for development affecting the setting of listed buildings, the primary consideration of the Borough Council will be the maintenance of the integrity of the original listed building. Proposals will also need to be sympathetic to the listed building in terms of massing, scale, appearance and materials.

Policy TC3 (Development affecting Conservation Areas) outlines that: 'The Borough Council will adopt the following approach to applications for development within or affecting conservation areas:

Where development is acceptable in relation to other policies in this Plan, it will be carefully judged for its impact and will be expected to make a positive contribution to the conservation area. The Borough Council will expect applications to contain sufficient details to enable the impact of the proposal upon the conservation area to be assessed.'

1.3 Legislation

1.3.1 Listed buildings are protected under the designation regime set out in the Planning (Listed Buildings and Conservation Areas) Act (1990) which empowers the Secretary of State for the Department of Digital, Culture, Media and Sport (DCMS) to maintain a list of buildings and areas of special architectural or historic interest. Any decisions where listed buildings and their settings, and/or conservation areas, are a factor must address the statutory considerations of the Planning (Listed Buildings and Conservation Areas) Act 1990 (see in particular sections 16, 66 and 72) as well as applying the relevant policies in the development plan and the National Planning Policy Framework.

1.3.2 Scheduled monuments (SMs) are protected through the Ancient Monuments and Archaeological Areas Act (1979), which has been updated in the National Heritage Act (1983). SMs are maintained on a list held by the Secretary of State for DCMS. Any alterations or works to a SM (including archaeological investigation) requires SM consent (SMC).

1.3.3 The Protection of Wrecks Act 1973 provides specific protection for wreck sites of archaeological, historic or artistic interest.

1.3.4 The Protection of Military Remains Act 1986 provides protection for the wreckage of military aircraft and designated military vessels. The Act provides for two types of protection: protected places and controlled sites. Military aircraft are automatically protected but vessels have to be specifically designated. The primary reason for designation is to protect as a 'war grave' the last resting place of UK servicemen (or other nationals); however, the Act does not require the loss of the vessel to have occurred during war.

1.3.5 Under the Hedgerow Regulations 1997, as amended by The Hedgerows (England) (Amendment) Regulations 2002, hedgerows are deemed to be historically important if they are over 30 years old and either: incorporate, or are associated with, a Scheduled archaeological feature or site; mark the boundary of a pre-1600 estate or manor recorded at the relevant date in a Sites and Monuments Record; or forms an integral part of a pre-1845 field system.

1.4 Consultation

1.4.1 Key issues raised during scoping and consultation to date specific to the historic environment are listed in Table 1.4, together with how details of how these issues have been considered in the production of this ES and cross-references to where this information may be found.

Table 1.4: Key points raised during scoping and consultation to date.

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	PINs - Scoping Opinion	<p>Paragraph 8.23 of the Scoping Report identifies the principal heritage assets which may be impacted by the Proposed Development. In addition to these, the Inspectorate considers that the ES should assess any likely significant effects on the settings of heritage assets on the southern side of the Thames, including Cliffe, Shornmead and New Tavern Forts.</p> <p>The assessment should consider the potential for cumulative impacts on cultural heritage assets, particularly in terms of the impacts to the settings of the military forts and the loss of archaeological resource. The cumulative assessment should include Tilbury2, Tilbury Energy Centre and the Lower Thames Crossing. Other projects to be considered in the cumulative assessment should be discussed and agreed with the relevant consultation bodies.</p>	<p>An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter.</p> <p>The cumulative assessment includes Tilbury2, Tilbury Energy Centre and the Lower Thames Crossing (see Volume 4, Chapter 20).</p>
September 2018	PINs - Scoping Opinion	<p>Whilst no Conservation Areas have been identified within the application site boundary, the Inspectorate notes that the proposed access route is located immediately adjacent to the West Tilbury Conservation Area. Any likely significant effects on the setting of the Conservation Area (particularly in terms of impacts from noise and traffic) should be assessed in the ES.</p>	<p>An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. The West Tilbury Conservation area is assessed in paragraphs 4.1.23 – 4.1.137 of this chapter.</p>
September 2018	PINs - Scoping Opinion	<p>The Inspectorate notes that the geophysical survey undertaken in 2017 and provided in Appendix B of the Scoping Report does not extend to the entirety of the Proposed Development area.</p> <p>The Applicant should ensure that the information used to inform the assessment is robust and allows suitable identification of assets likely to be impacted by the Proposed Development. The Applicant should make effort to agree the need for intrusive investigations (paragraph 8.26 of the Scoping Report indicates that intrusive investigations may be carried out) with relevant consultation bodies. Where necessary intrusive investigations should be completed prior to submission of the DCO application.</p> <p>The Applicant should ensure that their approach to defining the archaeological baseline is sufficient to identify potential archaeological remains within alluvial deposits.</p>	<p>Section 2.3 confirms that the desk-based and survey data is considered sufficient for a robust impact assessment of potential impacts.</p> <p>Paragraphs 2.8.4 and 2.8.5 set out further targeted survey and monitoring to be undertaken prior to and during construction.</p>
September 2018	PINs - Scoping Opinion	<p>The Inspectorate notes the potential for impacts to buried archaeology, as well as impacts to marine archaeological remains if the water cooling pipeline option is pursued. Cumulative impacts with other developments should also be assessed.</p> <p>The ES should set out the proposals for the recording of archaeology which would be permanently lost as a result of the Proposed Development and make effort to agree the approach with relevant consultation bodies. The ES assessment of impacts to buried archaeology should take into account the guidance contained in Historic England's guidance document 'Preserving Archaeological Remains' (Preserving Archaeological Remains: Decision taking for sites under development (Historic England, 2016)).</p>	<p>The water cooling pipeline is not being pursued. However, this comment is also applicable to the causeway structure now proposed. Marine archaeological impacts have been assessed in paragraphs 4.1.4 – 4.1.27. Cumulative effects have been assessed in Volume 4, Chapter 20.</p> <p>Paragraphs 2.8.4 and 2.8.5 set out further targeted survey and monitoring to be undertaken prior to and during construction.</p>
September 2018	PINs - Scoping Opinion	<p>The Inspectorate notes (paragraph 8.31 of the Scoping Report) that the assessment of impacts to setting will follow the staged approach set out in Historic England's 'The Setting of Heritage Assets: Good Practice Advice in Planning Note 3' (The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) (Historic England, 2017)).</p> <p>Appropriate viewpoints and photomontages should be used to illustrate how the Proposed Development would be seen in views from key heritage assets, both alone and together with other developments including Tilbury2, Tilbury Energy Centre and the Lower Thames Crossing.</p> <p>The Applicant should make effort to discuss and agree the location of viewpoints and the need for photomontages with relevant consultation bodies including Historic England.</p>	<p>Viewpoints and wirelines are shown in Volume 3, Chapter 6: Landscape and Visual Resources and the impact on key heritage assets, taking into account that information, is assessed in this chapter.</p>

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	PINs - Scoping Opinion	<p>Paragraph 8.34 of the Scoping Report describes how it is proposed to determine significance of effect, using a matrix-based approach.</p> <p>The ES should ensure that the methodology used is applicable to address the context of the receiving environment and issues relevant to the Proposed Development. Where professional judgement is used to reach conclusions on levels of harm and significance of effect this should be explained. The Inspectorate notes Historic England's comments in this regard (see section 3.4 of their scoping consultation response, Appendix 2 of this Opinion) and advises the Applicant to make effort to agree a specific methodology with relevant consultation bodies.</p>	<p>Section 2.2 describes in detail the methodology used to assess the significance of impacts and how professional judgement is applied where necessary.</p>
September 2018	Historic England - Scoping Opinion	<p>There are no designated heritage assets which would be directly affected by the proposed development. The principal designated heritage assets which may be impacted indirectly by the proposed development are: the scheduled monuments at Tilbury Fort, Earthworks near West Tilbury Church, WWII anti-aircraft battery at Bowaters Farm, East Tilbury Battery and Coalhouse Fort. Separately listed buildings at Grade I include St Katharine's Church and those at Grade II* include the riverside station at Tilbury Cruise Terminal and the Church of St James. Seven grade II listed buildings also fall within the study area.</p>	<p>An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter, which includes all of the assets referred to.</p>
September 2018	Historic England - Scoping Opinion	<p>We advise that the impact of the proposed development on the setting and significance of designated and non-designated heritage assets to be fully assessed in accordance with legislation, policy and guidance. In particular, we recommend the analysis follows the staged approach to assessment set out the Good Practice Advice in Planning 3: The Setting of Heritage Assets. The ES document would need to provide sufficient visual information to illustrate how the proposed infrastructure would be seen in views from key designated heritage assets and would be pleased to provide more detailed advice on proposed viewpoints for photomontages once an initial list has been drawn up.</p>	<p>An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. As recommended, assessment of setting has been undertaken in accordance with Good Practice Advice in Planning 3: The Setting of Heritage Assets.</p>
September 2018	Historic England - Scoping Opinion	<p>We would recommend a single Historic Environment chapter for the ES. However, the historic environment sections would also need to be integrated, and cross referenced to other relevant chapters. This is most relevant to the Landscape and Visual Assessment where we consider that it would be important to use historic environment receptors in to the assessment process. We consider that photomontages and/or wirescape images from heritage specific viewpoints would be essential particularly from key designated heritage assets. Wider landscape views are also needed, including any images that would seek to illustrate cumulative impacts in view of the quantum of development proposals in the vicinity. The assessment of 'setting' likewise should not be solely be restricted to visual impact, and would need to consider the impact from other environmental factors such as noise, traffic and lighting.</p>	<p>An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. An integrated approach to baseline information gathering and assessment has been undertaken, with particular reference to the locations of landscape viewpoints for visualisations. Viewpoints and wirelines are shown in Volume 3, Chapter 6: Landscape and Visual Resources. In addition, the results of the noise, traffic and lighting assessments have been considered as appropriate.</p>
September 2018	Historic England - Scoping Opinion	<p>Historic England has in the past raised concerns about the use of matrices and table to determine significance, magnitude of impacts and receptor sensitivity. This is in reference to the Design Manual for Roads and Bridges (DMRB) which is commonly used for the Environmental Impact Assessment (EIA) process for infrastructure projects. Whilst the standardised EIA matrices are a useful tool, the analysis of impact, harm, significance and setting is a matter of qualitative and expert judgment which cannot be achieved solely by the use of systematic matrices and the use of tables should be seen primarily as supporting material. We recommend that the applicant seek to deliver a clearly expressed, iterative and non-technical narrative for significance and harm, which is tailored to this specific environment.</p>	<p>An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. Assessment of impact, harm, significance, and setting has been undertaken through a combination of matrices allied to a significant degree of professional judgement.</p>
September 2018	Historic England - Scoping Opinion	<p>There is geophysical data which suggests potential for undesignated buried archaeological remains within the development area. If the water cooling option were to be adopted there would be potential impacts on marine archaeological remains. It is thus likely that there will be direct and indirect impacts on the terrestrial and marine historic environments that will need to be taken into account.</p>	<p>An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. Impacts on undesignated buried archaeological remains are considered in paragraphs 4.1.4 – 4.1.27 of this chapter.</p>

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	Historic England - Scoping Opinion	A geophysical survey (magnetometry) has been carried out across the development area [see Wessex Archaeology 2017, incorporated as Volume 6, Appendix 7.2], which has identified some anomalies, but it is important to note that this approach will not identify some remains of archaeological interest. This includes organic remains, such as wooden structures or boats, or deposits such as peat that may be of archaeological and palaeoenvironmental interest. A number of studies carried out in and around Tilbury Fort have identified important Holocene period alluvial and peat sequences indicative of periods of marine and regression and transgression. It is noted in Section 8.164 that the geological maps and BGS borehole records indicate that the main development site is underlain by Alluvium, suggesting that similar sequences Holocene sequences may be preserved here as well. The previous studies have demonstrated that the accumulation of peat was diachronous, highlighting the potential of the different sequences sampled to provide information about site specific landscape evolution over time and the mosaic of environments that existed on the floodplain in the past. Further work will therefore need to be carried out to determine the potential of the alluvial deposits identified at the site and the potential that these deposits to address archaeological questions.	An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. This includes an assessment of the significance of and impact upon deeply buried remains of potential archaeological and/ or palaeoenvironmental interest. A geoarchaeological deposit model has been produced for the site (see Volume 6, Appendix 7.2). Paragraphs 2.8.4 and 2.8.5 set out further targeted survey and monitoring to be undertaken prior to and during construction.
September 2018	Historic England - Scoping Opinion	We would recommend in the first instance that the existing sequences/deposit models produced for nearby sites are investigated as part of the desk-based assessment phase of works. This may provide useful information about the proposed development area as well as highlight gaps in the understanding that could be targeted for further study. We would also recommend a joined-up approach is used when investigations are considered for the development area, whether this is to address engineering questions, the presence of contamination or for archaeological purposes. Communication and collaboration between the various specialists could reduce the duplication of effort and maximise the potential of each sample to address the questions that need to be investigated as part of the application process	Paragraphs 2.8.4 and 2.8.5 set out further targeted survey and monitoring to be undertaken prior to and during construction. Consultation with Historic England and Thurrock Borough Council heritage officer has been sought. A geoarchaeological deposit model for the site has been produced (see Volume 6, Appendix 7.2).
September 2018	Essex County Council Archaeology - Scoping Opinion	It should be noted that the proposed development area is situated in a sensitive area of heritage assets situated between two scheduled coastal forts. It is recommended that considering the impacts likely to be caused by this development to both the heritage assets and their settings including listed buildings, scheduled monument, conservation areas and archaeological deposits, the applicant should organise joint early discussions between Historic England, conservation officer and archaeological advisors in advance of their EIA assessment to ensure the work is being undertaken appropriately and covers all aspects that will be required to be assessed. Considerable recent work has occurred within the area and all of this data will require reviewing and adding to the existing data held on the HER. A field assessment is likely to be needed to understand potential land fill within the area and how this has impacted on the historic ground surface. Even if this has occurred then the historic creeks and field boundaries that survive are likely to contain surviving archaeological deposits	An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. Consultation with Historic England and Thurrock Borough Council heritage officer took place at a meeting on 14 th November 2018, and a further meeting has been sought (February 2020). As detailed in Volume 3, Chapter 16: Geology, Hydrogeology and Ground Conditions, land-fills in the area lie outside the application boundary for Thurrock Flexible Generation Plant or have already been subject to disturbance (mining and re-depositing) in the case of power station ash fields. An Outline Written Scheme of Investigation (WSI) has been produced (application document A8.11).
September 2018	Marine Management Organisation - Scoping Opinion	The MMO welcomes the methodology for informing the Cultural Heritage Assessment which can be found in section 8.27 of the scoping report, but would defer to Historic England and their formal response to the PINS on this matter. The MMO note that there are a number of heritage features within the vicinity of the proposed project area. The MMO is content that these have been considered in section 8.23 of the scoping report, and as per section 7.2 of this report, welcome the methodology for assessing potential impacts.	Noted.
November 2018	Historic England – comments on PEIR	Need to agree viewpoints with Historic England and the LPA's heritage advisers to assess the impact of the proposed development on the setting of these assets	Viewpoints agreed and assessed as part of this chapter and in Volume 3, Chapter 6: Landscape and Visual Resources.

Date	Consultee and type of response	Points raised	How and where addressed
November 2018	Historic England – comments on PEIR	Bowater Farm Battery: The presence of vegetation surrounding the scheduled battery at Bowater Farm does not of itself justify the conclusion that no impacts on its setting will arise since vegetation is not permanent and may be removed	The effect of the scheme on Bowater Farm Battery has been reassessed in Section 4 of this chapter.
November 2018	Historic England – comments on PEIR	Tilbury Fort: we consider the landward defences; their setting and the contribution these make to its significance are of great importance. We consider this to have been significantly understated in the PEIR and do not agree this assessment.	The effect of the scheme on Tilbury Fort has been reassessed in Section 4 of this chapter.
November 2018	Historic England – comments on PEIR	An assessment of the Earthworks at West Tilbury is described in 3.1.26, but not assessed in Section 4	The effect of the scheme on the Earthworks at East Tilbury has been reassessed in Section 4 of this chapter.
November 2018	Historic England – comments on PEIR	An assessment of St James' Church West Tilbury is missing from Section 4.	The effect of the scheme on the setting of St James' Church has been reassessed in Section 4 of this chapter.
November 2018	Historic England – comments on PEIR	The assessment of the construction, operational and decommissioned phases is simplistic, but we assume it will be fully developed in the EIA.	The assessment of the construction, operational and decommissioned phases has been fully developed in Section 4 of this chapter.
November 2018	Historic England – comments on PEIR	The cumulative impacts need to be considered in the light of changes to the proposals for Tilbury Energy Centre and Lower Thames Crossing	Impacts have been assessed in Volume 4, Chapter 20: Historic Environment Cumulative Effects Assessment.
November 2018	Historic England – comments on PEIR	The local planning authority's archaeological adviser takes the lead in advising on the identification, assessment and scope for mitigation on non-designated buried archaeological remains. However, we note that a comprehensive assessment and evaluation to establish the potential for buried archaeological remains across all areas of the development which would involve ground works has yet to be completed (Section 2.3). This work will need to be undertaken to inform the EIA in order that the application meets the requirements of the National Policy Statement for Energy on the Historic Environment (para 5.8.8-10) and not carried out post-consent as part of the construction phase (4.1.12-13).	A geophysical survey was undertaken within Zone A (see Volume 6, Appendix 7.2) and the results incorporated into this chapter. A geoarchaeological assessment and deposit model was undertaken as part of the geotechnical site investigation works (see Volume 6, Appendix 7.2) and the results incorporated into this chapter.
October 2019	Essex County Council, Principal Historic Environment Consultant – comment on High level mitigation strategy	ECC response received January 2020 following further correspondence (see below). Meeting between Stratera, ECC and HE proposed.	Mitigation strategy proposed and included in assessment of effect. An Outline Written Scheme of Investigation (WSI) has been produced (application document A8.11).
October 2019	Historic England - comment on High level mitigation strategy	No response yet received, although was noted by Debbie Priddy. ECC suggest a meeting between Stratera, HE and ECC (see January 2020 response)	Mitigation strategy proposed and included in assessment of effect. An Outline Written Scheme of Investigation (WSI) has been produced (application document A8.11).
November 2019	Historic England – consultation on project changes	It is our advice that this proposed development has the potential to impact on deposits of archaeological and palaeo-environmental interest that have been classed as being significant. In particular, as required by the Overarching National Policy Statement for Energy (EN-1), it is apparent that a detailed assessment and evaluation of buried archaeological remains has yet to be completed to inform the preparation of an EIA for this proposed development.	An updated Historic Environment Desk-Based Assessment which takes account of the scheme changes and impacts to the marine environment has been prepared (see Volume 6, Appendix 7.1) and draws on the results of other survey work.
November 2019	Historic England – consultation on project changes	The summary of potential environmental effects, mitigation and monitoring presented within PEIR Table 6.1 is therefore incomplete and a supplementary summary table should be produced. Furthermore, the required archaeological assessment should specify the techniques and methodologies to be adopted for all subsequent survey investigations and set out within an outline or draft archaeological Written Scheme of Investigation (WSI).	An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. Mitigation strategy proposed and included in assessment of effect. An Outline Written Scheme of Investigation (WSI) has been produced (application document A8.11).

Date	Consultee and type of response	Points raised	How and where addressed
November 2019	Historic England – consultation on project changes	We also recommended that a deposit model is prepared as part of the Desk-Based Assessment (DBA) which should inform the historic environment chapter of the Environmental Statement. Data used in this model should utilise geotechnical investigations conducted at nearby sites and the British Geological Survey borehole register.	Completed and results incorporated into this chapter. Full report available in Volume 6, Appendix 7.2.
November 2019	Historic England – consultation on project changes	It should also be noted that the preliminary DBA deposit model should inform the preparation of a draft WSI so that geophysics and geotechnical investigation techniques used are suitable to guide the design of this proposed development. This is especially useful in areas where deep features/remains are expected and where deeply buried organic deposits such as peat are expected.	Completed and results incorporated into this chapter. Full report available in Volume 6, Appendix 7.2 and an Outline Written Scheme of Investigation (WSI) has been produced (application document A8.11).
November 2019	Historic England – consultation on project changes	<p>In conclusion, we recommend that you prepare the following draft documents for consultation with us and the relevant local authority during any remaining pre-application stage of project preparation:</p> <ul style="list-style-type: none"> • a supplementary summary of potential environmental effects, mitigation and monitoring to include all relevant proposed changes; • a DBA technical report comprising a preliminary sedimentary deposit model for the location of the proposed permanent causeway; and • a draft archaeological WSI which is also to be stipulated as a condition within any draft Development Consent Order (including deemed Marine Licence). 	<p>Potential environmental effects, mitigation and monitoring included in Table 5.1 of this chapter.</p> <p>Technical reports supporting this ES are in Volume 6: Appendix 7.1-7.2.</p> <p>An Outline Written Scheme of Investigation (WSI) has been produced (application document A8.11).</p>
November 2019	Gravesham Borough Council – consultation on project changes	<p>The primary change of relevance to Gravesham Borough Council is the proposal to construct a new permanent causeway into the River Thames along with two alternative access routes, with the consequential amendments to the red line boundary. This brings the construction facilities much closer to the east side of Gravesend and also directly impacts on the marine environment.</p> <p>The Project Changes report sets out the reasons for the causeway and an outline of its design. Impact on salt marsh is noted along with other issues to do with the dredged channel. There is however no discussion of the landscape, noise, lighting, historic environment and other potential impacts on Gravesham or Thurrock from the proposal. As use of causeway is dictated by the tide it has to be assumed that it could be operational at any point of the day or night. Para 3.5 makes reference to the top of the causeway being 'X meters AOD', please clarify what this should say.</p>	<p>Potential environmental effects on the historic environment, as well as proposed mitigation and monitoring is included in Table 5.1 of this chapter.</p> <p>The causeway height is clarified in Volume 2, Chapter 2: Project Description.</p>
November 2019	Gravesham Borough Council – consultation on project changes	It is not clear what the future use of the causeway is, which is described as permanent (para 3.1). The new Zone plan (Zone G) suggests that the access connections are temporary whereas for one of the deleted links (see para 3.16 (c)) it was suggested it would remain should large loads be required in the future. Clarity, and the carrying out of environmental assessment, is required.	The maximum design envelope has been applied to the assessment of effects of the scheme, which is included in Section 2.6 of this chapter.
November 2019	Gravesham Borough Council – consultation on project changes	It is noted that PINS advised the applicant to 'consider a SoCG with neighbouring Local Authorities regarding visual impacts from the project' (S.51 advice 31 Jan 2019). Combined with the proposed changes it would be helpful to have a meeting to understand the proposals better and explore common ground, and meet the PINS suggestion.	This is noted and the applicant will seek to progress a SoCG with Gravesham Borough Council.

Date	Consultee and type of response	Points raised	How and where addressed
January 2020	Essex County Council, Principal Historic Environment Consultant	Following the meeting at Thurrock's offices in November 2018 with the applicants and Historic England there was agreement that a detailed assessment of the cultural heritage would be required which needs to include an integrated assessment of all the heritage assets impacted by the development as part of the DCO process.	An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. An integrated approach to baseline information gathering and assessment has been undertaken. Technical reports supporting this ES are in Volume 6: Appendix 7.1-7.2
January 2020	Essex County Council, Principal Historic Environment Consultant	The direct impact of the development on below ground archaeological deposits will need to be defined, especially in the area of the proposed power plant, its associated construction road and pipeline corridor in advance of the DCO process. With the work undertaken for the recent development for the Roll on roll off ferry additional new information will be available especially in the area near to the main power plant.	The direct impact on below ground known and potential archaeological deposits is defined in Section 4. Previous work in the surrounding area (e.g. for the Tilbury2 development) has been used to inform the assessment of archaeological potential and effect, and is synthesised in the baseline environment (Section 3) and the Technical Report in Volume 6: Appendix 7.1.
January 2020	Essex County Council, Principal Historic Environment Consultant	A high level archaeological mitigation strategy was submitted to this office, however, this fails to address the work needed to be completed for the DCO process and indicates it is proposed for most of the field assessment work to be completed post DCO, however, this would not allow the inspector to have an understanding of the impact the development will have on the historic environment.	An assessment of the significance of the impact on heritage assets affected by Thurrock Flexible Generation Plant, including their setting, is given in Section 4 in this chapter. Assessment of impact, harm, significance, and setting has been undertaken through a combination of matrices allied to a significant degree of professional judgement, informed by a thorough Technical Report assessment (Volume 6: Appendix 7.1). A more comprehensive WSI has been prepared which sets out the required offsetting and mitigation measures (application document A8.11). As such there is sufficient information presented to understand the impact of the development on this historic environment.
January 2020	Essex County Council, Principal Historic Environment Consultant	It is recommended that further joint discussions with the archaeological consultants, Historic England (they will lead on the water side of the Thames) and ourselves will be required to define an agreed programme to allow an understanding of the impact of the proposed development on the historic environment assets within the area of the development prior to it being submitted for consideration. Desk top survey and field work will be required prior to the DCO submission to assess how the historic environment will be impacted by these proposals. Historic England should also have been consulted on this application. The changes proposed to the scheme will reduce impacts in some areas but potentially heighten it in others. This office would be happy to meet with the heritage consultants and discuss the requirements needed prior to the application being submitted, we recommend this is a joint discussion with Historic England	Consultation and discussion with both Essex County Council and Historic England is ongoing.

2. Assessment Approach

2.1 Guidance / standards

- 2.1.1 There is no single accepted or standard guidance for the assessment of the likely effects of development on the historic environment resource. Although developed for use on trunk road schemes, the *Design Manual for Roads and Bridges* (DMRB) (Highways Agency 2007) sets out a detailed methodology for considering the historic environment which, to date, represents the most comprehensive published guidance and has been used to inform this assessment.
- 2.1.2 The assessment process will give due regard to industry best practice guidance produced by the Chartered Institute for Archaeologists, and relevant Historic England guidance as set out in Historic Environment Good Practice Advice in Planning, *Note 2: Managing Significance in Decision Taking in the Historic Environment* (HE 2015) and *Note 3: The Setting of Heritage Assets* (2nd edition, HE 2017); *Environmental Archaeology* (HE 2011); *Preservation of Archaeological Remains* (HE 2016); and, *Waterlogged Organic Artefacts* (HE 2018). Historic England (when formerly English Heritage) also published *Conservation Principles, Policies and Guidance* in 2008, which has also informed this assessment.
- 2.1.3 Historic England has also recently published further advice on assessing the significance of heritage assets in their *Advice Note 12 Statements of Heritage Significance: Analysing Significance in Heritage Assets* (October 2019). This describes how significance (for heritage policy) should be assessed as part of a staged approach to decision making.
- 2.1.4 The following terminology has been adopted within this assessment for classifying and discussing elements of the historic environment:
- A Heritage Asset is a building, monument, site, place, area or landscape identified as meriting consideration in planning decisions because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing) (NPPF, Annex 2 Glossary).
 - The Setting of a heritage asset is the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the importance of an asset, may affect the ability to appreciate that importance or may be neutral (NPPF, Annex 2 Glossary).

- Importance (sensitivity) is used in place of 'Significance' (for heritage policy): this substitution of terms is used to avoid confusion with established EIA terminology. 'Significance' for heritage policy is defined in the NPPF (Annex 2, Glossary), as the value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.
- Value is used in reference to the components of a heritage asset that determines its importance, as described in Table 2.1.
- Significance is used when referring to the significance of effect resulting from impacts of the proposed development to the importance of heritage assets.

2.2 Assessment Methodology

- 2.2.1 Baseline conditions are established through desk-based review of existing sources of information, supported where appropriate by the use of field survey. The significance of effect of a proposed development on these baseline conditions is assessed through a process combining an evaluation of the importance of the historic environment and the scale of impact (magnitude of change) that would arise due to the construction and operation of the proposed development, taking into account mitigation measures incorporated into the design proposals, or during the construction and operational stages of the proposed development.
- 2.2.2 This methodology has been adapted to match the particular circumstances of the proposed development, following current best practice and the application of professional judgement.
- 2.2.3 The differences in the nature and scale of archaeological, built heritage and historic landscape features necessitate, within a broadly comparable framework, the use of different methodologies in order to assess the significance of effect resulting from a proposed development. In order to arrive at a judgement on the significance of effect, the assessment needs to consider the relative importance of the individual elements of a heritage asset and how these are likely to be affected.
- 2.2.4 To achieve this outcome a three-step process has been applied to the assessment of known and potential effects, involving assessments of the relative importance of these heritage assets, the likely magnitude of change (impact) on the assets and the resulting significance of effect on these assets.

Step 1a: Assessment of Importance (sensitivity)

2.2.5 The importance of some heritage assets is formally recognised through designation. Where assets have not been statutorily designated, they have been considered using professional judgment with reference to national published guidance and in accordance with the policies stated within the National Planning Policy Framework (NPPF) (MHCLG 2019).

2.2.6 National guidance provided by English Heritage (2008) provides a method of establishing the importance of heritage assets in reference to the following value criteria (bracketed terms indicate corresponding values identified in the NPPF (February 2019)).

- *Evidential (Archaeological) value. Deriving from the potential of a place to yield evidence about past human activity (worthy of expert investigation at some point).*
- *Historical value. Deriving from the ways in which past people, events and aspects of life can be connected through a place to the present. It tends to be illustrative or associative (An interest in past lives and events, including prehistoric. Heritage assets can illustrate or be associated with them and provide a material record of our nation's history).*
- *Aesthetic (Architectural and Artistic) value. Deriving from the ways in which people draw sensory and intellectual stimulation from a place. (These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skill, like sculpture).*
- *Communal value. Deriving from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory. Communal values are closely bound up with historical (particularly associative) and aesthetic values, but tend to have additional and specific aspects. (Heritage assets can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity).*

2.2.7 The overall importance of heritage assets is expressed on a 6-point scale of: Very High, High, Medium, Low, Negligible and Unknown, using the criteria presented in Table 2.1 below taken from the assessment guides in DMRB (HA 2007) and ICOMOS 2010.

Table 2.1: Criteria used to determine the importance (sensitivity) of heritage assets.

Heritage Importance (sensitivity)	Criteria
Very High	Heritage assets of international importance. World Heritage Sites and the individual attributes that convey their Outstanding Universal Value. Areas associated with intangible historic activities as evidenced by the register and areas with associations with particular innovations, scientific developments, movements or individuals of global importance.
High	Heritage assets of national importance. Scheduled Monuments, Listed Buildings (Grade I, II*), Registered Historic Parks and Gardens (Grade I, II*), Registered Battlefields, Protected Wrecks, Protected Military Remains. Also includes unscheduled sites and monuments of schedulable quality and/or importance discovered through the course of evaluation or mitigation. Designated and undesignated historic landscapes of outstanding interest, or high quality and importance and of demonstrable national value. Well-preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factors. Palaeogeographic features with a demonstrable high potential to include artefactual and/or palaeoenvironmental material, possibly as part of a prehistoric site or landscape. Undesignated sites of wrecked ships and aircraft that are demonstrably of equivalent archaeological importance to those already designated.
Medium	Heritage assets of regional importance. Conservation Areas, Grade II Listed Buildings and Registered Historic Parks and Gardens Historic townscapes and landscapes with reasonable coherence, time-depth and other critical factor(s). Unlisted assets that can be shown to have exceptional qualities or historic association. Designated special historic landscapes. Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional value. Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factors. Prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment. Undesignated wrecks of ships or aircraft that have moderate potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation.
Low	Heritage Assets with importance to local interest groups or that contributes to local research objectives. Locally Listed Buildings and Sites of Importance within a district level. Robust undesignated assets compromised by poor preservation and/or poor contextual associations. Robust undesignated historic landscapes. Historic landscapes with importance to local interest groups. Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations. Prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment. Undesignated wrecks of ships or aircraft that have low potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation.
Negligible	Assets with little or no archaeological or historical interest due to poor preservation or survival. Landscapes with little or no significant historical interest.

Heritage Importance (sensitivity)	Criteria
Unknown	The importance of asset has not been ascertained from available evidence.

Step 1b: Defining the contribution of setting

2.2.8 In determining the sensitivity of any heritage assets affected, NPPF and planning guidance requires the contribution made by their setting to be assessed (Table 2.2, based on the assessment guides in DMRB (HA 2007)). Elements of a setting may make a positive or negative contribution to the value of a heritage asset, may affect the ability to appreciate that value, or may be neutral. The key attributes of setting that contribute to the importance of the heritage asset comprise the asset's physical surroundings, the experience of the asset and the asset's associative attributes.

Table 2.2: Criteria for grading the contribution of setting to the importance of heritage assets

Contribution of Setting to Heritage Importance (sensitivity)	Criteria
High	A setting which possesses key attributes that make a strong positive contribution to the understanding and/or appreciation of the values that embodies its importance
Medium	A setting which possesses some key attributes that make a positive contribution to the understanding and/or appreciation of the values that embodies its importance
Low	A setting which possesses some attributes that make some/little positive contribution to the understanding and/or appreciation of the values that embodies its importance.

Step 2: Magnitude of Change (Impact)

2.2.9 The assessment of the magnitude of change (impact) is the identification of the degree of change from the proposed scheme upon elements of the historic environment. There is no standard scale of comparison against which the severity of effects on the historic environment may be judged, because of the great variety of resources and receptors. The assignment of a magnitude of impact is a matter of professional judgement. Effects may be adverse, neutral or beneficial.

2.2.10 Where it has been identified that there is no risk of physical effects to a heritage asset, and where its setting is such that there is no potential for it to be affected by the

presence of the proposed scheme, the asset is not considered further in the assessment.

2.2.11 The magnitude of change (summation of direct and indirect impacts) on heritage assets has been assigned a value of Major, Moderate, Minor, Negligible and No Change, which can be either adverse or beneficial, as shown in Table 2.3 and Table 2.4, which are based on the assessment guides in DMRB (HA 2007).

Table 2.3: Criteria for determining the magnitude of impact (adverse)

Magnitude of Impact	Physical	Setting
Major	Complete destruction or a fundamental, substantial change of an asset or historic environment feature. Change to most or all key elements of the historic environment, such that the resource is totally altered.	A comprehensive and fundamental change to the key positive attributes of a heritage asset's setting, such that the setting is substantially or totally altered.
Moderate	A considerable change or appreciable difference to the existing baseline. Changes to many key elements of the historic environment, such that the resource is clearly modified.	A considerable change to the key positive attributes of a heritage asset's setting such that its contribution to the importance of the asset is appreciably reduced.
Minor	A minor change to the baseline condition of a heritage asset. Changes to the key elements of the historic environment, such that the asset is slightly altered.	A limited change to the key positive attributes of a heritage asset's setting resulting in a slight but discernible reduction to its contribution to the asset's importance.
Negligible	A barely distinguishable change to the historic environment baseline	A very slight change to the key positive attributes of a heritage asset's setting such that the change is barely distinguishable
No change	No loss or alteration or characteristics, features or elements; no observable impact in either direction	No loss or alteration or characteristics, features or elements; no observable impact in either direction

Table 2.4: Criteria for determining the magnitude of impact (beneficial)

Magnitude of Impact	Physical	Setting
Major	Large scale or major improvement to a heritage asset or historic environment feature; extensive restoration or enhancement; major improvement of attribute quality	Large scale or major improvement to the setting of a heritage asset; extensive restoration or enhancement; major improvement of attribute quality
Moderate	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality

Magnitude of Impact	Physical	Setting
Minor	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring
Negligible	Very minor benefit to, or positive addition of one or more characteristics, features or elements	Very minor benefit to, or positive addition of one or more characteristics, features or elements
No change	No loss or alteration or characteristics, features or elements; no observable impact in either direction	No loss or alteration or characteristics, features or elements; no observable impact in either direction

Step 3: Determination of the Significance of Effect

- 2.2.12 The significance of effect has been derived from a consideration of the importance/potential of the asset, the contribution of its setting to that importance and the degree of impact upon it as a result of the proposed scheme.
- 2.2.13 Professional judgement is applied to arrive at a statement of significance, taking into account the value of the feature or asset, and all relevant aspects of the predicted change including the susceptibility to change of the nature and magnitude predicted; the proportion and importance of the asset or its setting that will be affected; the duration of the effect, and whether the effect is direct or indirect.
- 2.2.14 The interaction of the magnitude of impact (Table 2.3 and Table 2.4) and the importance of the heritage asset (Table 2.1) produce the significance of effect which will be calculated by using the matrix shown in Table 2.5. The significance of effect is expressed as Substantial, Major, Moderate, Minor, Negligible, or No Change. Where a range of significance of effect is presented in Table 2.5 (derived from the assessment guides in DMRB (HA 2007)), the final assessment for each effect is based upon expert judgement.

Table 2.5: Matrix used for the assessment of the significance of an effect.

Sensitivity of receptor	Magnitude of impact					
		No change	Negligible	Minor	Moderate	Major
Negligible		No change	Negligible	Negligible or minor	Negligible or minor	Minor
Low		No change	Negligible or minor	Negligible or minor	Minor	Minor or moderate

	Magnitude of impact					
	Medium	No change	Negligible or minor	Minor	Moderate	Moderate or major
High		No change	Minor	Minor or moderate	Moderate or major	Major or substantial
Very high		No change	Minor	Moderate or major	Major or substantial	Substantial

2.2.15 For the purpose of this assessment, any effects with a significance level of minor or less are considered to be **not significant**.

2.3 Baseline studies

2.3.1 Information on the historic environment within the application site and the surrounding area was collected through a detailed desktop review of existing studies and datasets. These are summarised in Table 2.6 below.

Table 2.6: Summary of key desktop sources.

Title	Source	Year	Author
Essex Historic Environment Record (EHER)	Essex County Council	2018	Essex County Council
Records of the National Mapping Programme	Essex County Council	2018	HE
Records held by the National Record of the Historic Environment	HE	2018	HE
Historic Ordnance Survey (OS) mapping	Groundsure and the National Library of Scotland	2018	OS
Historic mapping (including tithe and enclosure maps)	Essex Record Office	2018	Various
1:50,000 scale geological mapping	British Geological Survey (BGS)	2018	BGS
Borehole records for locations in the historic environment study area	BGS	2018	BGS
UKHO wreck and obstruction data	UKHO	2017	UKHO

2.3.2 The information was reviewed and synthesised, and a detailed technical assessment produced (Volume 6, Appendix 7.1: Historic Environment Desk-Based Assessment).

2.3.3 In order to inform the EIA, the site specific surveys listed in Table 2.7 have been undertaken.

2.4 Study area

2.4.1 The proposed development site is divided into a series of zones (see Figure 2.1), with Zone A comprising the main development site.

2.4.2 In terms of the historic environment, a 3km buffer from the centre of Zone A ('the Study Area') was assessed in order to ascertain the archaeological potential within the Site as a whole, and to assess the direct impacts to the buried archaeological resource from the proposed development scheme.

2.4.3 A 5km buffer taken from the centre of Zone A was assessed for impacts to the setting(s) of the relevant designated heritage assets (scheduled monuments, listed buildings and conservation areas) which were identified during the assessment as potential sensitive receptors to the scheme.

Table 2.7: Summary of site-specific surveys undertaken.

Title	Extent of survey	Overview of survey	Survey provider	Year	Reference to further information
Thurrock Flexible Generation Plant Geophysical Survey	Survey centred on NGR 566194 176616. The Site comprises arable fields located to the east of Tilbury with a designated survey area covering approximately 17.3 ha.	A detailed gradiometer survey was conducted over land adjacent to Tilbury Substation, Tilbury, the detailed gradiometer survey has demonstrated the presence of several strong rectilinear anomalies that could be archaeological in origin.	Wessex Archaeology	2017	Volume 6, Appendix 7.2: Deposit Model and Geophysical Survey Report
Walkover survey	Whole site and designated assets within wider study area	A walkover survey of the entirety of the site was undertaken by the principal authors, Dan Slatcher, in September 2018 and Nikki Cook in November 2019	RPS	2018 and 2019	Results incorporated into Volume 6, Appendix 7.1 Desk-Based Assessment

Geoarchaeological deposit model	Survey centred on NGR 566194 176616. The Site comprises arable fields located to the east of Tilbury with a designated survey area covering approximately 17.3 ha.	A programme of geoarchaeological fieldwork and deposit modelling to clarify the nature of the sub-surface stratigraphy across the site; enhance understanding of the nature, depth, extent of any former land surfaces, alluvial and peat deposits.	QUEST	2019	Volume 6, Appendix 7.2: Deposit Model and Geophysical Survey Report
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2.4.4 The assessment of impacts to settings of potential historic environment receptors was based on a Zone of Theoretical Visibility (ZTV) calculated from a maximum 40m stack height and main generating station building height of 20m within Zone A (see Figure 2.2).

2.4.5 The assessment of impacts to the settings of the relevant designated assets has also drawn on the wider wireframes and photography undertaken as part of Volume 3, Chapter 6: Landscape and Visual Resources to inform the wider settings analysis.

2.5 Uncertainties and/or data limitations

2.5.1 There has been limited non-intrusive archaeological investigations of the proposed development site, although a terrestrial geophysical survey was undertaken in Zone A, which identified potential archaeological features in this area. Historic maps, Lidar data and aerial photographic evidence has also been assessed, suggesting the presence of possible archaeological features from the prehistoric to the modern period within the development site boundary. Data recorded from the Historic Environment Record (HER) and National Heritage List for England (NHLE) have been assessed to derive a measure of archaeological potential, but not yet ground-truthed: this data is assumed to be accurate, but this cannot be guaranteed. As such, the principle of the maximum design envelope has been applied in undertaking the impact assessment.

2.5.2 Geoarchaeological monitoring and recording of boreholes and windowless samples undertaken as part of geotechnical site investigation works was undertaken to produce a geoarchaeological deposit model for the terrestrial element of the scheme in Zone A. This confirmed the presence of possible archaeological and palaeoenvironmental deposits in this area, but the exact nature and extent of this is yet to be fully understood.

2.5.3 Further archaeological mitigation (both non-intrusive and intrusive) is proposed as part of scheme, for both the terrestrial and marine environments where direct impacts are assessed as likely to occur.

2.6 Maximum design envelope parameters for assessment

- 2.6.1 This ES chapter assesses the short-term effects of the construction and decommissioning phases and the long-term effects relating to the operation and maintenance phase on the historic environment.
- 2.6.2 The maximum design envelope parameters identified in Table 2.8 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These parameters have been identified based on the overview description of the development provided in Volume 2, Chapter 2: Project Description, including all potential development options where these are under consideration by the applicant.
- 2.6.3 Effects of greater adverse significance are not predicted to arise should any other development scenario within the proposed development design envelope be taken forward in the final design scheme.

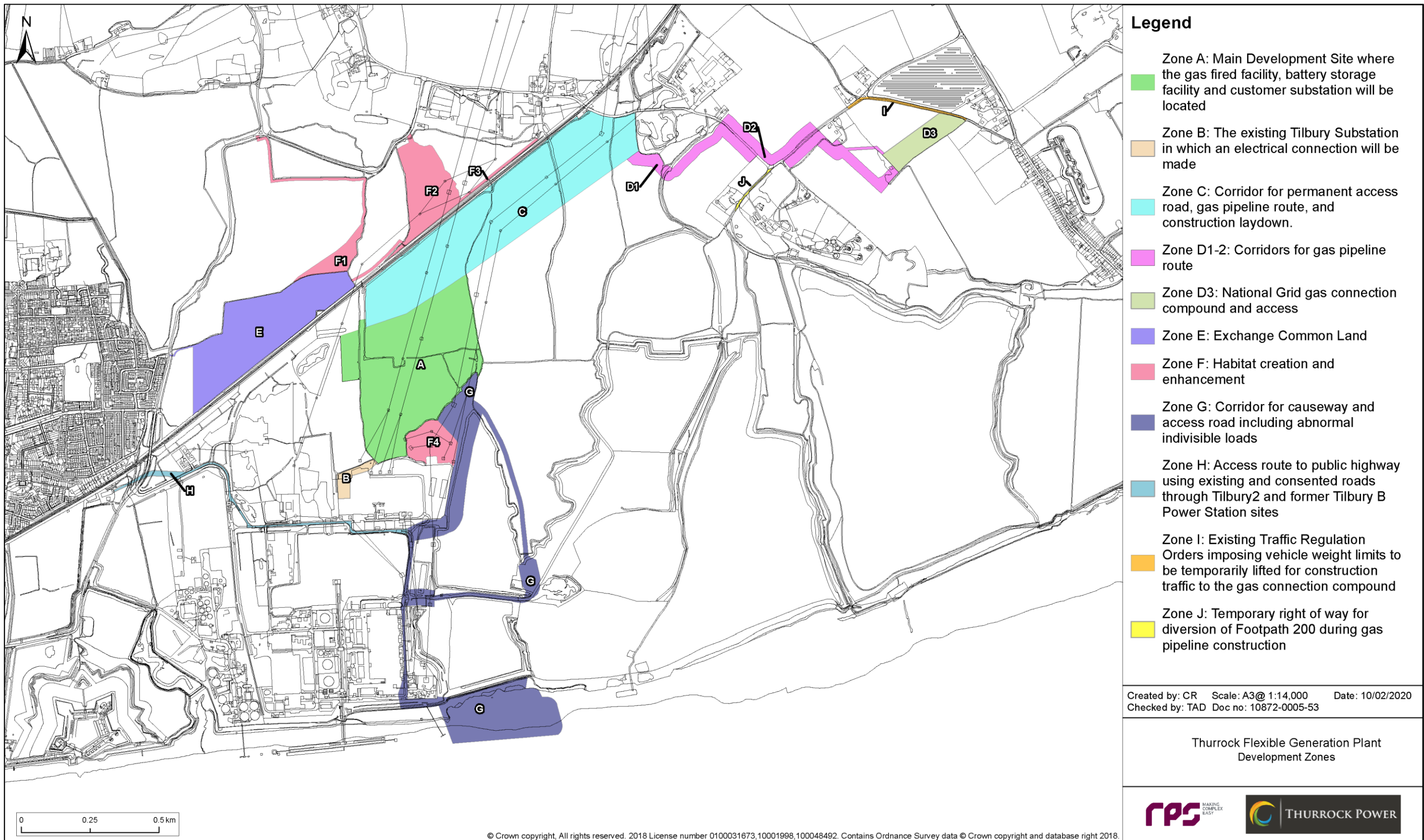


Figure 2.1 Proposed development site development zone

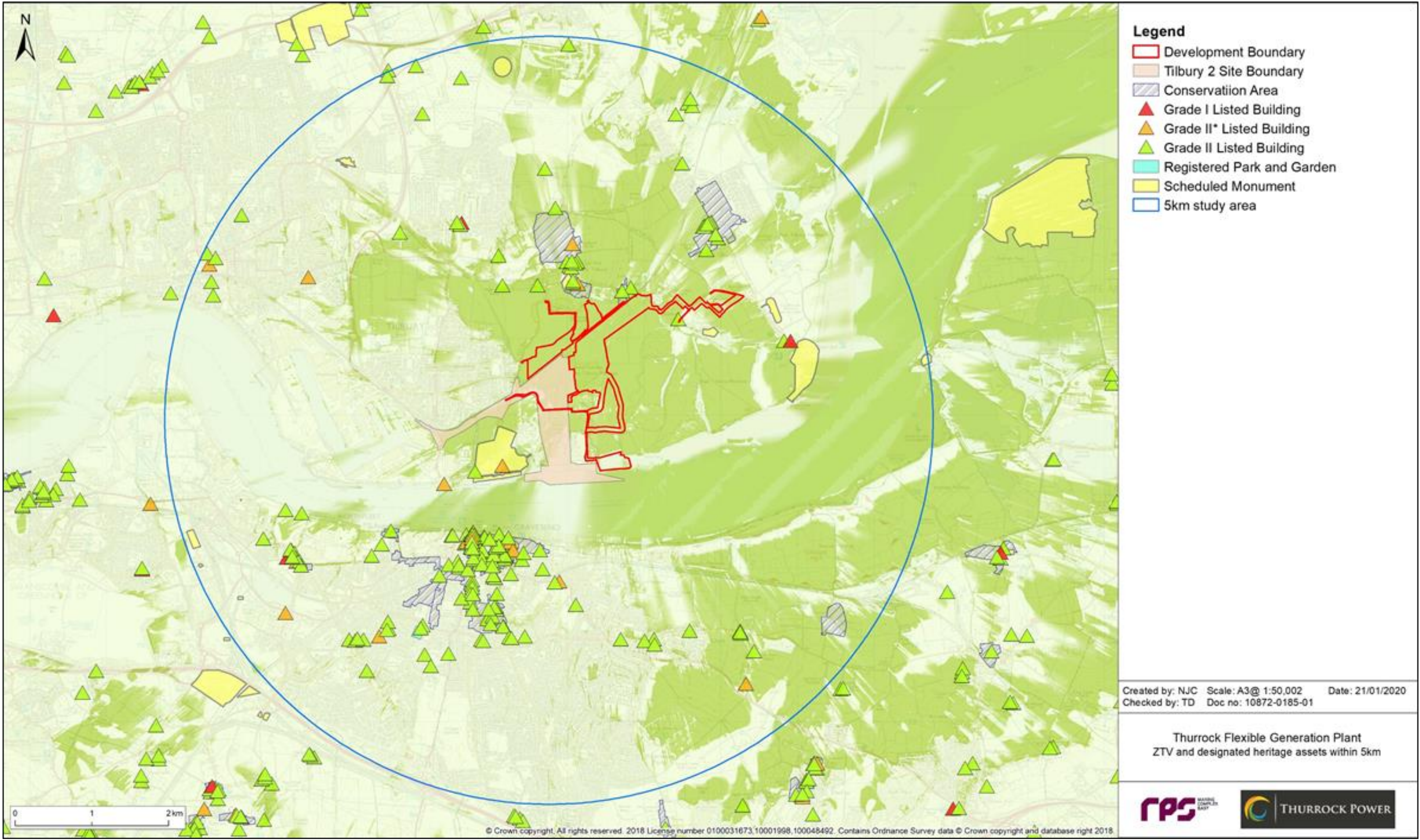


Figure 2.2 ZTV and designated heritage assets within a 5km buffer of Zone A

Table 2.8: Maximum design envelope parameters assessed.

Potential impact	Maximum design scenario	Justification
Construction		
Construction of all aspects of the Thurrock Flexible Generation Plant (including any stripping/groundworks required for habitat creation, storage, compounds and accesses, and dredging within the marine/intertidal zone) could result in permanent loss of, or damage to, heritage assets comprising buried archaeological and environmental remains.	Construction disturbing the ground may occur within any part of the main development site (Zone A) and the causeway construction area (as defined in the draft Deemed Marine License)	Maximum area would have greatest potential for impact on below-ground archaeology and marine/intertidal deposits
	Zone A foundations extend to peat layer if present; continuous flight auger (CFA) piling method used	Potential foundation depth and piling method with greatest potential for impact on below ground archaeology
	Topsoil strip required in Zones F1, F2 and E	Maximum area would have greatest potential for impact on below-ground archaeology
	Gas pipeline construction: 20m wide working corridor and trench 4 m deep or 5 m below feature for trenchless crossings; pipeline total length up to 3km	Maximum size, depth and length crossing undeveloped land would have greatest potential for impact on below ground archaeology
	Access road(s) for construction: 20m wide working corridor(s); route(s) not shared with gas pipe route	Maximum area of construction would have greatest potential for impact on below ground archaeology
	NTS connection above-ground installation: 50m x 50m compound	Maximum size would have greatest potential for impact on below ground archaeology
Construction works at Thurrock Flexible Generation Plant could result in temporary impacts on the settings of heritage assets including scheduled monuments, listed buildings, Conservation Areas and Registered Parks and Gardens.	Tower cranes and other construction machinery within the entire development site, including lighting, noise, etc	Greatest potential for visual impact on settings of designated assets
Construction works at Thurrock Flexible Generation Plant could result in impacts on the overall historic landscape.	Up to six year phased construction programme	Maximum duration would have greatest potential for impact on overall historic landscape
Operation and maintenance		
The operation and maintenance of Thurrock Flexible Generation Plant could result in long-term impacts on the settings of heritage assets including scheduled monuments, listed buildings, Conservation Areas and Registered Parks and Gardens.	Main development site buildings and gas engine stacks' height and visibility as defined in Volume 3, Chapter 6: Landscape and Visual Resources. Based on maximum of 48 stacks at 40m tall plus plume assessment, lasting for a period of up to 35 years.	Maximum visibility would have greatest impact on settings of heritage assets
	National Transmission System (NTS) connection above-ground installation buildings and equipment 5 m high. Located at point within Zone D3 most visible to Coalhouse Fort.	Maximum visibility would have greatest impact on settings of heritage assets
The operation and maintenance of Thurrock Flexible Generation Plant could result in long-term impacts on the overall historic landscape.	Entire development as described in Chapter 2	Maximum size would have greatest potential for impact on overall historic landscape
Decommissioning		
Decommissioning works at Thurrock Flexible Generation Plant could result in temporary impacts on the settings of heritage assets including scheduled monuments, listed buildings, Conservation Areas and Registered Parks and Gardens.	Ongoing operation of all or part of flexible generation plant after 35 years	Greatest long-term impact on settings of heritage assets
Decommissioning works at Thurrock Flexible Generation Plant could result in temporary impacts on the overall historic landscape.	All above-ground structures are decommissioned	Removal of gas pipeline and foundations is not envisaged by the applicant, subject to further consideration of decommissioning methods at the time

2.7 Impacts scoped out of the assessment

- 2.7.1 Impacts on buried archaeological remains during the Operational phase of the scheme have been scoped out as any direct impacts to buried archaeological remains are only expected to occur during Construction. It is assumed that any such archaeological remains would be examined to an agreed appropriate level ahead of any construction works taking place. As such, little or nothing of archaeological interest would remain in situ to be affected by any operational activities.
- 2.7.2 The scheduled monuments at Orsett (causewayed enclosure/Anglo-Saxon cemetery); the East Tillbury Battery; Aspdin's Kiln; and Dene Holes in Hangman's Wood have all been scoped out of further assessment: it was considered using professional judgement that there was no contextual or meaningful relationship between the Site and these monuments. The proposed development site makes no contribution to the settings or significance of these scheduled sites, and therefore the significance of effect arising from the construction, operation and decommissioning phases of the scheme would be 'no change'.
- 2.7.3 Impacts on other designated assets (Conservation Areas, listed buildings and registered park and gardens) within the urbanised areas of Gravesend resulting from possible changes within their settings have also been scoped out, as the settings of these assets comprise the immediate urban environment within which they are located. Their settings will not be affected by the proposed development.

2.8 Measures adopted as part of Thurrock Flexible Generation Plant

- 2.8.1 There is no inherent mitigation built into the project for archaeology, as the only inherent mitigation would be to not build on the top of known or potential features: preservation in situ would not be a viable option as this would affect the inherent layout of the scheme. None of the known and potential archaeological remains are considered to be of sufficient merit to warrant such an approach and are not considered to be of schedulable quality.
- 2.8.2 However, preservation by record will increase knowledge of the multi-period occupation of the site, which can also be set into its wider context and contribute to local/regional research aims and objectives. As such, a number of measures have been designed-in to the Flexible Generation Plant to offset the potential for impacts on the historic environment. These are summarised in Table 2.9.
- 2.8.3 Impacts to settings and historic landscape are proposed to be mitigated through landscape mitigation provided in accordance with a planting scheme based on the

Illustrative Landscape Plan (application document A2.9). A Landscape and Ecology Management Plan (LEMP) will set out the ongoing management and aftercare measures, and will be written post-DCO, but pre-construction, to discharge this DCO Requirement.

Table 2.9: Designed-in measures.

Measures to be adopted as part of Thurrock Flexible Generation Plant	Justification
Construction phase	
A Written Scheme of Investigation has been prepared setting out a comprehensive mitigation strategy for undertaking non-intrusive and intrusive archaeological recording for both the terrestrial and marine historic environment.	To offset any loss or damage to buried archaeological assets
Geophysical surveys will be undertaken of areas not yet surveyed, and where ground disturbance is proposed. The results will inform a programme of targeted evaluation/mitigation as appropriate.	To offset any loss or damage to buried archaeological assets
Additional geotechnical boreholes, and geoarchaeological monitoring and deposit modelling will be undertaken of the results.	To gather further information and knowledge regarding the palaeoenvironmental sequencing within the Holocene
Targeted archaeological evaluation and/or excavation and recording of the findings will be undertaken.	To investigate, record and understand the archaeological potential of the area, and to offset the impacts of the scheme through preservation by record
The results of the archaeological fieldwork will be published and disseminated	To engage and inform various audiences
Identification of unexpected archaeological assets/sites encountered during the construction phase will be undertaken in line with procedures agreed with the relevant authorities. The procedures will be contained within the Written Scheme of Investigation.	To offset any loss or damage to buried archaeological assets
Operation and maintenance phase	
Landscape mitigation planting will be undertaken (including the gapping up of hedgerows) and will be maintained in accordance with a Landscape and Ecology Management Plan.	To reduce any long-term effects on the settings of heritage assets and the historic landscape caused by the built element of the proposed development site

- 2.8.4 Further geophysical survey in those areas of the proposed development to be subject to bulk earthmoving outside the main development site where that was already surveyed (see Volume 6, Appendix 7.2) will be undertaken and depending on results, a scheme of further investigation to include trial trenching and/or archaeological

monitoring of soil stripping, to be followed by an appropriate level of recording and dissemination.

- 2.8.5 For more deeply buried remains of palaeoenvironmental potential archaeological monitoring and recording of further ground investigation works would be undertaken, followed by an appropriate level of dissemination.
- 2.8.6 In respect of construction, standard good practice measures regarding noise, dust, etc. would be adopted and implemented through a Code of Construction Practice (CoCP). An Outline CoPD is included as application document A8.6 as part of the application and provides general and topic-specific strategies, control measures and monitoring procedures to limit the potential adverse impacts from constructing the proposed plant, on the environment and the local community, as far as reasonably practicable.
- 2.8.7 Mitigation measures for reducing the impacts to the historic environment are set out in Section 4 of this chapter. Details can also be found in the draft WSI (application document A8.11).

Offsetting

- 2.8.8 Where programmes of archaeological investigation (including dissemination of results and placement of acquired materials in suitable archives) are undertaken post-consent but ahead of and during construction, this is not considered to be mitigation as it does not avoid or reduce the magnitude of impact or the significance of effect. Rather, it is considered that the programmes of archaeological investigation are a means of 'offsetting' or 'remedying' those impacts and effects. The same logic applies to the recording of historic buildings or structures ahead of demolition.

3. Baseline environment

3.1 Current baseline

- 3.1.1 A detailed description of the historic environment baseline is presented within Volume 6, Appendix 7.1: Historic Environment Desk-Based Assessment, which should be read in conjunction with this chapter. This section summarises and synthesises the information presented in Appendix 7.1 and 7.2, which has been used in assessing the impacts of the proposed scheme on the historic environment, as set out in Section 4.
- 3.1.2 There is considerable evidence from known sites and finds, as well as cropmarks shown on aerial photographs, to suggest extensive activity in the Study Area throughout the prehistoric period, with multi-period sites suggesting almost continuous occupation from early prehistory. However, the main focus of settlement seems to have been the higher ground nearby at Mucking, and also at Gun Hill/West Tilbury, Linford, East Tilbury and Orsett/Chadwell St Mary. The majority of the Site is separated from these settlements and the higher ground by part of the London, Tilbury and Southend Railway known as the Tilbury Loop, used mainly for commuter passenger services between central/east London and locations in Essex.
- 3.1.3 The Site lies within a historic landscape which is characterised as low-lying drained marshland, with areas of rough grazing land, largely held as common but with some former dispersed farmsteads and small, irregular fields indicating piecemeal enclosure, divided by reed-filled ditches. There are few hedgerows in the flat landscape, but where they do exist species usually include hawthorn, oak, elm, and occasionally elder, blackthorn, and dog rose. Tree cover is sparse on the drained marshland and is mainly restricted to the planting associated with the industrial developments, including the sewage works, edges of settlements and hawthorn scrub and small trees either side of the railway line. Scrub and small trees also intermittently line roads and paths. There has been significant boundary loss within the Site and its surrounds, resulting in a more open landscape and areas of grazed and cultivated marsh and common. However, the patterns of historic drainage channels remain extant and legible and there is considerable time-depth, but with diminished legibility.
- 3.1.4 The main development site (Zone A) currently comprises open, flat fields crossed by drainage ditches and three overhead power lines with steel lattice electricity pylons. It is immediately to the north of the existing Tilbury Substation and site of the decommissioned Tilbury B coal fired power station, with the River Thames further to the south.

- 3.1.5 Figure 3.1 shows HER data for a radius of 3km around the application site, while Figure 3.2 shows Historic Landscape Character within the study area. More detailed figures showing the chronological spread of sites and monuments, and historic mapping, are contained within Volume 6, Appendix 7.1: Historic Environment Desk-Based Assessment.

Designated heritage assets

- 3.1.6 In terms of relevant designated heritage assets, no World Heritage Sites, Scheduled Monuments, Historic Battlefields, Registered Parks and Gardens, Protected Military Remains or Historic Wrecks lie within the Site itself.
- 3.1.7 Designated assets within a wider 5km buffer of the Site, taken from the centre of Zone A, are shown on Figure 2.2 and comprise 11 Scheduled Monuments, 206 listed buildings (three Grade I, 16 Grade II* and 187 Grade II), one Registered Park and Garden and a number of Conservation Areas. Two Conservation Areas (West Tilbury Parts 1 and 2, and East Tilbury) are located on the north side of the River: the remainder are largely to the south within Gravesham District, and most are clustered to form the historic core of the town.
- 3.1.8 Three sites within the 5km Wider Study Area are also recorded on Historic England's Heritage at Risk register. These comprise the East Tilbury Conservation Area; and the Scheduled Monuments at Coalhouse Fort and Cliffe Fort.

Prehistoric

- 3.1.9 The Site lies c.1.25km to the south of the geological and topographical boundary of the East Tilbury Marshes Gravel (Gibbard 1985) and borehole sequences have confirmed the presence of a thick sequence of intercalated alluvial and peat deposits overlying sands and gravels of the Shepperton Gravel between c. -11m OD and -17m OD (Quest 2019). The peat deposits have been shown to provide significant palaeoenvironmental information considered to be of a national or international importance providing detail of environmental and landscape change during the prehistoric periods (Quest 2013).
- 3.1.10 From the beginning of the Holocene, the River Thames underwent a gradual transition from a braided river system to a single meandering channel and the chalk and gravel was progressively buried under deep alluvial deposits as a result of relative sea rise. During the course of the Holocene, further periods of stabilisation of the valley floor and changes in sea level are indicated in the Tilbury area by peat horizons.
- 3.1.11 No Palaeolithic archaeological features have thus far been recorded in the Study Area: at present, the EHER contains only records of findspots relating to material of this date. None are recorded within the Site itself. The considered potential for Palaeolithic

material to be found within the Study Area is recorded geospatially in the EHER and is documented as 'Low'.

- 3.1.12 In some areas where deep gravel deposits have been recorded, peat accumulation dating to the Mesolithic period has been identified underlying the alluvial sedimentation. Some findspots of Mesolithic material are recorded within the Study Area, but none within the Site itself.

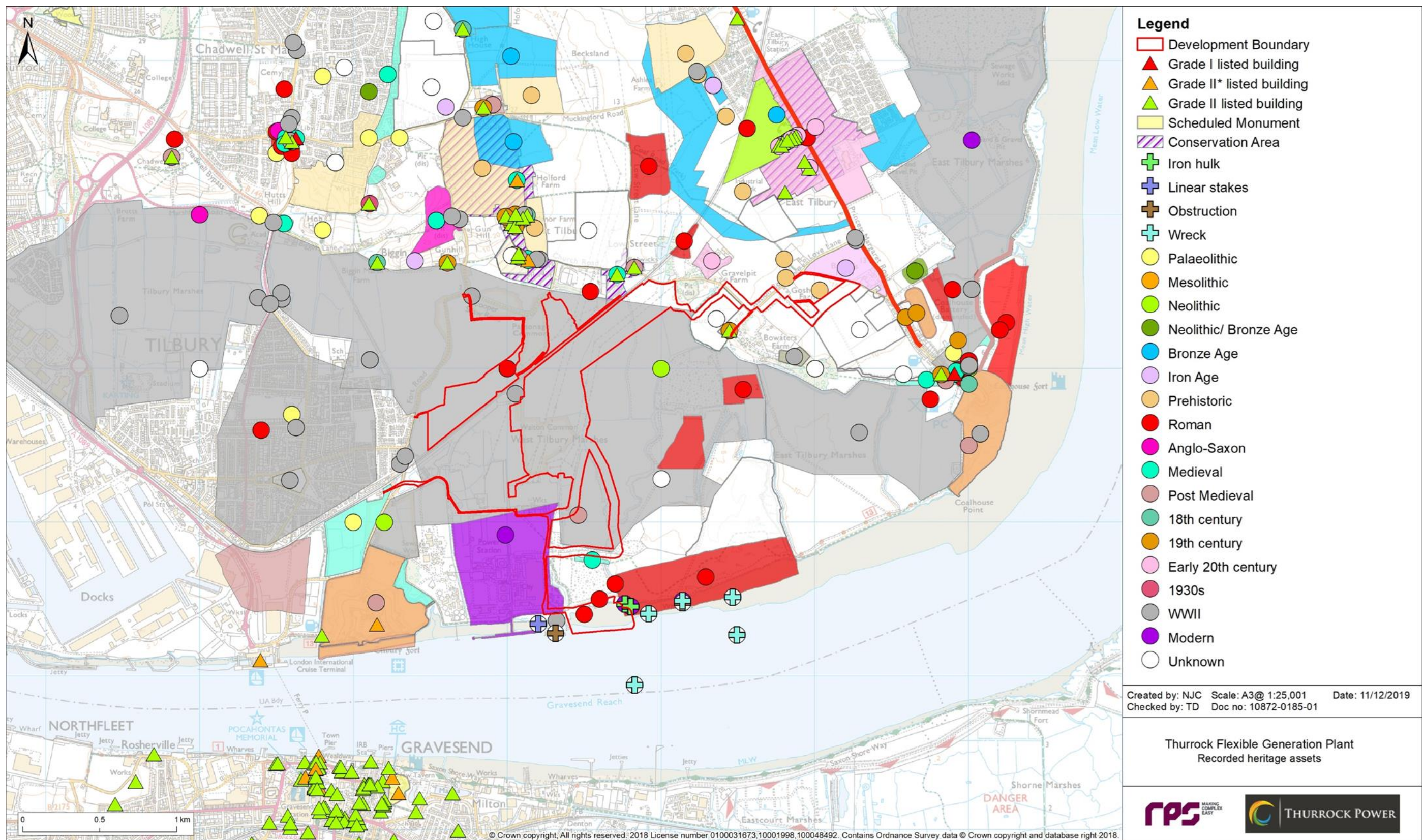


Figure 3.1 Recorded heritage assets within a 3km study area around the main development site

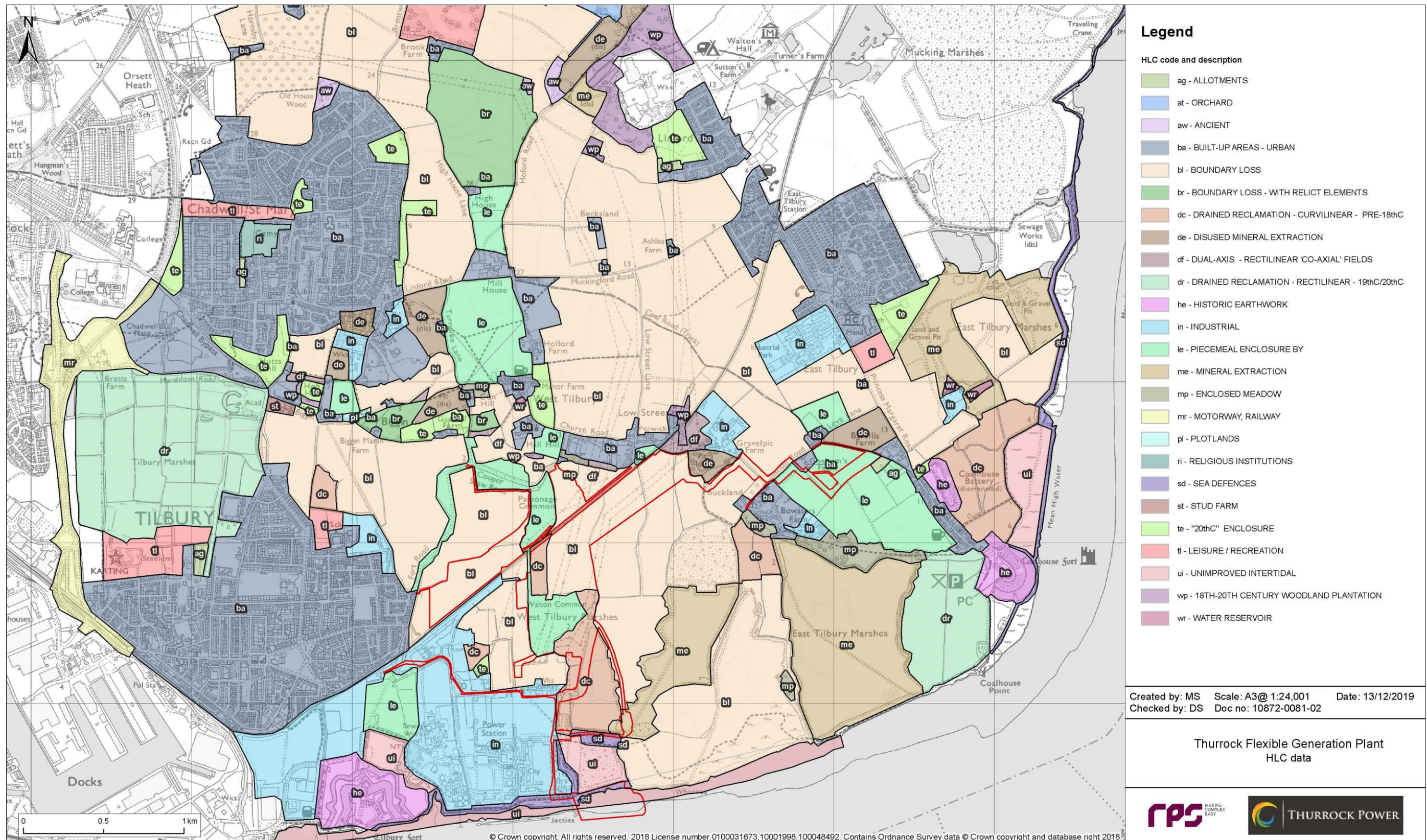


Figure 3.2 Historic Landscape Character of the site and surrounding area

- 3.1.13 However, a partial skeleton was found in 1883 within peat at c.10m below ground level (bgl) at the Tilbury Docks site (Spurrell, 1889), c.3km to the west-southwest of Zone A. More recent analysis (Schulting, 2013) has revealed the skeleton to be of Late Mesolithic date (8015–7860 cal BP): the Late Mesolithic is a period for which human skeletal finds are very rare in Britain, and such a find highlights the presence of human habitation, and the potential utilisation of the floodplain not far from the proposed development site, during this period.
- 3.1.14 Although evidence of prehistoric archaeology is limited in the Lower Thames Valley, the palaeoenvironmental record indicates woodland clearance, cultivation and animal husbandry was taking place which suggests the presence of prehistoric farming settlements close-by.
- 3.1.15 An ancient ridgeway route running between Chelmsford and Horndon-on-the Hill in Essex, and Higham in Kent, is presumed to have crossed the Thames at East Tilbury, to the east of the proposed development site at a point where the Thames narrows, and is likely to have been a well-known routeway which had been in use throughout the prehistoric period, as nomadic hunter-gatherers gradually began to settle more permanently in the landscape during the later prehistoric period.
- 3.1.16 The area surrounding East Tilbury and Lindford is recorded in the EHER as a prehistoric ritual landscape, and there are various areas of cropmarks and known sites and finds from the Neolithic and Bronze Age recorded throughout the Study Area. Archaeological evaluation by trenching and excavation has revealed occupation from the Neolithic, as well as late Bronze Age ditches belonging to superimposed field systems and limited Roman features.
- 3.1.17 At Gun Hill, c.1.2km to the north-northwest of Zone A, evidence suggests a field system may have been created by the late Bronze Age which continued in use into the Iron Age, whilst at Mill House Farm, West Tilbury, a variety of cropmarks were identified comprising ring ditches, curvilinear features, a trackway, enclosures, and pits dated to the Bronze Age, suggesting an established settlement site on the higher ground above the floodplain, c.2km due north the proposed development Site. It is likely that the people who were actively using and managing the land within Zone A and the West Tilbury Marshes were living at this location in West Tilbury, and another encampment may well have existed at East Tilbury. A Bronze Age channel ditch was also identified within Zone A during the SI works in BH1 in October 2019.
- 3.1.18 The earliest salt production in Britain using the industrial ceramic known as briquetage is now firmly dated to the Middle Bronze Age and its use extends to the early Roman period. When found at Gun Hill, the briquetage at Gun Hill was the earliest record of such material in Essex.
- 3.1.19 It is likely that the marshland area surrounding the proposed development Site, from the foreshore at East Tilbury Marshes and Coalhouse Fort in the east, across and round to Tilbury, with its extensive saltmarsh and tidal floodplain, was actively managed for grazing and subsistence, and that the first industry in the area, that of salt production, would have been actively taking place as the landscape was reclaimed and managed and its resources exploited for both salt and animal grazing.
- 3.1.20 Settlement and funerary/ritual evidence within the Study Area continues from the Neolithic and Bronze Age into the Iron Age, with several sites seeing continued and expanded activity. There are as yet no recorded Iron Age sites or finds within the Development Site, although adjacent to Zone D, at East Tilbury Place, part of a sub-rectangular enclosure was recorded, some of which had already been destroyed by gravel extraction. The enclosure ditch was c.1.5m wide and approximately 0.75m deep: pits outside the enclosure were excavated and contained 'soft red undecorated pottery', charcoal and animal bones dating to the Iron Age period.
- 3.1.21 The evidence from the multi-phase site at Gun Hill at West Tilbury suggest that the first major period of settlement was in the Early to Middle Iron Age, although earlier activity is recorded through ephemeral finds of Palaeolithic, Mesolithic, Neolithic and Bronze Age date.
- 3.1.22 Originally thought to be a Neolithic henge (it eventually proved to be a Late Bronze Age ringwork), the nationally significant site at Mucking, c.4km to the north-northeast of Zone A, contains remains dating from the Neolithic to the Middle Ages—a period of some 3,000 years—and the Bronze Age and Anglo-Saxon features are particularly notable. The story of the site at Mucking begins with a succession of Early Neolithic, Grooved Ware, and Beaker-attributed occupations. Eight earlier Bronze Age barrows were found, plus a Middle Bronze Age field system with an accompanying settlement. It was, though, with the establishment of its two ringworks during the Late Bronze Age that the fortified site, whose economy was fuelled by metalworking and salt production, begins to look different from other parts of the landscape, not least because of the continuous high density of occupation that stretches from the beginning of the first millennium BC through to the early Anglo-Saxon period.
- 3.1.23 It is likely from the evidence within the Study Area that the process of salt production most likely began at Tilbury Marshes during the Bronze Age, but this industrial process was certainly an established part of Iron Age life in the area, with domestic settlement focused on the higher ground, but with the low level marshlands being managed for salt production.
- 3.1.24 The settlement evidence within the Study Area is likely to have been satellite activity to the main fortified settlement at Mucking.

Roman/Romano-British

- 3.1.25 Recorded sites of Roman date are widespread across the Study Area, and some material is recorded within the Site itself, on the foreshore and on the landward side of the Mean High Water mark in and around Zone G. The wider area would have been heavily Romanised and it is likely that extraction of gravel, chalk and clay continued during the Roman period. The Roman settlers significantly expanded the industry of salt production which had begun much earlier in the later prehistoric period, leading to the creation of 'red hills' and salterns – remains of salt-making activity of prehistoric and/ or Roman date.
- 3.1.26 To the south of Zone A an extensive area of Roman settlement is recorded in the area immediately adjacent to the proposed causeway and jetty (Zone G). Below the present high tide level, the area measuring c.1.1km long and c.0.3km wide (as recorded in the EHER) comprises the remains of an extensive settlement, associated with much 1st and 2nd century AD pottery, and may represent a landing-place for traffic from Kent or elsewhere.
- 3.1.27 At Coal Road, east of Low Street Lane, c.1.3km to the northeast of Zone A, the bank of an old gravel pit produced small quantities of Romano-British pot dating to the 2nd century. Approximately 500m to the northeast, to the west of East Tilbury, a field system was recorded which comprised of a complex of field boundaries dating from the Roman period in close proximity to a late Bronze Age settlement. The presence of a number of pits and postholes in this area, combined with pottery evidence hints at the existence of a Romano-British settlement in the vicinity.
- 3.1.28 At East Tilbury, near to Coalhouse Fort, a substantial Roman building would appear to have existed in the area of St Catherine's Church, where the walls reportedly contain some Roman and later bricks. The EHER notes that it was reported in the 18th century that gravel-digging near the church often uncovered tessellated pavement, and it is likely that a high-status building was located in the vicinity.
- 3.1.29 The line of a Roman Road follows what is now Princess Margaret Road, which overlies the earlier prehistoric Ridgeway route: a corresponding road apparently approached the north Kent coast at Higham, where burial evidence has been found. Roman remains have also been recorded at Tilbury Fort to the southwest of Zone A, with finds including Samian ware and *fibulae*.
- 3.1.30 There was clearly a large Roman/Romano-British presence within the Study Area, involving salt production and a likely landing-stage/trading post, as suggested by the extensive area of settlement and ceramics found on the foreshore to the east of Zone G, which also extended inland with field systems, settlements and burials, including the establishment of new encampments and the re-purposing of earlier ones.

Saxon and Medieval

- 3.1.31 The nationally significant site at Mucking, c.4km north-northeast of the Site, had been abandoned by the Romano-British during the 4th century and there was a gap before the Saxon occupation of the site began in the early 5th century. This was among the earliest Anglo-Saxon settlements in England. The Anglo-Saxon settlement gradually moved north over the course of two hundred years after its establishment, and during or after the 8th century, the settlement was either abandoned, or drifted beyond the area that was excavated, with the area previously occupied by the Anglo-Saxon settlement becoming part of a Saxo-Norman field system.
- 3.1.32 As was the case during the Bronze Age, where satellite settlements and activity occurred in the Study Area away from the main settlement at Mucking, so too during the Saxon period there were satellite settlements within the landscape surrounding the Site, most of which revolved around the foundation of early Christian churches. Small villages became established around the churches, which then grew into the historic settlements at East Tilbury (around St Catherine's Church); West Tilbury (around St James' Church); and at Chadwell St Mary (around St Mary's Church).
- 3.1.33 St Catherine's Church at East Tilbury may relate to Bede's earliest Christian site at '*Tilberg*': the site has the potential to be an early Saxon settlement/religious site as it lies on the ancient highway from the East Tilbury ferry to Mucking and beyond. Moreover, within an arable field close to the church, heavily worked by a metal detecting group, the EHER has recorded that more than 20 early Saxon *sceattas* have been found, plus a range of 14th to 17th century metal objects.
- 3.1.34 The scheduled earthworks to the southwest of St James' Church at West Tilbury include a length of rampart with an internal ditch reputed to be the site of a Saxon hall – a high-status residence. In c.628 Tilbury was recorded as the location of Bishop Cedda's palace and the scheduled earthworks may indeed be the remnants of an early ecclesiastical site at this location and the original manor.
- 3.1.35 During the medieval period, the early Christian chapels and religious sites often became the foci for expanding settlements which also aggregated around earlier manors, themselves established during the Saxon period, such as those at West Tilbury, East Tilbury and Chadwell St Mary. The proposed development site was in the agrarian hinterland of these Saxon and expanding medieval settlements.
- 3.1.36 The historic settlement most closely associated with the Site is West Tilbury, which is situated at the edge of an escarpment immediately overlooking the marshes, and the hamlet around Low Street, which together form Parts 1 and 2 of the West Tilbury Conservation Area. The Low Street hamlet developed around the second West Tilbury

manor of Condovers, created in the 15th century, and Walnut Tree Cottage (Grade II listed) was the manor farm.

- 3.1.37 Evidence from West and East Tilbury Marshes and also Mucking Marsh suggests that the land was improved and used for grazing during the medieval period: the landscape is characterised by a rectilinear pattern of fields divided by drainage ditches with a medieval sea wall surviving on the eastern edge of Mucking Marsh, and a surviving counter wall and ditch at West and East Tilbury Marshes. The current footpath linking Tilbury Fort with Coalhouse Fort largely follows the line of the medieval sea wall and ditch, and part of the Zone G haulage road lies adjacent to the counter wall, which survives as a tall grassy bank.
- 3.1.38 In the Medieval period West Tilbury was a small settlement very closely related to agriculture. Much evidence of this past has been retained in the present landscape, including a complete example of a Medieval ‘open field’ system in the area of The Great Common Field bounded by Rectory Road, Turnpike Lane, Blue Anchor Lane and Muckingford Road. Much Medieval ‘common land’ upon which farmers had common rights to graze animals still remains in the vicinity of West Tilbury, including Parsonage Common and Walton Common, parts of which fall within the proposed development site.
- 3.1.39 The historic dispersed and polyfocal settlement pattern largely survives at West Tilbury, where the Grade II* listed former parish Church of St James (now redundant and repurposed as a family home) includes 11th century fabric. The church tower and the trees around the churchyard are an important silhouette and landmark from all directions. West Tilbury Hall (Grade II) is the manor of the village. It was built in the 16th century in a prominent hilltop position on the site of the previous ‘Domesday Manor’, and a Medieval market and fair, both dating from the 14th century, were held at West Tilbury on the area that is now The Green.
- 3.1.40 The moated site recorded at St Chad’s Well may also be the remnants of a medieval manor, although it has also been suggested that St Chad’s Well may have been a Holy Well of Roman date, and located on a Roman road or trackway leading northwards from the estuary and the known settlement site on the foreshore in the area of Zone G.
- 3.1.41 The EHER also records a medieval road and causeway located on the redan outwork of what eventually became first, a blockhouse at Tilbury during the Tudor period, and later the Tilbury Fort. The road most probably connected with the ferry houses on the Essex side of the river, which were associated with boats crossing the Thames from Gravesend, with the medieval road and causeway thereby linking Gravesend with West Tilbury. Medieval Gravesend was an important and wealthy town, derived from its position on the Thames: in the 14th century Richard II granted to the watermen of

Gravesend and their successors the sole right to ferry passengers to London. This right, which was successively confirmed by later monarchs, was the beginning of the long ferry, and gave great impetus to the growth of Gravesend as a maritime centre and port.

Post-Medieval

- 3.1.42 The picture of settlement and activity in the wider area during the early Post-Medieval period was similar to that of the later medieval period and comprised mostly the continuation of the established medieval settlement, enclosure, agricultural practices and routeways through the landscape, with little expansion.
- 3.1.43 However, the wider area was significant in the defence of the River Thames from at least the reign of Henry VIII onwards, as it appears that it was during the Post-Medieval period that the first fortifications appear on the shorelines on both sides of the Lower Thames Estuary, including the scheduled monuments comprising Tilbury Fort and the early phases of the mainly 19th century Coalhouse Fort on the Essex side, and a blockhouse at Gravesend on the Kent side.
- 3.1.44 King Henry VIII ordered the building of a blockhouse at Tilbury in 1539 and also new marsh roads (Fort Road and Cooper Shaw Road) that cut across West Tilbury Green and other common land. The blockhouse at Tilbury was superseded by the far larger and more complex fort and battery seen today, which is pentagonal, double-moated star-plan, with arrowhead-shaped bastions projecting from four of the angles, designed by the chief engineer to Charles I, Sir Bernard de Gomme and succeeded the Henrican blockhouse in the late 17th century.
- 3.1.45 Gravesend Blockhouse located c.2.1km southwest of Zone A on the south bank of the River Thames was built in 1539 as part of a chain of coastal defences in response to the renewed threat of invasion. It was one of five artillery blockhouses built along this stretch of the River Thames to defend the approach to London and the dockyards at Woolwich and Deptford. The other blockhouses were located at Tilbury, Higham, Milton and East Tilbury. The Gravesend Blockhouse crossed its fire with Tilbury Blockhouse on the north bank of the river and guarded the ferry crossing between Gravesend and Tilbury.
- 3.1.46 The site of Coalhouse Wharf and the Coastguard Lookout is thought to be the location of the 1540 blockhouse at East Tilbury: a second blockhouse was built subsequently to the seaward side of the first, and by 1735 this was described as ‘inundated and ruined by the sea’.
- 3.1.47 West Tilbury also has a well-chronicled association with Elizabeth I and her address to the troops at the time of the Armada in August 1588, at their camp at Gun Hill.

3.1.48 Within an area surrounded by Zone G of the Site, 'Wick House' is recorded from documentary sources as a Post-Medieval site c.100m southeast of the 400kv substation at Tilbury Power Station, but this has not been identified on the ground, and the area is now much disturbed. It may once have been a small farmstead.

18th and 19th centuries

3.1.49 As noted in its Conservation Area appraisal (Thurrock Council 2007), the timber-framed buildings and oldest plan forms at West Tilbury date from the medieval period, but the present external appearance of many of these earlier original buildings owe their external surface character from the later agriculturally prosperous 18th and 19th centuries, including the later use of render or re-facing in brick, the raising of roofs and the alteration of doors, porches and windows which hide a wealth of earlier historic details. The settlement prospered and grew, but with little physical change to its size. The majority of the Grade II listed buildings within the Conservation Area at West Tilbury are of late 18th or early 19th century date and cluster around The Green.

3.1.50 The River Thames, providing easy access to London, became heavily defended during the Post-Medieval period and later, with modernisations to Tilbury Fort, and the construction of New Tavern Fort at Gravesend (a scheduled monument, and Grade II* listed), with the fort at Gravesend designed and built to provide cross fire with Tilbury Fort on the north side of the river.

3.1.51 The first phase of the present Coalhouse Fort scheduled monument was begun in 1799 but was disarmed and abandoned after the Battle of Waterloo then enlarged and replaced in 1847-55 by a more complex structure. Following recommendations made by the Royal Commission on the Defence of the UK in 1860 the fort of the 1850s was then superseded by the present buildings between 1861-74.

3.1.52 Cliffe Fort, also a scheduled monument, is located c.4km east of Zone A, on the southeast side of the Thames in Kent, and lies due east of Coalhouse Fort as a pair defending The Lower Hope at a bend in the Thames leading into Gravesend Reach. The Fort was constructed during the 1860s as part of the River Thames' coastal defence system.

3.1.53 Shornmead Fort is located c.3.2 km southeast of Zone A, on the south side of the Thames in Kent, c.2km around the foreshore to the southwest of Cliffe Fort and was built with the intention to cross its fire with Coalhouse and Cliffe Forts in defending this part of the River.

3.1.54 By 1854, the London Tilbury and Southend Railway had been constructed. The railway line divides the application Site and bisects the historic settlements to the north from the ancient marshland commons and managed landscape to the south. The railway

provided access to the landing stage at Tilbury for passenger liners, which was replaced in 1924 by the present structure, comprising Riverside Station and floating landing stage, which is Grade II* listed, located c.2km southwest of Zone A and to the west of Tilbury Fort. There was also a station at Low Street.

3.1.55 The construction of the railway severed some of the historic routeways linking the settlements and higher ground to the farmland marshes and altered some field patterns as the fields were bisected.

Early 20th century

3.1.56 At the end of the 19th century, there had been little socio-economic change since the medieval period within the immediate area of the Site, which had remained largely rural and agricultural in nature. However, to the west, Tilbury Docks were opened in 1886 to alleviate congestion in the main London docks in the East End and begin the process of the gradual modern industrialisation of this part of the Thames.

3.1.57 At the same time, the construction of the railway and development of the Docks led to the beginnings of the creation of the modern urban town of Tilbury on the Chadwell Marshes to the west of the Site, to house the workers.

3.1.58 At East Tilbury, c.1.5 km northeast of Zone A, a purpose-built industrial village was developed between the 1930s and the 1960s for the British Bata Shoe Company Ltd as one of a number of satellites or colonies that the parent organisation, the Bata Shoe Company, based in Zlin, near what is now the eastern border of the Czech Republic, was constructing around the world in the 1930s. The East Tilbury Conservation area now covers the site and surroundings, and some of the houses and buildings within are also Grade II listed. Both the layout and design of the pre-war factory, housing and community facilities were devised by the parent company and the settlement combines Garden City planning and Modernist architecture. Its character has subsequently been diluted by a large private residential development of the 1970s and piecemeal change to the company buildings and is on the Heritage at Risk register.

3.1.59 During the First World War anti-aircraft guns at Tilbury Fort brought down a German airship, whilst to the north at Orsett there was a military airfield, which operated as a landing ground from 1916 to 1919 during the early days of military aviation.

World War II

3.1.60 A number of defensive features of Second World War date have been recorded both within the application Site and in its vicinity. During WWII there was the development of a wide range of defensive measures to meet the much greater threat of invasion and attack from the air, and included anti-aircraft batteries, gun emplacements (spigot mortars), road barriers and anti-landing ditches, particularly within locations considered

vulnerable to attack, such as Lower Thames Estuary. The low-lying topography of Essex, particularly along the coast, presented many such vulnerable locations, and many fields were criss-crossed with ditches to prevent their use by enemy gliders.

3.1.61 During the course of the Second World War, military features appeared in the English landscape on an unprecedented scale, but their impact was largely ephemeral, as the majority of features were removed at the end of hostilities. The appearance of cropmarks of medieval and earlier sites on both NMP mapping and Lidar data also indicates that these anti-invasion defences probably had little impact on earlier archaeological features beyond the ditches.

3.1.62 At both Mucking Marsh and West and East Tilbury Marshes, there are spreads of anti-glider ditches recorded from aerial photos, although none of those recorded within the Site are now visible.

Post-War (Modern) to present

3.1.63 In the 1940s, with the expansion of urban Tilbury, a sewage works was built to the south of the town, immediately adjacent and to the east of Tilbury Fort.

3.1.64 Tilbury 'A' Power Station was constructed to the southwest of the Site and adjacent to the sewage works between 1949 and 1957. Tilbury 'B' was constructed adjacent to Tilbury 'A' during the 1960s. At this time the jetty was lengthened to the east and its original coal-handling cranes were replaced. By the 1970s works buildings and an electricity sub-station had been constructed and a number of overhead power lines crossed the wider area.

3.1.65 The two Tilbury Power Stations, A and B, were built on made ground previously reclaimed from marsh and their construction obliterated the only historic farmstead in the zone – Marsh Farm. Tilbury 'A' was partly demolished in 1999, whilst Tilbury 'B' was converted to biomass in 2011. The jetty was enlarged in 2004. Following the closure of the Power Station, a programme of demolition has commenced across the remainder of 'A' and 'B' and relatively few structures now remain.

3.1.66 The former Tilbury Power Station site is currently being redeveloped to create a new port terminal, Tilbury2, comprising modifications and enlargements to the existing jetty and other marine works, as well as warehousing, other buildings and structures, and a new railway provision with improved road bridge.

3.1.67 At the time of writing, site investigation works are being undertaken to the east of Zone A on the East Tilbury Marshes as part of a plan for a Lower Thames Crossing to be put forward by Highways England as a DCO application in 2020.

3.2 Future baseline

3.2.1 Future changes to the historic environment baseline could include additions to the list of designated heritage assets, e.g. additional designations of scheduled monuments, listed buildings, etc. or amendments to the descriptions of the assets and/or areas covered by the present designations.

3.2.2 Other changes could occur as a result of further information regarding archaeological sites becoming available, possibly through programmes of intrusive or non-intrusive fieldwork.

3.2.3 No significant change to the historic environment baseline in the area is currently anticipated to occur as a result of climate change. Drier weather in the summer months may lead to the discovery of as yet unknown archaeological sites that become visible as cropmarks or parchmarks.

3.2.4 No changes in statutory legislation on historic environment issues are currently anticipated, although this may change at any time. Additional guidance may be issued by national statutory advisors, or others, including guidance on the assessment process.

Climate change

3.2.5 The Met Office Hadley Centre (MOHC) UK Carbon Projections ('UKCP18') dataset (MOHC, 2018) provides probabilistic projections of change in climatic parameters over time for 25 km grid squares across the UK. Projected changes for a RCP8.5¹ future global greenhouse gas emissions scenario have been reviewed for the 2050–2069 and 2080–2099 periods, representing changes towards the end of the proposed development's initial 35-year operating lifetime and changes for the period beyond that should operation continue.

3.2.6 The likely ranges of change in climatic parameters including precipitation, temperature, wind speed, humidity and frequency of extreme weather are not considered to materially affect the future baseline described above for the historic environment or increase the sensitivity of receptors to impacts beyond that described in Section 4.

¹ RCP8.5 refers to a high-emissions scenario assuming 'business as usual' growth globally with little additional mitigation. This is a conservative (worst-case) approach for the assessment

4. Assessment of Effects

4.1 Construction phase

4.1.1 The impacts of the construction of Thurrock Flexible Generation Plant on the historic environment have been assessed. The potential impacts arising from the construction of Thurrock Flexible Generation Plant are listed in Table 2.8 along with the maximum design scenario against which each construction phase impact has been assessed. A detailed description of the project is contained within Volume 2, Chapter 2: Project Description.

4.1.2 There are no direct physical impacts to any designated heritage assets. There are potential direct physical impacts to buried archaeological remains and impacts to the settings of some designated and undesignated heritage assets within the Study Area.

4.1.3 A description of the potential effect on historic environment receptors caused by each identified impact is given below.

Buried archaeological remains – terrestrial and marine/intertidal

4.1.4 The archaeological baseline demonstrates that there are known and potential archaeological remains within the site, comprising largely prehistoric and Romano-British activity in the form of landscape reclamation and management (drainage channels), possible industrial activity (salt production) and settlement evidence, as well as anti-glider ditches dating to WWII. Moreover, there is also the potential to discover additional Palaeolithic and/or Mesolithic material from stratified deposits.

4.1.5 Evidence of cropmarks and palaeochannels are shown on aerial photographs and on Lidar data throughout the application site. Medieval ridge and furrow is also shown.

4.1.6 A Bronze Age channel was identified in Zone A during site investigation works and there is known Roman/Romano-British settlement evidence on the foreshore and extending to the east of Zone G. A medieval counterwall and associated flood defences, as well as drainage channels, are also within and in close proximity to the site.

4.1.7 There is the possibility of further prehistoric and Romano-British evidence to be found within the inter-tidal mudflats within Zone G, including palaeoenvironmental deposits, as well as the potential for maritime craft of all periods.

4.1.8 The marine and intertidal zone has a low to moderate potential for archaeological assets dating from prehistoric to Post Medieval periods, in particular evidence relating

to the Roman occupation within and to the east of Zone G, and the maritime commercial history of the Thames.

4.1.9 It is considered unlikely that prehistoric or Roman wreck sites of national importance will be found at the Site due to their rarity within the archaeological record but there is a moderate potential for Medieval, Post Medieval and modern wrecks although no evidence was identified during the recent geophysical survey undertaken as part of the Tilbury2 marine assessment.

4.1.10 There is a low potential for the remains of Saxon/Medieval fish traps to survive on the edge of the river. A small number of fish traps within Essex have been designated as monuments of national significance where they have been found to be in a good state of preservation, however such evidence is considered rare and so unlikely at the site.

Importance (sensitivity) of receptor

4.1.11 Whilst none of the remains are considered to be of schedulable quality, the rarity of the potential early prehistoric (Palaeolithic and Mesolithic) material, possible Bronze Age landscape reclamation evidence from BH1, and potential for marine and intertidal features of archaeological and maritime interest indicates that such evidence, where found, would be of medium-high, regional-national importance.

4.1.12 The approach to desk-based assessment and field evaluation means that other archaeological assets of medium or higher sensitivity are unlikely to be discovered during construction, following the completion of all pre-commencement archaeological works.

4.1.13 Other assets may be discovered during construction, though this risk will be controlled through the measures outlined in Table 2.9 (i.e. through adherence to the WSI).

4.1.14 The detailed investigation of the known and potential archaeological resource to be impacted by the development is likely to make a significant contribution to local and regional research objectives.

4.1.15 More deeply buried remains of palaeoenvironmental potential are considered likely to make a moderate to major contribution to regional and/ or national research objectives and these assets are of medium to high sensitivity.

Magnitude of impact

4.1.16 The proposed works during the construction phase of the scheme will comprise direct physical impacts to below-ground archaeological and palaeoenvironmental features, where present, resulting from:

- Ground works associated with any levelling/contouring works;

- Ground works associated with the excavation of new drainage channels for habitat creation;
 - Ground works associated with the excavation/piling/dredging of foundations for buildings and associated infrastructure;
 - Site clearance and provision of temporary drainage;
 - Construction of the causeway, haul routes and laydown areas;
 - Trenching for the gas pipeline and provision of a working corridor;
 - Soft and hard landscaping for the proposed scheme.
- 4.1.17 Typical construction plant to be used will include excavators, drilling rigs, graders and haulage vehicles, mobile and tower cranes, heavy and light goods vehicles. Piling is expected to be required for foundations of certain structures on the main development site and may use impact/driven or vibratory techniques, to be defined following further design and subject to the recommendations of a Piling Risk Assessment to be undertaken prior to construction.
- 4.1.18 To construct the causeway, the very soft foreshore sediment will be removed at low tide and backfilled with crushed rock fill placed on a geotextile (to prevent the rock sinking into the bed material below). The causeway will then be formed from further crushed rock aggregate, reinforced by one or more further layers of geotextile. The causeway crest will be formed by rock filled gabions or precast concrete pads.
- 4.1.19 The causeway is expected to be constructed by backhoe excavator working progressively outward from the riverbank, replacing the excavated/dredged material with the crushed rock fill, laying the geotextile layers and completing the rock mound to the design level, prior to placing the crest gabions or precast concrete pads.
- 4.1.20 Where archaeology is present these physical impacts are necessarily of a major magnitude, as archaeological remains are a non-renewable resource. By the very nature of construction activities, direct impacts to buried archaeological remains involves their destruction, which although can be mitigated through offsetting, requires suitable justification for the level of harm to these heritage assets. Impacts would be permanent and are not reversible.
- 4.1.21 Overall, the magnitude of impact on those assets which are of low to medium sensitivity is deemed to be moderate.
- 4.1.22 The magnitude of impact on those assets which are of medium to high sensitivity is deemed to be major.

Significance of effect

- 4.1.23 The significance of effect of the scheme on buried archaeology, without additional mitigation, will be **moderate to major adverse**.

Further mitigation or enhancement

- 4.1.24 Further mitigation against potential impacts to buried archaeological remains would principally comprise avoidance through design.
- 4.1.25 This could include relocation or micro-siting of some proposed activities, or protection by placing material over the archaeological remains such that the impact of construction activities does not extend as far as the remains. The placement of materials may be permanent or temporary, with the materials being removed following completion of the construction activities in certain zones of the site. For example, at the contactor compounds on currently undeveloped land, it may be possible to avoid the stripping of soils in some of the materials laydown areas. Instead, geotextile matting (or an equivalent) could be placed on the topsoil to which a layer of crushed stone could be added to avoid any ground disturbance.
- 4.1.26 A pre-commencement programme of further archaeological investigation is proposed, the scope of which will be agreed with relevant stakeholders: the principles of these investigations are set out in Volume 6, Appendix 7.4. The results of these investigations would be examined, and any opportunities for further mitigation through avoidance or reduction of impact would be identified and considered alongside other factors influencing the design and build process.

Residual effect

- 4.1.27 The residual effect following further mitigation/enhancement is predicted to be **minor adverse** and not significant.

Impacts on the settings of heritage assets including designated assets and buried archaeological remains

- 4.1.28 In line with the maximum design scenario set out in Table 2.8, the tallest proposed structures at the main development site have been modelled within the ZTV.
- 4.1.29 Setting is the surroundings in which an asset is experienced: all heritage assets have a setting, irrespective of the form in which they survive and whether they are designated or not. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance, or may be neutral. Although views of or from an asset will play an important part to its setting, other environmental factors such as noise, dust, vibration, as well as spatial associations, and the understanding of the historic relationship between places.

4.1.30 Heritage assets that only comprise buried remains retain a presence in the landscape and, like other heritage assets, have a setting, which can be appreciated by their relationship to their surrounding topography or other heritage assets.

4.1.31 A change in setting, including resulting from development, can sustain, enhance or better reveal the significance of an asset as well as detract from it or leave it unaltered.

Buried archaeological remains

4.1.32 The setting of the known and potential buried archaeological features within the site comprises their relationship with each other, as well as the wider views out over the surrounding landscape, in particular the relationship between the potential prehistoric and Romano-British features and the settlement evidence located on the higher ground to the north at West Tilbury, and the East Tilbury/Lindford prehistoric ritual landscape and associated domestic and industrial evidence dating from the prehistoric to the medieval periods.

4.1.33 However, this setting has been eroded by the insertion of the ‘Tilbury Loop’ railway line and other industrial features, such as electricity pylons, the new electricity substation, infrastructure associated with the Tilbury A and B power stations, and mineral extraction works, and therefore the contribution made by the setting to the importance of the archaeological features within the site is considered to be low to medium.

4.1.34 The magnitude of impact to the setting of the buried archaeological remains will be minor where there are visible above-ground features resulting from the development. As such, the significance of effect is considered to be **minor adverse**, which is not considered significant.

Scheduled Monuments

4.1.35 The following scheduled monuments lie within a 5km radius from the centre of Zone A, and their settings are considered to be potentially affected by the proposed scheme:

- Earthworks near Church, West Tilbury
- Tilbury Fort
- Gravesend Blockhouse
- New Tavern Fort, Gravesend
- Coalhouse Fort
- Bowaters Farm HAA Battery
- Cliffe Fort

Earthworks near Church, West Tilbury (NHLE ref 1002199)

4.1.36 The designated earthworks at West Tilbury are located c.800m to the north of Zone A and are bisected from the main built part of the proposed development by the railway.

4.1.37 The scheduled monument comprises earthworks south and west of St James’ Church, located at the edge of the escarpment overlooking the levels towards the river, and covering the neck of a promontory.

4.1.38 The earthworks are thought to possibly be the remnants of Bishop Cedda’s palace and may also be associated with the camp at which Elizabeth I reviewed her troops before the Armada. They lie within part one of the West Tilbury Conservation Area and also within an area of wider cropmarks and activity at Gun Hill which dates from the prehistoric period.

4.1.39 It is likely that the earthworks are of early medieval date and are associated with the Saxon manor at West Tilbury. The wider setting of the scheduled monument comprises the marshland to the south, and extensive views out across the Thames. The proposed development site contributes to the wider setting of this monument, but is considered to make a low contribution to the overall significance of the asset, which derives its significance (in heritage policy terms) primarily from its evidential and archaeological value, and other contextual associations, of which the Site forms only a small part.

Importance (sensitivity) of receptor

4.1.40 Being a scheduled monument, the sensitivity of the receptor is necessarily high. However, the contribution made by the Site to the setting of the scheduled monument is considered to be low, as although it makes some positive contribution to the understanding and appreciation of the values which embody the significance of the asset, these values are more demonstrably embodied by the physical remains of the earthworks and their immediate topographical and contextual location.

Magnitude of impact

4.1.41 The proposed works during the construction phase of the scheme will comprise a minor change to the wider setting of the monument, which already comprises significant industrial elements within its aspect. There may be effects from noise during construction, but these are not permanent.

Significance of effect

4.1.42 The significance of effect of the scheme on the setting of the scheduled monument will be **minor adverse**.

Further mitigation or enhancement

4.1.43 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

4.1.44 The residual effect is predicted to be minor adverse during construction, which is not significant.

Tilbury Fort (NHLE ref 1021092)

4.1.45 Tilbury Fort is located c1km southwest of the main development site on low lying ground on the north bank of the River Thames.

4.1.46 The designated assets comprise the buried remains of a blockhouse constructed during the reign of Henry VIII in 1539, superseded and overlain by the far larger and more complex 17th century and later fort and battery, the whole containing structures and remains dating from the second quarter of the 16th century onwards.

4.1.47 The Officers Barracks within the fort are Grade II* listed (list entry number 1375568). Adjacent to the fort on its western side is the Grade II listed Worlds End Inn, a late 17th or early 18th century timber framed house, altered in the 19th century and now used as a public house (list entry number 1111632).

4.1.48 Considered to be England's most spectacular surviving example of a late 17th century coastal fort, Tilbury Fort was designed at a time when artillery had become the dominant feature of warfare and was built with massive low earthworks, which were more resilient to the shock of bombardment when compared to stone fortifications. The system of bastions and complicated outworks defending the batteries from the rear are principally a Dutch design, and extremely rare in England. The layout and construction of the Fort was geared to the optimum siting of artillery at the forward batteries, which in conjunction with the batteries on the opposing bank of the Thames at Gravesend, could create a field of fire spanning the estuary, and providing defence of both the river and the city of London.

4.1.49 Historically Tilbury Fort was surrounded by open marshland and the complex system of moats protected the fort from landward attack. Today, Tilbury Fort is largely experienced within a prominent industrial setting to both its east and west, with only partial survival of its former historic landscape setting to the north which has been compromised by the railway and modern urban development of Tilbury, although some elements of open landscape remain, including longer views over to the higher ground and settlement at West Tilbury.

4.1.50 The River Thames and surrounding defensive forts on both the north and south side of the river, including Gravesend Blockhouse, New Tavern Fort, Shornmead Fort, Coalhouse Fort and Cliffe Fort, share a historic functional and visual connection with Tilbury Fort, and thus form part of its setting and contribute to its significance

(importance) as the best preserved and most complete example of this rare type of coastal fort.

Importance (sensitivity) of receptor

4.1.51 Being a scheduled monument, the sensitivity of the receptor is necessarily high. However, the contribution made by the proposed development site to the setting of the scheduled monument, located c.1km to the northeast of the scheduled area, is considered to be low, as the redevelopment of the Tilbury A and B power stations (as the new Tilbury2 docks), the sewage plant adjacent to the Fort, and the substation to the northeast of the Tilbury2 site, separates the main development area within Zone A from the scheduled monument. The proposed development site is largely obscured by these industrial elements, other than the upper parts of the pylons marching across this part of the landscape.

4.1.52 The most significant element of the setting of the scheduled monument, and which makes the greatest contribution to its significance as a heritage asset, comprises its immediate relationship with the River Thames and Gravesend Reach, which it was purposefully built to defend. In conjunction with the reciprocal defences at New Tavern Fort and Gravesend Blockhouse (also both scheduled monuments), the significance of the setting of Tilbury Fort is mostly derived from its relationship with the fortifications at Gravesend and the fields of fire that these forts could cover to prevent a seaborne invasion of the city of London. The fields of fire for the artillery pieces mounted at Tilbury Fort in the past remain mostly unaffected by later development or alterations to the river to the south and west, although later development to the west has slightly compromised this aspect of the setting of Tilbury Fort.

4.1.53 At present, the proposed development site is considered to make only a low contribution to the understanding and appreciation of the values that embody the importance of Tilbury Fort and its setting as a receptor of high sensitivity.

Magnitude of impact

4.1.54 The construction of the proposed Thurrock Flexible Generation Plant would have no direct physical impact on the scheduled monument nor listed buildings at Tilbury Fort, and therefore the potential impact is limited to an impact on their setting.

4.1.55 Given the wide-ranging built and industrial landscape in the wider area, and that the most significant parts of the setting of the Fort are its riverside and southerly and eastern aspects across and along Gravesend Reach, the magnitude of impact from the proposed development is assessed as minor.

4.1.56 This judgement has been reached based on an assessment of the past and future baseline when Tilbury A and B power stations were operational (with tall buildings and

chimneys) and the future context where the consented Tilbury2 redevelopment will also be operational, with the addition of the built elements of the proposed development site into a limited portion of the overall vista from the monument.

- 4.1.57 It is considered that there will be a limited change effected to the key positive attributes that contribute to the setting of the scheduled monument, and that the key elements and attributes of the site which embody its significance and value will experience only limited, not considerable change. The ability to appreciate and understand Tilbury Fort, and its legibility and archaeological/historical value, will only be slightly reduced in overall terms, although the change will be discernible.

Significance of effect

- 4.1.58 Overall, the sensitivity of the asset is considered to be high and the magnitude of impact is deemed to be minor. The significance of effect of the construction of the Flexible Generation Plant will be **minor adverse** which is not significant.

Further mitigation or enhancement

- 4.1.59 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

- 4.1.60 The residual effect is predicted to be minor adverse during construction, which is not significant.

Gravesend Blockhouse (NHLE ref 1005120)

- 4.1.61 Gravesend blockhouse is located c.2.1 km southwest of the main development site on the south side of the River Thames.

- 4.1.62 The scheduled monument comprises the standing and buried remains of a mid-16th century artillery blockhouse, part of a chain of coastal defences built along this stretch of the River Thames by Henry VIII. The gun lines were remodelled in the 1780s before being levelled in 1834. The blockhouse was partially demolished in 1844.

- 4.1.63 The Blockhouse has group value as part of the Henrican chain of defences and in particular its functional and visual association with Tilbury Fort and New Tavern Fort, which make a high contribution to its significance. The River Thames forms its principal setting.

Importance (sensitivity) of receptor

- 4.1.64 Being a scheduled monument, the sensitivity of the receptor is necessarily high. The setting of Gravesend Blockhouse, on the edge of the Thames, makes a significant contribution to its sensitivity. The setting of the designated asset primarily comprises

the River Thames, which it was designed to defend; the built development of Gravesend; and the fort's relationship with Tilbury Fort, on the north bank of the Thames, with which it was intended to operate as a pair, with a purposefully designed field of fire.

- 4.1.65 The contribution made by the proposed development site to the setting of the scheduled monument is considered to be low.

Magnitude of impact

- 4.1.66 The proposed development would have no direct physical impact on the scheduled monument and therefore the potential impact is limited to an impact on its setting. The scheduled monument lies within the ZTV of the built part of Thurrock Flexible Generation Plant.

- 4.1.67 There is a wide-ranging built and industrial landscape in the wider area. From the scheduled monument the causeway and main built part of the proposed development would be seen in association with existing electricity infrastructure including pylons, as well as the Tilbury2 development, and the other industrial/port elements along this part of the Thames.

- 4.1.68 There would be minor changes to the setting of the designated asset through slight changes in longer views northeast from the scheduled monument. It is not considered that this would detract significantly from the legibility and significance of the fort, as its principal relationship is with the River Thames and Tilbury Fort, and defending the estuary eastwards as part of the other fortifications at Shornmead Fort, Cliff Fort and Coalhouse Fort. The magnitude of impact of the proposed Thurrock Flexible Generation Plant on the scheduled monument is assessed as being the lower end of minor adverse.

Significance of the effect

- 4.1.69 Overall, the sensitivity of the asset is considered to be high and the magnitude of impact is deemed to be minor. The significance of effect of Thurrock Flexible Generation Plant on the scheduled monument will therefore be **minor adverse**, which is not significant.

Further mitigation or enhancement

- 4.1.70 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

- 4.1.71 The residual effect is predicted to be minor adverse during construction, which is not significant.

New Tavern Fort, Gravesend, including Milton Chantry (NHLE ref 1013658)

4.1.72 The scheduled monument comprises the remains of New Tavern Fort which includes within its grounds the earlier chapel or chantry associated with the Leper Hospital of St Mary the Virgin at Milton by Gravesend. The monument lies near Gravesend Pier and close to the River Thames. Both the fort and the chantry are also listed at Grade II* (list entry numbers 1261173 and 1089047 respectively). The chantry is located at the northwest side of the fort. New Tavern Fort was one of several forts built or improved during the later 18th and/ or earlier 19th century.

4.1.73 New Tavern Fort, Gravesend, including Milton Chantry, is located c.2.1 km southwest of the main development site, and is an unusually complete example of 18th century fortifications which underwent development in the 19th and 20th centuries. The fort displays a complete sequence of mounted guns representing each stage in its development and contains a number of unusual features which have been preserved in situ. The site is known for its connection with General Charles Gordon who lived here from 1865-71 and was later killed at Khartoum. The foundations of his house still survive within the fort.

4.1.74 The fort itself, along with Tilbury Fort on the opposite bank of the Thames, illustrates well the strategic importance of the Thames Estuary and the methods employed to defend it over a period of 170 years. New Tavern Fort is particularly well preserved, having been maintained over a number of years by the New Tavern Fort Project. In the north west corner of the fort is Milton Chantry, a 14th century building representing the chapel of a medieval hospital.

Importance (sensitivity) of receptor

4.1.75 Being a scheduled monument and Grade II* listed, the sensitivity of the receptor is necessarily high. The setting of New Tavern Fort, on the edge of the Thames, makes a significant contribution to its sensitivity. The setting of the designated asset primarily comprises the River Thames, which it was designed to defend; the built development of Gravesend; and the fort's relationship with Tilbury Fort, on the north bank of the Thames, with which it was intended to operate as a pair, with a purposefully designed field of fire.

4.1.76 The setting of New Tavern Fort, on the edge of the Thames makes a significant contribution to its sensitivity, while the location of the ecclesiastical remains of the Chantry is a reminder of their association with the medieval town at Gravesend.

Magnitude of impact

4.1.77 The proposed development would have no direct physical impact on the scheduled monument and listed buildings, and therefore the potential impact is limited to an

impact on their setting. The scheduled monument and listed buildings lie within the ZTV of the built part of the proposed Thurrock Flexible Generation Plant.

4.1.78 There is a wide-ranging built and industrial landscape in the wider area. From the scheduled monument the causeway and main built part of the proposed development would be seen in association with existing electricity infrastructure including pylons, as well as the Tilbury2 development, and the other industrial/port elements along this part of the River.

4.1.79 There would be minor changes to the setting of the designated assets through slight changes in longer views northeast from the area. It is not considered that this would detract significantly from the legibility and significance of the fort and its buildings, as its principal relationship is with the River Thames and Tilbury Fort; with the town of Gravesend, and defending the estuary eastwards as part of the other fortifications at Shornmead Fort, Cliff Fort and Coalhouse Fort.

4.1.80 The magnitude of impact of Thurrock Flexible Generation Plant on the scheduled monument and listed buildings is assessed as being the lower end of minor adverse.

Significance of the effect

4.1.81 Overall, the sensitivity of the asset is considered to be high and the magnitude of impact is deemed to be minor. The significance of effect of Thurrock Flexible Generation Plant on the scheduled monument will therefore be **minor adverse**, which is not significant.

Further mitigation or enhancement

4.1.82 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

4.1.83 The residual effect is predicted to be minor adverse during construction, which is not significant in.

Coalhouse Fort battery and artillery defences (NHLE ref 1013943).

4.1.84 Coalhouse Fort battery and artillery defences is located c.2.3 km east of the main development site (Zone A). The scheduled monument comprises a mid-19th century artillery fortification built as part of a complex of structures to defend the River Thames. Adjacent to the scheduled monument are two listed buildings, the Church of St Catherine, listed at Grade I (list entry number 1337129) and the Old Rectory, listed at Grade II (list entry number 1111553). However, these buildings have been scoped out of further assessment as the proposed development site does not make a positive contribution to their settings or significance, given intervening built form and topography.

4.1.85 The scheduled area comprises the Victorian Coalhouse Fort at East Tilbury, with its associated railway link and jetty and its rifle range, as well as the foundations of an Henrician 'blockhouse' coastal battery, a late 19th century 'Quick-Firer' battery and a low-level radar tower dating from World War II.

4.1.86 The earliest of this remarkable sequence of Thameside defences is the blockhouse, the construction of which was ordered by Henry VIII in 1539/40. It was built of stone and timber robbed from St Margaret's Chantry nearby. Nothing is visible of the structure itself, but the landward ditch survives as a creek, and timber palisading running along the shore in the area may belong to this phase.

4.1.87 Beside the blockhouse a jetty was built, perhaps initially to support the blockhouse but later to land coal. After several phases of rebuilding, the jetty served Coalhouse Fort, to which it was joined by a full-gauge railway line which survives almost intact but for the tracks themselves. The first phase of the fort, begun in 1799, was replaced in 1847-55 by a more complex structure which was in turn superseded by the present buildings between 1861-74. This latest fort was added to in the First and Second World Wars and only went out of military use in 1949.

4.1.88 Near the waterfront a little distance from the fort are a 19th century battery for Quick-Fire guns and searchlights, a rifle range and a World War II low-level radar tower. Virtually intact World War II radar installations of the type at East Tilbury are known at only two other places in England, making this an extremely rare survivor of a once widespread system. The structures form a remarkable group of defensive sites at the strategically important Coalhouse Point.

Importance (sensitivity) of receptor

4.1.89 Being a scheduled monument, the sensitivity of the receptor is necessarily high, and a high sensitivity is ascribed to all elements that comprise the scheduled area, including the WWII radar installation.

4.1.90 The immediate setting of Coalhouse Fort, on the edge of the Thames and at the bend in the river when The Lower Hope narrows to become Gravesend Reach, makes a high contribution to the sensitivity of the scheduled monument, as does its paired relationship with Cliffe Fort immediately to the east on the opposite side of the river.

4.1.91 The wider River Thames and surrounding defensive forts on both the north and south side of the river, including Tilbury Fort around the shoreline to the west, and Cliffe Fort, Shornmead Fort, Gravesend Blockhouse and New Tavern Fort, share a historic functional and visual connection with Coalhouse Fort, and thus form part of its wider setting and also contribute to its significance (importance). However, the intervening built form and industrial development between Tilbury Fort and Coalhouse Fort has

resulted in the visual link between the two forts being considerably diminished, but remain connected by their historical association and also the Two Forts Way public footpath.

4.1.92 The setting of Coalhouse Fort also comprises the historic lower village of East Tilbury and surrounding fields, and various anti-invasion defences.

4.1.93 The proposed development site, as an area of agricultural/common land, lies within the wider landscape setting of Coalhouse Fort, and is considered to make a medium contribution to its wider setting within the context of the East Tilbury Marshes. Anti-glider ditches from WWII are recorded in the EHER across this wider landscape and within Zone A, and both Coalhouse Fort, and the nearby scheduled Bowaters Farm WWII HAA battery (located 1km northwest of the fort, and c.1.25km east of Zone A) were strategically important in the defence of Britain from air attack during the Second World War.

Magnitude of impact

4.1.94 The Thurrock Flexible Generation Plant would have no direct physical impact on the scheduled monument; and therefore the potential impact is limited to an effect on its setting from primarily the western and southwestern parts of the scheduled area.

4.1.95 Given the separation distance, the wide-ranging built and industrial landscape in the wider area, and that the most significant parts of the setting of the Fort are its riverside and eastern, southerly and western aspects across and along Gravesend Reach, the magnitude of impact from the proposed development is assessed as minor.

4.1.96 This judgement has been reached based on an assessment of the past and future baseline when Tilbury A and B power stations were operational (with tall buildings and chimneys) and the future context where the consented Tilbury2 redevelopment will also be operational. As a result, the addition of the built elements of the proposed development site will only intrude into a limited portion of the overall vista from the monument.

4.1.97 It is considered that there will be a limited change effected to the key positive attributes that contribute to the setting of the scheduled monument, and that the key elements and attributes of the site which embody its significance and value will experience only limited, not considerable change. The ability to appreciate and understand Coalhouse Fort, and its legibility and archaeological/historical value, will only be slightly reduced in overall terms, although the change will be discernible.

Significance of effect

- 4.1.98 Overall, the sensitivity of the asset is considered be high and the magnitude of impact is deemed to be minor. The significance of effect of the construction of the Flexible Generation Plant will be **minor adverse**, which is not significant.

Further mitigation or enhancement

- 4.1.99 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

- 4.1.100 The residual effect is predicted to be minor adverse during construction, which is not significant.

Second World War anti-aircraft battery at Bowaters Farm (NHLE ref 1012185),

- 4.1.101 The Second World War heavy anti-aircraft battery at Bowaters Farm is located c.1.3km east of the main development site (Zone A) and c.250m southwest of Zone D3 (gas connection compound) and was one of a number of key defensive positions within the area during WWII.

- 4.1.102 Anti-aircraft batteries were widely distributed around England, with a marked concentration in the South East around London. As a result of development pressure in the South East few have survived. The example at Bowaters Farm is the last surviving example of such batteries in this area of Essex. It forms the latest part of a series of important defensive installations at Coalhouse Point which illustrate the development of coastal defences from the Tudor period to the mid-20th century, and therefore derives significance also from its group value with the WWII structures at Coalhouse Fort.

- 4.1.103 The ZTV suggests only partial visibility with the Site and at present vegetational cover prevents any visual link. However, in the context of WWII defence structures within the wider landscape, the proposed Thurrock Flexible Generation Plant forms part of the wider setting of the HAA battery at Bowaters Farm, in terms of its relationship with the expanse of flat land at the East Tilbury Marshes, and the anti-glider ditches which are recorded across the area, including within the proposed development site.

- 4.1.104 Although at present the visual link between the site and the scheduled monument is largely non-existent, this could potentially change in the future, and the Site is considered to make a medium contribution to the setting of the Bowaters Farm Battery.

- 4.1.105 However, this setting has been heavily compromised by the industrialisation of the area during the post-war period with the construction of the Tilbury A and B power stations, as well as the insertion of electricity pylons across the landscape.

Importance (sensitivity) of receptor

- 4.1.106 Being a scheduled monument, the sensitivity of the receptor is necessarily high. Zone A lies within the wider setting of the monument, comprising land on which anti-aircraft landing ditches were placed as part of the defence of Britain from aerial attack during the Second World War, and forms part of the wider landscape that the HAA battery was defending from possible invasion and attack from the air.

Magnitude of impact

- 4.1.107 Thurrock Flexible Generation Plant would have no direct physical impact on the scheduled monument; and therefore, the potential impact is limited to an effect on its setting. The addition of the built elements of the proposed development site will only intrude into a limited portion of the overall vista from the monument.

- 4.1.108 It is considered that there will be a limited change effected to the key positive attributes that contribute to the setting of the scheduled monument, and that the key elements and attributes of the HAA battery which embody its significance and value will experience only limited, not considerable change. The ability to appreciate and understand the Bowaters Farm HAA battery, and its legibility and archaeological/historical value, will only be slightly reduced in overall terms, although the change will be discernible. As such, the magnitude of impact will be minor.

Significance of effect

- 4.1.109 Overall, the sensitivity of the asset is considered be high and the magnitude of impact is deemed to be minor. The significance of effect of the construction of the Flexible Generation Plant will be **minor adverse**, which is not significant.

Further mitigation or enhancement

- 4.1.110 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

- 4.1.111 The residual effect is predicted to be minor adverse during construction, which is not significant.

Cliffe Fort (list entry number 1003403)

- 4.1.112 Cliffe Fort is located c.4 km east of the main development site, on the south bank of the River Thames in Kent and directly east of Coalhouse Fort at the point where the Lower Hope of the Thames narrows and turns into Gravesend Reach. The fort was designed by the Royal Engineers, and together with Coalhouse Fort formed a strongly defended barrier guarding the approaches to London in case of a seaborne attack.

4.1.113 The scheduled monument comprises a fort constructed during the 1860s as part of a wider River Thames' coastal defence system. It was part of a large and expensive defence infrastructure programme which at the time incorporated the latest in fortification theory and technology.

4.1.114 The fort contains one of the best preserved of the rare Brennan torpedo installations, including the remains of a unique rising observation tower.

Importance (sensitivity) of receptor

4.1.115 Being a scheduled monument, the sensitivity of the receptor is necessarily high, and it also derives group value from its association with Coalhouse Fort, and also the other forts along the shoreline both north and south of the river.

4.1.116 The most significant part of the setting of the scheduled monument comprises its relationship with the River Thames and Coalhouse Fort. The fields of fire for the artillery pieces mounted here in the past remain largely unaffected by later development or alterations to the river. The surrounding open ground to the south and east has been much altered by quarrying and in this area the setting of the monument has been compromised. Similarly, the addition of later jetties has detracted from the setting of the scheduled monument to some extent.

4.1.117 The main built area of the Thurrock Flexible Generation Plant forms part of the wider setting of the fort, but does not make a significant contribution to its setting or significance (in heritage policy terms).

Magnitude of impact

4.1.118 The Thurrock Flexible Generation Plant would have no direct physical impact on the scheduled monument at Cliffe Fort, and therefore the potential impact is limited to an impact on its setting. The monument lies within the ZTV of the built part of Thurrock Flexible Generation Plant.

4.1.119 Given the separation distance and the wide-ranging built and industrial landscape in the wider area, there would be slight changes to the setting of the designated asset through very minor changes in views from the scheduled monument. The magnitude of impact is therefore assessed as being negligible.

Significance of the effect

4.1.120 Overall, the sensitivity of the asset is considered to be high and the magnitude of impact is deemed to be negligible. The significance of effect of Thurrock Flexible Generation Plant will therefore be **minor adverse**, which is not significant.

Further mitigation or enhancement

4.1.121 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

4.1.122 The residual effect is predicted to be minor adverse during construction, which is not significant.

Conservation Areas

4.1.123 The Thurrock Flexible Generation Plant is considered to lie within the wider setting of two Conservation Areas: West Tilbury c.700m to the north, and East Tilbury c.1.7km to the northeast of Zone A.

4.1.124 The Site was not considered to make a contribution to the settings or significances of any of the Conservation Areas (or listed buildings therein) within Gravesend, as their significance derives from their immediate association and group value on the southern side of the River Thames, which demonstrate the historic development of urban Gravesend as a medieval and post-medieval maritime town, and therefore these were scoped out of further assessment, as any changes within their wider setting would have a negligible effect at most, or 'no change'.

West Tilbury Conservation Area

4.1.125 The West Tilbury Conservation Area is split into two parts: Part One comprises the area to the north of Zone A, which contains the scheduled earthworks near the Church, as well as Church of St James, listed at Grade II* (list entry number 1111541); West Tilbury Hall (list entry number 1111625) and Barn to North of West Tilbury Hall (list entry number 1308889), each listed at Grade II. To the north of this area, the conservation area contains a number of further listed buildings. These are Marshall's Cottages (list entry number 1337058) listed at Grade II*; Kings Head Public House (list entry number 1111633), The Bakery (list entry number 1111634), Granary to northeast of Manor Farmhouse (list entry number 1146758), Post House (list entry number 1308454), Well House (list entry number 1308840), Manor Farmhouse (list entry number 1337089) and The Cottages (list entry number 1337090), each listed at Grade II. Marshall's Cottages are located in the northern part of the conservation area; the remainder of the buildings are located further to the south.

4.1.126 Part Two of the West Tilbury Conservation Area comprises the hamlet and second manor at Low Street. Two further listed buildings lie in this separate part of the conservation area to the east. These are Polwicks and Walnut Tree Cottage (list entry numbers 111623 and 111624 respectively), each listed at Grade II.

4.1.127 A Conservation Area Appraisal has been undertaken by Thurrock Council (Thurrock Council 2007) which notes that the special interest of the Conservation Area includes that human activity has long been present in the vicinity and evidence has included cropmarks, rectilinear features, trackways and ring ditches. Roman pottery has also been found in the vicinity and it is thought that a Roman road passed nearby.

4.1.128 In the medieval period West Tilbury was a small settlement very closely related to agriculture, and the West Tilbury Marshes and majority of the application site was held by the West Tilbury Manor Estate. Much evidence of this past has been retained in the present landscape, which includes a complete example of a medieval 'open field' system in the area of The Great Common Field bounded by Rectory Road, Turnpike Lane, Blue Anchor Lane and Muckingford Road. Much medieval 'common land' upon which farmers had common rights to graze animals still remains in the vicinity of West Tilbury, including Zone A.

4.1.129 A distinguishing characteristic of West Tilbury is the fact that there has been very little physical change to the settlement. This has resulted in the evolution of a settlement that is sporadic in its character. The built form of West Tilbury is dominated by the adjoining and surrounding landscape.

Sensitivity of receptor

4.1.130 The heritage values of the conservation area and designated assets therein are as follows:

- Evidential and Historical – The evidential value derives primarily from the fabric of the buildings, structures, the street pattern, the layout of the greens and the potential for associated buried archaeological remains. The historical value is largely illustrative;
- Aesthetic - The value derives from the design value of the designated and other assets contained within the conservation area in terms of their expression of settlement and ecclesiastical architecture of the medieval period and later; and
- Communal – The value of the conservation area derives from its symbolic value as part of the local village and farming community.

4.1.131 Based on the above, the West Tilbury Conservation Area is deemed to be of medium to high sensitivity. The setting of the conservation area makes a contribution to the sensitivity of the designated asset itself and those contained within it.

4.1.132 The setting of the conservation area comprises the surrounding fields and landscape vista, particularly to the marshes to the south. The conservation area appraisal notes that:

“West Tilbury continues to be a rural settlement within a historic rural agricultural setting on an escarpment. There are wide views to and from the former marshes to the south and west and from the north and east across the agricultural land. The church tower and trees around the churchyard are an important silhouette and landmark from all directions.”

4.1.133 The wider landscape has been industrialised for the past century. It is also bisected from the marshland to the south by the railway line. In the direction of the application site, the landscape has been dominated by Tilbury Power Station and associated infrastructure since the inter war period, and its setting has also been compromised by mineral extraction works.

Magnitude of impact

4.1.134 The Thurrock Flexible Generation Plant would have no direct physical impact on the conservation area or designated assets which it contains and therefore the potential impact is limited to an impact on their settings. The conservation area lies partly within the ZTV of the built part of the Thurrock Flexible Generation Plant.

4.1.135 Given the wide ranging built and industrial landscape in the wider area, and the location of the listed buildings within an area of built development at the edge of the ZTV, there would be, at most, slight changes to the settings of these designated assets through minor changes in views from the listed buildings or their immediate environs. This would result in limited changes to the key positive attributes of the settings of these assets, resulting in a slight but discernible reduction to their contributions to the assets' importance.

4.1.136 The magnitude of impact of the Thurrock Flexible Generation Plant on the West Tilbury Conservation Area is therefore assessed as being minor adverse.

Significance of effect

4.1.137 Overall, the sensitivity of the asset is considered to be high and the magnitude of impact is deemed to be minor adverse. The significance of effect of the Thurrock Flexible Generation Plant on the conservation area and the various designated assets within it will therefore be **moderate adverse**, which is significant.

Further mitigation or enhancement

4.1.138 Although significant adverse effects have been predicted, no further mitigation is proposed to reduce this effect.

Residual effect

4.1.139 The residual effect is predicted to be moderate adverse during construction, which is significant.

East Tilbury Conservation Area

4.1.140 East Tilbury conservation area is located c.1.5 km northeast of the main development site (Zone A).

4.1.141 The conservation area comprises the former factory complex of the British Bata Shoe Company and a large housing development of some 352 houses in a ‘garden village’ setting. This planned settlement was designed by architects of international importance from Zlin, Moravia (now the Czech Republic). The conservation area contains a number of designated assets. These comprise 2, Bata Avenue (list entry number 1224054), 4 and 6, Bata Avenue (list entry number 1224055), 12 and 14, Bata Avenue (list entry number 1224058), 24 and 26, Bata Avenue (list entry number 1224059), 32 and 34, Bata Avenue (list entry number 1224061), 28 And 30, Bata Avenue (list entry number 1224101), Building 13, Bata Factory (list entry number 1224103), 8 And 10, Bata Avenue (list entry number 1266987), 16 And 18, Bata Avenue (list entry number 1266988), Bata Industrial Buildings Numbers 24 And 34, Victory House And Nelson House (list entry number 1393327), and Bata Industrial Building Number 12 (list entry number 1393328).

4.1.142 In addition, Smithy Cottage (list entry number 1111554) is located further north within the built development of East Tilbury, outside the conservation area.

4.1.143 A Conservation Area Appraisal has been undertaken by Thurrock Council (Thurrock Council 2007), which, in respect of the East Tilbury Conservation Area, notes that:

“The setting of the whole Conservation Area is enhanced by the central area of open spaces and the original ‘garden village’ layout can still be appreciated. The estate still has the very spacious feel of the original design, so evident in plan form. Although the swimming pool and tennis courts are now gone, the tennis courts remain open and the landscaping is still apparent, however flats have been built on the swimming pool site. Although some ‘modern’ improvements have occurred, these are mostly confined to the privately owned properties. The overall design and infrastructure is still very much in evidence.

Although there have been a number of alterations and extensions, the layout and street (or avenue) character, the regular plot and building line character and the block form of the houses have been retained”.

Sensitivity of receptor

4.1.144 The heritage values of the conservation area are as follows:

- Evidential and Historical – The evidential value derives primarily from the fabric of the buildings, structures, the street pattern and the layout of the (small) green

spaces. The potential for associated buried archaeological remains is low, although the buildings themselves are likely to contain evidence for previous uses. The historical value is partly illustrative, although clearly there are associations with past named individuals and the British Bata Shoe Company;

- Aesthetic - The value derives from the design value of those designated and other assets contained within the conservation area in terms of their expression of planned industrial settlement architecture of the inter war period and later; and
- Communal – The value of the conservation area derives from its symbolic value as part of the local community.

4.1.145 Based on the above, the East Tilbury Conservation Area is deemed to be of medium sensitivity. The setting of the conservation area itself makes a minor contribution to its sensitivity, although the conservation area provides the setting for the assets, designated and otherwise, contained within it.

4.1.146 The setting of each of the conservation area is not wide ranging and comprises the surrounding fields. The wider landscape has been industrialised for the past century. In the direction of the application site, the landscape has been dominated by Tilbury Power Station since the inter war period.

Magnitude of impact

4.1.147 The Thurrock Flexible Generation Plant would have no physical impact on the conservation area or designated assets which it contains and therefore the potential impact is limited to an impact on their settings. The conservation area lies partly within the ZTV of the built part of the Thurrock Flexible Generation Plant.

4.1.148 Given the wide ranging built and industrial landscape in the wider area, and the location of the listed buildings within an area of built development at the edge of the ZTV, there would be, at most, slight changes to the setting of the designated asset through minor changes in views from the listed buildings or their immediate environs and the magnitude of impact of the Thurrock Flexible Generation Plant on the conservation area is assessed as being minor.

Significance of the effect

4.1.149 Overall, the sensitivity of the asset is considered be medium and the magnitude of impact is deemed to be minor adverse. The effect of proposed Thurrock Flexible Generation Plant on the East Tilbury Conservation Area and designated asserts within it will therefore be of **minor adverse** significance, which is not significant.

Further mitigation or enhancement

4.1.150 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

4.1.151 The residual effect is predicted to be minor adverse during construction, which is not significant.

Listed Buildings

4.1.152 The majority of the listed buildings within the 5km study area of the Site are located within urban contexts within no meaningful or contextual relationship with the Thurrock Flexible Generation Plant Site, and therefore have been scoped out of further assessment.

4.1.153 Those designated built heritage assets which are contained within scheduled monuments and Conservation Areas where the Site does lie within the settings of these assets have already been assessed above.

4.1.154 This section addresses potential impacts to the settings of those listed buildings which lie outside of these other designations.

Riverside Station, including floating landing stage listed at Grade II* (list entry number 1111547).

4.1.155 Riverside Station, including its floating landing stage, is located c.2.1 km southwest of the main development site.

4.1.156 The designated asset comprises a terminal for passenger ships, built by the Port of London Authority in 1924. The neo-Georgian structure includes the railway station and baggage hall, ticket office, and floating landing stage. The architect was Sir Edwin Cooper for the Port of London Authority. The station was formally closed during the 1990s. The landing stage was re-opened in 1995 and was refurbished for leisure uses.

Sensitivity of receptor

4.1.157 The heritage values of this listed building are as follows:

- Evidential and Historical – The evidential value of the listed building derives from its fabric and the evidence which it may contain. The historical value is partly illustrative, although there are significant associations with named vessels and individuals, including for example the Empire Windrush, which docked here in 1948, generally accepted to have been the first ship to bring a large group of

migrants from the Caribbean, invited to the United Kingdom in response to labour shortages in the post-war years;

- Aesthetic - the Riverside Station, built in neo-Georgian style and completed in 1924, is the work of the notable architect Sir Edwin Cooper in his capacity as architect to the Port of London Authority; and
- Communal – The value derives from its symbolic value as part of the local community.

4.1.158 Based on the above, the listed building is deemed to be of high sensitivity. The setting of the listed building on the Thames Terraces makes a contribution to the sensitivity of the designated asset: the final design for the landing stage incorporated a floating platform secured to the riverbank by hinged steel booms, which enabled it to rise and fall 21 ft. with the tide.

4.1.159 The setting of the listed building primarily comprises its relationship with the River Thames. The functional and visual relationship with the Town Pier in Gravesend on the south side of the River Thames (listed at Grade II*, list entry number 1089004) and indeed the ability to traverse the Thames by ferry, makes a significant contribution to the significance of the asset. To the north away from the river, the setting of the asset has been compromised by extensive industrial development.

Magnitude of impact

4.1.160 The Thurrock Flexible Generation Plant would have no physical impact on the designated asset and therefore the potential impact is limited to an impact on its setting. The listed building lies within the ZTV of the built part of the Thurrock Flexible Generation Plant.

4.1.161 Given the wide ranging built and industrial landscape in the wider area, there would be minor changes to the setting of the designated asset through minor changes in views from the listed building and the magnitude of impact of the Thurrock Flexible Generation Plant on the designated asset is assessed as being minor.

Significance of the effect

4.1.162 Overall, the sensitivity of the asset is considered to be high and the magnitude of impact is deemed to be minor. The significance of effect of the Thurrock Flexible Generation Plant on the listed building will therefore be **minor adverse**, which is not significant.

Further mitigation or enhancement

4.1.163 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

4.1.164 The residual effect is predicted to be minor adverse during construction, which is not significant.

Church of St Mary listed at Grade I (list entry number 1111576), Chadwell House and Sleepers Farmhouse, each listed at Grade II (list entry numbers 1166282 and 1337061 respectively).

4.1.165 The Church of St Mary, Chadwell House and Sleepers Farmhouse are located some 2.3 km northwest of the main development site at the centre of Chadwell St Mary next to the junction of Linford Road and Chadwell Hill. The designated assets comprise the 12th century and later church of St Mary; the 18th century red and black brick house, Chadwell House; and the 15th century timber framed house, Sleepers Farmhouse.

Sensitivity of receptor

4.1.166 The heritage values of this listed building are as follows:

- Evidential and Historical – The evidential value derives primarily from the fabric of the buildings, structures and the potential for associated buried archaeological remains. The historical value is largely illustrative;
- Aesthetic - The value derives from the design value of the designated assets in terms of their expression of settlement and ecclesiastical architecture of the medieval period and later; and
- Communal – The value of the listed buildings derives from their symbolic value as part of the local village and farming community.

4.1.167 Based on the above, the listed buildings are deemed to be of up to high sensitivity. The setting of the listed buildings makes a contribution to the sensitivity of the designated assets.

4.1.168 The setting of the listed buildings primarily comprises each other and their relationship with the mostly late village in which they are located. The built development of Chadwell St Mary provides a high degree of screening for the listed buildings located within it.

Magnitude of impact

4.1.169 The Thurrock Flexible Generation Plant would have no physical impact on the designated assets and therefore the potential impact is limited to an impact on their settings. The listed buildings lie at the edge of the ZTV of the built part of Thurrock Flexible Generation Plant.

4.1.170 Given the separation distance, the wide ranging built and industrial landscape in the wider area, and the location of the listed buildings within an area of built development

at the edge of the ZTV, there would be, at most, very minor changes to the setting of the designated asset through minor changes in views from the listed buildings or their immediate environs and the magnitude of impact of Thurrock Flexible Generation Plant on the listed buildings is assessed as being negligible.

Significance of the effect

4.1.171 Overall, the sensitivity of the asset is considered to be high and the magnitude of impact is deemed to be negligible. The effect of Thurrock Flexible Generation Plant on the listed buildings will therefore be of **minor adverse** significance, which is not significant.

Further mitigation or enhancement

4.1.172 No significant adverse effects have been predicted and no further mitigation is considered to be required.

Residual effect

4.1.173 The residual effect is predicted to be minor adverse during construction, which is not significant.

Buckland (list entry number 1147796)

4.1.174 Buckland comprises a Grade II listed late 18th or early 19th century house in grey gault brick with a grey slate roof and was formerly 'Tilbury House' on historic mapping.

4.1.175 It was one of a number of dispersed farmsteads on the East Tilbury Marshes that lay between the historic hamlet of Low Street to the northwest and the historic core of East Tilbury to the southeast. Old tracks linked these settlements together past Buckland, which also connected to the estuary and associated wharves to the south.

Importance (sensitivity) of receptor

4.1.176 The importance (sensitivity) of the Grade II listed Buckland is medium. It is located close to Zone D (corridor for gas pipeline route) of the application site and it is proposed that a temporary right of way diversion of Footpath 200 will pass in front of the property during the construction of the gas pipeline element of the proposed development scheme.

4.1.177 The main built part of the Thurrock Flexible Generation Plant (Zone A) is located c.1km to the west-southwest of the house and lies within its wider setting. Zone D3 (gas connection compound and access) is located c.600m to the east-northeast.

Magnitude of impact

4.1.178 The Thurrock Flexible Generation Plant would have no physical impact on the designated assets and therefore the potential impact is limited to an impact on their settings.

4.1.179 During construction work, the impact to the setting of this asset (through noise and disturbance, and possible loss of tranquillity with the re-routing of the footpath) will be minor to moderate adverse, but this will be temporary and reversible.

Significance of the effect

4.1.180 During construction, the significance of effect would at times be **minor adverse**, which is not significant.

Further mitigation or enhancement

4.1.181 Although significant adverse effects have been predicted, no further mitigation is proposed to reduce this effect.

Residual effect

4.1.182 The residual effect is predicted to be moderate adverse at times during construction, which is significant.

Other listed buildings

4.1.183 Of the remaining listed buildings, each listed at Grade II, the following are located between 1km and 3km of the main development site and lie within the ZTV, and are therefore potentially sensitive receptors to the proposed scheme:

- Gunhill Farmhouse (list entry number 1146774), an early 18th century farmhouse;
- Biggin Farmhouse (list entry number 1111645, an 18th century brick and timber framed and plastered farmhouse; and
- Sunspan (list entry number 1408508), a steel framed Sunspan house, built to the designs of Wells Coates and David Pleydell-Bouverie between 1934-8.

4.1.184 The Thurrock Flexible Generation Plant would have no physical impact on these designated assets and therefore the potential impact is limited to an impact on their settings. The listed buildings lie at the edge of the ZTV of the built part of the Thurrock Flexible Generation Plant. As Grade II listed buildings they are considered to be of medium sensitivity.

4.1.185 The setting of each of these listed buildings comprises the grounds in which they are located, in some cases with associated yards and buildings and the surrounding open land, of which the Site forms a small part of their wider setting.

4.1.186 The wider landscape has been largely industrialised for the past century. In the direction of the application site, the landscape has been dominated by Tilbury Power Station since the post-war period, and prior to that the development of Tilbury Docks and modern Tilbury on the marshes to the south. On this basis any impacts on the settings would be very minor in nature and result in a **negligible or minor adverse** significance of effect, which is not significant.

Historic landscape.

4.1.187 In terms of historic landscape, the present landscape has reasonable coherence and time-depth; it is averagely well-preserved and is also associated with the Scheduled earthworks at West Tilbury; the Grade II listed West Tilbury Hall, Conservation Area and Grade II* St James' Church.

4.1.188 Historic mapping and Tithe records suggest that Zones A, B, C, E, F and G were all part of the manorial lands held by the West Tilbury Estate, the early medieval manor house having been replaced by West Tilbury Hall.

4.1.189 The historic landscape also contributes to the setting of the West Tilbury Conservation Area.

Sensitivity of receptor

4.1.190 The areas in which the Thurrock Flexible Generation Plant is located have seen field boundary removal since the 19th century, with industrial development within and adjacent to parts of it and as such the historic landscape is somewhat degraded.

4.1.191 However, it is considered to be of medium importance (sensitivity), on the basis that the current landscape has reasonable coherence and time-depth; it is averagely well-preserved and is also associated with the Scheduled earthworks at West Tilbury, and other assets.

Magnitude of impact

4.1.192 Given the wide-ranging nature of the historic landscape, the impact is predicted to be of local spatial extent, short term duration, continuous and reversible, and would affect the receptor directly. Elements of the existing landscape within Zone A, the area of land within which the principal built elements of the proposed development will be constructed, i.e. gas engines, batteries and substations, would be lost, but there would otherwise be little or no change to landscape elements. The magnitude of impact is therefore considered to be minor.

Significance of the effect

4.1.193 Overall, the sensitivity of the historic landscape is considered to be medium and the magnitude of impact is deemed to be minor. The significance of effect during construction will therefore be **minor adverse**, which is not significant.

Further mitigation or enhancement

4.1.194 Other than those measures designed-in to the Thurrock Flexible Generation Plant, no further mitigation is warranted or proposed.

Residual effect

4.1.195 The residual effect following designed-in measures is predicted to be **minor adverse**, which is not significant.

Future monitoring

4.1.196 All mitigation will have been completed at the end of the construction phase and no further monitoring is warranted or proposed. However, should new groundworks be required which may impact potential buried archaeological deposits, then the procedures and clauses within an agreed WSI should be invoked and followed.

4.2 Operational and maintenance phase

4.2.1 All archaeological mitigation will have been completed at the end of the construction phase and no further monitoring is warranted or proposed during the operational and maintenance phases.

Impacts on the settings of heritage assets including SMs, listed buildings, Conservation Areas and Registered Parks and Gardens

4.2.2 Impacts during the operation and maintenance phase of the Thurrock Flexible Generation Plant may affect the settings of cultural heritage features. Such impacts and effects would be of a very similar nature to those described and assessed under construction effects, although during operation the landscape mitigation measures provided in accordance with a planting scheme based on the Illustrative Landscape Plan (application document A2.9) will be under way or have been completed (see paragraphs 4.1.1 to 4.1.193 and the summary in Table 5.1). A Landscape and Ecology Management Plan (LEMP) setting out the ongoing management and aftercare measures during the operational and maintenance phases of the project will be underway and ongoing.

4.2.3 The effect of the operation and maintenance phase of the Thurrock Flexible Generation Plant will therefore be of up to **moderate adverse** significance at Tilbury Fort

Scheduled Monument and West Tilbury Conservation Area, which is significant, and no more than **minor adverse** (non-significant) at all other receptors.

Impacts on the overall historic landscape

4.2.4 Impacts during the operation and maintenance phase of Thurrock Flexible Generation Plant may affect the character of the overall historic landscape. Such impacts and subsequent effects would be of a very similar nature to those described and assessed under construction effects, although during operation all proposed restoration of elements of the historic landscape, backfilling of cable and gas trenches and the measures to be proposed within the landscape mitigation measures and LEMP will be under way or have been completed (see summary in Table 5.1).

4.2.5 The effect of the operation and maintenance phase of the Thurrock Flexible Generation Plant will therefore be of **minor adverse** significance, which is not significant.

Future monitoring

4.2.6 All mitigation will have been completed at the end of the construction phase and no further monitoring is warranted or proposed.

4.3 Decommissioning phase

4.3.1 The impacts of the onshore decommissioning of the Thurrock Flexible Generation Plant have been assessed on the historic environment. The environmental effects arising from the decommissioning of the Thurrock Flexible Generation Plant are listed in Table 2.8 along with the maximum design scenario against which each decommissioning phase impact has been assessed.

4.3.2 A description of the potential effect on historic environment receptors caused by each identified impact is given below.

Impacts on the settings of heritage assets including SMs, listed buildings, Conservation Areas and Registered Parks and Gardens.

4.3.3 Impacts during the decommissioning phase of Thurrock Flexible Generation Plant may affect the setting of heritage assets. Such impacts and effects would be temporary and of a very similar nature to those described and assessed under construction effects (see paragraphs 4.1.1 to 4.1.193 and the summary in Table 5.1) and would include the presence of plant and machinery during the decommissioning process.

4.3.4 The primary effects on heritage assets arising from the Thurrock Flexible Generation Plant would derive from the permanent development in Zones A and G, and therefore greater focus is placed on effects arising during construction, in particular at the end of

that process when the structures are built. Therefore, the effect of decommissioning the proposed development would be **minor adverse** significance, which is not significant.

- 4.3.5 In the event that the proposed development continues in operation rather than being decommissioned, the ongoing effect would be no greater than assessed above, i.e. **minor to moderate adverse** significance.

Impacts on the overall historic landscape.

- 4.3.6 Impacts during the decommissioning phase of Thurrock Flexible Generation Plant may affect the character of the overall historic landscape. Such impacts and subsequent effects would be temporary and of a very similar nature to those described and assessed under construction effects (see summary in Table 5.1) and would include the presence of plant and machinery during the decommissioning process.
- 4.3.7 The primary effects on heritage assets arising from the Thurrock Flexible Generation Plant would derive from the permanent development in Zones A and G, and therefore greater focus is placed on effects arising during construction, in particular at the end of that process when the structures are built. Therefore, the effect of the decommissioning phase of the Thurrock Flexible Generation Plant will be of **negligible** significance, which is not significant.
- 4.3.8 In the event that the Thurrock Flexible Generation Plant continues in operation rather than being decommissioned, the ongoing effect would be no greater than assessed above, i.e. **minor adverse** significance.

Future monitoring

- 4.3.9 All mitigation will have been completed at the end of the construction phase and no further monitoring is warranted or proposed.

4.4 Cumulative effects

- 4.4.1 Cumulative effects are those arising from impacts of the proposed development in combination with impacts of other proposed or consented development projects that are not yet built or operational. An assessment of cumulative effects for the historic environment has been made and is reported in Volume 4, Chapter 20.

4.5 Transboundary effects

- 4.5.1 A screening of transboundary impacts has been carried out and is presented in Volume 5, Appendix 4.1: Transboundary Impacts Screening Note. This screening exercise identified that there was no potential for significant transboundary effects with regard

to the historic environment from the Thurrock Flexible Generation Plant upon the interests of other EEA States.

4.6 Inter-related effects

- 4.6.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the construction, operation or decommissioning of Thurrock Flexible Generation Plant on the same receptor. The following assessments have been made and a description of the likely inter-related effects on the historic environment is provided in Volume 5, Chapter 31: Summary of Inter-Related Effects.

5. Conclusion and summary

- 5.1.1 The methods used to assess the magnitude of impact of the proposed change and significance of effects on the historic environment have had regard to national and local standards and guidance.
- 5.1.2 The effects of the proposed Thurrock Flexible Generation Plant on heritage assets during the construction phase would vary from minor to major adverse prior to mitigation, which would be significant in the case of moderate and major adverse effects. The latter would occur only if sensitive archaeological remains are present and would be disturbed in the areas of construction works. With the implementation of mitigation measures including a Written Scheme of Archaeological Investigation, construction effects would be at most minor adverse (not significant) save on the setting of West Tilbury Conservation Area, where a temporary moderate adverse effect that would be significant is predicted.
- 5.1.3 The effects during the operation and maintenance phase of the Thurrock Flexible Generation Plant would be 'no change' or minor adverse, which are not significant, at all receptors save for West Tilbury Conservation Area where a moderate adverse effect that would be significant is predicted.
- 5.1.4 Decommissioning effects would be similar to those during construction, albeit providing at least a partial reversal towards the current baseline for the settings of heritage assets, as the above ground infrastructure associated with the proposed development would be removed from the landscape.
- 5.1.5 A summary of the findings of the historic environment assessment is presented in Table 5.1, below.

Table 5.1: Summary of potential environment effects, mitigation and monitoring.

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Construction							
Construction of Thurrock Flexible Generation Plant (including any stripping required for storage, compounds and accesses) could result in permanent loss of or damage to, heritage assets comprising buried archaeological remains	As set out in the Outline Written Scheme of Investigation	Major (where present)	Medium to high	Moderate to major adverse (significant)	As set out in the Outline Written Scheme of Investigation Possibility of refined design solutions (e.g. micro-siting or 'no dig' solutions for some aspects of the scheme)	Minor adverse (not significant)	Monitoring during construction as set out in the Outline Written Scheme of Investigation
Temporary impacts on the setting of West Tilbury Earthworks Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Tilbury Fort Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Gravesend Blockhouse Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of New Tavern Fort Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Coalhouse Fort Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Bowaters Farm Battery Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Cliffe Fort Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of West Tilbury Conservation Area and designated assets therein	n/a	Minor	High	Moderate adverse (significant)	None	Moderate adverse (significant)	None
Temporary impacts on the setting of East Tilbury Conservation Area	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Temporary effects on the setting of Grade II* Riverside Station as a result of noise and/or visual impact	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary effects on the setting of Grade I St Mary's Church, and Grade II Chadwell House and Sleepers Farmhouse	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Grade II Buckland	n/a	Minor	Medium	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Construction works at Thurrock Flexible Generation Plant could result in impacts on the overall historic landscape	n/a	Minor	Medium	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Operation and maintenance							
Loss of or damage to, heritage assets comprising buried archaeological remains	n/a	No change	Medium	No change	None	No change	None
Long-term impacts on the settings of scheduled earthworks at West Tilbury	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Long-term impacts on the setting of Tilbury Fort Scheduled Monument	n/a	Minor	High	Moderate adverse (significant)	None	Moderate adverse (significant)	None
Long-term impacts on the setting of Gravesend Blockhouse Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Long-term impacts on the setting of New Tavern Fort Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Long-term impacts on the setting of Coalhouse Fort Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Long-term impacts on the setting of Bowaters Farm Battery Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Long-term impacts on the setting of Cliffe Fort Scheduled Monument	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Long-term impacts on the setting of West Tilbury Conservation Area and designated assets therein	n/a	Minor	High	Moderate adverse (significant)	None	Moderate adverse (significant)	None
Long-term impacts on the setting of East Tilbury Conservation Area	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Long-term impacts on the setting of Grade II* Riverside Station as a result of noise and/or visual impact	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Long-term impacts on the setting of Grade I St Mary's Church, and Grade II Chadwell House and Sleepers Farmhouse	n/a	Minor	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Long-term impacts on the setting of Grade II Buckland	n/a	Minor	Medium	Minor adverse (not significant)	None	Minor adverse (not significant)	None
The operation and maintenance of Thurrock Flexible Generation Plant could result in long-term impacts on the overall historic landscape	Landscape planting including the gapping up of hedgerows	Minor	Medium	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Decommissioning							
Temporary impacts on the setting of West Tilbury Earthworks Scheduled Monument	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Tilbury Fort Scheduled Monument	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Gravesend Blockhouse Scheduled Monument	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of New Tavern Fort Scheduled Monument	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Temporary impacts on the setting of Coalhouse Fort Scheduled Monument	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Bowaters Farm Battery Scheduled Monument	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Cliffe Fort Scheduled Monument	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of West Tilbury Conservation Area and designated assets therein	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant in EIA terms)	None
Temporary impacts on the setting of East Tilbury Conservation Area	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary effects on the setting of Grade II* Riverside Station as a result of noise and/or visual impact	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary effects on the setting of Grade I St Mary's Church, and Grade II Chadwell House and Sleepers Farmhouse	To be defined in decommissioning plan	Negligible	High	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Temporary impacts on the setting of Grade II Buckland	To be defined in decommissioning plan	Negligible	Medium	Minor adverse (not significant)	None	Minor adverse (not significant)	None
Decommissioning works at Thurrock Flexible Generation Plant could result in temporary impacts on the overall historic landscape	To be defined in decommissioning plan	Negligible	Low	Negligible (not significant)	None	Negligible (not significant)	None

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