

National Grid Cable Tunnel Replacement Project

Environmental Statement Volume IV

Chapter 15 Biodiversity - Gravesend

December 2023



Quality information

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15 Biodiversity

15.1 Introduction

- 15.1.1 This chapter assesses the likely significant effects of the Tilbury to Grain and Tilbury to Kingsnorth (TKRE) Tunnel Replacement Project (“the Proposed Development”) on Important Ecological Features¹ (IEFs) at the Gravesend Site. It considers the likely effects on ecological receptors during the construction, and operational phases.
- 15.1.2 This chapter also identifies any measures to avoid or reduce likely adverse effects on ecology arising from the Proposed Development, and where appropriate compensation for those residual impacts that cannot be avoided.
- 15.1.3 This chapter should be read together with the introductory chapters of this Environmental Statement (ES Volume II Chapters 1 – 6). Details of the effects of the Proposed Development on IEF’s at the Tilbury Site can be found in ES Volume IV Chapter 7.
- 15.1.4 The ecological assessment has been informed by data from other technical chapters, in particular the following comprising:
- Chapter 16: Landscape and Visual;
 - Chapter 19: Noise and Vibration;
 - Chapter 20: Air Quality; and
 - Chapter 21: Water Environment.
- 15.1.5 This chapter is supported by the following appendices (ES Volume VI) and figures:
- Appendix 7.1: Preliminary Ecological Appraisal (PEA);
 - Appendix 7.2: Ornithological Baseline Report;
 - Appendix 7.3: Great Crested Newt (GCN) eDNA Report;
 - Appendix 7.4: Otter & Water Vole Survey;
 - Appendix 7.5: Bat Report;
 - Appendix 7.6: Badger Report;
 - Appendix 7.7: Reptile Report;
 - Appendix 7.8: Invertebrate Report;
 - Appendix 7.9: National Vegetation Classification (NVC) / Habitat Condition Assessment Survey;
 - Appendix 7.10: Marine Screening Assessment;
 - Figure 15-1: Designated Sites for Nature Conservation;
 - Figure 15-2: Phase 1 Habitat Map;
 - Figure 15-3: Ecological Mitigation Measures.
- 15.1.6 This chapter has also been supported by a Report to Inform Habitat Regulations Assessment (HRA) Test of Likely Significant Effects, an Arboricultural Impact Assessment, and Biodiversity Net Gain (BNG) Assessment and Strategy Report which accompany the planning applications.

¹ As defined in Chapter 4 of the Chartered Institute of Ecology and Environmental Management’s Guidelines for Ecological Impact in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. [ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.2-April-22-Compressed.pdf \(cieem.net\)](https://cieem.net/publications/ecia-guidelines-2018-terrestrial-freshwater-coastal-and-marine-v1.2-april-22-compressed.pdf) Accessed 27/09/23

15.2 Relevant Legislation, Policy and Guidance

Introduction

15.2.1 The section of this chapter provides an overview of the relevant legislation, planning policy and technical guidance relevant to the ecological assessment.

Legislation

- 15.2.2 The following pieces of legislation apply specifically to the ecological assessment:
- Wildlife and Countryside Act (WCA) 1981 (as amended) (Ref 15-1);
 - Countryside and Rights of Way (CROW) Act 2000 (as amended) (Ref 15-2);
 - Natural Environment and Rural Communities (NERC) Act 2006 (as amended) (Ref 15-3);
 - The Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) (Ref 15-4);
 - The Environment Act 2021 (Ref 15-5);
 - Protection of Badgers Act 1992 (as amended) (Ref 15-6);
 - The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WFD) (Ref 15-7);
 - Animal Welfare Act 2006 (Ref 15-8); and
 - Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended) (Ref 15-9).

National Policy

15.2.3 National Planning Policy relevant to this ecological assessment are detailed in Table 15-1.**Error! Reference source not found.**

Table 15-1: National Planning Policy

Policy Reference	Relevant Policy and Context
National Planning Policy Framework (2023) (Ref 15-10) – Paragraphs 174, 175 & 179	Paragraph 174 states that planning policies and decisions should contribute to and enhance the natural and local environment through a number of means including: <i>‘minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures’;</i> Paragraph 175 states that <i>“Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.”</i> Paragraph 179 states that <i>“To protect and enhance biodiversity and geodiversity, plans should:</i> <i>a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and</i>

Policy Reference	Relevant Policy and Context
	<i>b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity”.</i> Paragraph 180 states that “When determining planning applications, local planning authorities should apply the following principles: <i>a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;</i> <i>b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;</i> <i>c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and</i> <i>d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.”</i> The NPPF defines ancient/veteran trees as follows: <i>A tree which, because of its age, size and condition, is of exceptional biodiversity, cultural or heritage value. All ancient trees are veteran trees. Not all veteran trees are old enough to be ancient, but are old relative to other trees of the same species. Very few trees of any species reach the ancient life-stage</i>
Environment Act (2021) Schedule 14 (Ref 15-5)	Schedule 14 makes provision for grants of planning permission in England to be subject to a condition to secure biodiversity net gain (BNG). Schedule 14 will only apply when relevant secondary legislation is in place. It is currently expected that majority of projects consented under the Town and Country Planning Act (Ref 15-11) will be required to deliver 10% BNG from January 2024 onwards (Ref 15-12).
Overarching National Policy Statement for Energy (EN-1) (2021) Section 5.3 Biodiversity and Geological Conservation (Ref 15-13)	The 2011 versions of the National Policy Statements remain in force until the revised NPS are designated in early 2024. Paragraphs 5.3.3 to 5.3.9 mirror the requirements in the NPPF to consider effects on designated sites, protected species and habitats. In addition, advocating application of the mitigation hierarchy, in particular seeking to avoid impacts on SSSI's. Paragraph 5.3.13 promotes due consideration of Local Nature Reserves and Local Sites. However, states that given the need for new infrastructure, these designations should not be used in themselves to refuse development consent. Paragraph 5.3.15 – Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. When considering proposals, the IPC should maximise such opportunities in and around developments, using requirements or planning obligations where appropriate.

Policy Reference	Relevant Policy and Context
	Paragraph 5.3.17 – The IPC should refuse consent where harm to habitats and species of principal importance would result, unless the benefits (including the need) of the development outweigh that harm. Paragraph 5.3.18 – The applicant should include appropriate mitigation measures as an integral part of the proposed development.
National Policy Statement for Electricity Networks Infrastructure (EN5) (2021) (Ref 15-14)	Paragraph 2.7.2 – The applicant will need to consider whether proposed overhead lines will cause problems for large birds such as swans and geese colliding with overhead lines.
Overarching National Policy Statement for Energy (EN-1) (November 2023) (Ref 15-15)	The 2023 versions of the National Policy Statements come into force in early 2024. Section 5.4 outlines the Planning Policy for Biodiversity and Geological Conservation. The most relevant paragraphs for this purpose are as follows: Paragraph 5.4.8 mirrors the protections in the NPPF, and presumes against development within SSSIs except where the benefits (including need) of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs. Paragraph 5.4.21 – states that the design process should embed opportunities for nature inclusive design, seeking Biodiversity Net Gain and wider environmental gains. The scope of potential gains will be dependent on the type, scale, and location of each project. Paragraph 4.1.19 to Paragraph 4.1.20 – Before submitting an application applicants should seek the views of the Statutory Nature Conservation Body to determine if an Appropriate Assessment under the Habitat Regulations is required. Paragraph 5.4.42 – states that developments should consider the mitigation hierarchy and consider reasonable alternatives. Where significant harm cannot be avoided, impacts should be mitigated and as a last resort, appropriate compensation measures should be sought.
National Policy Statement for Electricity Networks Infrastructure (EN-5) (November, 2023) (Ref 15-16)	The 2023 versions of the National Policy Statements come into force in early 2024. Paragraph 2.5.1 – notes that when planning and evaluating the proposed development's contribution to environmental and biodiversity net gain opportunities to reconnect important habitats via green corridors, biodiversity stepping zones, and reestablishment of appropriate hedgerows should be considered.

Local Planning Policy

15.2.4 Local Planning Policies relevant to this ecological assessment are detailed in Table 15-2.

Table 15-2: Local Planning Policy

Policy Reference	Policy Context
Gravesham Borough Council Local Plan (Ref 15-17) – Policy	4.1.6 Planning applications that accord with the policies in the development plan for Gravesham will be approved without delay, unless material considerations indicate otherwise.

Policy Reference	Policy Context
CS01: Sustainable Development	4.1.7 When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework and in this Core Strategy. It will work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area. 4.1.8 Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision then the Council will grant permission unless material considerations indicate otherwise, taking into account whether: - Any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or - Specific policies in that Framework indicate that development should be restricted.
Gravesham Borough Council Local Plan – Biodiversity	Paragraph 5.7.7 mirrors the protection for statutory and non-statutory designated sites set out in national policy. Paragraph 5.7.9 and 5.7.10 relate directly to the bird populations associated with the internationally significant Special Protection Areas (SPA) and Ramsar sites that make up the North Kent marshes (Thames Estuary and Marshes SPA/Ramsar Site, Medway Estuary and Marshes SPA/Ramsar Site, and The Swale SPA/Ramsar Site). It states that <i>‘There is currently insufficient evidence to adequately assess the cause of this decline’</i> and that in the interim a precautionary approach will be adopted requiring developers to undertake HRA and where necessary provide or contribute to mitigation measures for the recreation needs arising from development. Paragraph 5.7.11 notes that the Greater Thames Marshes has been declared a Nature Improvement Area (NIA) and in Gravesham this includes the River Thames and much of the marshland to the east of Gravesend. 5.7.13 sets out that within the Borough <i>‘The strategy is to ensure that there is no net loss of biodiversity in the Borough and to take every opportunity to improve biodiversity. Development will then be expected to be designed, laid out and constructed in a manner which protects habitats and important species and also includes features to enhance biodiversity. Biodiversity Opportunity Areas have been identified across Kent and the wider South East which incorporate areas of the greatest biodiversity value.’</i> <i>In Gravesham, these comprise: North Kent Marshes; Thames-side Green Corridors; and Medway Gap and North Kent Downs. These areas give opportunities for the restoration or creation of new priority habitats and will be the focus for improvement where opportunities arise, for example through the Local Nature Partnerships and the Nature Improvement Area.</i>
Gravesham Borough Council Local Plan Policy CS12: Green Infrastructure	Paragraphs 5.7.22 to 5.7.23 state that sites designated for their biodiversity value will be protected based on their level of designation, and that the green infrastructure strategy will seek to ensure there will be <i>‘no net loss of biodiversity in the Borough, and opportunities to enhance, restore, re-create and maintain habitats will be sought, in particular within the Biodiversity Opportunity Areas shown on the Strategic Green Infrastructure Network map and within new development.’</i> Paragraph 5.7.25 states <i>‘Where a negative impact on protected or priority habitats/species cannot be avoided on development sites and where the</i>

Policy Reference	Policy Context
	<i>importance of the development is considered to outweigh the biodiversity impact, compensatory provision will be required either elsewhere on the site or off-site, including measures for ongoing maintenance’.</i>
Kent Environment Strategy (Ref 15-18) – Policy 5 – Conserve and enhance the quality and supply of the county of Kent’s natural and historical resources and assets.	Policy 5 states that the County Council will seek to ‘ <i>Improve and increase functional habitat networks on land and in the sea, identifying opportunities and protecting and enhancing our natural and historic environment and landscape character through planning and decision making.</i> ’

Guidance

- 15.2.5 This ecological assessment has been carried out taking into account the following guidance:
- Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment (Ref 15-19);
 - Bat Surveys for Professional Ecologists: Good Practice Guidelines – Third Edition (Ref 15-20);
 - Bat Surveys for Professional Ecologists: Good Practice Guidelines – Fourth Edition (Ref 15-21);
 - Kent’s Plan Bee: Kent County Council’s Pollinator Action Plan (Ref 15-22);
 - Biodiversity Metric 4.0 – User Guide (Ref 15-23); and
 - Bug Life - Creating Green Roofs for Invertebrates: A Best Practice Guide (Ref 15-24)

15.3 Scope and Methodology

Study Area/Zone of Influence

- 15.3.1 The assessment of the likely significant effects on biodiversity has included an assessment of Important Ecological Features (IEFs) with the potential to be directly or indirectly affected by the Proposed Development.
- 15.3.2 Based on the nature of the Proposed Development, the potential for impacts on the following biodiversity resources/receptors were considered as part of the assessment:
- Statutory and non-statutory sites designated for nature conservation value within 2km (10km for The National Site Network²);
 - Legally protected or otherwise notable species at the Site or within 2km (5km radius for bat species); and
 - Habitats or features within or adjacent to the Site based on the likely zone of influence of the Proposed Development for each IEF, and an understanding of the maximum distances typically considered by statutory consultees.

Scope and Assessment Methodology

- 15.3.3 This assessment considers the potential impacts of the Proposed Development at the Gravesend Site taking into account the proposed design and programme set out in ES Volume II Chapter 3 Project Description. The assessment considers both the impacts during construction and when the Proposed Development is operational.
- 15.3.4 The potential impacts of the Proposed Development at the Tilbury Site are described separately in ES Volume III Chapter 7.

² i.e. Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites.

- 15.3.5 The baseline for the assessment is considered based on current site conditions, drawing upon information collected during field surveys undertaken between October 2022 and September 2023, and other relevant pre-existing information from previous surveys undertaken at the Gravesend Site including information collected by National Highways (in support of Lower Thames Crossing) (Ref 15-25), and Natural England (Ref 15-26).

Impact Assessment Method

- 15.3.6 The ecological assessment has been undertaken in accordance with the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Ref 15-19). The aims of the ecological assessment are to:

- identify IEFs (i.e. designated sites, habitats, species or ecosystems) which may be impacted by the Proposed Development;
- provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects of the Proposed Development. Impacts and effects may be positive or negative;
- facilitate scientifically rigorous and transparent determination of the consequences of the Proposed Development in terms of national, regional and local policies relevant to biodiversity and biodiversity conservation, where the level of detail provided is proportionate to the scale of the development and the complexity of its potential impacts; and
- set out what steps will be taken to adhere to legal requirements relating to the relevant ecological features concerned.

- 15.3.7 The principal steps involved in the CIEEM approach (Ref 15-19) can be summarised as:

- Ecological features that are both present and might be affected by the Proposed Development are identified (both those likely to be present at the time works begin and those predicted to be present at a set time in the future) through a combination of targeted desk-based study and field survey work to determine the relevant baseline conditions;
- The importance of the identified ecological features is evaluated, placing their relative biodiversity conservation importance into geographic context, which is then used to define the relevant biodiversity features that need to be considered further;
- The changes or perturbations predicted to result as a consequence of the Proposed Development (i.e. the potential impacts) and which could potentially affect relevant ecological features are identified and their nature described. Established best-practice, legislative requirements or other incorporated design measures to minimise or avoid impacts are also described and are taken into account;
- The likely effects (positive or negative) on relevant ecological features are then assessed, and where possible quantified;
- Measures to avoid or reduce any predicted significant effects, if possible, are then developed in conjunction with other elements of the design (including mitigation for other environmental disciplines) and if necessary, measures to compensate for effects on features of biodiversity conservation importance are also included;
- Any residual effects of the Proposed Development are reported; Scope for ecological enhancement is considered.

- 15.3.8 It is not necessary in the assessment to address all habitats and species with potential to occur in the relevant study area and instead the focus is on those that are “relevant” i.e. ecological features that are considered to be important and potentially affected by the Proposed Development. The CIEEM guidelines (Ref 15-19) makes clear that there is no need to “carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable”. This does not mean that efforts should not be made to safeguard wider biodiversity and requirements for this have been considered. National and local planning policy documents emphasise the need to achieve net gains for nature and that a core principle for planning is that it should contribute to conserving and enhancing the natural

environment and reducing pollution. These considerations have been applied to the assessment method in this chapter.

- 15.3.9 Following assessment utilising the CIEEM methodology, in order to enable the results of the ecological assessment to be compared with those from other chapters of the ES, the residual impacts have been equated to the comparable significance criteria that are utilised within other chapters of this ES.
- 15.3.10 Embedded mitigation measures have been developed and outlined within the Outline CEMP (and inform required protected species licences). Following this, each key ecological receptor would be evaluated to determine whether there are any effects and whether mitigation is required to reduce the significance of the effect.

Determining Importance of Ecological Features

- 15.3.11 Data received through consultation, desk-based assessments and field-based investigations were used to allow the importance of ecological features (including designated sites, ecosystems, habitat and species) of value (or potential value) to be identified, and the main factors contributing to their value described and related to available guidance. Each ecological feature or resource has then been subject to evaluation to assign a level of importance (or potential importance) within a defined geographical context using the following geographic scales of reference:
- International (i.e. European);
 - National (i.e. England);
 - Regional (i.e. South East England);
 - County (i.e. Kent);
 - District (i.e. Gravesham);
 - Local (e.g. Eastcourt Marshes);
 - Site; and
 - Negligible (used where the value is lower than the site level).
- 15.3.12 The value of relevant ecological features is based on consideration of their intrinsic and potential ecological importance and does not include consideration of social and economic values.
- 15.3.13 For the purposes of the assessment within this chapter, only ecological features of at least Local importance are considered as IEFs that require assessment for potential significant effects.

Characterising Ecological Impacts and Effects

- 15.3.14 In accordance with the CIEEM guidelines the terminology used within the Ecological Impact Assessment (EclA) draws a clear distinction between the terms 'impact' and 'effect'. For the purposes of the EclA, these terms are defined as follows:
- Impact – Actions resulting in changes to an ecological feature. For example, demolition activities leading to the removal of a building utilised as a bat roost; and
 - Effect – Outcome resulting from an impact acting upon the conservation status or structure and function of an ecological feature. For example, killing/injury of bats and reducing the availability of breeding habitat as a result of the loss of a bat roost may lead to an adverse effect on the conservation status of the population concerned.
- 15.3.15 Potential impacts (and where relevant resultant effects) have been characterised as follows:
- Beneficial/adverse – is the impact likely to be positive or negative;
 - Magnitude – the 'size' or 'amount' of an impact – this is determined on a quantitative basis where possible;
 - Spatial extent – the area or distance over which the impact occurs;

- Duration – the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. For the purposes of this assessment the following categories are utilised where relevant: short-term (up to 1 year), medium-term (1-5 years), long term (more than 5 years) and permanent. The duration of an effect may be longer than the duration of an activity or impact;
- Reversibility – is the impact temporary or permanent. A reversible (temporary) impact is one from which recovery is possible or for which effective mitigation is both possible and enforceable; and
- Timing and frequency – consideration of the point at which the impact occurs in relation to critical life-stages or seasons.

Significance Criteria

15.3.16 For each ecological feature, only those characteristics relevant to understanding the ecological effect of the Proposed Development and determining the significance are described. The determination of the significance of effects has been made based on the predicted effect on the structure and function, or conservation status, of relevant ecological features, as follows:

- Not significant – no effect on structure and function, or conservation status; and
- Significant – structure and function, or conservation status is affected.

15.3.17 The CIEEM guidelines (Ref 15-19) state that:

‘For the purposes of EclA a ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ (i.e. relevant ecological features) or for biodiversity in general’.....

In broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).

15.3.18 For designated sites, the assessment has considered how the proposed development is likely to affect the conservation objectives for the site and/or its interest/qualifying features. For ecosystems, consideration is given to if the proposals are likely to result in a change in ecosystem structure and/or function.

15.3.19 For species and habitats the effects of impacts on individual habitats and species are considered in relation to ‘conservation status’ which is defined in the CIEEM guidelines as follows:

- For habitats: *conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area;*
- For species: *conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.*

15.3.20 In considering effects on conservation status, reference has been made to relevant available guidance on the existing conservation status of the feature. Such judgements are based, wherever possible, on quantitative evidence. However, where necessary the professional judgement of an experienced ecologist has been applied.

15.3.21 For those effects considered significant, the effect has also been characterised as appropriate (e.g. adverse or beneficial), and qualified with reference to the geographic scale at which the effect is significant (e.g. an adverse effect significant at a national level). The output is dependent on both the characteristics and magnitude of the impact and the value of the feature concerned. For example, an affected feature that, as a whole, is of national value may be subject to effects that only affect that feature at a local-scale, and do not affect it at a national level.

15.3.22 In order to provide consistency of terminology in the conclusions of the assessment, the residual effects of the Proposed Development have been translated to a significance level on a scale of

negligible, minor, moderate and major comparable to that used in the other assessments reported within this ES, as outlined in Table 15-3. These conclusions have been provided in each case in brackets following the equivalent CIEEM assessment conclusion.

Table 15-3: Relating CIEEM Assessment to Terminology Used in Other Chapters

Effect significance terminology used in other ES chapters		Equivalent CIEEM assessment
Significant (Beneficial)	Major Beneficial	Beneficial effect on structure/function or conservation status at regional, national or international level.
	Moderate Beneficial	Beneficial effect on structure/function or conservation status at County or District level.
Not significant	Minor Beneficial	Beneficial effect on structure/function or conservation status at Site or local level.
	Negligible	No effect on structure/function or conservation status.
	Minor Adverse	Adverse effect on structure or conservation status at Site – local level
Significant (Adverse)	Moderate Adverse	Adverse effect on structure/function or conservation status at County or District level.
	Major Adverse	Adverse effect on structure/function or conservation status at regional, national or international level

Establishing Baseline Conditions

Desk Study

- 15.3.23 A desk study was carried out to identify nature conservation designations and protected and notable habitats and species potentially relevant to the Proposed Development including scheduled invasive non-native species.
- 15.3.24 The study area used for the desk study is defined in Paragraphs 15.3.1 to 15.3.2 of this chapter.
- 15.3.25 Desk study sources are summarised in Table 15-4.

Table 15-4: Desk Study Sources

Data Source	Date Obtained/ Reviewed	Data Requested
Multi-Agency Geographic Information for the Countryside (MAGIC) website	November 2023	International statutory designations within 10 km of the Site. Other statutory designations within 2 km. Ancient woodlands and notable habitats within 500m of the Site. Information on habitats and habitat connections (based on aerial photography) relevant to interpretation of planning policy and assessment of potential protected and notable species constraints.
Kent Biological Records Centre	December 2022	Statutory and Non-statutory designations within 2 km of the Site Protected and notable species records within 1 km of the Site (records for the last 10 years only).
Publicly available aerial photography	December 2022	Information on habitats and habitat connections (based on aerial photography) relevant to interpretation of planning policy and assessment of potential protected and notable species constraints.

Data Source	Date Obtained/ Reviewed	Data Requested
Lower Thames Crossing Development Consent Order application documents Error! Reference source not found.	November 2023	Review of publicly available information documenting surveys of protected and/or notable species and habitats undertaken in support of DCO application (undergoing examination) which adjoins the Proposed Development.
Natural England Access to Evidence	November 2023	Review of the following documents for information relevant to the baseline for the Proposed Development: NECR472 North Thames Estuary and Marshes Breeding Birds report.(Ref 15-26)
Buglife	November 2023	Review of relevant information in relation to invertebrate populations in the Thames Estuary Marshes: - Important Invertebrate Areas (Ref 15-27); and - All of a Buzz in the Thames Gateway (Ref 15-28)

Field Surveys

A series of habitat and species surveys commenced in November 2022 and concluded in September 2023 as set out in Table 15-5. Survey methods were based upon Natural England standing advice (Ref 15-29) and CIEEM best practice guidance for protected species and habitats.

- 15.3.26 A Preliminary Ecological Appraisal was produced in January 2023 (survey undertaken in November 2022) (ES Volume VI – Appendix 7.1) in support of an initial options appraisal, as a consequence covered a larger area than will be impacted by the proposals.

Limitations

- 15.3.27 Details of limitations (e.g., weather conditions, health and safety considerations) that may have affected the outcome of individual survey visits are provided within the accompanying baseline appendices (Volume VI – Appendix 7.1 to Appendix 7.10). As detailed within the baseline survey reports these constraints have been taken into account when interpreting the survey results and where appropriate a precautionary approach has been taken when assigning importance values to ecological features, with a 'reasonable worst case' importance rating assigned, based both the 2023 field survey data and other available data for the Site.

Based on this approach, there is confidence that the outputs of the ecological assessment provide a robust assessment, enabling all likely significant effects of the Proposed Development at the Tilbury Site to be robustly identified.

Biodiversity Net Gain

- 15.3.28 A Biodiversity Net Gain Assessment for the Proposed Development as a whole (i.e. both the Tilbury and Gravesend Sites combined) has been undertaken utilising Natural England's Biodiversity Metric 4.0 (Ref 15-30**Error! Reference source not found.**) and is reported separately within the accompanying Biodiversity Net Gain Assessment and Strategy.

- 15.3.29 National Grid are committed to ensuring that the Proposed Development achieves a BNG of 10-15%.

Table 15-5: Protected Species and Habitat Surveys

Survey Type and relevant technical appendix)	Scope and Method	Survey Period	Survey Extent
Extended Phase 1 Habitat Survey (Volume VI Appendix 7.1)	An extended Phase 1 Habitat Survey and an appraisal of the potential suitability of the habitats present to support protected and notable species and invasive species was undertaken on 17 and 25 November 2023, and 23rd January 2023. A further visit to cover habitats adjoining the Site access route was undertaken on 17th October 2023. The Phase 1 Habitat Survey was undertaken in accordance with the standard survey methods (Ref 15-30 Natural England Biodiversity Metric 4.0 Available at https://publications.naturalengland.org.uk/publication/5850908674228224 Ref 15-31). It involved categorising the different habitat types and habitat features within the survey area. The information gained from the survey was used to determine the likely ecological value of the Site, and to direct any more specific survey work required.	November 2022 with updates January 2023 and October 2023	November 2022 and January 2023 survey covered the main areas of the Gravesend Site and adjoining habitats to the east. October 2023 update covering minor changes to the Site boundary and habitats adjoining the access road leading into the Gravesend Site.
National Vegetation Classification (NVC) Survey (Volume VI Appendix 7.2)	NVC survey was undertaken at the Gravesend Site on 22 August 2023 to characterise the habitats present and identify the extent of homogenous habitats. Results were used to identify closest affinities to the communities described in the NVC manuals. The NVC survey was supplemented by a structured walk through the area to assess the overall abundance and distribution of any protected and/or notable species.	August 2023	Three fields of grassland and reedbed that will be impacted by proposed Gravesend Sealing End Compound (SEC) and associated temporary works
Intertidal Birds (Foreshore habitats) (Volume VI Appendix 7.3)	Between October 2022 and March 2023 the following surveys were undertaken at each Site: - Monthly high water roost count covering adjacent intertidal mudflat habitat; and - Monthly low water feeding count covering adjacent intertidal mudflat habitat. For intertidal surveys, at high water all areas were visited sequentially, and a single count of all species present undertaken within the two-hour period either side of high water. At low water all areas were visited sequentially and counts of waterbirds feeding on the intertidal mud undertaken, with birds and their numbers recorded on both the rising and falling tide, where possible. Subsequently visits at each Site using the same methodologies were undertaken in June, July and August 2023 to assess usage of the same areas of intertidal habitat by protected/notable species during the breeding season.	October 2022 – March 2023 and June to August 2023.	Intertidal surveys extended 200m east and west of the sections of foreshore adjoining the Proposed Development to record waterbird species occurring in areas that may be at risk from noise and visual disturbance during construction and operation.

Survey Type and relevant technical appendix)	Scope and Method	Survey Period	Survey Extent
Non-Breeding Birds (Terrestrial habitats) (Volume VI Appendix 7.2)	Survey of terrestrial habitats for non-breeding birds were undertaken monthly between October 2022 and March 2023 with surveys based on the methods described by Bibby <i>et al.</i> (Ref 15-32) and Gilbert <i>et al.</i> (Ref 15-33).	October 2022 – March 2023	Wintering surveys of terrestrial habitats covered the areas of the proposed scheme walked to within 50m, including approximately a 50m buffer of the Site.
Breeding Birds (Volume VI Appendix 7.2)	A standard territory mapping methodology for surveying breeding birds as detailed in Bibby <i>et al.</i> (Ref 15-32) and Gilbert <i>et al.</i> (Ref 15-33) was implemented. Regular stopping points were included along the survey route to record any species that may be passing through the survey area. Bird behaviour (singing, calling, carrying food, nest building) was recorded and mapped. A total of three visits were undertaken between June and July 2023. Due to the survey being undertaken late in the season any species recorded within the terrestrial habitats of the Site was deemed to be breeding where birds were recorded singing; were in suitable habitat; agitated behaviour/anxiety calls from adults (suggesting the presence of a nest or young nearby); or juvenile birds were recorded.	June-July 2023	Areas of terrestrial habitat at and surrounding the main works areas at Tilbury and Gravesend. Access routes along existing roads or access tracks were excluded from the scope.
Bats – Roost Suitability Surveys (Volume VI Appendix 7.5)	Following identification of features potentially suitable for roosting during the November 2023 An external preliminary roost assessment (PRA) of all existing trees and structures at the Gravesend Site was undertaken on 5 May 2023.	February & May 2023	Existing SEC at Gravesend and tree to the west of the proposed Gravesend SEC.
Bats – Activity Surveys (Volume VI Appendix 7.5)	A total of three bat transect surveys were undertaken at the Gravesend Site, with visits in May, July, and August 2023. Surveys were undertaken in accordance with the relevant Bat Conservation Trust (BCT) guidelines at time of survey (Ref 15-20) covering the period from sunset until 2 hours after sunset. Prior to each walked transect a static bat detector was deployed. This device was left in-situ for a minimum of 5 nights after each transect survey.	April – September 2023	Bat activity transect covered the Gravesend Site and adjacent habitat.
Bats – Emergence Surveys (Volume VI Appendix 7.5)	Three dusk bat emergence was undertaken on 10 May, 21 June and 12 July 2023 covering a single tree on the western boundary of the Gravesend Site with high roost suitability. Two surveyors observed the building from 15 minutes before sunset to 2 hours after sunset. All emergence/re-entry surveys will include the use of an IR camera in line in accordance with BCT's interim guidance note (Ref 15-34).	May 2023	Single mature tree on the western boundary of the Gravesend Site.

Survey Type and relevant technical appendix)	Scope and Method	Survey Period	Survey Extent
Great Crested Newt (Volume VI Appendix 7.3)	Habitat Suitability Index (HSI) surveys were undertaken in parallel with the Extended Phase 1 Habitat survey in November 2023 utilising the method set out within Amphibian Reptile Group (ARG) Advice Note 5 (Ref 15-35). Great crested newt environmental DNA (eDNA) samples were undertaken of the ditches within and adjoining the Gravesend Site on 9 May 2023, and subject to laboratory analysis.	November 2023 (HSI) and May 2023 (eDNA)	Ditches within and adjacent to the Site.
Invertebrates (Volume VI Appendix 7.8)	An invertebrate specialist visited on three occasions (July, August and September 2023) to undertake walkover surveys and collect samples. During each visit a range of techniques were used including ground searching, yellow pan traps, sweep netting, suction sampling; beating and direct observation. A particular focus was placed on establishing the presence/absence of protected and/or notable species known to occur within the wider Thames Estuary.	July-September 2023	Habitats within and adjacent to the Site
Badger (Volume VI Appendix 7.6)	Walkovers surveys of the Gravesend Site were undertaken on 17 July 2023 and 11 September 2023. The aim of the surveys was to provide robust evidence for the presence or likely absence of badgers. The survey was conducted using best practice guidance based on Harris S, Cresswell P and Jefferies D Surveying Badgers (Ref 15-36), recording field signs indicating presence of badger including setts, day beds (above ground areas where badgers sleep), badger latrines, diggings or snuffle holes.	July & September 2023	Habitats within and adjacent to the Site + known sett locations to the south-east of the Site
Reptile (Volume VI Appendix 7.7)	A total of 50 artificial refugia (a mix of roofing felt and corrugated iron) were deployed within the Gravesend Site on 9 May 2023. However, only 30 of the refugia were available to access for subsequent checks due to pony grazing within the field where these refugia have been deployed. This is not considered a significant constraint as the areas of most suitable reptile habitat remained accessible throughout the surveys. Refugia were then subject to survey checks in accordance with the guidance provided in Froglife Advice Sheet 10 (Ref 15-37) and the Herpetofauna Workers' Manual (Ref 15-38) between 19 May 2023 and 18 September 2023.	April - September 2023	Habitats within and adjacent to the Site
Water Vole and Otter (Volume VI Appendix 7.4)	A water vole survey was undertaken on ditches within and adjacent to the Site. Suitable ditches or watercourses within the site were searched for signs of water voles and/or otter. Two survey visits were undertaken in accordance with the methods set out in the Water Vole Mitigation Handbook (Ref 15-39). The first in May 2023 and the second in September 2023.	May - September 2023	Ditches within and adjacent to the Site.

15.4 Consultation and Stakeholder Engagement

15.4.1 There has been ongoing consultation and engagement with stakeholders. This is reported in Table 15-6. Project Responses to the EIA Screening Opinion received from Gravesham Borough Council are presented in ES Volume VI Appendix 4.2. Wider details on the consultation undertaken for the ES is detailed in ES Volume II Chapter 5: Consultation.

Table 15-6: Consultation and Stakeholder Engagement Log

Date	Type	Topics Discussed/Comments Received	Project Response
25 November 2022	Meeting - Royal Society for the Protection of Birds (RSPB)	The RSPB stated that ground nesting birds will be a key consideration during construction phase along with other Schedule 1 birds such as marsh harriers and water voles. The RSPB also recommended Cliffe Pools as being suitable locations for exported spoil, stating that the RSPB are interested in using tunnel spoil from the Proposed Development to provide wildlife benefits at this location, should it be suitable. During the meeting, details of relevant RSPB contacts were provided to allow continued and meaningful engagement.	Embedded mitigation includes measures to ensure habitat clearance works are timed appropriately to minimise impact on bird populations.
01 December 2022	Meeting - RSPB	A meeting was held with the RSPB to further introduce the project and the options considered. The RSPB stated that the Shorne coast designated site is one of the best breeding sites for Redshank in the country, and that the area would benefit from improvements to the freshwater supplies.	No change in water quality expected as a consequence of the Proposed Development.
28 November 2022	Meeting – Natural England	Natural England outlined proposals for designation of a SSSI as part of the 'Thames Estuary Invertebrates Essex and Kent SSSI' notification project. Concern raised in particular regarding Goshem's Farm, an Ingrebourne Valley site which consists of ash deposits, has undergone 10 years of ecological monitoring and is particularly important for invertebrates with species of national interest. Identified importance of foreshore habitats at Tilbury and Gravesend as potentially supporting habitat for the SPA.	The final design at Tilbury has sought to minimise the impact on any future SSSI notification. The raised plateau of invertebrate interest has been avoided entirely. Bird surveys have been undertaken to ascertain the value of the foreshore habitats at Tilbury and Gravesend as supporting habitat for the nearby SPA.

Date	Type	Topics Discussed/Comments Received	Project Response
09 February 2023	Meeting – Natural England	National Grid updated on the project's option work and progression with the new tunnel option, and currently looking at options for siting the required sealing end compounds. Natural England advised to ensure that location decision making is an iterative process informed by ecological survey findings consistent with best practice. A robust demonstration of alternatives will be critical for the EIA process, as the current proposed location falls within an area proposed by NE for SSSI notification in the coming months. As a 's28g' public body with duties towards both biodiversity generally and SSSIs specifically, the project is urged to avoid areas proposed for SSSI notification. Natural England also advised that the ash field is particularly sensitive and should be avoided. Natural England were also keen to engage in beneficial re-use of tunnel arisings.	The design at the Gravesend Site has sought to minimise impacts through positioning the proposed SEC as close as possible to the existing facility. National Grid are still in discussion with a number of parties regarding sustainable disposal of tunnel spoil, and are confident of securing a sustainable end-use for tunnelled material.
20 March 2023	Meeting – Natural England	National Grid presented optioneering work on ecological constraints. National Grid set out view that HRA was not required for the GI works proposed. NE subsequently confirmed HRA was required if works were to occur during the wintering season. Natural England identified a number of NE funded survey reports to be published via Access to Evidence covering surveys undertaken in support of proposed North Thames Estuary and Marshes SSSI.	National Grid delayed GI works such that they commenced outside of the time window of concern to National Grid. Natural England survey reports subsequently obtained via Access to Evidence website and included in desk study data sources (Ref 15-26).
17 September 2023	Meeting - Buglife	National Grid outlined results of 2023 surveys and design of the Proposed Development. Buglife were reassured by the small footprint of the project at Tilbury, and not concerned regarding expected impacts assuming embedded mitigation measures are included. Requested that in reinstating the site the contractor is encouraged not to flatten the site and leave ruts/depressions to increase invertebrate habitat mosaic.	Guidance on reinstatement incorporated to embedded mitigation measures identified in Section 15.8; and will be included as a requirement within the Contractor's requirements. A biodiverse brown roof has been included within the design at both Tilbury and Gravesend sites. Design will incorporate principles identified in Buglife guidance (Ref 15-24).

Date	Type	Topics Discussed/Comments Received	Project Response
22 September 2022	Meeting – Natural England	A meeting was held with Natural England to discuss the scope and progress of the ecological assessment, the Report to inform the HRA and the approach to Biodiversity Net Gain (BNG) HRA: The working noise modelling results were discussed. It was confirmed that an increase of 3dB from the baseline is Natural England's internally agreed approach, but that there is a difference between perceptible noise change and what would influence bird behaviours/cause disturbance. It was also raised that the HRA should consider other functionally linked land than just the foreshore and to consider ringed plover in the area, further inland of the foreshore. It was agreed that a draft of the Report to Inform the HRA would be provided to Natural England prior to the submission of the planning applications. Ecology Surveys: The ecology surveys undertaken for the Proposed Development were discussed, in particular the invertebrate, bird, reptile, badger and water vole surveys and the likely mitigation where required. BNG: A "first draft" of the BNG metric 4.0 was presented with an explanation of which elements of the work were being recorded as a loss/retained/delayed. This was to be developed to include a post-construction plan (landscape plan) and a BNG strategy to be included with the planning submission.	Changes to the requested scope of the HRA have been reflected in the final version of the HRA Likely Significant Effects Test Report.

Date	Type	Topics Discussed/Comments Received	Project Response
28 September 2023	Meeting - RSPB	A meeting was held with the RSPB to update on the progress of the project. An update was provided on the ecological survey work to date as well as early plans for reinstatement and landscaping. The RSPB suggested small ponds, which will help wildlife and that an approach that complements the Lower Thames Crossing's proposal. It was suggested no grazing or mowing, scrub habitat (hawthorn and blackthorn), long rough grass etc. The banks for existing ditches were also discussed e.g. shelves in south facing ditch banks and sand capping.	The final restoration proposals for the fields in the west of the Gravesend Site has been largely driven by the need to provide replacement grazed pasture suitable to support hornet robberfly. Within this constraint the design has incorporated a series of seasonally wet scrapes that will benefit both bird and invertebrate populations.
September/ October 2023	Public consultation responses	Public comments raised the following points: - Water vole present in the Thames and Medway Canal - Seals using the mudflats and lots of migrating birds present - Works need to be sensitively planned due to value of Site for birds.	These points are taken into account in the embedded mitigation measures incorporated into the design of the Proposed Development.

15.5 Baseline Environment

Designated Sites

Statutory Designated Sites

15.5.1 Table 15-7 provides a summary of the statutory designated sites within the Study Area, as shown on Figure 15-1.

Table 15-7: Statutory Designated Sites within Study Area

Site	Reason for Designation	Distance from Gravesend Site
Thames Estuary & Marshes Ramsar site	The site comprises a complex of brackish, floodplain grazing marsh ditches, saline lagoons and intertidal saltmarsh and mudflat. The habitats support internationally important numbers of wintering waterfowl, and the saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.	30m south
South Thames Estuary and Marshes SSSI	The site consists of an extensive mosaic of grazing marsh, saltmarsh, mudflats and shingle characteristic of the estuarine habitats of the north Kent marshes. Supports outstanding numbers of wintering birds, and also of breeding bird interest	30m south
Thames Estuary & Marshes Special Protection Area (SPA)	The site consists of coastal, estuary, floodplain, and intertidal habitats, hosting a range of internationally significant overwintering birds. Qualifying species include overwintering populations of pied avocet (<i>Recurvirostra avosetta</i>); and hen harrier (<i>Circus cyaneus</i>). In addition, the following migratory species: ringed plover (<i>Charadrius hiaticula</i>); grey plover (<i>Pluvialis squatarola</i>); dunlin (<i>Calidris alpina</i>); knot (<i>Calidris canutus</i>); black-tailed godwit (<i>Limosa limosa islandica</i>); and redshank (<i>Tringa tetanus</i>). The estuary and adjacent grazing marsh areas support an important assemblage of wintering waterbirds including grebes, geese, ducks and waders.	520m northeast (southern bank of Thames); 2375m northeast (northern bank of Thames)
Mucking Flats & Marshes Site of Special Scientific Interest (SSSI)	An extensive stretch of Thames mudflats and saltmarsh, together with sea wall grassland. Wintering wildfowl and waders reach both nationally and internationally important numbers on the mudflats,. Also supports significant numbers of waders such as Curlew sandpiper and an important late summer flock of yellow-legged herring gulls. Between the sea wall and mean high water line lie areas of high level saltmarsh of a type uncommon in Essex. The saltmarsh has a high invertebrate interest, which includes the rare spider <i>Baryphyma duffeyi</i> .	2.4km northeast
North Downs Woodlands Special Areas of Conservation (SAC)	The site consists of mature Asperulo-Fagetum beech forests and yew (<i>Taxus baccata</i>) woods within a mosaic of scrub and other woodland types. The site also contains semi-natural dry grasslands and scrubland facies on calcareous substrates which is an important orchid site.	8.3km

Site	Reason for Designation	Distance from Gravesend Site
Medway Estuary and Marshes SPA	Medway Estuary and Marshes SPA covers both marine and terrestrial areas. There is a diverse mix of intertidal habitats, including saltmarshes, mudflats, shell beaches and eelgrass beds. These habitats support a diverse range of water birds throughout the year, including breeding waders and terns in the summer and important numbers of geese, ducks, grebes and waders in winter.	9.8km

- 15.5.1 The Thames Estuary and Marshes SPA and Ramsar Sites are both of **International** importance. These sites cover areas of coastal, estuary, floodplain, and intertidal habitats located on both sides of the River Thames. The distances shown in Table 15-7 identify the distance to the boundary of the designated site at its closest point.
- 15.5.2 The banks of the Thames adjoining the Gravesend Site also support areas of intertidal habitat and have been identified in correspondence with Natural England (pre-application meeting 20 March 2023) as habitat of potential value in supporting bird populations associated with the nearby Thames Estuary and Marshes Ramsar/SPA.
- 15.5.3 In addition, the grassland and scrub habitats in close proximity to the Gravesend site are suitable to support a range of breeding and wintering birds. At its closest point the Gravesend Site is approximately 50m from the foreshore habitats adjoining the River Thames. However, the proposed shaft and Gravesend SEC proposed as part of the Proposed Development are approximately 165m at the closest point.
- 15.5.4 The Thames Estuary and Marshes Ramsar site (including areas that fall within the South Thames Estuary SSSI) is approximately 30m to the south of the Gravesend Site, but it is separated from the Site by the Thames and Medway Canal and the HS1 railway.
- 15.5.5 The Mucking Flats and Marshes SSSI and South Thames Estuary SSSI are both of **National** importance.
- 15.5.6 These areas of foreshore habitat are considered to be potentially of value in supporting bird populations associated with the nearby Thames Estuary and Marshes Ramsar/SPA.
- 15.5.7 The North Downs Woodland SAC and the Medway Estuary and Marshes SPA and Ramsar are each of **International** importance, but being located 8.3km and 9.8km respectively from to the south of the Gravesend Site with no clear functional linkage are not expected to be impacted by the Proposed Development. These sites are not considered further in the assessment.
- 15.5.8 The Mucking Flats and Marshes SSSI and South Thames Estuary SSSI are both of **National** importance.

Non-Statutory Designated Sites

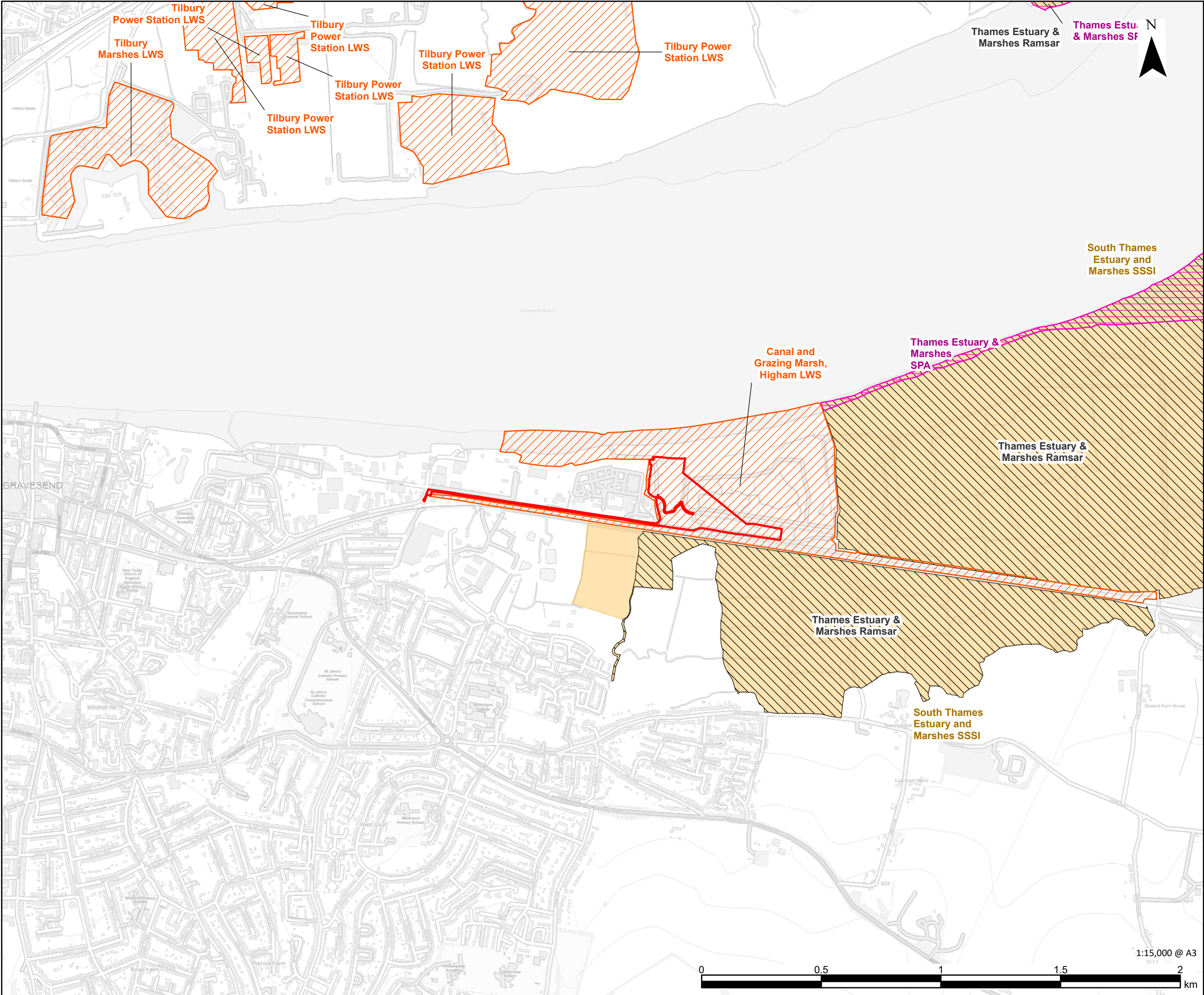
- 15.5.9 Table 15-8 provides a summary of the non-statutory designated sites within the Study Area, as shown on Figure 15-1.

Table 15-8: Non-Statutory Designated Sites within Study Area

Site (size ha)	Reason for Designation	Distance from Gravesend Site
Canal and Grazing Marsh, Higham LWS (60.57ha)	Managed and unmanaged grazing marsh, salt marsh, reedbed and a long stretch of the Thames and Medway Canal Site supports good populations of reptiles, bats as well as bird and invertebrate assemblages.	Within the Site

Site (size ha)	Reason for Designation	Distance from Gravesend Site
A226 Gravesend Road. Chalk Roadside Nature Reserve (RNR) (Size data not provided)	Area of roadside verge designated by Kent Wildlife Trust.	1.6km to the south
GR01 Nr Queens Farm (Size data not provided)	Area of roadside verge designated by Kent Wildlife Trust.	1.6km to the south east
Tilbury Power Station Local Wildlife Site (LWS) (48.8ha)	A large, multi-site designation that encompasses a number of previously designated sites including Lytag Brownfield, Tilbury Centre and Goshems Farm. The sites are of importance for their coastal grazing marshes, post-industrial sites and hotspots for reptile diversity. The habitat also supports key invertebrate communities.	1.4km to the north (north of the Thames)
Tilbury Marshes LWS (40.5ha)	Relict grazing-marsh, brackish ditches, outer moats and grasslands at Tilbury Fort. The Site supports many Nationally Scarce plant species and important invertebrate communities.	1.5km to the northeast (north of the Thames)

- 15.5.10 The sections of the Canal and Grazing Marsh, Higham LWS located outside of the boundaries of statutory designated sites are of **County** importance.
- 15.5.11 All the remaining LWS's are also of **County** importance. The Gravesend Road, Chalk RNR is of **District** importance.
- 15.5.12 Land adjacent to the eastern boundary of the Site is part of the Shorne Marshes RSPB reserve. This is a reserve not accessible to the public but managed for its nature conservation importance, including value to a range of bird species.
- 15.5.13 The Gravesend Site is located within an area identified within the 'All of a Buzz in the Thames Gateway' study by Buglife and Natural England (Ref 15-28) as of low potential for supporting notable invertebrate assemblages. The location of the new proposed Gravesend SEC is not within an Important Invertebrate Area (IIA) (Ref 15-27). However, the route of the proposed overhead line realignment and the fields to the south of the proposed SEC, are located within the Thames Estuary South IIA. This designation denotes areas Buglife consider to be nationally or internationally significant places for the conservation of invertebrates.
- 15.5.14 The Gravesend Site also falls within the Greater Thames Marshes Nature Improvement Area (NIA). The NIA seeks to protect and enhance this valuable habitat and increase numbers of endangered species and protect existing flora and fauna. In addition, it falls within Buglife's B-Lines Network, a 3km corridor within which habitat restoration and creation can be focussed to maximise gains for pollinators.
- 15.5.15 The GR01 Nr Queens Farm and GR02 A226 Gravesend Road, Chalk Roadside Nature Reserves (RNR's) are both of **District** importance.
- 15.5.16 Habitats within the Tilbury Power Station LWS to the north of the River Thames form part of the larger network of habitat to the north of the Thames that Natural England are considering as an extension to the Mucking Flats & Marshes SSSI. While the area is yet to be formally statutory designated, given the known value of the site for both invertebrates and reptiles the LWS is considered as being of up to **National** importance. Impacts on the site are considered within Volume III Chapter 7 of this ES, and therefore are not considered further in this chapter.
- 15.5.17 There is no ancient woodland within 2km of the Site.



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LEGEND

- Red Line Boundary (Above Ground)
- Site of Special Scientific Interest
- Ramsar
- Special Protection Area
- Local Wildlife Site

NOTES

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ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60677311

FIGURE TITLE

Designated Sites for Nature Conservation

FIGURE NUMBER

Figure 15.1

Habitats

Habitats Within the Site

15.5.18 The habitats within the Site are shown on Figure 15-2: Phase 1 Habitat Map.

Existing Gravesend SEC and surrounds

15.5.19 The existing Gravesend SEC is located in the north of the Site and consists of a fenced area supporting gravel and hardstanding. The SEC is surrounded by a combination of mixed scrub, tall ruderals and small areas of grassland and disturbed ground supporting ephemeral/perennial species.

15.5.20 The areas of scrub are dominated by dense hawthorn (*Crataegus monogyna*) and bramble (*Rubus fruticosus* agg) scrub, and the areas of tall ruderals include stands of creeping thistle (*Cirsium arvense*) and hemlock (*Conium maculatum*).

Pony Grazed Grassland in West of the Site

15.5.21 The three fields in the west of the Site were predominately pony grazed grassland with associated smaller areas of tall ruderals and scrub.

15.5.22 The grazed grassland areas showed greatest affinity with the NVC community MG6 *Lolium perenne* – *Cynosurus cristatus* grassland, with some species indicating previous flooding with brackish water, and some areas of bare ground around entrances/feeding areas. The sward was dominated by creeping bent (*Agrostis stolonifera*), with frequent meadow barley (*Hordeum secalinum*), perennial rye-grass (*Lolium perenne*), common couch (*Elymus repens*) and white clover (*Trifolium repens*). With occasional species including sea beet (*Beta vulgaris* subsp. *maritima*), hoary cress (*Lepidium draba*) and spear-leaved orache (*Atriplex prostrata*).

15.5.23 In small patches of slightly raised ground within these fields there are small areas of NVC community MG1a *Arrhenatherum elatius* grassland – *Festuca rubra* subcommunity grassland with cock's-foot (*Dactylis glomerata*), soft brome (*Bromus hordeaceus* ssp *hordeaceus*), hoary cress, yarrow (*Achillea millefolium*), ribwort plantain (*Plantago lanceolata*), common couch and red fescue (*Festuca rubra* agg.).

15.5.24 At the margins of the fields and scattered through the shorter grazed grassland in the two smaller southern fields are longer sward areas containing frequent false-oat grass, and locally frequent tall ruderals including common nettle (*Urtica dioica*), hemlock (*Conium maculatum*) and creeping thistle (*Cirsium arvense*). In addition, there were occasional stands of mixed scrub including hawthorn and bramble.

Tall Ruderal dominated strip on Western Boundary

15.5.25 An area adjoining the northwest boundary of the Gravesend Site was dominated by a dense stand of hemlock (*Conium maculatum*) with occasional other ruderal species. The adjoining ditch is dominated by common reed (*Phragmites australis*).

Veteran Tree

15.5.26 Within the bank dominated by hemlock is a small mature elder (*Sambucus nigra*) (T139 in the Arboricultural Impact Assessment) of approximately 6m in height that has been identified within the Arboricultural Impact Assessment as a veteran tree due to the presence of a number of veteran features including extensive stem decay, cavities and crown dieback.

15.5.27 Veteran trees are an irreplaceable habitat, and are known to often support significant invertebrate and fungal populations. The tree has been retained in the design and therefore has not been subject to further surveys. On a precautionary basis it is considered as being of up to National importance.

Fields to the south of Milton Rifle Range

15.5.28 Fields to the south of the Milton Rifle Range support unmanaged species poor grassland. The easternmost section which includes the existing pylon and immediate surrounds showed the closest

affinity to the NVC community MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* subcommunity. This area comprises species poor tall unmanaged grassland with false oat-grass common couch, common nettle and cleavers (*Galium aparine*).

- 15.5.29 The MG1b habitat transitions to the north to NVC community S4 *Phragmites australis* swamp and reedbeds located adjacent to the drain which was dominated by common reed (*Phragmites australis*).
- 15.5.30 Moving to the west the MG1b habitat transitions into areas dominated by tall ruderals, in particular a raised bund in the northwest of the field which supports creeping thistle (*Cirsium arvense*) and hemlock (*Conium maculatum*), in close association with smaller of mixed scrub including hawthorn and bramble.

Ditches

- 15.5.1 Brackish water filled drains are present throughout the Gravesend Site. These are fringed with common reed, bulrush (*Typha latifolia*) sea club-rush (*Bolboschoenus maritimus*), sea aster (*Aster tripolium*) and celery leaved buttercup (*Ranunculus sceleratus*). No submerged or floating aquatic macrophytes were observed. The north-south drain separating the pony grazed fields in the west of the Gravesend Site from the adjoining Milton Rifle Range is in places fringed by stands of scrub dominated by bramble and hawthorn.

Milton Rifle Range

- 15.5.2 Within the Rifle Range the habitat varies between areas of short sward species poor amenity grassland managed for the shooting operation, and surrounding areas of largely unmanaged grassland containing frequent false oat-grass (*Arrhenatherum elatius*) and cock's-foot (*Dactylis glomerata*) and mugwort (*Artemisia vulgaris*) and common ragwort (*Senecio jacobea*) with occasional yarrow (*Achillea millefolium*), Canadian fleabane (*Erigeron canadensis*), sea beet (*Beta vulgaris*), and broadleaved dock (*Rumex obtusifolius*).

Habitat Evaluation

With the exception of the existing Gravesend SEC, the majority of the Site is identified within Natural England's Priority Habitat Inventory (Ref 15-40) as Coastal and Floodplain Grazing Marsh. Grazing marsh is defined as '*periodically inundated pasture, or meadow with ditches which maintain the water levels, containing standing brackish or fresh water. The ditches are especially rich in plants and invertebrates. Almost all areas are grazed and some are cut for hay or silage*' (Ref 15-41 UK Biodiversity Action Plan (2008) Priority Habitat Descriptions – Coastal and Floodplain Grazing Marsh. Available at <https://data.jncc.gov.uk/data/82b0af67-d19a-4a89-b987-9dba73be1272/UKBAP-BAPHabitats-07-CoastFloodGrazingMarsh.pdf>

- 15.5.3 . As such it is a habitat type defined in part by the presence of suitable hydrological and topographical conditions rather than strictly the botanical communities present (Ref 15-42)Ref 15-42.
- 15.5.4 The pony grazed grasslands in the west of the Site currently have the greatest diversity in both species composition and structurally, based on the marginal areas of longer grassland, tall ruderal and scrub. The areas within the Rifle Range and directly to the south of it are generally species poor and less structurally diverse.
- 15.5.5 Overall the habitats within the Gravesend Site form a mosaic which are of greater value than the individual elements. Based on this and its status as Habitat of Principal Importance the habitats at the Site are evaluated as being of **County** importance.



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	Ditch
	A2.1 - Scrub - dense/continuous
	A2.2 - Scrub - scattered
	B2.1 - Neutral grassland - unimproved
	B2.2 - Neutral grassland - semi-improved
	B4 - Improved grassland
	B5 - Marsh/marshy grassland
	C3.1 - Other tall herb and fern - ruderal
	C3.2 - Other tall herb and fern - non ruderal
	F1 - Swamp
	G1 - Standing water
	J1.2 - Cultivated/disturbed land - amenity grassland
	Hardstanding

FIGURE NUMBER

Figure 15.2

Habitats Adjoining the Site

- 15.5.7 The hardstanding access road (Wharf Road) is adjoined to the north by a ditch which had been colonised by thick clumps of southern reed and reed mace in some sections, and in the most westernmost section had Japanese knotweed (*Reynoutria japonica*) growing within the channel. The eastern end of the ditch was overshadowed by a stand of white willows (*Salix alba*). Throughout the ditch is in close association with areas of tall ruderal and species poor semi-improved grassland habitat.
- 15.5.8 The ditch to the north of Wharf Road is also adjoined by a line of trees with species varying along its length but including sycamore (*Acer pseudoplatanus*), osier (*Salix viminalis*), hawthorn, silver birch (*Betula pendula*) and blackthorn (*Prunus spinosa*), and tamarisk (*Tamarix gallica*). Habitats to the north of the road are evaluated as being of **Site** Importance.
- 15.5.9 To the South of Wharf Road the Gravesend Site adjoins the Thames and Medway Canal which is fringed by swamp habitat dominated by reed with occasional reedmace (*Typha latifolia*). These represent areas of Habitat of Principal Importance and are **County** value.
- 15.5.10 The River Thames Estuary supports a range of protected and notable habitats as documented in ES Volume VI - Appendix 7.10, including saltmarsh, and intertidal mudflats and sediments. The Estuary is therefore considered to be of **Regional** importance. However, as detailed in ES Volume VI -Appendix 7.12 no construction works are required within marine habitats and the tunnel will be bored approximately 30m below the surface so no indirect impacts are expected. Marine habitats are therefore scoped out of further assessment.

Species

- 15.5.11 Table 15-9 presents a summary of desk study and field survey results for protected and/or notable species at the Tilbury Site, alongside an evaluation of their importance. Full descriptions of the baseline conditions are provided in ES Volume VI Appendices 7.1 to 7.9 of this ES.

Table 15-9: Summary of baseline details for legally protected and notable species

Species/Specie Group and Relevant Technical Appendix	Baseline Conditions	Ecological Features	Importance	Rationale
Bats (Volume VI – Appendix 7.5)	The Gravesend Site was found to support no active bat roosts within or adjoining the Site. However, Tree 139 located within the Gravesend Site retains high suitability to support a roost. Walked activity transects identified regular usage of the Site by common pipistrelle (<i>Pipistrellus pipistrellus</i>), soprano pipistrelle (<i>Pipistrellus pygmaeus</i>) with occasional other species including noctule (<i>Nyctalus noctula</i>), Leisler's bat (<i>Nyctalus leisleri</i>). Static bat detector surveys identified registrations consisting predominately consisted of common pipistrelle and soprano pipistrelle with occasional noctule, Nathusius's pipistrelle (<i>Pipistrellus nathusii</i>), and Myotis sp³.	Bat assemblage utilising the Gravesend Site and surrounding habitats	District	The Gravesend Site provides limited roosting opportunity and activity consists predominately of common species with occasional use by a range of other bats with more limited distribution.
Intertidal Birds (Volume VI – Appendix 7.2)	The Lower Thames Crossing undertook intertidal bird vantage point surveys between 2017 and 2019 approximately 400m east of the Gravesend Site, and around 500m east of the Tilbury Site. Although not overlapping the Gravesend and Tilbury sites the data illustrates the importance of the intertidal areas to the east of the Site, with high overall peak counts in particular of avocet (<i>Recurvirostra avosetta</i>), black-tailed godwit (<i>Limosa limosa</i>), dunlin (<i>Calidris alpina</i>), lapwing (<i>Vanellus vanellus</i>) and redshank (<i>Tringa totanus</i>). The intertidal surveys undertaken between October 2022 and September 2023 at both sites identified a total of 30 waterbird species using the intertidal survey area (28 at the Tilbury Site and 23 at Gravesend Site). In addition, marsh harrier (<i>Circus aeruginosus</i>) was recorded flying over the Tilbury Site intertidal survey area. The 2022/2023 surveys identified notable peak counts of the following SPA/Ramsar species: gadwall (17 Low Tide = LT); lapwing (3 LT); grey plover (<i>Pluvialis squatarola</i>) (1 LT); ringed	Intertidal wetland bird assemblage utilising Gravesend Site and adjoining habitat	District	No waterbird species recorded within the Survey Area in 2022/2023 represented 1% or more of the international or national population estimates used for assessing populations. One species, gadwall recorded within the Gravesend Site Survey Area in 2022/2023 had a peak count exceeding 1% of the Thames Estuary and Marshes Ramsar or SPA populations. Gadwall was recorded twice and the peak count exceeded the 1% threshold on two occasions, with peaks of 17 birds in December 2022 and 13 in January 2023 Species recorded in 2023 included: - 1 no. Annex I species: Mediterranean gull;

³ *Myotis* bat calls can be very similar; therefore, have been classified as *Myotis* species unless call characteristics or observations of the bat and behaviour have been recorded to enable species level identification.
December 2023

Species/Specie Group and Relevant Technical Appendix	Baseline Conditions	Ecological Features	Importance	Rationale
	plover (2 LT); whimbrel (<i>Numenius phaeopus</i>) (1 LT); dunlin (36 HT); redshank (1 LT); dunlin (36 HT). At Gravesend other notable peak counts were as follows: black headed gull (<i>Chroicocephalus ridibundus</i>) (142 High Tide = HT); Unidentified tern (65 HT). Other species recorded with low peak counts included); Mediterranean gull (<i>Numenius phaeopus</i>) (5 LT).			- 3 no. SPA 4.2 species: gadwall; lapwing; whimbrel; - 4 no. SPA/Ramsar/SSSI species: grey plover, ringed plover; dunlin; redshank - 4 no. Birds of Conservation Concern (BoCC) red list species: lapwing; ringed plover; whimbrel; curlew; - 12 no BoCC amber list species: wigeon; mallard; oystercatcher; grey plover; snipe; common sandpiper; green sandpiper; black-headed gull; Mediterranean gull; common gull great black backed gull; teal. Based on the range of species, but relatively low numbers recorded, the Site is considered to be of up to District importance.

Species/Specie Group and Relevant Technical Appendix	Baseline Conditions	Ecological Features	Importance	Rationale
Non-breeding Birds (Volume VI – Appendix 7.2)	Total of 28 species recorded during non-breeding bird surveys from October 2022 to Marchs 2023 (22 at Tilbury and 17 at Gravesend). Protected/notable species recorded were: woodpigeon, kestrel, rook, wren, starling, dunnock, chaffinch and reed bunting.	Non-breeding birds population at and adjoining Gravesend Site	Local	No species listed on Annex 1 of the EU Birds Directive were recorded at the Gravesend Site; a single Species of Principal Importance reed bunting ; and three species on the BoCC amber list, kestrel , rook and reed bunting. Three species are included on the BoCC Amber List. Species numbers were very low and no species were recorded at numbers of national (i.e. 1% or more of the UK non-breeding population) or county significance. Whilst some of the species of conservation importance that were recorded within the Gravesend Site are declining in the UK, most remain widespread. With the relatively low numbers of species recorded, using professional judgement, these are evaluated as being of no more than Local importance.

Species/Specie Group and Relevant Technical Appendix	Baseline Conditions	Ecological Features	Importance	Rationale
Breeding Birds (Volume VI – Appendix 7.2)	Surveys undertaken in support of the Lower Thames Crossing between 2017 and 2019 included survey of the larger Filborough Marsh and Firing Range area, including the land adjoining the eastern boundary of the Gravesend Site, and the areas immediately to the south within the Thames Estuary and Marshes SSSI and Ramsar. Territories of Cetti's warbler were confirmed within the Gravesend Site and to the South of the Gravesend Site within reedbeds adjoining the canal. In addition, marsh harrier was found to be foraging and breeding within Shorne Marshes RSPB reserve in an area approximately 690m to the west of the proposed Gravesend SEC. Total of 32 species were recorded in the Gravesend Site survey area during 2023 surveys, and of these 22 species were assumed to be breeding (derived from confirmed and probable/possible territories). Protected/notable species assumed to hold territories were moorhen (1 probable); kestrel (1 confirmed); carrion crow (1 possible); skylark (1 possible); Cetti's warbler (1 confirmed); whitethroat (1-2 confirmed); wren (1-2 confirmed), song thrush (1 possible); linnet (confirmed 2-3); goldfinch (confirmed 2-3). Other widespread/common species where territories were present included: woodpigeon, collared dove, blue tit, great tit, long-tailed tit, chiffchaff, reed warbler, blackcap, blackbird and robin.	Breeding birds population at/adjoining Gravesend Site	Local	One species (Cetti's Warbler) recorded is listed on Schedule 1 of the Wildlife and Countryside Act, 1981 (as amended). Four species (Skylark, Song Thrush, Dunnock and Linnet) recorded are listed as a Priority Species in the UK. Three species (Skylark, Greenfinch and Linnet) are included on the BoCC Red List. Seven species (Moorhen, Woodpigeon, Kestrel, Whitethroat, Wren, Song Thrush and Dunnock) are included on the BoCC Amber List. No species are present within the Survey Area in numbers of national significance, i.e., 1% or more of the UK population. Country criteria are not available but based on the species recorded being relatively widespread and low number of territories none are likely to be of County importance. The valuation of local importance is based on a precautionary approach, taking into account that some individual species may have been missed during early part of the breeding season.

Species/Specie Group and Relevant Technical Appendix	Baseline Conditions	Ecological Features	Importance	Rationale
Great crested newt (Volume VI – Appendix 7.3)	No waterbodies within 500m of the Gravesend Site were found to support GCN during surveys in support of the Lower Thames Crossing (Ref 15-25). Two waterbodies were identified for survey (WB4 and WB5 – see Volume VI – Appendix 7.3). Both are brackish water ditches/drains and eDNA survey was undertaken on 9 May 2023. WB4 was sampled and analysis returned a negative result. WB5 was inaccessible to survey due to the steepness of the banks. However, WB4 and WB5 are interconnected, and both contain brackish water which is generally unsuitable to support GCN. They are assumed to be absent from the Gravesend Site.	WB4 and WB5	Negligible	Amphibians, including great crested newts respire partially through their damp skin through osmosis, and high levels of salinity reduce the efficiency of respiration, with some chemicals found within saline waters suspected to be toxic to amphibians, especially in high concentrations⁴. Great crested newt are assumed to be absent and are not considered further in this assessment.
Reptiles (Volume VI – Appendix 7.7)	The 2023 surveys confirmed presence of three of the four widespread reptile species with the following peak adult counts: slow worm (5), common lizard (1) and grass snake (1 sighting during other surveys). Several factors are likely to have reduced peak counts during the 2023 visits including the following: - High temperatures during 4 of the 7 survey visits; and - 20 refugia initially deployed within fields in the west of the Gravesend Site were inaccessible due to pony grazing of these areas during the subsequent survey visits. As the most frequently recorded reptile at the Gravesend Site it is likely that slow worm may have been most impacted by the above constraints. On a precautionary basis for the purpose of assessment the Gravesend Site is assumed to support up to a 'Good' population of slow worm. Given the peaks counts of grass snake (1 adult) and common lizard (1 adult) it is considered unlikely that the peak count would	Reptile assemblage utilising Gravesend Site and adjacent habitats	District	The presence of three confirmed species (common lizard, slow worm and grass snake) and an aggregated score of four (three low populations and one moderate population) for the populations on the Gravesend Site. These two factors are indicators of a key reptile site according to Froglife's Advice Sheet 10 (Ref 15-37). and as such Gravesend would be considered an 'important' Site in relation to reptile biodiversity and population. Its reptile assemblage is considered to be of District value.

⁴ Duff J.P., Colville K and Foster J (2011) Mass mortality of great crested newts (*Triturus cristatus*) on ground treated with road salt, Veterinary Record 2011 168: 282
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Species/Specie Group and Relevant Technical Appendix	Baseline Conditions	Ecological Features	Importance	Rationale
	have increased sufficiently to alter the low population status categories indicated by the 2023 surveys.			
Invertebrates (Volume VI – Appendix 7.8)	Desk study searches did not identify any recent invertebrate survey work for the Gravesend Site. However, the wider surrounding areas of floodplain grazing marsh yielded records for a range of Species of Principal Importance identifying the potential value of the Gravesend Site. Surveys undertaken in 2023 identified a total of 307 species of which 27 are regarded as ‘key species’⁵. This is a higher than average total species list for a three visit survey, and suggests that the Gravesend survey area is a diverse site for invertebrates. A total of 4 Species of Principal Importance were recorded as follows: brown-banded carder-bee (<i>Bombus humilis</i>); shrill carder-bee (<i>Bombus sylvarum</i>); hornet robberfly (<i>Asilus crabroniformis</i>) and small heath butterfly (<i>Coenonympha pamphilus</i>). In addition, phoenix fly (<i>Dorycera graminum</i>) is considered to be very likely to occur, and Wall butterfly (<i>Lasiommata megera</i>) is considered possible to occur. The most important feature of the Gravesend survey area is that it provides habitat for hornet Robberfly, namely grazed rough pasture with dung beetles for it to prey upon. Because of its strong association with grazing livestock, hornet robberfly is a species that must have an ability to move over medium distances in order to follow the changing numbers and distribution of livestock. Hornet robberfly may be regarded as having a meta-population across the north Kent grazing marshes, and the Gravesend survey area may be regarded as a site which contributes to supporting that metapopulation.	Invertebrate assemblage utilising Gravesend Site and adjoining habitats	County	27 Key Species were recorded from the Gravesend survey area. However, of the 27 Key Species, a quarter (7 species) are here regarded as having out of date and inaccurate conservation statuses. A total of 4 accurately rated rare key species were found. A further two SPI were not recorded but are considered likely to occur. The Gravesend Site and adjacent areas are considered to support an invertebrate assemblage of County importance. The habitats in the west of the Gravesend Site support a diverse structure allowing these are to support a wide range of species. Areas of unmanaged grassland within and to the south of the Milton rifle range are of lower invertebrate importance.

⁵ Defined as Red Data Book and Nationally Scarce species from British Red Data Book for insects Version 1; Threatened, Near Threatened and Data Deficient species from version 2, and Nationally Rare or Nationally Scarce species from version 3.

Species/Specie Group and Relevant Technical Appendix	Baseline Conditions	Ecological Features	Importance	Rationale
Badger (Volume VI – Appendix 7.6)	No badger setts were found within the Gravesend Site. However, the habitat is potentially suitable to support setts. Badger are assumed to currently be absent from the Gravesend Site.	Badger population at Gravesend	Negligible	Badgers are widespread in Kent, and while present in the wider local area do not appear to utilise the Gravesend Site. Badger is consequently only considered further in this ES chapter with respect to legislative compliance.

Species/Specie Group and Relevant Technical Appendix	Baseline Conditions	Ecological Features	Importance	Rationale
Water Vole (Volume VI – Appendix 7.4)	The data search from the Kent and Medway Biological Records Centre identified a range of water vole records associated with the wider Gravesend and Higham Marshes area. Surveys in support of the Lower Thames Crossing (Ref 15-25) found water vole to be present within WB5 directly to the east of the existing substation, and on the southern boundary of the Milton rifle range. Based on the density of field signs these waterbodies were considered to support a medium water vole population. The ditches on the western boundary of the Gravesend Site, adjoining the Metropolitan Police Training Centre and extending into the centre of the Gravesend Site also contained water vole, with a low population assumed. The Kent and Medway Canal which is located approximately 15m to the south of the Site was also found to support a low population of water vole. No evidence of water vole was recorded at Gravesend during the 2023 surveys. Habitat present was considered suitable, and within some sections (in particular WB5) the steepness of banks and density of common reed severely restricted access and may have obscured field signs. As a consequence, the presence of positive evidence could not be ruled out, and on a precautionary basis therefore use of the ditches within the Site, continues to be assumed for assessment purposes. There are no recent records of otter activity in the vicinity of the Gravesend Site, and no evidence indicating presence of otter was identified during the 2023 surveys.	Water vole populations utilising WB4 and WB5	District	Water vole has undergone a massive decline in numbers at a UK level over the last 50 years. They are a Habitat of Principal Importance and the wider population on the Gravesend marshes is known to of regional importance.
Otter (Volume VI – Appendix 7.4)	There are no recent records of otter activity in the vicinity of the Gravesend Site.	None	Negligible	There are no recent records of otter activity, and they are assumed absent from the habitats within the Gravesend Site.

Species/Specie Group and Relevant Technical Appendix	Baseline Conditions	Ecological Features	Importance	Rationale
Protected and/or Notable Plants (Volume VI – Appendix 7.9)	The desk study identified no previous records of protected and/or notable plants from within or adjacent to the Gravesend Site. The 2023 surveys identified a stand of divided sedge (<i>Carex divisa</i>) within the Milton rifle range. However, it is located outside of the boundary of the Gravesend Site and will not be directly impacted.	Population of divided sedge at Milton rifle range	District	Threat status and rarity of the species recorded in the area as follows: Divided sedge – Species of Principal Importance and Nationally Scarce.
Invasive Non-Native Plant Species	Japanese knotweed (<i>Reynoutria japonica</i>) is present to the north of Wharf Road adjoining the Site. It is listed under Schedule 9 of the Wildlife and Countryside Act (1981 as amended) making it an offence to plant or cause its spread in the wild.	Japanese knotweed at Wharf Road	N/A	Legal constraint only. No works currently expected in this area beyond use of existing access road.
Marine Mammals	Thames and its banks and suitable for cetaceans and pinnipeds. The location of the proposed activities, had between 1 and 5 sightings per km ² during the 10-year period between 2004 and 2014.	Marine Mammal population utilising Thames Estuary	Regional	The wider Thames Estuary represent an important site for cetaceans and pinnipeds in a regional context. However, no works are proposed in the channel and the project will utilise existing jetty/port berths and established shipping lane to remove the total of approximately 80 barges of spoil. No impacts are expected and therefore receptor not considered further in the assessment.

Key Receptors

15.5.12 The key ecological receptors (i.e. Important Ecological Features) at Gravesend are outlined in Table 15-10, along with the rationale.

Table 15-10: Summary of Important Ecological Features

Ecological Feature(s)	Importance	Considered further in this assessment (i.e.. an IEF relevant to the Proposed Development)
Thames Estuary & Marshes SPA and Ramsar; Medway Estuary and Marshes SPA	International	Yes
Mucking Flats and Marshes SSSI	National	Yes
South Thames Estuary and Marshes SSSI	National	Yes
North Downs Woodlands SAC	International	No – No functional linkage and 8.3km from Gravesend Site
Canal and Grazing Marsh, Higham LWS	County	Yes
A226 Gravesend Road. Chalk Roadside Nature Reserve (RNR) (Size data not provided)	District	Yes
GR01 Nr Queens Farm (Size data not provided)	District	Yes
Tilbury Power Station Local Wildlife Site LWS;	Up to National	No – North of the Thames and addressed in Volume II – Chapter 7.
Tilbury Marshes LWS	County	No – North of the Thames and addressed in Volume II – Chapter 7.
Habitat mosaic within the Gravesend Site	County	Yes
Habitat adjoining the Gravesend Site – Habitats adjoining access road to the north of Wharf Road	Site	No
Habitat adjoining the Gravesend Site – Thames and Medway Canal	County	Yes
Veteran elder tree (T139)	Up to National	Yes
River Thames Estuary	Regional	No – no works in channel.
Bat Assemblage at Gravesend	District	Yes
Intertidal wetland bird assemblage at Gravesend Site and adjacent habitat	District	Yes
Non-breeding birds assemblage at Gravesend Site and adjacent habitat	Local	Yes
Breeding bird assemblage at Gravesend Site and adjacent habitat	Local	Yes
Great crested newt at WB4 and WB5	Negligible	No
Reptile assemblage utilising Gravesend Site and adjacent habitats	District	Yes
Invertebrate assemblage utilising Gravesend Site and adjacent habitats	County	Yes
Badger population at Gravesend Site	Negligible	No
Water vole populations	District	Yes

Ecological Feature(s)	Importance	Considered further in this assessment (i.e.. an IEF relevant to the Proposed Development)
Otter populations at Gravesend Site	Negligible	No
Population of divided sedge at Milton Rifle Range	District	No – outside of the Site and will not be impacted
Marine mammals	Regional	No – no works in the channel and use of established shipping lanes to transport spoil.

15.6 Key Parameters for Assessment

The Proposed Development

15.6.1 A detailed description of the Proposed Development is provided in ES Volume II Chapter 3: Project Description. The following aspects of the Proposed Development relevant to this chapter comprise:

- The site preparation and construction works, especially:
 - Extent of vegetation clearance for permanent works;
 - Extent of vegetation management for temporary works;
 - Shaft and SEC locations;
 - Areas for plant maintenance, site offices and compound areas;
 - Methods and routes for spoil disposal;
 - Storage areas for construction and for excavated materials;
 - Indicating phasing and duration of works;
 - Acoustic disturbance from construction activities;
 - Dust generation;
 - Water generated by the construction process and routes of disposal; and
 - Lighting during preparation and construction.
- Land uses within the operational Proposed Development in particular:
 - New headhouse and Sealing End Compound and levels of associated operational activity;
 - New access roads and utilities;
 - New drainage; and
 - Lighting.

15.7 Mitigation

Embedded Mitigation

15.7.1 The following embedded mitigation has been taken into consideration when assessing the ecological impacts of the Proposed Development:

Design of the Proposed Development

- 15.7.2 As set out within ES Volume II Chapter 2: Alternatives, the design of the Proposed Development at Gravesend has sought to minimise impacts on the Thames Estuary and Marshes SPA and Ramsar Site through siting the proposed new Gravesend Sealing End Compound (SEC) in close proximity to the existing SEC, while ensuring main works will avoid direct impacts on the SPA and Ramsar and minimise risk of disturbance impacts.
- 15.7.3 Spoil removal at the Gravesend Site will be limited to that generated by the sinking of the shaft. All spoil from the tunnelling process will be removed and disposed of at the Tilbury Site, this limiting the requirement for vehicle movements and a larger working area at Gravesend.
- 15.7.4 The land required for the Proposed Development at Gravesend includes large areas of habitat to the southeast of the proposed Gravesend SEC. The majority of this land is required on a temporary basis only to facilitate the realignment of overheads lines to link into the new facility. These works will be temporary in duration and are assumed to consist of the following:
- De-stringing (to bring existing cables to ground level) is likely to require minimal vegetation clearance. Access will be required to the existing SEC and terminal pylon to the southeast of the proposed Gravesend SEC. When cables have been lowered to ground level where they will be rolled up and removed by hand;
 - Re-alignment of existing overheads will involve upgrade works to one existing pylon to the southeast of the proposed SEC (to reinforce foundations). This will require vegetation clearance and ground disturbance within an area of approximately 0.4ha around the pylon base to enable installation of new foundations;
 - The installation of new, realigned overhead lines require rolling out the new cables through the areas of habitat that they will subsequently over-sail. This operation will be undertaken by hand to limit the disturbance of these habitats. Habitats along the alignment of the new overhead will be retained, but where necessary above ground vegetation will be sensitively strimmed back to ground level as required to avoid cables becoming tangled with the vegetation. It is likely that only a small percentage of the overall area included in the temporary working area (see Figure 15-4) will require clearance. Vegetation clearance will adhere to the PMoW for reptiles and breeding birds, and will be agreed with the supervising Ecological Clerk of Works (ECoW);
 - Following the completion of construction all areas of temporary habitat loss (including the remainder of the fields in the west of the Gravesend Site, and land around the upgraded terminal pylon) will be reinstated. Where it will not pose a constraint to grazing, the Contractor will be directed to ensure reinstatement leaving a varied topography incorporating vehicle ruts and gentle scrapes and mounds, and exposing sub-soil layers in some areas to encourage areas of less vigorous vegetation growth.
- 15.7.5 The design of the Proposed Development includes a Outline Landscape and Ecology Management Plan which incorporates the following habitat creation features :
- **350m² biodiverse brown roof:** this will be provided on the proposed Gravesend headhouse building and will utilise low nutrient substrate growing medium (where possible from the Site). As far as the final design allows the depth of substrate should vary across its extent between approximately 80mm and 150mm. A variety of substrates will also be introduced in order to maximise niches available for invertebrates (e.g. piles of sand; pebbles; and logs) in order to provide niches for a range of invertebrates. The brown roof will be sown at a low density (approx. 2g/m²) with seed collected from the surrounding area with the aim of providing brownfield habitat of value for a range of invertebrate species. The seeding rate will intentionally be kept very low to allow an element of natural colonisation and maintain areas of bare ground;
 - **600m² of new wet scrapes:** the landscape designs includes additional wet scrapes aimed at collecting water and supporting small stands of reedbed to complement the existing ditches

network at the Gravesend Site to further enhance the range of habitats for aquatic plants and fauna;

- **0.62ha tussocky grassland:** following the completion of construction the northern field which will contain the propose Gravesend SEC will be reinstated with the aim of creating tussocky grassland with scattered scrub of value to both invertebrates, birds and bats. As the remaining areas of habitat north of the east-west running ditch are unlikely to be practical for ongoing grazing they will target creation of a tussocky sward with affinity to the NVC community MG5 *Cynosaurus cristatus-Centaurea nigra* grassland. The area will be sown with Emorsgate EM10 tussock mixture (or similar approved by the supervising ecologist) at a rate of 4g/m²;
- **1.45ha grazed pasture:** the two smaller fields in the west of the Gravesend Site will be reinstated to grazed pasture following the completion of construction. In order to maximise the value for invertebrates the following measures will be employed:
 - Fields will incorporate an undulating landform with a series of shallow scrapes to create seasonally inundated ephemeral pools. Scrapes will be seeded with Emorsgate EM8 meadow mixture at 4g/m²;
 - Approximately 15% of the total area of the field (split into smaller linear strips within the field) will be left to naturally revegetate, in order to promote natural recolonisation by species present in adjoining retained habitat. These areas will aim to provide initially areas of bare ground, and in due course provide areas of tall ruderals that will enhance structure and mimic the mosaic habitats currently present;
 - The remainder of the fields will be sown with a seed mix with the target of creating grassland with an affinity to NVC community MG6 *Lolium perenne-Cynosaurus cristatus* grassland. The area will be sown with Germinal RE9 Farmland mixture (MG6 grassland) or similar;
 - Planting of scattered hawthorn scrub, and
 - On establishment of the sward pony grazing will be reinstated. No ivermectin will be used.
- **215m boundary planting on southern margin:** will consist of linear planting of hawthorn and blackthorn.

15.7.6 An appropriate monitoring programme for during (where relevant) and post-construction will be formalised and agreed as part of the planning application and included within the detailed LEMP. At the Gravesend Site this is likely to include monitoring for invertebrate populations and reptiles.

Construction Environmental Management Plan (CEMP)

15.7.7 The Outline Construction Environmental Management Plan (OCEMP) (ES Volume VI - Appendix 3.1) summarises the types of mitigation measures that will be considered to mitigate against the effects of the Proposed Development.

15.7.8 The following general environmental management controls will be secured as part of the CEMP, and are considered relevant to the assessment:

- Provide all employees, site operatives and personnel with pollution awareness induction training and regular toolbox talks covering environmental issues;
- Closed board fencing would be installed around the construction compounds;
- A set of generic best practice working methods referred to as Best Practicable Means (BPM) would be employed during the construction phase. Typical BPM are outlined below, which would be refined as individual commitments in the Final CEMP:
 - Unnecessary revving of engines will be avoided, and equipment will be switched off when not in use;

- Appropriate routing of construction traffic on public roads and along access tracks;
- Drop heights of materials will be minimised;
- Plant and vehicles will be sequentially started up rather than all together;
- Plant will always be used in accordance with manufacturers' instructions. Care will be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading will also be carried out away from such areas; and
- Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturer's specifications.
- implement the range of air quality measures set out in the OCEMP designed to ensure dust suppression during construction;
- Site clearance will be kept to a minimum and there will be a 5 m buffer around all water feature. (e.g., using temporary exclusion fencing, fabric silt fences, straw bales, maintaining vegetation etc.) other than at crossings or where there are specific tasks that need to be undertaken close to a water features;
- Appropriate separate storage of topsoil/subsoil and materials, and at least 20 m from water Features on flat ground;
- The implementation of a temporary drainage system and other measures to manage pollution risk during construction (e.g., fabric silt fences, lagoons, bunds, straw bales, sandbags, lamella clarifiers or other proprietary measures as may be required) etc;
- If discharging water to a nearby watercourse, the rate of discharge will need to be agreed with the relevant authority to ensure that there is no unacceptable increase in flood risk or risk of scour. Any discharge will need to be undertaken with the agreement of the relevant statutory regulator and will need to comply with the pollution prevention requirements set out in the final CEMP;
- Lighting – construction lighting will be minimised, and where required efforts made to direct lights downwards and away from sensitive receptors and minimise light spill into adjacent areas; ensuring that lighting is turned off when not required;
 - The use of lighting will be minimised to that required for safe site operations and security;
 - Lighting will utilise directional fittings to minimise outward light spill and glare (e.g. via the use of light hoods/cowls which direct light below the horizontal plane, preferably at an angle greater than 20° from horizontal); and
 - Lighting will be directed towards the middle of the Site rather than towards the boundaries.

15.7.9 Veteran tree T139 will be retained and protected from adverse impacts throughout construction in accordance with the tree protection measures presented in the Arboricultural Impact Assessment Appendix E.

15.7.10 In addition, the OCEMP includes the following ecology specific embedded measures that will be secured:

- –The Ecological Clerk of Works (ECOW) will complete a walkover pre-construction to reconfirm the ecological baseline conditions and to identify any new ecological risks;
- Prior to the commencement of site clearance a precautionary method of works (PMoW) to cover pre-construction site clearance works will be developed and implemented. This will include consideration of the following:
 - **Reptiles** – slow worm, common lizard and grass snake are known to occur at Gravesend. Phased vegetation clearance to displace reptiles into areas of suitable adjacent habitat, alongside hand searching by an ecologist/supervised destructive

clearance will be required in areas of suitable reptile habitat. Clearance works should be undertaken during the period March to October inclusive under suitable weather conditions. Ideally clearance works will target March, September and October in those areas of the Site with potential to support nesting birds.

- **Birds** – Vegetation clearance should wherever possible (including consideration of other species constraints) be targeted to be undertaken during the period September to February inclusive.
- **Bats** - Where trees with high or moderate suitability to support bats are retained, no works should be undertaken within 10m of the tree.
 - If works are required within 10m of the tree this will need to be conducted over winter (November to March, weather-dependent) outside of the active bat season, when bats would not normally be present in the type of roost that the trees are suitable to support (i.e. not hibernation roosts) to avoid any disturbance impacts. If works are required within 10m of tree that have the moderate or high suitability to support roosting bats during the active season (April to October) measures should be undertaken to avoid disturbance of bats potentially present, such as avoiding directional lighting of the tree and taking measures to mitigate the potential impact of noise and vibration, for example by use of hand tools where possible.
 - Where trees are to be removed that are suitable to support roosting bats, but no roost was identified during emergence surveys, a precautionary method of felling under the supervision of a suitably qualified ecologist who holds at least a Natural England WML-CL18 (Bat Survey Level 2) will be implemented to avoid potential impacts on roosting bats.
- **Badgers** – No setts have been identified at Gravesend. However, the Site and a surrounding 30m buffer should be checked for presence of new setts by an ecologist prior to and during site clearance works.
- **Water vole** – are known to utilise the ditches within and adjacent to the Gravesend Site. Where necessary habitat manipulation will be undertaken in advance of the works to displace water vole from a 5m section of bank to allow a new headwall to be installed. A suitable section of ditch not supporting burrows will be identified by a water vole holder of a CL31 licence to displace water vole.
- **Protected plant species** – the ECOW will undertake a search of all areas to be disturbed during works for notable rare/plant species and where found their locations will be clearly demarked to enable them to be avoided during works.

The draft PMoW will be shared with key consultees such as the planning authorities, RSPB, Buglife and Natural England for their comment prior to being implemented.

- The main construction areas should be encircled with close boarded noise fencing to minimise the risk of disturbance of adjoining habitats suitable to support a range of notable nesting birds. It is expected the layout and design of fencing will require local authority approval via a planning condition.
- A 5m width buffer of semi-natural habitat will be retained adjoining all ditches during construction. No works will be permitted within this buffer zone and the boundary will be marked by fencing to prevent incursions into this zone. The design of the scheme will ensure no degradation in the quality of existing habitats.
- An invasive non-native species management plan will be drafted and implemented to include safe means of removal and disposal of any areas of Japanese knotweed impacted by the Proposed Development.

- To ensure compliance with relevant wildlife legislation, pre-construction surveys to check for the presence of invasive non-native species will be undertaken prior to the commencement of vegetation clearance works.
- The Contractor will provide a Biodiverse Brown Roof for the headhouse buildings. The Contractor is to follow best practice guide⁶ provided by invertebrate charity, Buglife, on the specific specification of the roof.

Operational Embedded Measures

15.7.11 Lighting during operation will be managed to ensure it is avoided wherever possible, and where required sensitive design ensures that spillage into adjacent habitats is minimised. Lighting design will be undertaken in accordance with the Bat Conservation Trust and Institute of Lighting Engineer's Guidance Note 08/23 (Ref 15-42).

15.8 Potential Impacts

Introduction

15.8.1 This section identifies that prior to mitigation the following potential impacts (positive and negative) on IEF's could arise as a consequence of the construction and operation of the Proposed Development at the Gravesend Site.

Potential impacts during construction

- **Habitat loss/gain** – a permanent loss or gain of habitat as a result of the Proposed Development;
- **Habitat degradation** – direct or indirect impacts resulting in the reduction in the condition of retained habitats within or adjoining the Proposed Development, and its suitability for some or all of the species it supports.;
- **Species mortality** – direct impacts on species populations due to potential for killing/injury during site clearance operations. For example, site clearance activities;
- **Species disturbance/displacement** – indirect impacts resulting from a change in normal conditions (light, noise, vibration, human activity) that result in individuals or populations of species changing behaviour or range;
- **Fragmentation/connectivity of populations or habitats** – indirect impacts by dividing or enhancing connectivity between a habitat, group of related habitats, site or ecological network, or the creation of partial or complete barriers to the movement of species, with a consequent impairment of ecological function;
- **Introduction/spread of invasive species** - the movement of personnel, equipment and plant machinery, potentially facilitates the introduction of invasive species.

Potential Operational Effects

15.8.2 The following additional operational impacts and associated effects may occur:

- **Habitat degradation/disturbance** – potential for indirect impacts associated with operational lighting which may reduce the suitability of adjoining habitats for bat and bird populations. In addition, permanent increases in human activity associated with ongoing operation of the headhouses and SECs could reduce the suitability of adjacent habitat for use by nesting and foraging birds.

⁶ https://cdn.buglife.org.uk/2019/07/Creating-Green-Roofs-for-Invertebrates_Best-practice-guidance.pdf

15.9 Assessment of Effects

- 15.9.1 The following assessment of ecological effects has been undertaken assuming the implementation of the embedded mitigation measures set out Section 15.8, and included within Figure 15-3.

Construction Phase

Designated Sites

Thames Estuary and Marshes SPA and Ramsar/Mucking Flats and Marshes SSSI

- 15.9.2 Details of the qualifying features and conservation objectives for the Thames Estuary and Marshes SPA and Ramsar site (also designated as SSSI) are provided in ES Volume VI – Appendix 7.10. The results of noise modelling undertaken in support of the HRA are provided in Report to Inform Habitat Regulations Assessment Test of Likely Significant Effects.
- 15.9.3 Baseline surveys undertaken in support of the Proposed Development in 2022/2023 identified six species within the survey area at Tilbury exceeding 1% of the Thames Estuary and Marshes SPA or Ramsar populations, namely gadwall; little egret; avocet; black-tailed godwit; dunlin and redshank. Only one species recorded at Gravesend (gadwall) exceeded the 1% threshold. In the context of the wider Thames Estuary, the Gravesend Site Survey Area is only infrequently by these species and in low numbers.
- 15.9.4 Due to the particular focus on the intertidal zone flagged by Natural England in early discussions (as potential supporting habitat for the species for which the SPA/Ramsar is designated), baseline noise measurements for the crest of the beach (the path just above the mudflats) were modelled and are presented in Table 15-11. The area on both sides of the river is relatively noisy due to its industrial setting. As a result, although the LAeq⁷ noise levels are relatively low, the LAm⁸ levels are fairly high. During the daytime this includes frequent (i.e. recorded multiple times during 1hr) brief noise events averaging 73 dB at Gravesend. This indicates a very variable baseline noise environment with considerable fluctuations. At night, the average and maximum noise levels are lower as expected, being 47dB (LAeq) and 54dB (LAm) at Gravesend.
- 15.9.5 Note that the LAm is not the single loudest noise event during the 24hr recording period. It is the average of the LAm for each 5 minute recording block over the 24hr recording period. Therefore, noise levels of 70dB are frequently experienced on the foreshore (at least every 5 minutes).

Table 15-11: Baseline sound levels

Location	Day		Night	
	LAeq,T dB	LAFmax dB	LAeq,T dB	LAFmax dB
Gravesend	49	73	47	54

- 15.9.6 The construction phases of the Proposed Development are summarised in ES Volume II Chapter 3. Most works at Gravesend will be undertaken during the day. If noise levels do not exceed the baseline then they will not be audible as distinct noises. While the quality of a noise can also be relevant, the distance of the Proposed Development works from the foreshore and the nature of the existing noise environment, with considerable influence from human activity, mean that the quality of the noise created during works will not be materially different from the existing soundscape.
- 15.9.7 Comparison with the baseline levels presented in Table 15-11 shows that at Gravesend the mudflats will be subject to an average noise level due to the works of up to 50dB. This would occur during Phase 1 (Site Set Up). During the later phases the noise level at the mudflats is forecast to be lower being up to 45dB. In other words, even during the noisiest phases the construction noise levels will be within 1dB of baseline levels (these being 49dB), which would not be perceptible as a difference. Moreover, due to the presence of other sensitive nesting bird species in the general area the embedded mitigation measures provided a part of design of the Proposed Development include the

⁷ Equivalent continuous sound level

⁸ The maximum sound level reached during a measurement period

provision of closed board noise-fencing to surround the construction site. This will reduce noise levels by approximately 10dB meaning that the average noise levels experienced across the foreshore will be well below current baseline levels.

- 15.9.8 The LAmax levels at all phases at Gravesend are forecast to be well below the baseline LAmax levels, with the highest levels during use of the dumper or bulldozer. An LAmax of 50dB or below is forecast at the foreshore during this operation, which is well below the baseline LAmax of 73dB.
- 15.9.9 Based on the above, it can be concluded that birds using the mudflats adjacent to the Gravesend Site will not be disturbed by noise associated with construction works at Gravesend to a level that would translate to any measurable effect on the features for which the Thames Estuary and Marshes SPA/Ramsar site are designated.
- 15.9.10 The closest that construction works associated with the tunnel will take place to the intertidal zone at Gravesend is 120m to the south (and 640m to the west of the SPA/Ramsar site) This is also sufficiently distant that construction lighting will not perceptibly change light levels at the foreshore or SPA/Ramsar, particularly as there is a 4m high embankment between the ground level at the construction site and the ground level at the intertidal foreshore.
- 15.9.11 At the southern margin of the Site the access road and fields to be used for storage during construction are approximately 30m from Ramsar site. The main noise sources during construction at Gravesend will arise from the shaft site approximately 170m to the north of the Ramsar site. Construction activity closer to the Ramsar site will be more limited. The impact of noise and visual disturbance on areas of the Ramsar site directly to the south of the Gravesend site are likely to be moderated by the proximity of these areas to the existing HS1 rail line, which is located between the Gravesend Site and the Ramsar and acts as a significant source of noise and visual disturbance. Within this context noise from the Proposed Development is unlikely to increase the peak noise levels within the Ramsar and based on the existing levels of disturbance any birds utilising those areas closest to the Gravesend Site are likely to be already to be habituated to high levels of noise and visual disturbance.
- 15.9.12 Construction lighting will be managed in accordance with the CEMP controls and both the proposed Gravesend SEC and the main car park and offices during construction are located more than 100m from the areas of foreshore adjoining the Site, and the areas of Ramsar site to the south. This is sufficiently distant that with the assumed CEMP controls in place construction lighting is not expected to perceptibly change light levels at any location.
- 15.9.13 The depth of the tunnel under the river, at the deepest invert level, will be -34.434m at the Tilbury Shaft. The substrate in which the tunnel will be installed is chalk. At a depth of approximately 30m under the River Thames, within a bedrock substrate, tunnel construction will not result in any surface noise or vibration impacts of effects on the water column. As such, there will be no indirect effects from the tunnel boring process on the river 30m above, or the SPA between 600m and 2.3km downstream.
- 15.9.14 Best practice water pollution controls will be implemented as part of the outline CEMP such that with these measures in place no water course pollution that would impact the SPA/Ramsar are expected.
- 15.9.15 Based on the above and those impacts described in ES Volume II Chapter 7: Biodiversity - Tilbury, overall the impacts of the Proposed Development are not likely to result in any significant effect on the structure and function of the Thames Estuary and Marshes SPA and Ramsar Site or the Mucking Flats and Marshes SSSI.

South Thames Estuary and Marshes SSSI

- 15.9.16 The Proposed Development will result in no loss of habitat from the South Thames Estuary and Marshes SSSI. The SSSI is located approximately 30m to the south of the Gravesend Site, and also extends to cover the land 230m to the east of the Gravesend Site.



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- 15.9.17 The shaft and tunnel will be located approximately 120m from the areas of SSSI to the south of the Gravesend Site, and approximately 670m to the west of the remainder of the SSSI (separated by the Milton Rifle Range).
- 15.9.18 As detailed for the Thames Estuary and Marshes Ramsar Site in paragraph 15.9.11, the impact of noise and visual disturbance on areas of the SSSI directly to the south of the Gravesend site are likely to be moderated by the proximity of these areas to the existing HS1 rail line, which is located between the Gravesend Site and the Ramsar and acts as a significant source of noise and visual disturbance. Within this context noise from the Proposed Development is unlikely to increase the peak noise levels within the SSSI and based on the existing levels of regular disturbance any birds utilising those areas of the SSSI closest to the Gravesend Site are likely to already be habituated to high levels of noise and visual disturbance.
- 15.9.19 The areas of the SSSI to the east of the Gravesend tunnel shaft and proposed Gravesend SEC are well separated (670m) and with the implementation of CEMP measures it is unlikely that there will be a discernible change in the noise levels experienced at these areas during construction.
- 15.9.20 Assuming the implementation of the CEMP, construction lighting and water pollution are unlikely to result in any notable impacts on the habitats and species for which the SSSI is designated.
- 15.9.21 Overall, the Proposed Development is considered unlikely to result in a significant effect on the structure and function of the South Thames Estuary and Marshes SSSI.

Medway Estuary and Marshes Special Protection Area

- 15.9.22 The Medway Estuary and Marshes SPA is located approximately 9.9km from the Gravesham Site, and similar to the Thames Estuary and Marshes SPA and Ramsar supports a diverse mixture of habitats and bird populations. It is located further from the Gravesham Site than the Thames Estuary and Marshes SPA, with similar sensitivities.
- 15.9.23 Based on the same rationale as presented for the Thames Estuary and Marshes SPA and Ramsar any impact on the bird populations for which the SPA/Ramsar is designated are likely to be negligible. Therefore, no significant effect on the structure and function of the Medway Estuary and Marshes SPA is expected.

Canal and Grazing Marsh, Higham Local Wildlife Site

- 15.9.24 The Gravesend Site is located entirely within the Canal and Grazing Marsh, Higham LWS, which is designated on the basis of its coastal floodplain grazing marsh habitat, incorporating reedbed, open water and marshland. The fields to the south of the existing SEC will be used for the construction of the new SEC, with the two smaller fields to the south used for storage and laydown, and the areas of dense ruderals in the west of the Site used for site offices and car parking.
- 15.9.25 Fields to the south of the Milton Rifle Range and part of the rifle range itself will be required for temporary works to enable the realignment of overhead lines. The works are expected to take approximately 12 weeks to complete and will involve existing overhead lines being lowered to ground level before being cut to manageable pieces and rolled up by hand. Where feasible vegetation clearance will be avoided, however it will likely be necessary in some areas to cut back vegetation and scrub in order to avoid the cables becoming entangled. For the purposes of assessment, it is assumed that all habitat within the rifle range and the fields to the south of it will be cut back to ground level to enable the works.
- 15.9.26 The Proposed Development is assumed to result in the following impacts on habitats within the LWS:
- Permanent loss of approximately 0.62ha of MG6 *Lolium perenne-Cynosurus cristatus* dominated habitat mosaic from the field to the south of the existing Gravesend SEC;
 - Permanent loss of approximately 0.34ha tall ruderal dominated habitat in the west of the Gravesend Site;

- Temporary loss (approx. 4 years) of approximately 1.45ha of MG6 *Lolium perenne*-*Cynosurus cristatus* dominated habitat mosaic from the three fields to the south of the existing Gravesend SEC;
- Temporary loss (approx. 4 years) approximately 0.7ha of MG1 grassland associated with pylon modification works in fields to south of Milton Rifle Range;
- Temporary modification (approx. 12 weeks) of approximately 0.79ha of species poor MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* subcommunity grassland within field to the south of the Milton Rifle Range to enable overhead line diversion works; and
- Temporary modification (approx. 12 weeks) of approximately 1.64ha of combination of MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* subcommunity grassland and species poor amenity grassland to enable overhead line diversion works.

15.9.27 In total, these impacts amount to direct effects on an area of 5.54ha of Coastal and Floodplain Grazing Marsh, a Habitat of Principal Importance under Section 41 of the NERC Act (Ref 15-3). This represents approximately 9% of the Canal and Grazing Marsh, Higham LWS. The adjoining areas of retained habitat are also likely to be subject to temporary disturbance (approx. 4 years) due to increased noise, visual disturbance. However, the extent of these impacts is likely by the implementation of the CEMP measures and the closed board noise fencing which will surround the construction area.

15.9.28 Following completion of the overhead line modification works the total of 2.43ha subject to temporary modification will return to their current management regimes and are expected to return to their original condition within 12 months of completion of works.

15.9.29 As detailed in paragraph 15.7.5 of the Outline Landscape and Ecological Management Plan includes for the creation of approximately 0.62ha of tussocky grassland and 1.45ha grazed pasture. These habitats will be enhanced through the provision of shallow scrapes and sensitive ongoing management to promote biodiverse areas of grazed pasture of value to a range of species. All reinstated or new areas of habitat are expected to suitable to be considered Coastal and Floodplain Grazing Marsh.

15.9.30 Taking into account the embedded mitigation measures proposed, the Proposed Development is likely to result in a temporary (up to 4 years) adverse impact on the structure and function of the Canal and Higham Local Wildlife Site at the Local level, that is Not Significant. Following the completion of construction and establishment of proposed planting this is expected to reduce to a long term Negligible effect which is Not Significant.

A226 Gravesend Road, Chalk Roadside Nature Reserve

15.9.31 The A226 Gravesend Road, Chalk RNR is located approximately 1.6km from the Gravesend Site but is located adjacent to the proposed construction Heavy Goods Vehicle (HGV) route. The peak number of two-way HGV movements will vary during phases of construction and are summarised in Section 3.7 of ES Volume II Chapter 3: Project Description during the construction period. Peak two-way movements per day will peak at 150 movements during tunnel construction for a period of approximately 24 weeks, then dropping to approximately 80 per day during tunnel lining delivery (23 weeks). For the majority of the rest of construction the peak numbers will be far lower at less than 30 two way movements per day.

15.9.32 Detailed NOx deposition modelling has not been undertaken for the RNR. However, based on its proximity to the A226 it will likely be subject to increased levels of deposition for the duration of construction. Grassland within the roadside verge is unlikely to be highly sensitive to nitrogen deposition, however in absence of further data it is assumed on a precautionary basis that increased nitrogen deposition has the potential to result in a minor reduction in species diversity. On a precautionary basis a temporary adverse effect (up to 4 years), at the Local level, which is Not Significant.

GR01 Nr Queens Farm RNR

- 15.9.33 The GR1 Nr Queens Farm RNR is located approximately 1.6km from the Gravesend Site, and approximately 1.5km from the proposed construction HGV route. There is no functional linkage between the RNR and Gravesend Site, as a consequent no impacts (or resultant effects) are expected, and there will be a negligible effect that is Not Significant.

Other non-statutory designated sites

- 15.9.34 All other non-statutory designated sites to the south of the Thames are more than 1.5km from the Gravesend Site. With the implementation of the embedded mitigation measures, based on the nature of the proposals and the intention to transport the majority of excavated material by barge from the Tilbury Site, no adverse effects upon the structure or function of any other non-statutory designated sites are expected.

Habitats

Habitats within the Site

- 15.9.35 Veteran tree T139 is located within the Gravesend Site, within an area that was identified for temporary works during construction. Veteran trees are an irreplaceable habitat and as a consequence the tree and its root protection area will be retained and protected during construction in accordance with the measures set out in Appendix E of the Arboricultural Impact Assessment. Following the implementation of these measures no significant effect on veteran tree T139 is expected.
- 15.9.36 Direct habitat losses due to the Proposed Development at the Gravesend Site are summarised in paragraph 15.9.26.
- 15.9.37 All ditches within and adjacent to the Gravesend Site will be retained along with a minimum 5m buffer of adjoining habitat. No discharge to existing ditches is to be undertaken during construction and in combination with the implementation of pollution controls included in the CEMP these measures will act to ensure any risk of impacts on ditch habitats is minimised.
- 15.9.38 The construction of the proposed Gravesend SEC and associated laydown, storage and offices will result in the permanent loss of 0.96ha of Coastal and Floodplain Grazing Marsh, and temporary loss of 0.7ha of Coastal and Floodplain Grazing Marsh, from the three grazed fields in the west of the Gravesend Site. While the underlying diversity of the grazed areas that are impacted is relatively low, their overall value as a habitat resource is enhanced by the presence of scattered scrub, patches of tall ruderals and bare ground at the margins of the fields.
- 15.9.39 In addition, a total of up to 2.43ha of Coastal and Floodplain Grazing Marsh will be temporarily impacted due to cutting back to ground level in order to facilitate realignment of overhead lines (approx. 12 weeks duration). These areas are species poor and lack structural diversity, however form part of the wider mosaic of Coastal and Floodplain Grazing Marsh adjoining the Thames in this area. In total works are expected to impact less than 1% of the total resource of Coastal and Floodplain Grazing Marsh available within the network of designated sites adjoining the Gravesend Site.
- 15.9.40 As stated in Section 15.7, the Outline Landscape and Ecology Management Plan for the Site will provide the 350m² biodiverse brown roof; 0.62ha tussocky grassland; and 1.45ha of grazed pasture. The embedded mitigation measures will ensure that once established these features will provide habitats of similar or higher diversity to those lost, and that will continue to qualify as the Habitat of Principal Importance Coastal Floodplain Grazing Marsh. The provision of a biodiverse brown roof will provide an additional brownfield habitat resource to compliment the areas of bare ground and ruderals currently at the Gravesend Site.
- 15.9.41 Based on the above, habitat loss at the Gravesend Site is expected to result in a temporary adverse effect on the conservation status of the habitat mosaic at the Gravesend Site at the Local level that

is Not Significant. Following the implementation of embedded mitigation measures the effect is expected to be reversible and will reduce to a long-term negligible effect that is Not Significant.

Habitats Adjacent to the Site

- 15.9.42 As detailed in ES Volume III Chapter 21, construction of the shaft and tunnel at the Gravesend Site is not expected to result in any notable impact on the ground water levels in areas of vegetation adjoining the Site.
- 15.9.43 The embedded mitigation measures within the CEMP (which include pollution controls and measures to limit light spill) will act to minimise the risk of indirect effects on habitats adjoining habitats, including the Thames and Medway Canal. In particular, the foreshore habitats adjoining the River Thames are located more than 100m from the areas of the Gravesend Site where construction works are proposed.
- 15.9.44 Following implementation of the embedded mitigation any impacts on adjoining habitats are expected to result in adverse effects at the Site level only which are Not Significant.

Species

Bats

- 15.9.45 The Proposed Development will not result in the loss of any confirmed roosts or trees/buildings with suitability to support roosting bats.
- 15.9.46 A single tree with high suitability to support roosting bats was identified within the Site but the trees is to be retained, with a surrounding buffer of 10m. The embedded mitigation measures set out in Section 15.7 will be employed to ensure risk of disturbance is minimised. No bats were found to be utilising the tree for roosting during the 2023 surveys, however it continues to have high suitability to support roosting bats in the future. As detailed within Section 15.5, bat activity and static detector surveys undertaken in 2023 suggest that the Gravesend Site and adjacent habitat is predominately utilised by more widespread bat species such as common pipistrelle and soprano pipistrelle with more occasional usage by noctule and Leisler's bat.
- 15.9.47 The habitat losses and modifications that will occur because of the Proposed Development at Gravesend are summarised in paragraph 15.9.26. During construction (approx. 4 years) there will be a temporary reduction in the availability of bat foraging habitat, however the areas affected are relatively small in the context of the scale of the wider areas of similar habitat that remain available in the adjoining areas of floodplain grazing marsh. In addition, ditches will be retained, and with the CEMP measures in place there will remain good east-west and north-south commuting routes available through the sites which will avoid any impacts on connectivity in the wider landscape. The impacts on habitat availability for bats during construction will therefore be very minor.
- 15.9.48 Any impacts on bats utilising the habitat at the Gravesend Site for foraging and/or community during construction will be temporary (approximately 4 years) and minimised by the implementation of outline controls within the CEMP aimed at minimising construction lighting and reducing light spill into adjacent habitats. Following these controls it is expected that there will be a temporary adverse effect at the Site level that is Not Significant.
- 15.9.49 Following the implementation of these measures no significant effect on the bat assemblage utilising the Site is expected to occur during construction.

Birds

Intertidal wetland birds

- 15.9.50 Surveys undertaken in 2022/2023 found that the areas of intertidal habitat adjoining the Gravesend Site were used by a lower diversity of species and lower numbers of birds than the areas north of the River Thames at the Tilbury Site. Only one species (gadwall) recorded within the Gravesend Site Survey Area in 2022/2023 had a peak count exceeding 1% of the Thames Estuary and Marshes

Ramsar or SPA populations. Gadwall was recorded twice and the peak count exceeded the 1% threshold on two occasions, with peaks of 17 birds in December 2022 and 13 in January 2023.

- 15.9.51 A further seven SPA/Ramsar species were recorded namely: gadwall, lapwing and whimbrel (all SPA 4.2 species) and grey plover, ringed plover; dunlin; redshank. In all cases numbers recorded were low.
- 15.9.52 The Proposed Development at the Gravesend Site will result in the habitat losses identified in paragraph 15.9.26. While there will be an overall reduction in terrestrial habitat this is considered unlikely to adversely affect intertidal wetland bird populations utilising the Gravesend Site.
- 15.9.53 The works that would generate the key sources of noise and visual disturbance are located a minimum of 100m to the south of the intertidal zone, associated with the proposed Gravesend SEC and associated construction laydown areas. As described in paragraphs 15.9.2 to 15.9.15 in relation to the assessment of potential impacts on the Thames Estuary and Marshes SPA and Ramsar, the areas of intertidal habitat are unlikely to be subject to any notable changes in noise levels as a result of the Proposed Development. Prior to mitigation noise levels at the foreshore would be very minor compared to the existing baseline, and close boarded noise fencing is proposed around the construction area as part of the embedded mitigation. Therefore, negligible change in noise conditions is expected. Noise fencing and the flood bunds adjoining the River Thames will act to minimise the risk of any increase in visual disturbance from the main construction works. Sections of the Ramsar site to the south of the Gravesend Site, adjoin the HS2 railway line and therefore are unlikely to be as severely impacted by any change in noise and visual disturbance.
- 15.9.54 Overall, with the embedded mitigation measures in place the Proposed Development at the Gravesend Site disturbance impacts are only likely to result in temporary adverse effects (up to 4 years) on the conservation status of the intertidal wetland bird assemblage (or any constituent populations) at up to the Site level, which is not significant. The impacts will be reversible following completion of construction works and the long-term effect on the wetland intertidal bird assemblage will therefore be Negligible and not significant.

Non-breeding Birds

- 15.9.55 The Gravesend Site was found to be of no more than Local importance for non-breeding birds. Both species numbers and total numbers of birds recorded was relatively low.
- 15.9.56 The Proposed Development will result in the loss of approximately 2.4ha of grazed flood plain grazing marsh in the west of the Gravesend Site. In addition, there may be a further 2.4ha that are subject to temporary clearance works to facilitate overhead line realignment works. The potential for adverse impacts due to noise and visual disturbance resulting in displacement of non-breeding birds from habitat surrounding the proposed Gravesend SEC will be reduced by the close-boarded noise fencing that is part of the embedded mitigation. With these measures in place the Proposed Development is likely to result in a temporary adverse effect on non-breeding bird populations at the Site level which is not significant.

Breeding birds

- 15.9.57 Data from 2023 breeding bird surveys, alongside those undertaken in previous years by other projects, indicates that the breeding bird assemblage associated with the habitat at and adjoining the Gravesend Site is of up to Local importance.
- 15.9.58 As detailed in paragraph 15.9.26/15.9.35, there will be loss of approximately 2.4ha coastal floodplain grazing marsh habitat consisting of grazed pasture with areas of tall ruderals, reeds and scrub for approximately 4 years, before habitat creation following construction creates approximately 1.5ha of replacement habitat. This represents a net loss of approximately 0.9ha of coastal grazing marsh habitat, however this long-term reduction will in part be compensated by the restored habitat in the northern field being of higher quality for breeding birds than the grazed pasture currently present.
- 15.9.59 Towards the end of the construction period there will also be a temporary reduction in the habitat quality of up to 2.4ha of additional grassland habitats associated with the overhead line realignment

works. Works are expected to take approx. 12 weeks to undertake with habitat returning to current condition in approximately 12 months.

- 15.9.60 Sensitive seasonal timing of works and/or ecological supervision will act to limit the risk of direct loss of nests during vegetation clearance. However, without appropriate controls increased levels of noise, visual disturbance and lighting all have the potential to result in adverse impacts on nesting bird populations, through displacement and aborted breeding effort leading to reduced juvenile recruitment. As a consequence, the Proposed Development will include close-boarded fencing around the construction area to reduce noise and visual disturbance. In addition, the CEMP will ensure adherence to good practice measures to minimise light spill into adjacent habitats.
- 15.9.61 The Gravesend Site is located adjacent to the Metropolitan Police Training Facility and Milton Rifle Range. Both generate loud and irregular peak noise levels. In addition the HS1 railway to the south generates regular noise and visual disturbance. During construction these peak noise level events are likely to become more frequent, in particular during the shaft construction phase. However, all tunnel spoil will be removed at the Tilbury Site and therefore no 24 hours working is expected to be required at the Gravesend Site.
- 15.9.62 Embedded mitigation measures will act to reduce the intensity and extent of any disturbance impacts that occur, such that adverse impacts are expected to limit adverse impacts on those habitats adjoining the Gravesend Site, and act to minimise any impact on the higher quality habitats to the south of the Gravesend Site and to the east of the Milton Rifle Range.
- 15.9.63 On this basis the net effect on the breeding bird assemblage at the Tilbury Site is expected to be a temporary adverse (up to 4 years) effect on conservation status of breeding birds at the Local level, which is not significant. The effect will be reversible (within 12 months of end of Construction) and in the long term will be negligible and not significant once construction is complete.
- 15.9.64 Baseline surveys recorded Cetti's warbler utilising habitat within Site, and in particular within reedbed just outside of the Site adjoining the Thames and Medway Canal. Cetti's Warbler is afforded special protection under Schedule 1 of the Wildlife and Countryside Act (1981, as amended), which makes it an offence to disturb the species when at or near the nest. The embedded mitigation measures will act to minimise the risk of an offence, and minimise the risk of legal offences. This will include sensitive seasonal timing of works to ensure thorough nesting checks and establish suitable buffer zones in the event they are found to be utilising habitat in the immediate vicinity of works.

Widespread reptiles

- 15.9.65 The Gravesend Site is known to support three species of widespread reptile (slow worm, common lizard and grass snake)
- 15.9.66 As part of the embedded mitigation measures set out in Section 15.7, all areas of suitable reptile habitat requiring vegetation clearance will be subject to phased vegetation clearance during the period reptiles are active (March to October under suitable weather conditions), to displace any reptiles present into adjacent areas of retained habitat. This precautionary method of works will be followed by hand search and destructive clearance under ecological supervision to minimise the risk of killing/injury.
- 15.9.67 The total permanent and temporary habitat losses as a consequence of the Proposed Development are summarised in paragraph 15.9.26. However, the majority of the three fields in the west of the Gravesend Site consist of short, grazed grassland that is of limited value for reptiles, with the more suitable areas of habitat associated with the interface between areas of grassland, scrub and tall; ruderals on the existing margins of the Site. As part of the embedded mitigation for water vole a buffer of minimum 5m will be retained around each of the ditches within/adjoining the Gravesend Site.
- 15.9.68 As a consequence, vegetation clearance to facilitate the construction of the shaft and proposed Gravesend SEC would be undertaken in 2024/2025 with habitat of value to reptiles (i.e. excluding the areas of short grazed grassland) estimated to be only around 40% of the total area of the western fields approximately 0.38ha.

- 15.9.69 Following construction (approx. 4 years) these areas of the Site will be landscaped to create 0.62ha of tussocky grassland surrounding the proposed Gravesend SEC which will be of high suitability for reptiles. In addition, the fields to the south of the proposed Gravesend SEC will provide 1.45ha of grazed pasture enhanced with shallow scrapes and with areas on the margins targeted to provide areas of bare ground and/or tall ruderals to ensure a similar level of reptile habitat provision to that present currently.
- 15.9.70 In addition, in approximately 2028 there will be temporary loss of approximately 0.7ha of grassland within the field to the south of the Milton Rifle Range to enable pylon upgrade works and associated equipment laydown. In the same year there will be modification of up to 2.43ha of existing grassland areas within and to the south of the Milton Rifle Range to allow cabling to be safely rolled up/out by hand without becoming tangled. It is likely only a small percentage of the total 2.43ha would be cleared.
- 15.9.71 The habitat manipulation works within the rifle range and the fields to the south of it may reduce scrub cover and introduce new areas of shorter vegetation and bare ground within these extent. However, National Grid will not be responsible for the ongoing maintenance of these areas and it is likely that within 12 months they will have naturally regrown to a state comparable to conditions prior to works.
- 15.9.72 The habitat loss/modification that will occur as a consequence of the Proposed Development at Gravesend is expected to result in a temporary adverse effect at the Local level that is not significant due to disturbance and temporary reduction in habitat availability. In the short term (1-2 years) following construction habitat creation and reinstatement will reduce this effect to a negligible effect at the Site level which is Not Significant.

Invertebrates

- 15.9.73 Baseline surveys undertaken in 2023 confirmed that the invertebrate assemblage supported by the Gravesend Site and adjoining habitats are of County importance.
- 15.9.74 The construction of the Proposed Development at Gravesend will result in the habitat losses identified in paragraph 15.9.26. The invertebrate survey identified the areas of greatest invertebrate diversity at the Gravesend Site to be associated with the grazed pasture and fringing areas of scrub and tall ruderals within the fields in the west of the Site. These areas yielded the records of the four Species of Principal Importance recorded during the 2023 surveys, namely hornet robberfly, shrill carder-bee; brown-banded carder-bee, and small heath butterfly.
- 15.9.75 The construction of the shaft and the proposed Gravesend SEC will commence in 2025, and with the exception of a retained 5m buffer of habitat adjoining the existing ditches, will result in the removal of all suitable habitat for invertebrates within the three fields in the west of the Site. (total approx. 2.07ha). In parallel, it will result in the loss of the tall ruderal habitat on the western boundary with the Metropolitan Policing Training facility (0.34ha). This includes all areas of grazed pasture, thus removing a source of dung, upon which the hornet robber fly is dependent for part of its life-cycle.
- 15.9.76 Following completion of construction the areas of the northern field that are not within the operational boundary of the new SEC, and the restored land on the far western boundary (total approx. 0.62ha) will be sown to promote a tussocky grassland sward of value to invertebrates, with area enhanced through the provision of shallow wet scrapes and scattered scrub planting. These areas are expected to be managed in the long term to promote value for biodiversity, and a mosaic of scrub, grassland and tall ruderals. They will be complemented by the provision of a biodiverse brown roof on the headhouse building.
- 15.9.77 The smaller fields to the south of the Gravesend SEC will be reinstated to grazed pasture and enhanced through scrapes and leaving some areas unsown to promote natural recolonisation. Grazing will be reinstated in these fields in order to ensure replacement habitat suitable for hornet robberfly. It is expected that these habitats will take between 2-3 years after construction to establish.

- 15.9.78 The overhead line realignment will result in the loss of approximately 0.7ha of rough grassland in the fields to the south of the Milton Rifle Range in 2028 near the end of the construction phase to enable works around the existing pylon base and materials storage. In addition, during 2028 there will be a requirement for habitat clearance works to facilitate the realignment of the overhead cables. These works will require clearance of an area up to a maximum of 2.43ha, however habitat clearance will only be undertaken where necessary so is unlikely to require clearance of the full extent. Works required in these areas will involve the temporary disturbance of these areas only and the requirement for grass cutting and/or scrub clearance in some areas. Following the short term works in these areas (approx. 12 weeks) the areas will be reinstated, avoiding flat and compacted ground and encouraging some scrapes, and vehicle tracks to enhance variability of conditions. No seeding will be undertaken and areas will be allowed to regenerate naturally. It is expected that within 12 months these areas of habitat will have re-established and will provide similar habitat for invertebrates to that present prior to the works.
- 15.9.79 While there will be a temporary reduction in suitable habitat for invertebrates (in particular the mosaic of habitats associated with the areas of grazed pasture) the extent of habitat loss is considered relatively small in the wider context of the availability of similar floodplain grazed pasture within the remainder of the Canal and Grazing Marsh, Higham LWS and adjoining Thames Estuary and Marshes SSSI and Ramsar. While the 4 SPI recorded at the Site have limited distributions at a national scale, each is known to occur relatively frequently in the Thames Estuary area. As such the populations at the Gravesend Site form part of wider local metapopulations which will be better buffered against short term and small-scale changes in habitat availability. As such it is not expected that these species will be lost entirely from the local area due to the habitat losses expected due to the Proposed Development at the Gravesend Site.
- 15.9.80 Overall, there will be a temporary reduction in the availability of suitable insect habitat for the invertebrate assemblage at Gravesend. This will last for approximately six years (4 years construction + 2 years establishment). This is expected to result in a temporary adverse effect on conservation status of the invertebrate assemblage that is Significant at the District level during construction. Following implementation of the embedded mitigation measures and establishment of the new habitat creation this is expected to reduce to a negligible effect that is Not Significant.

Water vole

- 15.9.81 The ditches within and adjacent to the Gravesend Site will be retained with an adjoining 5m buffer zone of retained habitat. In addition, the controls within the Outline CEMP will act to minimise the risk of pollution of the watercourses supporting water vole.
- 15.9.82 The design of the Proposed Development will ensure there is no change in the existing drainage and outfalls into ditches/drains during the construction period. No water generated by the tunnelling process will be discharged to the existing ditches.
- 15.9.83 There will be a requirement during construction to install one new headwall to allow surface water run off to discharge to the existing drain to the east of the proposed Gravesend SEC during operation. The ditch is known to historically support water vole, however none were recorded during the 2023 surveys and the ditch is known to contain areas of dense scrub habitat likely to be less suitable for water vole.
- 15.9.84 A suitable section of ditch not supporting burrows will be identified by a water vole holder of a CL31 licence to displace water vole. Where necessary habitat manipulation will be undertaken in advance of the works to displace water vole from a 5m section of bank to allow a new headwall to be installed.
- 15.9.85 Noise and lighting controls within the Outline CEMP will act to reduce the potential for adverse impacts on the ditches surrounding the proposed Gravesend SEC and Site Offices. However, based on the proximity of the ditches to the construction area, it is possible that these impacts will result in some disturbance and temporary displacement of water voles utilising the immediately adjoining section of ditch during the construction period (4 years). Lighting and noise will reduce following completion of construction and therefore this is expected to result in a temporary adverse effect (4 years) at the Site level only which is Not Significant.

Invasive Non-Native Species

- 15.9.86 Prior to the commencement of site clearance works a check will be made for any new invasive non-native species to ensure legislative compliance.
- 15.9.87 The invasive non-native species Japanese knotweed is present to the north of Wharf Road in vegetation adjoining the proposed site access road.
- 15.9.88 Japanese knotweed is listed under Schedule 9 of the Wildlife and Countryside Act (1981 as amended). While it is not within an area that will be impacted by the Proposed Development, in order to prevent its further spread an INNS management plan will be implemented during site clearance works.

Operational Phase

Designated Sites

Thames Estuary & Marshes SPA and Ramsar and Mucking Flats and Marshes SSSI

- 15.9.89 Thames Estuary and Marshes SSSI and Ramsar is located approximately 95m from the operational Gravesend SEC and approximately 685m from the Thames Estuary and Marshes SPA. During the operational phase the Gravesend SEC will be unmanned and in normal operation it is expected that there will be approximately bi-monthly visits with a light van or car. Maintenance works are expected to require a further five to ten light goods vehicle visits every two to five years. These levels of activity are comparable to those for the existing SEC which is located closer to the foreshore than the new SEC. These levels of disturbance are not expected to result in any measurable negative impact on the features for which these sites are designated.
- 15.9.90 All surface water runoff from the headhouse roof and any water pumped from the tunnel will be discharged into free draining stone material within the SEC, and soak away naturally. Surface water from the road will drain via filtration trenches and be discharged into the existing ditch to the east of the proposed SEC. The proposed discharge will be restricted to greenfield run-off rates (0.4litre per second) and will be similar to existing levels. As such no adverse impacts (or resultant significant effects) on the structure and function of nearby designated sites are expected.

Canal and Grazing Marsh, Higham LWS

- 15.9.91 As detailed above, during the operational phase activity associated with the tunnel and SEC will be minimal, and no significant change in the levels of surface water run-off are expected.
- 15.9.92 External lighting will be provided within the SEC and will be designed in accordance with the Institute of Lighting Professionals Guidance Note 8 Bats and Artificial Lighting (Ref 15-42). Lighting will be activated by sensors when required and based on the low anticipated frequency of maintenance any lighting of the SEC is expected to be minimal. On this basis there is considered to be negligible risk of disturbance of faunal species utilising the LWS.

Other Designated Sites

- 15.9.93 No adverse impacts (or resultant effects) on any of the other designated sites within the study area are expected, based on their distance from the Tilbury Site and the lack of any functional linkages.

Habitats

- 15.9.94 During the operational phase it is possible that occasional access to the pylons and overhead lines will be required for maintenance works. When such events occur they may result in temporary disturbance of habitats below the overheads and around the pylon bases. Given the mosaic nature of the habitats, no significant adverse effect on the conservation status of the habitats concerned is expected.

Protected and/or notable species

- 15.9.95 As detailed in relation to the Canal and Grazing Marsh, Higham LWS embedded mitigation will minimise the potential for light spill, and limit discharge to existing ditches to levels similar to those experienced currently. In addition, no significant noise generating activities are expected during operation. Based on this and the low levels of human activity (and thus visual disturbance) the operation of the new cable tunnel and proposed Gravesend SEC is unlikely to result in any ongoing disturbance of surrounding habitats (that may support reptiles, foraging bats, breeding birds and widespread reptiles) during the operational phase.
- 15.9.96 The Proposed Development results in minor changes in the alignment of the overhead lines to the north of the proposed Gravesend SEC. There are no indications that the existing overhead lines adversely affect flight lines of bird species currently utilising the wider Thames Estuary. The changes that will occur are minor in nature and as a consequence of the Proposed Development are therefore not expected to impact existing bird populations that utilise the Site and immediate surrounds.
- 15.9.97 During the operational phase it is possible that occasional access to the pylons and overhead lines will be required for maintenance works. When such events occur they may result in temporary disturbance of habitats below the overheads and around the pylon bases. A precautionary working method (incorporating sensitive timing of works) will be implemented under the supervision of an ECOW for any works requiring habitat clearance of disturbance. These measures will be sufficient to limit impacts and avoid killing/injury of protected and/or notable species during maintenance works.
- 15.9.98 No significant effects of protected and/or notable species are expected during the Operational Phase.

15.10 Additional Mitigation

Off Site Habitat Creation

- 15.10.1 Excavation of the tunnel will generate a large volume of spoil material. There are several examples in the wider Thames Estuary of such material being utilised for large scale habitat creation. National Grid are in negotiations with a number of suitable partner organisations with the facilities to accept spoil materials through existing consented operations (e.g. RSPB at Cliffe Pools) to enable habitat enhancement of existing wetland sites.
- 15.10.2 Assuming that an agreement is reached this will represent additional biodiversity enhancement to delivered as consequence of the Proposed Development.
- 15.10.3 As detailed within the Biodiversity Net Gain Assessment and Strategy Report, National Grid are committed to ensuring that the Proposed Development as a whole will achieve 10-15% Biodiversity Net Gain. While good progress has been made towards this goal, further measures are required to ensure this target is achieved. In line with the strategy set out in the report, opportunities will continue to be developed to ensure this target is achieved.

15.11 Residual Effects

- 15.11.1 Table 15-12 provides a summary of all effects on Important Ecological Features (IEF's) before and after additional mitigation.
- 15.11.2 Following the implementation of the embedded mitigation measures no permanent significant effects on IEFs are expected as a results of the construction and operation of the Proposed Development at the Gravesend Site.

15.12 Assessment of Effects

15.12.1 This assessment of ecological effects has been undertaken after the implementation of embedded and additional mitigation.

Table 15-12: Assessment of Residual Biodiversity Effects

Receptor	Importance	Potential Impact	Avoidance/ embedded Mitigation	Significance of Effect Prior to Additional Mitigation (equivalent assessment criteria conclusion)	Additional Mitigation	Residual Effect
Construction Phase						
Thames Estuary & Marshes SPA and Ramsar	International	- Noise and visual disturbance of habitat within Ramsar and SSSI and potential 'supporting habitat' for SPA species; - Vibration from tunnelling; - Water pollution; - Increase in barge movements.	- Gravesend SEC sited away from sensitive foreshore habitats; - Outline CEMP measures (including pollution controls; noise and dust suppression sensitive timing of vegetation clearance); - Noise fencing of construction area.	No significant effect on structure/function (Negligible – Not Significant)	None required	No significant effect on structure/function (Negligible – Not Significant)
Thames Estuary & Marshes SSSI	National					
Medway Estuary and Marshes SPA	International					

Receptor	Importance	Potential Impact	Avoidance/ embedded Mitigation	Significance of Effect Prior to Additional Mitigation (equivalent assessment criteria conclusion)	Additional Mitigation	Residual Effect
Canal and Grazing Marsh, Higham LWS	County	- Permanent habitat loss/modification affecting Coastal Floodplain Grazing Marsh due to construction of new SEC; - Temporary habitat loss/modification due to realignment of overhead lines; - Noise and visual disturbance; - Vibration due to tunnelling activity	- Habitat creation to include areas of tussocky grassland and grazed pasture and biodiverse brown roof; - Outline CEMP measures (including pollution controls; noise and dust suppression sensitive timing of vegetation clearance); - Noise fencing of construction area.	Temporary adverse effect (up to 4 years) on structure and function of LWS at Local level (Minor Adverse – Not Significant)	None	No significant effect on structure/ function (Neutral, Not Significant)
A226 Gravesend Road, Chalk RNR	District	Increased NO_x levels from vehicle movements	CEMP measures	Temporary adverse effect on conservation status at Local level, Not Significant (Minor adverse – Not Significant)	None	No significant effect on structure/function (Negligible – Not Significant)
GR01 Nr Queens Farm RNR	District	Increased NO_x levels from vehicle movements	CEMP measures	No significant effect on structure/function (Negligible – Not Significant)	None	No significant effect on structure/function (Negligible – Not Significant)

Receptor	Importance	Potential Impact	Avoidance/ embedded Mitigation	Significance of Effect Prior to Additional Mitigation (equivalent assessment criteria conclusion)	Additional Mitigation	Residual Effect
Other non-statutory designated sites	County	- Noise and visual disturbance; - Increased NO_x levels from vehicle movements	Outline CEMP measures (including pollution controls; noise and dust suppression sensitive timing of vegetation clearance).	No significant effect on structure/function (Negligible – Not Significant)	None required	No significant effect on structure/function (Negligible – Not Significant)
Veteran elder T139	Up to National	Habitat loss or damaged to root zone during construction/temporary works	- Tree protection in accordance with the Arboricultural Impact Assessment - Outline CEMP measures (including pollution controls; noise and dust suppression	No significant effect on conservation status (Negligible – Not Significant)	None required	No significant effect on conservation status (Negligible – Not Significant)

Receptor	Importance	Potential Impact	Avoidance/ embedded Mitigation	Significance of Effect Prior to Additional Mitigation (equivalent assessment criteria conclusion)	Additional Mitigation	Residual Effect
Habitat mosaic within the Gravesend Site	County	- Permanent and temporary habitat loss; - Noise, visual and light pollution	- Habitat creation to include areas of tussocky grassland (0.62ha) and grazed pasture (1.45ha) and biodiverse brown roof (350m²); - Clearance to facilitate overhead lines will minimise footprint of works and only remove vegetation where necessary; - Outline CEMP measures (including pollution controls; noise and dust suppression sensitive timing of vegetation clearance); - Natural regeneration of temporarily impact habitats; - Retention of ditches with 5m buffer;	Temporary adverse effect on conservation status at Local level, Not Significant (Minor adverse – Not Significant)	None	No significant effect on structure/function (Negligible – Not Significant)
Habitat adjacent to the Site (including Thames and Medway Canal and River Thames)	Up to Regional	- Noise and visual disturbance - Pollution from run off./chemical spills etc	Outline CEMP measures (including pollution controls; noise and dust suppression sensitive timing of vegetation clearance)	No significant effect on conservation status (Negligible – Not Significant)	None required	No significant effect on conservation status (Negligible – Not Significant)

Receptor	Importance	Potential Impact	Avoidance/ embedded Mitigation	Significance of Effect Prior to Additional Mitigation (equivalent assessment criteria conclusion)	Additional Mitigation	Residual Effect
Bats Assemblage	District	- Reduction in foraging habitat - Disruption of flight lines - Light pollution	- Habitat creation and landscaping at SEC; - Outline CEMP measures (including pollution controls; noise and dust suppression sensitive timing of vegetation clearance)	Temporary adverse effect at the Site level, Not Significant (Minor adverse – Not Significant)	None required	No significant effect on conservation status (Negligible – Not Significant)
Intertidal birds	District	- Temporary and permanent habitat loss reducing availability of foraging and roosting habitat - Noise and visual disturbance - Overhead lines impacting flight lines	- Gravesend SEC is sited away from the foreshore; - Outline CEMP measures (including noise suppression and sensitive timing of vegetation clearance); - Noise fencing of construction area.	Temporary adverse effect at the Site level, Not Significant (Minor adverse – Not Significant)	None required	No significant effect on conservation status (Negligible – Not Significant)
Non-breeding birds	Local	- Temporary and permanent habitat loss - Noise and visual disturbance	- Outline CEMP measures (including noise suppression and sensitive timing/PMoW for vegetation clearance); - Noise fencing of construction area.	Temporary adverse effect (approx. 4 years) at the Local level, Not Significant (Minor adverse – Not significant)	None required	No significant effect on conservation status (Negligible – Not Significant)

Receptor	Importance	Potential Impact	Avoidance/ embedded Mitigation	Significance of Effect Prior to Additional Mitigation (equivalent assessment criteria conclusion)	Additional Mitigation	Residual Effect
Breeding birds	Local	• Temporary and permanent habitat loss • Destruction of nests/failed breeding effort • Noise and visual disturbance	• Gravesend SEC is sited away from the foreshore; • Outline CEMP measures (including noise suppression and sensitive timing/PMoW for vegetation clearance); • Noise fencing of construction area.	Temporary adverse effect (approx. 4 years) at the Local level, Not Significant (Minor adverse – Not significant)	None required	No significant effect on conservation status (Negligible – Not Significant)
Reptile Assemblage utilising Gravesend Site and adjacent habitats	County	• Temporary and permanent habitat loss • Direct killing/injury during site clearance • Noise, visual and light pollution of retained habitats	• Outline CEMP measures and PMoW for phased vegetation clearance prior to works; • Habitat creation to include tussocky grassland and provide structural diversity in areas of grazed pasture.	Temporary adverse effect (approx. 4 years) at the Local level, Not Significant (Minor adverse – Not significant)	None required	No significant effect on conservation status (Negligible – Not Significant)

Receptor	Importance	Potential Impact	Avoidance/ embedded Mitigation	Significance of Effect Prior to Additional Mitigation (equivalent assessment criteria conclusion)	Additional Mitigation	Residual Effect
Invertebrate assemblage utilising Gravesend Site and adjacent habitats	County	• Temporary and permanent habitat loss • Direct loss of individuals/life-stages during site clearance • Noise, visual and light pollution of retained habitats • Change in habitat composition	• Embedded habitat creation around SEC and provision of brown roof; • Reinstatement of areas impacted by overhead works to promote invertebrate diversity.	Significant temporary adverse effect (up to 4 years) at District level on conservation status (Moderate adverse – Significant)	None	No significant effect on conservation status (Negligible – Not Significant)
Water vole populations	District	• Temporary and permanent habitat loss • New/alterd outfalls (water quantity and quality) • Noise, visual and light pollution of retained habitats	• Outline CEMP measures (including pollution controls; noise and dust suppression and control of lighting); • Retention of ditches with 5m buffer; • Displacement of water voles under Natural England class licence (as required) to enable headwall construction.	Temporary adverse effect (4 years) at the Site level only which is Not Significant (Minor adverse – Not Significant)	None required	No significant effect on conservation status (Negligible – Not Significant)
Invasive Non Native species (INNS)	-	• Potential for spread of INNS	• ECOW to check site prior to site clearance for any new INNS; Invasive species management plan to be drafted and implemented for Japanese knotweed.	-	-	-

Receptor	Importance	Potential Impact	Avoidance/ embedded Mitigation	Significance of Effect Prior to Additional Mitigation (equivalent assessment criteria conclusion)	Additional Mitigation	Residual Effect
Operational Phase						
Thames Estuary & Marshes SSSI, SPA and Ramsar	International/National	- Noise and visual disturbance during construction - Water pollution	- Any water from the tunnel during operation discharged to ground in free draining stone surrounding Tilbury SEC; - Design of surface water drainage restricted to greenfield run-off rates.	No significant effect on structure/function (Negligible – Not significant)	None required	No significant effect on structure/function (Negligible – Not significant)
Canal and Grazing Marsh, Higham LWS	County	- Noise and visual disturbance - Operational lighting resulting in disturbance of fauna - Water pollution	- Lighting to be minimised and provided in accordance with best practice guidance; - Facility unmanned with occasional maintenance only.	No significant effect on structure/function (Negligible – Not significant)	None required	No significant effect on structure/function (Negligible – Not significant)
Other designated sites	Up to County	- Noise and visual disturbance - Operational lighting resulting in disturbance of fauna - Water pollution	- Lighting to be minimised and provided in accordance with best practice guidance; - Facility unmanned with occasional maintenance only.	No significant effect on structure/function (Negligible – Not significant)	None required	No significant effect on structure/function (Negligible – Not significant)

Receptor	Importance	Potential Impact	Avoidance/ embedded Mitigation	Significance of Effect Prior to Additional Mitigation (equivalent assessment criteria conclusion)	Additional Mitigation	Residual Effect
Habitats	County	Temporary disturbance of habitats during maintenance works	PMoW to be implemented to avoid impacts during any site clearance/disturbance required during maintenance access to overhead lines	No significant effect on conservation status (Negligible – Not significant)	None	No significant effect on conservation status (Negligible – Not significant)
Protected and/or notable species	Up to County	- Noise and visual disturbance - Operational lighting resulting in disturbance of fauna - Maintenance works leading to occasional temporary habitat modification - Bird strike of overhead lines due to change in alignment	- Lighting to be minimised and provided in accordance with best practice guidance; - Facility unmanned with occasional maintenance only; - PMoW to be implemented to avoid impacts during any site clearance/disturbance required during maintenance access to overhead lines.	No significant effect on conservation status (Negligible – Not significant)	None	No significant effect on conservation status (Negligible – Not significant)

15.14 Summary

- 15.14.1 An assessment has been undertaken of the likely effects of the Proposed Development on Important Ecological Features (IEF's) at the Gravesend Site. It has considered the likely effects on ecological receptors during the construction and operational phases.
- 15.14.2 The Proposed Development at the Gravesend Site is located within the Canal and Grazing Marsh, Higham LWS, a non-statutory site of County importance. In addition, the southern margin of the Gravesend Site is approximately 30m from the Thames Estuary and Marshes SSSI and Ramsar Site, a site of International importance.
- 15.14.3 The fields in the west of the Gravesend Site consist of pony grazed grassland forming a mosaic with areas of scrub, reed, and tall ruderals. Fields to the south of the Milton Rifle Range and within the range itself are generally unmanaged and less diverse. All of these areas are considered meet the definition to be considered Coastal and Floodplain Grazing Marsh, a Habitat of Principal Importance.
- 15.14.4 Surveys identified that the Site supports notable populations of common reptiles (slow worm, common lizard and grass snake) and water vole. In addition, it has been found to support a diverse assemblage of invertebrates of County Importance, including hornet robberfly.
- 15.14.5 Intertidal bird surveys identified very low levels of use by the species for which the Thames Estuary and Marshes SPA/Ramsar site are designated. In addition, the number of species and number of birds recorded during the breeding and non-breeding bird surveys suggests these areas are of no more than Local importance for these species groups.
- 15.14.6 The Proposed Development at Gravesend will incorporate a range of embedded mitigation measures that have been included in the design to avoid and/or reduce impacts on important ecological features. This includes minimising vegetation clearance, and creation of a range of biodiverse habitats following construction including reinstatement of the southern fields to grazed pasture. In addition, a range of CEMP measures will be employed to reduce/avoid impacts including sensitive timing of works and maintaining buffer zones around all ditches. Close-boarded noise fencing will be erected around the construction site to limit noise disturbance.
- 15.14.7 Based on the low numbers of SPA/Ramsar species utilising the Gravesend Site, and the offset of the proposed Gravesend SEC from the intertidal habitats no significant effect on the structure/function of the Thames Estuary & Marshes SPA and Ramsar are expected.
- 15.14.8 The Proposed Development at the Gravesend Site will result in the loss of approximately 2.4ha of existing grazed pasture, but this impact will be partially offset by the creation of approximately 2ha of new grassland dominated habitats and a biodiverse brown roof (350m²). In parallel, there will be temporary modification of habitat to facilitate overhead line realignment works. This will result in a temporary adverse effect (approx. 4 years) on conservation status at the Local level that is not significant.
- 15.14.9 Embedded mitigation measures are expected to reduce impacts on intertidal birds, however a low-level impacts is likely to remain due to disturbance and temporary habitat losses. The Proposed Development at Gravesend will result in a temporary adverse effect (approx. 4 years) on the intertidal bird assemblage at the Site level that is not significant. For both breeding and non-breeding birds there will similarly be a temporary adverse effect (approx. 4 years) at the Site level that is not significant.
- 15.14.10 A precautionary method of works will be employed as part of the CEMP in order to sensitively clear areas of suitable reptile habitat and displace reptiles into areas of adjacent habitat. With these measures in place a temporary adverse effect (approx. 4 years) at the Site level that is not significant is expected.
- 15.14.11 The Gravesend Site is known to support a diverse range of invertebrate species. Habitat loss during construction is expected to result in a significant temporary (approx. 4 years) adverse effect on conservation status at the District level. However, based on the similar areas of suitable habitat within the surrounding marshes, this effect is expected to be reversible and following completion of construction this is expected to reduce to a long term effect that is not significant.

15.14.12 During operation of the Gravesend SEC it will be unmanned during normal operation and minimal disturbance of adjacent habitats and associated species are expected. No significant effects are expected on designated sites, habitats or species during the operational phase.

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15.16 Abbreviations

Abbreviation	Meaning
BoCC	Birds of Conservation Concern
BCT	Bat Conservation Trust
BNG	Biodiversity Net Gain
BPM	Best Practicable Means
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CRoW	Countryside and Rights of Way
dB	Decibel
ECOW	Ecological Clerk of Works
EclA	Ecological Impact Assessment
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
GCN	Great Crested Newts
GI	Ground investigation
HGV	Heavy Goods Vehicle
HRA	Habitats Regulations Assessment
HSI	Habitat Suitability Index
HT	High Tide
IEF	Important Ecological Features
IEMA	Environmental Management and Assessment
IIA	Important Invertebrate Area
INNS	Invasive Non-Native species
LT	Low Tide
LWS	Local Wildlife Site
NERC	Natural Environment and Rural Communities
NIA	Nature Improvement Area
NOx	Nitrous Oxides
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NVC	National Vegetation Classification
PEA	Preliminary Ecological Appraisal
PMoW	Precautionary Method of Works
RNR	Roadside Nature Reserve
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SEC	Sealing End Compound
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TKRE	Tilbury to Grain and Tilbury to Kingsnorth
WCA	Wildlife and Countryside Act
WFD	Water Framework Directive

