



Thurrock Flexible Generation Plant

**Environmental Statement Volume 3
Chapter 9: Onshore Ecology**

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Environmental Impact Assessment

Environmental Statement

Volume 3

Chapter 9

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Summary

This document assesses impacts of the Thurrock Flexible Generation Plant on onshore ecology for the Environmental Statement (ES).

Qualifications

This document has been prepared by Matthew Fasham, a Chartered Environmentalist and full Member of the Chartered Institute of Ecology and Environmental Management, who has fifteen years' experience of environmental impact assessment.

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1. Introduction

1.1 Purpose of this chapter

- 1.1.1 This chapter of the Environmental Statement presents the findings of Environmental Impact Assessment (EIA) work undertaken concerning potential impacts of Thurrock Flexible Generation Plant on onshore ecology.
- 1.1.2 Specifically, this chapter considers the likely effects of Thurrock Flexible Generation Plant on ecological receptors during construction, operation and decommissioning. With the exception of wintering birds, this chapter considers effects on receptors on the landward side of the sea wall only. For an assessment of impacts on intertidal and marine habitats and receptors other than wintering birds, refer to Volume 3, Chapter 17: Marine Environment.
- 1.1.3 Where Natura 2000 sites (i.e. internationally designated sites) are considered, this chapter summarises the assessments made on the interest features of internationally designated sites as described within Section 4 of this chapter. The full assessment of effects on the integrity of Natura 2000 sites is contained within the Habitat Regulations Assessment Report (HRAR) for Thurrock Flexible Generation Plant which accompanies the ES.
- 1.1.4 This chapter summarises information from ecological surveys contained within the technical report included at Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report, additional reports presented in Volume 6, Appendix 9.2: Third Party Survey Reports and the technical report included at Volume 6, Appendix 9.4: Foreshore Wintering Bird Surveys 2019-20.
- 1.1.5 The surveys summarised in Volume 6, Appendices 9.1 – 9.4 are:
- Extended Phase 1 habitat survey;
 - Additional vegetation survey of specific grassland types;
 - Invertebrate scoping surveys;
 - Eel scoping survey
 - Reptile survey;
 - Breeding bird survey;
 - Terrestrial wintering bird survey of potential Functionally Linked Land;
 - Foreshore wintering bird surveys (by third parties and RPS);
 - Bat survey;
 - Water vole and otter survey; and

- Badger survey.

1.1.6 In particular, this ES chapter:

- presents the existing environmental baseline data established from desk studies, surveys and consultation to date;
- presents the potential environmental effects on ecology arising from the proposed Thurrock Flexible Generation Plant, based on the information gathered and the analysis and assessments undertaken to date;
- identifies any assumptions and limitations encountered in compiling the environmental information; and
- highlights any necessary monitoring and/or mitigation measures that could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

1.2 Planning policy context

- 1.2.1 National planning policy for energy generation Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to ecology, is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1; DECC, 2011a). National planning policy for electricity generation plant from fossil fuels is contained in the Fossil Fuel Electricity Generating Infrastructure NPS EN-2 (DECC, 2011b) but there are no specific additional policies relating to ecology.
- 1.2.2 NPS EN-1 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 1.1 below.

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

Summary of NPS EN-1 provision	How and where considered in the ES
The development must be assessed with regard to whether or not the project would have a significant effect on a European site or any site which is provided the same protection as a matter of policy (NPS EN-1, paragraph 4.3.1).	Effects of the Thurrock Flexible Generation Plant on European sites are considered in this chapter (Section 4) and a full assessment of effects on integrity of European sites is provided in the HRAR which accompanies the ES.
The Environmental Statement should set out any effects on internationally, nationally, and locally designated sites of ecological conservation importance, on protected species and habitats and other species identified as being of principal importance for the conservation of biodiversity (NPS EN-1, paragraph 5.3.3).	Relevant baseline data have been collated to determine ecology features of concern, and inform the assessment of effects, which sets out effects on designated sites, protected species and habitats and other species identified as being of principal importance for the conservation of biodiversity (see Section 4).

Summary of NPS EN-1 provision	How and where considered in the ES
The applicant should show how the project would take opportunities to conserve and enhance biodiversity conservation interests (NPS EN-1, paragraph 5.3.4).	Where practicable, opportunities to enhance the site for the benefit of biodiversity have been included in proposed development and are summarised in the Outline Ecological Management Plan (OEMP) (application document A8.7). These have been informed by baseline surveys.
The likely effects on sites of regional and local biodiversity interest should be considered, although these sites would not be used in themselves to refuse development consent (NPS EN-1, paragraph 5.3.13).	Likely ecology and nature conservation effects on all known designated sites of ecology and nature conservation interest (including those of regional and local interest or value) have been assessed in Section 4.
Particular consideration should be given to the likely effects of on feeding and hunting grounds, migration corridors and breeding grounds (NPS EN-5, paragraph 2.7.2).	The likely effects of the Thurrock Flexible Generation Plant on all species considered in this chapter have been assessed with regard to the potential for loss, damage or disturbance of habitat of value for breeding or nesting, foraging or hunting, and commuting or migration (see Section 4).

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

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

Summary of NPS EN-1 policy on decision making (and mitigation)	How and where considered in the ES
The Secretary of State should have regard to the Government's biodiversity strategy, which includes aims to ensure a halting, and if possible a reversal, of declines in Priority Habitats and Species, with wild species and habitats as part of healthy, functioning ecosystems; and the general acceptance of biodiversity's essential role in enhancing the quality of life, with its conservation becoming a natural consideration in all relevant public, private and non-governmental decisions and policies. The Secretary of State should also take account of the challenge of climate change (paragraphs 5.3.5, 5.3.6).	Relevant baseline data have been collated (Section 3.7) in order to determine the presence and condition of ecology features of concern (habitats and species), and inform the mitigation strategies to help protect and, where practicable, restore Priority Habitats and Species and the conservation of biodiversity. The role of habitats and species in the ecosystem has been considered in the assessment of their value, where applicable (Section 3). Reference is made to the potential effects of climate change on biodiversity in Section 3.2.1.
The development should aim to avoid significant harm to biodiversity, including through mitigation and consideration of reasonable alternatives (paragraph 5.3.7)	The design of the Thurrock Flexible Generation Plant has taken into account the need to protect biodiversity and prevent significant harm. Mitigation measures described in this chapter include measures to protect and minimise the potential for adverse effects on biodiversity.

Summary of NPS EN-1 policy on decision making (and mitigation)	How and where considered in the ES
Appropriate weight should be given to designated sites, protected species, habitats and other species of principal biodiversity conservation value (paragraph 5.3.8)	The ecology and nature conservation value of sites, species and habitats identified within the study areas, have been assessed and are explained in this chapter. The value of each feature has informed the assessment of effects (Section 4).
Many individual wildlife species receive statutory protection under a range of legislative provisions. Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales and thereby requiring conservation action. The Secretary of State should ensure that these species and habitats are protected from the adverse effects of development by using requirements or planning obligations. The Secretary of State should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the development outweigh that harm. In this context, the Secretary of State should give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which may result from a proposed development (paragraphs 5.3.16 - 5.3.17.)	Natural England have been consulted. Records of meetings and communications are provided in Table 1.4. A series of species and habitat surveys have been undertaken in order to inform this assessment of effects (Section 3). A mitigation strategy has been developed in order to minimise the potential for disturbance to species and habitats and provide long-term biodiversity benefit (Table 2.8 and as outlined in the OEMP, application document A8.7).
Appropriate mitigation measures should be included as an integral part of the development: <ul style="list-style-type: none"> during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works; during construction and operation, best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements; habitats will, where practicable, be restored after construction works have finished; and opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals. Where appropriate mitigation will be put in place the Secretary of State should consider what appropriate requirements should be attached to any consent and/or planning obligations (paragraphs 5.3.18-5.3.19).	Mitigation measures adopted to mitigate the ecology and nature conservation effects are described in this chapter (see Table 2.8) and are further developed in the OEMP (application document A8.7) (to be updated prior to construction as necessary following pre-commencement surveys). Measures include limiting the extent of works, following best practice guidelines, reinstating habitats after construction or installation and opportunities for enhancement/creation of habitats where practicable.

Summary of NPS EN-1 policy on decision making (and mitigation)	How and where considered in the ES
Mitigation measures agreed with Natural England and confirmation as to whether or not Natural England intends to grant or refuse any necessary licence applications will be taken into account during the processing of an application (paragraph 5.3.20).	Natural England has been consulted with regard to the ecological assessment. Pre-construction surveys will also be required in order to update survey findings and inform any future need for a licence or licences.

1.2.4 A number of other policies are relevant to this chapter including:

- National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019);
- Web-based National Planning Practice Guidance (NPPG) formulated by the Ministry of Housing, Communities & Local Government (MHCLG) (formerly the Department for Communities and Local Government) (MHCLG, 2019);
- UK Biodiversity Action Plan (UK BAP) (JNCC, 2011); and
- Essex BAP (Essex Biodiversity Project, various).

1.2.5 Key provisions of the policies are set out in Table 1.3, along with details as to how these have been addressed within the assessment.

Table 1.3: Summary of other relevant policies to ecology and nature conservation.

Summary of other relevant policy provision	How and where considered in the Environmental Statement
National Planning Policy Framework	
The NPPF sets out the national planning policies for England and the Government's desire to enable sustainable development. One of the overall aims of the NPPF is that the planning system should aim to conserve and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible.	Identification and assessment of protected species have been included at Sections 3 and 4 of this chapter respectively. A Net Gain assessment has been produced in Volume 6, Appendix 9.3
National Planning Practice Guidance	
The guidance states that the planning system should protect, enhance and conserve the natural and local environment (paragraph 109, section 11 of the NPPG).	Identification and assessment of protected species have been included at Sections 3 and 4 of this chapter respectively.
Essex BAP	

The Essex Biodiversity Action Plan 2010-2020 identifies 19 'priority' habitat types within Essex. It has been superseded by the UK Post-2010 Biodiversity Framework but is relevant for assessing value of species and habitats of local importance.	Identification and assessment of habitats and protected species have been included at Sections 3 and 4 of this chapter respectively.
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1.3 Legislation

European legislation

- 1.3.1 Council Directive 92/43/EEC (the Habitats Directive) provides for protection of animals and plants throughout EU member states through both the designation/classification of European Sites as well as the protection of European Protected Species.
- 1.3.2 The Habitats Directive was first transposed into UK law through the Conservation (Natural Habitats, &c.) Regulations 1994. In England and Wales, these Regulations have been superseded by the Conservation of Habitats and Species Regulations 2017.
- 1.3.3 The Birds Directive is transposed into UK law through the Wildlife & Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 and provides a framework for the conservation and management of, and human interactions with, wild birds in Europe.
- 1.3.4 All of the above UK regulations allow for the designation or classification of European Sites as specified under the Habitats Directive including Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites.

National legislation

- 1.3.5 Sites of Special Scientific Interest (SSSIs) are designated under the Wildlife & Countryside Act 1981, as amended. Part II of the Act makes it an offence to damage any sites designated as SSSI. Any works which may potentially damage these sites require prior consultation with Natural England.
- 1.3.6 Local Nature Reserves (LNRs) are local authority designations under the National Parks and Access to the Countryside Act 1949. They are designated in consultation with relevant statutory nature conservation agencies and are managed for nature conservation and people.

- 1.3.7 The Conservation of Habitats and Species Regulations 2017 require that a plan or project that is not directly connected with or necessary for the management of a Natura 2000 site, but which has a likely significant effect on the site, either individually or in combination with other plans or projects, will require an appropriate assessment of the impact of that plan or project on the interests of the Natura 2000 site. An assessment of the potential impacts of the Thurrock Flexible Generation Plant on the qualifying interests of relevant SACs is presented in the HRAR, which accompanies the ES.
- 1.3.8 The Natural Environment and Rural Communities Act 2006 (NERC Act) provides that Natural England's general purpose is to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and future generations. Section 41 of the NERC Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. Section 41 lists guidance to decision-makers, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act to have regard to biodiversity conservation in England when carrying out their functions.

1.4 Consultation

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

Table 1.4: Key points raised during scoping and consultation.

Date	Consultee and type of response	Points raised	How and where addressed
19 February 2018	Site meeting with Jonathan Bustard of Natural England (NE) via the discretionary advice service (DAS), Statera Energy and Cherryfield Ecology	Introduction to proposals, and discussion on potential ecological issues. NE raised: <ul style="list-style-type: none"> • Possibility of important invertebrate communities in the area due to the proximity to local wildlife sites with these present. A specialist entomologist should be employed to assess the site for important invertebrate communities. • Potential for water voles to be present • Bird surveys and potential for raptors to be present • Requirement for reptile mitigation • Overall aim to be delivery of net gain to biodiversity 	Surveys of invertebrate potential, reptiles, water voles and breeding birds are summarised in Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report and Section 3, and impacts are assessed in Section 4. Mitigation strategy is summarised in the OEMP (application document A8.7). As outlined in Section 4, overall the mitigation strategy is considered to present a minor beneficial impact on biodiversity due to the ecological mitigation and enhancement proposed.
March 2018	Jonathan Bustard of Natural England by email	Scope of ecological survey work outlined to NE, which NE considered to be broadly acceptable: <ul style="list-style-type: none"> • Phase 1 habitat survey • Invertebrate scoping • GCN eDNA • Reptiles • Breeding birds • Water Voles • Badgers 	Surveys are summarised in Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report and Section 3.
June-July 2018	Jonathan Bustard of Natural England by phone and email	Provided update on survey progress and mitigation proposals	Surveys are summarised in Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report and Section 3, Mitigation strategy is summarised in the OEMP (application document A8.7).
December 2018	Meeting at RPS Cambridge office with Jonathan Bustard of Natural England	Ecological mitigation proposals including Water Voles Update on ecological surveys including wintering terrestrial bird surveys Scope of air quality assessment Biodiversity net gain	Terrestrial wintering bird surveys are summarised in Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report. A review of third party wintering bird foreshore surveys is summarised in Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report. Assessment of effects of aerial emissions are summarised in Volume 3, Chapter 12: Air Quality and Volume 6, Appendix 12.1: Assessment of Air Quality Impacts on Ecological Receptors The biodiversity net gain assessment is provided in Volume 6, Appendix 9.3.
August 2019	Meeting at Statera Energy office with Natural England	Water Vole mitigation strategy	The Water Vole mitigation strategy is summarised in the OEMP (application document A8.7).
30th August 2018	Meeting at Thurrock Council offices, in attendance: RPS, Statera Energy, Thurrock Council, Steve Plumb Associates (SP) (for Thurrock Council)	RPS provided update on consultation with Natural England, baseline ecology surveys undertaken to date and gave outline of proposed habitat creation. SP noted importance of assessing cumulative effects with the nearby NSIP developments. Uncertainty regarding Lower Thames Crossing route and its potential impacts on local wildlife sites was discussed. General agreement that the Thurrock Flexible Generation Plant main site has been positioned in area of low ecological value/sensitivity relative to surrounding landscape	Surveys are summarised in Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report and Section 3, Mitigation strategy is summarised in the OEMP (application document A8.7).

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	PINS - Scoping Opinion	<p>The Applicant proposes to scope out wintering and passage bird surveys in respect of the arable farmland crossed by the gas connection and access road route corridors. The Inspectorate does not agree there is sufficient evidence to support scoping out surveys for wintering and passage birds on the arable farmland crossed by the gas connection and access road route corridors.</p> <p>The Inspectorate considers there is potential for impacts from disturbance/ displacement to birds, from the proposed development alone and particularly cumulatively with other developments (including from use of the existing or new jetty)</p> <p>The Applicant should undertake further consultation with Natural England in effort to agree the approach and timing of specific surveys for wintering and passage birds.</p> <p>The ES must fully assess impacts on the designated sites and on functionally linked land utilised by qualifying features of these sites, both alone and cumulatively with other developments.</p>	<p>Surveys of wintering birds in areas potentially considered to be functionally linked land were carried out between September 2018 and March 2019 and an assessment of potential effects are reported in this chapter and in the HRAR.</p> <p>This scoping opinion was based on a cooling water option which is no longer being considered. However, the project design now includes the construction and use of a causeway to deliver equipment to the construction site. Therefore, effects of this causeway on birds are assessed in this chapter, and in the HRAR. Cumulative effects are assessed in Volume 4 Chapter 22.</p>
September 2018	PINS - Scoping Opinion	<p>The Inspectorate notes that the Phase 1 habitat survey and preliminary species surveys presented in Appendix D of the Scoping Report do not appear to have considered the area required for the potential cooling water pipeline. In the absence of this information (or confirmation that the cooling water option will not be pursued), the Inspectorate does not agree to scope out white clawed crayfish surveys.</p> <p>The Applicant should seek to agree the need for white clawed crayfish surveys with relevant consultation bodies. If there is potential for significant effects on white clawed crayfish, this should be assessed in the ES.</p>	<p>The ditches on site are not suitable habitat for white-clawed crayfish. The ditches were mostly dry at the latter end of the 2018 survey period, and it is therefore extremely unlikely that white-clawed crayfish could be present in those ditches that are affected by the proposed development.</p>
September 2018	PINS - Scoping Opinion	<p>The Applicant proposes to scope out surveys for bats. Table 8.5 of the Scoping Report states that there are no potential bat roost sites in the 'main development site' and that the development is considered highly unlikely to result in fragmentation of foraging or commuting routes given the habitats present on site. This appears to contradict paragraph 8.89 of the Scoping Report, which states that these habitats may be of value to foraging and commuting bats.</p> <p>The Inspectorate also notes that the Phase 1 habitat survey and preliminary species surveys presented in Appendix D do not appear to have considered the area required for the potential cooling water pipeline. In the absence of this information (or confirmation that the cooling water option will not be pursued) and noting the potential suitability of habitats on the main development site for foraging and commuting bats, the Inspectorate does not agree to scope out the need for bat surveys.</p> <p>The Applicant should seek to agree the approach to and the need for bat surveys with relevant consultation bodies. If there is potential for significant effects on bats, this should be assessed in the ES.</p>	<p>Initial discussions with NE on proposed survey effort did not include bat surveys and it was considered that such surveys had been scoped out of the assessment. However, in response to the Scoping Opinion, bat activity surveys were undertaken in 2019 and included in Volume 6, Appendix 9.2: Third Party Survey Reports. An assessment of impacts on foraging bats is provided in Section 4 of this chapter.</p>
September 2018	PINS - Scoping Opinion	<p>The Applicant proposes to scope out surveys for otter. Table 8.5 of the Scoping Report explains no otters are recorded within 2 km of the 'main development site' and the loss of any ditches on site is not considered to have a detrimental impact on foraging otters.</p> <p>The Inspectorate also notes that the Phase 1 habitat survey and preliminary species surveys presented in Appendix D do not appear to have considered the area required for the potential cooling water pipeline. In the absence of this information (or confirmation that the cooling water option will not be pursued), the Inspectorate does not agree to scope out the need for otter surveys.</p>	<p>The cooling water option is no longer being pursued.</p> <p>Signs of otters would have been recorded during water vole surveys, and no signs indicating presence of otters have been found.</p>
September 2018	PINS - Scoping Opinion	<p>The Inspectorate notes that Natural England's consultation response (see Appendix 2 of this Opinion) explains that the nationally significant invertebrate assemblage on the adjacent Tilbury2 site could be considered to be of sufficient quality to meet the designation requirements of a SSSI and that the site is being considered for notification. The ES should assess impacts on invertebrate assemblages both alone and cumulatively with other developments where significant effects are likely.</p>	<p>Tilbury2 has been consented and the majority of the area supporting the nationally significant invertebrate assemblage has been or will be destroyed for construction of the Tilbury2 development.</p> <p>An assessment of cumulative effects has been undertaken in Volume 4, Chapter 22.</p>

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	PINS - Scoping Opinion	The Scoping Report states that there are two Local Wildlife Sites (LWSs) within 1 km of the 'main development site'. However, Figure 2.1 (in Appendix D of the Scoping Report) identifies a number of other LWSs, including two within the application site. It also appears that the area required for the cooling water pipeline (not shown on Figure 2.1) would fall within a LWS. The Inspectorate is aware that a LWS review has been undertaken by Thurrock Council, which has resulted in amendments to LWS boundaries. The Applicant should take these amendments into account in the ES.	Details of LWS are provided in Section 3 and Table 3.1. The review of LWSs has not yet resulted in formal amendments to LWS boundaries. It is noted that one of the proposed amendments includes designation of Walton Common (Zone A). Any future designation of this area as a LWS would not materially affect the significance of effects presented in this ES or the mitigation proposed for the loss of habitat in Zone A.
September 2018	PINS - Scoping Opinion	Ecological surveys used to inform the assessment must include the area required for the water-cooling pipeline, if this option is pursued.	The cooling water option is no longer being progressed.
September 2018	PINS - Scoping Opinion	The ES should identify and quantify all temporary or permanent habitat losses by type (including loss of any functionally-linked land). This should cover the entirety of the application site; including the cooling water pipeline and gas pipeline corridors as well as the main development site.	Impacts of habitat loss are assessed in Section 4. Wintering bird surveys to determine whether birds from the SPA are present in areas considered to be potential functionally linked land have been undertaken and the land affected by construction is not considered to be functionally-linked land based on the lack of SPA birds recorded during the surveys.
September 2018	PINS - Scoping Opinion	The Inspectorate notes the intention to assess impacts from operational air quality emissions on ecological receptors. The ES should include clear cross-reference between the Ecology chapter and other relevant aspect chapters e.g. air quality. The ES should assess impacts from modelled pollutant deposition levels against relevant critical loads provided in the UK Air Pollution Information System (APIS). Any likely significant effects to habitats and protected species should be assessed.	Impacts of operational emissions on ecological receptors are considered in Volume 6, Appendix 12.1: Assessment of Air Quality Impacts on Ecological Receptors and Section 4.
September 2018	PINS - Scoping Opinion	The Inspectorate considers that impacts from lighting on ecological receptors (including aquatic ecology, if the cooling water pipeline option is pursued) should be assessed where significant effects are likely.	Impacts of disturbance on species during construction are considered in Section 4. Operational lighting impacts are not considered likely as the access road will be unlit and the Thurrock Flexible Generation Plant site will be unlit externally save for directional motion-activated security lighting.
September 2018	PINS - Scoping Opinion	The Inspectorate notes the proximity of the Proposed Development to the Thames Estuary and Marshes Important Bird Area (IBA), which is not identified as a receptor in the Scoping Report. The ES should assess any likely significant effects to the IBA.	It is not standard practice to include IBAs as receptors in ESs. Impacts on birds are assessed via impacts on the SPA/Ramsar, on breeding and wintering birds and within the HRAR (application document A5.2).
September 2018	PINS - Scoping Opinion	There are a number of ditches present on and around the application site. The Applicant should ensure there is suitable effort to confirm whether these ditches contain ecological receptors e.g. fish and/ or eel populations. Any likely significant effects should be assessed in the ES.	The majority of the ditches that would be directly affected became dry during the 2018 field season (confirmed during water vole surveys) and are therefore not considered likely to hold significant populations of fish. Notwithstanding this, an assessment of the site for potential to support eels was undertaken and is presented in Volume 6, Appendix 9.2: Third Party Survey Reports. The site is not considered suitable to support eel populations or other populations of fish.
September 2018	PINS - Scoping Opinion	The Preliminary Ecological Appraisal (Appendix C of the Scoping Report) states that no invasive species have been found on the main development site. Surveys to identify the presence of invasive species should be undertaken for the whole application site and any necessary eradication/ control measures detailed in the ES.	Phase 1 surveys have been undertaken across the whole application site, and no invasive non-native plant species were recorded.
September 2018	PINS - Scoping Opinion	The Applicant considers that there is no potential for impacts to saltmarsh, however no specific justification is provided in this regard. The Inspectorate does not agree that sufficient information has been provided in order to scope this matter out. In particular, the Inspectorate notes the potential for construction and operation of the cooling water pipeline to result in changes to coastal processes and sedimentation patterns, which could impact on the saltmarsh habitats. The ES should describe the potential impacts to saltmarsh and any likely significant effects on this habitat should be assessed. This should include consideration of any cumulative effects, including with the consented new jetty, Tilbury2 and Tilbury Energy Centre.	Effects on saltmarsh from the construction and operation of the causeway are assessed in Volume 3, Chapter 17: Marine Environment.

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	PINS - Scoping Opinion	<p>The scale of development proposed in the Tilbury area requires detailed consideration of both temporary and permanent cumulative effects; as such the Inspectorate recommends that the cumulative assessment is presented in a standalone aspect chapter. In particular the Inspectorate notes the shared land interests that exist within the Proposed Development site boundary, i.e. with the proposed Lower Thames Crossing, Tilbury2 and Tilbury Energy Centre NSIPs (as illustrated on Figure 16 of the Scoping Report). The cumulative assessment should include all phases and elements of the Proposed Development and the other developments; and all relevant aspect assessment chapters.</p> <p>Particular consideration should be given to the cumulative impacts resulting from disturbance (including noise, traffic and light) to bird species associated with the South Thames Estuary and Marshes SSSI and the Thames Estuary and Marsh SPA and Ramsar site.</p>	<p>The potential for in-combination effects on the Thames Estuary & Marshes SPA/Ramsar site is assessed in Section 4, Volume 6, Appendix 12.1: Assessment of Air Quality Impacts on Ecological Receptors, the HRAR (application document A5.2) and Volume 4, Chapter 22.</p>
September 2018	Environment Agency – Scoping Opinion	<p>The scoping report identifies a mosaic of habitats associated with the site. The main issues that should be considered are:</p> <ul style="list-style-type: none"> • Impact on statutory designated sites (SSSIs, SPAs) • Impact on non-statutory sites (Local Wildlife Sites) • Protected species, particularly water voles and great crested newts • Water Framework Directive, particularly any effects on terrestrial watercourses/ditches • Impacts on fish and eels in ditches also need to be considered and surveys undertaken • Invasive species. If any are present then eradication measures will be required. • Invertebrate populations. The site is likely to have a significant assemblage of scarce brownfield invertebrates. This will need detailed surveys and adequate mitigation/compensation measures such as compensatory ditches and wetland 	<p>Impacts on statutory and non-statutory sites, habitats including ditches and protected species are assessed in Section 4 of this chapter and the HRAR (application document A5.2).</p> <p>A high-level Water Framework Directive assessment is provided in Volume 3, Chapter 15: Hydrology and Flood Risk.</p> <p>The majority of the ditches that would be directly affected became dry during the 2018 field season (confirmed during water vole surveys) and are therefore not considered likely to hold significant populations of fish.</p> <p>Notwithstanding this, an assessment of the site for potential to support eels was undertaken and is presented in Volume 6, Appendix 9.2: Third Party Survey Reports. The site is not considered suitable to support eel populations or other populations of fish.</p> <p>During the various field surveys carried out, no invasive non-native plant species were recorded. Invasive species protocol is summarised in the CoCP (application document A8.6) and Table 2.8.</p> <p>The site does not contain brownfield habitat and an assessment of Zone A by an appropriately experienced consultancy specialising in invertebrates concluded that surveys for invertebrates were not required (Volume 6, Appendix 9.1: Ecological desk study and survey report). However, impacts on invertebrates have been considered and mitigation is proposed – see Section 4 and the OEMP (application document A8.7).</p>
September 2018	Environment Agency – Scoping Opinion	<p>The developer should adequately incorporate mitigation measures to offset the impacts on receptors during construction and operation. Where mitigation is not possible, then significant compensation will be required, off-site if necessary. We would like to see incorporation of wildlife friendly sustainable drainage features and green roofs in the development where possible, as these offer an opportunity to provide net gains in regards to biodiversity.</p>	<p>Designed-in and additional mitigation is proposed to offset ecological effects and provide overall net gain.</p> <p>On-site options for sustainable drainage features have been explored and further detail is provided in the Conceptual Drainage Scheme (application document A7.4).</p>
September 2018	Environment Agency – Scoping Opinion	<p>Saltmarsh can only be scoped out on the understanding that no saltmarsh (including upper saltmarsh species) are present in the River Thames corridor. Rather than scoping out a particular habitat type, the assessment should just state that it will scope in all habitats within the zone of influence of the development.</p>	<p>Effects on saltmarsh from the construction and operation of the causeway are assessed in Volume 3, Chapter 17: Marine Environment.</p>
September 2018	Essex County Council – Scoping Opinion	<p>The EIA should thoroughly explore all reasonable options to enhance the development for Protected and Priority species and habitats, and others of significance at a local level</p>	<p>Mitigation and enhancement measures are summarised in the OEMP (application document A8.7) and Section 4.</p>

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	Essex County Council – Scoping Opinion	It is recommended that the HRA screening needs to identify which Impact Risk Zones (IRZs) the site falls within for Natura 2000 (N2K) sites identified by Natural England on MAGIC website for this type of development which may or may not be 10km. An assessment should also be made of SSSIs and LWS (within 2km) and recommended Marine Conservation Zones (rMCZs)	Impacts on statutory and non-statutory sites, habitats including ditches and protected species are assessed in Section 4 and the HRAR(application document A5.2). Effects on rMCZs are assessed in Volume 3, Chapter 17: Marine Environment.
September 2018	Essex County Council – Scoping Opinion	The Shadow HRA needs to consider impact pathways for Likely Significant Effects (LSE) on the Thames Estuary and Marshes SPA/Ramsar and North Downs SAC from the development alone or in-combination with other plans and projects e.g. LTC, Tilbury2 and Tilbury Energy Centre – all NSIPs in the locality	The potential for in-combination effects on the Thames Estuary & Marshes SPA/Ramsar site is assessed in Volume 4, Chapter 22; Volume 6, Appendix 12.1: Assessment of Air Quality Impacts on Ecological Receptors; and the HRAR.
September 2018	Essex County Council – Scoping Opinion	Where further ecological field work is required will be undertaken to ensure that up to date information is used as a basis for assessment, these should be supplemented by data from Essex Field Club and Essex Wildlife Trust to inform the survey requirements and ensure that Priority and Protected Species are considered adequately.	Data was obtained from Essex Wildlife Trust for the PEIR. An updated data search was undertaken for the ES which included obtaining data from Essex Wildlife Trust and Essex Field Club (Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report).
September 2018	Essex County Council – Scoping Opinion	Reference to LWS is limited to 1 km from the main development site and states the presence of two such sites, but section 2.5 of the PEA in Appendix D shows that there are two LWS within the red line boundary, a further five adjacent to it and 11 more within 2 km. Direct and indirect impacts to all of these sites should be considered within the ecological assessment. These sites should also be considered for enhancement should compensation be required.	The PEA referred to as Appendix D (dated June 2018) was based on a version of the application boundary which is out of date – there are no longer any LWSs within the redline, for example (see Table 3.1). The assessment of designated sites is set out in Section 4, and impacts on LWSs are assessed here.
September 2018	Essex County Council – Scoping Opinion	Figure 2 (Sheet1) - This figure gives the red line boundary for the development, which differs from the area covered by the PEA contained in Appendix D. Area K, as shown on this figure, crosses land known as Tilbury Ashfields, and will affect land already managed in mitigation for ecological impacts arising from an active planning consent there. Any cumulative impact on this site, which is of high significance for its invertebrate populations should be carefully assessed and substantial compensation for any impacts will be expected.	The main part of the Tilbury Ashfields, where ecological restoration has already taken place, are not affected by the revised development boundary. The proposed access road from the causeway (Zone G) runs adjacent to the restored ashfield along an existing track and crosses an area that will be restored once the PFA mining and land raising works adjacent to the Tilbury Substation are complete, but would not result in any losses of land already restored and managed for the existing active land-raising consent. No impacts on the ashfields are therefore predicted.
September 2018	Essex County Council – Scoping Opinion	The evaluation of habitats plays down the status of some grassland areas as remnants of Coastal Grazing marsh, a Priority Habitat. Further detailed botanical survey is required to establish the plant communities present (Area K) and to properly evaluate its conservation value and potential for restoration or enhancement.	Area K as labelled at the time of scoping) is no longer part of the application and lies outside the Order Limits: therefore no effects would occur.
September 2018	Essex County Council – Scoping Opinion	Although not subject to a national conservation designation, it should be noted that the breeding pair of Raven represents the only known breeding site in Essex at the present time, and is therefore of high County – level significance. Compensation for the loss of the nest site should be considered.	The nesting ravens were in Zone B which is the existing Tilbury Substation. The nest site would not therefore be directly affected by the Thurrock Flexible Generation Plant. Impacts on the breeding bird assemblage are assessed in Section 4.
September 2018	Gravesham Borough Council – Scoping Opinion	It is suggested that consideration be given as to whether the NSIP proposals for London Resort at Swanscombe Peninsula could result in cumulative impacts that need to be taken into consideration – particularly if water cooling is used or water transport used during the construction phase, given the proposed Marine Conservation Areas detailed in the Scoping Report.	Effects on Marine Conservation Areas are assessed in Volume 3, Chapter 17: Marine Environment
September 2018	Gravesham Borough Council – Scoping Opinion	Whilst the Scoping Report covers the potential need for Appropriate Assessment under the Habitats Regulation, there doesn't appear to be mention of potential impact on Functionally Linked Habitat that supports the designated sites.	Surveys to assess whether birds that are designated features of the SPA / Ramsar are present in potential functionally linked land have been undertaken and are reported in Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report.

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September 2018	Gravesham Borough Council – Scoping Opinion	The Council is mindful that the proposal is being brought forward in the context of a market for electricity supply whereby there may be environmentally preferable alternatives that could be delivered either by this developer or by others. This may have implications if Appropriate Assessment under the Habitats Regulations is required and a case needs to be made in terms of Imperative Reasons of Overriding Public Interest (IROPI).	The HRAR (application document A5.2) has not identified significant effects on European sites that would require a case to be made in terms of IROPI.
September 2018	Marine Management Organisation – Scoping Opinion	Visual / noise disturbance to local ornithological features should be considered in any final ensuing ES. The MMO draw your attention to the local Royal Society for the Protection of Birds (RSPB) Thames Estuary and Marshes Important Bird Area (IBA) which is within the direct vicinity of the proposed outfall, intake and jetty work area.	It is not standard practice to include IBAs as receptors in ESs. Impacts on birds are assessed via impacts on the SPA/Ramsar, on breeding and wintering birds and within the HRAR (application document A5.2).
September 2018	Natural England – Scoping Opinion	We note that the proposal includes the loss of an area of common land known as Walton Common. We understand that there has been a consultation process with the local community regarding implications for Walton Common with respect to the proposal, and that a land exchange is under discussion. We advise that land being offered as replacement (“exchange land” in the EIA Scoping Report) should be of least equal value when compared to the land being replaced, in the context of (amongst other matters) the public interest. The EIA should consider the planned land management objectives for such mitigation land as there may be valuable opportunities to provide enhancement such as replacement meadow seeding to provide nectar for pollinators. The compatibility of common land mitigation and other ecological mitigation requirements should be carefully examined.	Details of potential ecological mitigation, including meadow creation, are provided in the OEMP (application document A8.7).
September 2018	Natural England – Scoping Opinion	It is important that appropriate evidence and analysis is included in the ES to inform the assessment under the Habitats Regulations. Therefore, we advise that survey of wintering birds should include the other areas of development (such as farmland crossed by the gas connection pipe, and access routes) and not just the water-cooling pipe vicinity, because these habitats may provide a functional linkage to the adjacent SPA and Ramsar site, and thus are relevant to the HRA and EIA. It is important that the EIA and Habitats Regulations Assessment consider impacts upon both the European site itself and on functionally linked land utilised by SPA birds.	Surveys to assess whether birds that are designated features of the SPA / Ramsar are present in potential functionally linked land have been undertaken and are reported in Volume 6 Appendix 9.1: Ecological Desk Study and Survey Report.
September 2018	Natural England – Scoping Opinion	It is not clear to us whether the preliminary species surveys that are referenced in the EIA Scoping report include consideration of the cooling pipe option. Natural England advises that surveys should cover the whole area of development (i.e. including an appropriate corridor of the cooling pipeline option) or present compelling reasons why such surveys are not required. We also advise that the applicant should consult Natural England’s published guidance for protected species licencing.	The cooling option is no longer being progressed and therefore effects have been scoped out of this assessment.
September 2018	Natural England – Scoping Opinion	Currently the methodology of the surveys proposed (e.g. for passage and wintering birds) is not sufficiently detailed for Natural England to agree that these will be fit for the purpose of HRA and EIA assessments (with reference to table 8.4). We strongly recommend that our pre- application DAS service is used to agree evidence requirements for the project.	Surveys to assess whether birds that are designated features of the SPA / Ramsar are present in potential functionally linked land have been undertaken and are reported in Volume 6 Appendix 9.1: Ecological Desk Study and Survey Report.
September 2018	Natural England – Scoping Opinion	The summary statement in Table 8.7 is not sufficiently detailed to allow Natural England to agree that the impacts to saltmarsh habitat may be scoped out. There is potential that works to install a water-cooling pipe would release sediments which could smother saltmarsh habitats, and therefore saltmarsh should be scoped in).	Effects on saltmarsh from the construction and operation of the causeway are assessed in Volume 3, Chapter 17: Marine Environment.
September 2018	Natural England – Scoping Opinion	The nationally significant invertebrate assemblage on the adjacent Tilbury2 site could be considered to be of sufficient quality to meet the designation requirements of a Site of Special Scientific Interest (‘SSSI’). Natural England is currently considering such a site for notification. We will be adding the site to our SSSI designations’ pipeline in due course, consistent with the requirements of our designations’ strategy. We will advise further as this progresses but consideration of impacts both alone and cumulative with other developments on these invertebrate assemblages will be necessary to meet the requirements of EIA.	Impacts on invertebrates have been assessed and mitigation including habitats for invertebrates is proposed. When considering cumulative effects, Tilbury2 will result in the loss of the majority of the Lytag Brownfield LWS, for which compensation is proposed offsite.

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September 2018	Natural England – Scoping Opinion	The scale of development proposed in this area requires careful consideration of both temporary and permanent in-combination impacts. The EIA will need to consider impacts on existing environmental features, previous mitigation commitments of the land within and adjacent to the development and any mitigation and compensation schemes that are required enable the delivery of other development coming forward in this locality. We would advise that one approach would be the preparation of a co-ordinated mitigation strategy would be agreed between the applicants for this site and nearby developments which would safeguard and join up important environmental features and provide enhancement at the landscape scale.	The applicant is willing to explore opportunities for joint development of measures at the landscape scale, in conjunction with developers of other sites. However, as the other proposed developments are significantly larger, the applicant would expect others to lead any joint strategy.
September 2018	Port of Tilbury London Limited – Scoping Opinion	PoTLL has particular concerns regarding ecology, as the Thurrock Flexible Generation Plant proposals have the potential to interact with impacts from the Tilbury2 project mainly by virtue of geographical proximity and the interconnection between certain habitat and species receptors. In particular, the site proposed for the Thurrock Flexible Generation Plant itself is subject to a draft Local Wildlife Site designation (LWS) (although this does not appear to have been identified in the scoping report), and is known to support semi-improved coarse grassland and relict grazing marsh habitats of confirmed value for reptiles and (in the boundary ditches) water voles, and with likely value for ground nesting and scrub birds, badgers and species from the nationally significant invertebrate assemblage associated with the power station area generally, potentially including Priority species such as hornet robberfly. Thus, further impacts on such resources could arise from the Thurrock Flexible Generation Plant with additional consequences for local metapopulations over and above those arising from Tilbury2 alone and/or Tilbury2 cumulatively with the TEC and LTC	The review of LWSs has not yet resulted in amendments to LWS boundaries. It is noted that one of the proposed amendments includes designation of Walton Common (Zone A). Any future designation of this area as a LWS would not materially affect the significance of effects presented in this ES or the mitigation proposed for the loss of habitat in Zone A. Impacts on protected species are assessed in Section 4. Mitigation proposals are provided in the OEMP (application document A8.7) and include habitat creation for reptiles and water voles. Cumulative effects are considered in Volume 4, Chapter 22.
September 2018	Port of Tilbury London Limited – Scoping Opinion	Whilst the Lytag Brownfield Local Wildlife Site (LWS) and Tilbury Centre LWS have been identified (para 2.19, para 8.86), the presence of the Tilbury Power Station draft LWS, which forms part of the Thurrock Flexible Generation Plant 'main development site', appears to have been overlooked by the Applicant. Impacts on this designation should be considered, including impacts on this surviving grazing marsh fragment in the wider landscape-scale context of the Thurrock Thames Marshes. The permanent loss of the draft LWS and historic grazing marsh will also need to be weighed against the potential operational life of the proposed development being potentially limited to 35 years.	The review of LWSs has not yet resulted in amendments to LWS boundaries. It is noted that one of the proposed amendments includes designation of Walton Common (Zone A). Any future designation of this area as a LWS would not materially affect the significance of effects presented in this ES or the mitigation proposed for the loss of habitat in Zone A.
September 2018	Port of Tilbury London Limited – Scoping Opinion	The Applicant has also failed to identify the Tilbury Marshes LWS within the Scoping Report as falling within the proposed development boundary, and at para 3.38 this land (area J) is identified as having potential 'community use' under a future s106 agreement. Area J encompasses the triangle of grassland adjacent to Fort Road (and within the Tilbury Marshes LWS) which originally formed part of the Tilbury2 Order Limits, but which was excluded in order to preserve this area of long-established grassland. Consideration will therefore need to be given to whether potential 'community use' would be compatible with maintaining the ecological interest of this area.	This area is no longer part of the application boundary and therefore effects have been scoped out of the assessment.
September 2018	Port of Tilbury London Limited – Scoping Opinion	An update habitat survey is documented at Appendix D. This describes Walton Common as 'semi-improved grassland' but does not consider whether it meets the definition of Priority coastal and floodplain grazing marsh habitat.	This is considered in Section 3.
September 2018	Port of Tilbury London Limited – Scoping Opinion	It is noted that the desk study documented at Chapter 2 of Appendix D does not include the comprehensive data available for the adjacent landholdings via the Tilbury2 Application and Examination submissions (which are readily accessible via the PINS website). Furthermore, records do not appear to have been sought from the Essex Field Club, which is likely to hold a far greater number of records relevant to the search area than the repositories contacted by Thurrock Flexible Generation Plant. The evaluation section which follows is therefore considered incomplete.	Documents associated with the Tilbury2 site have been reviewed where appropriate. Essex Field Club data has been obtained for the ES.

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September 2018	Port of Tilbury London Limited – Scoping Opinion	A notable omission from the list of bird species recorded at Chapter 8 is nightingale (a red list species) which was regularly recorded by the proponents of the Tilbury2 scheme.	Nightingale was not recorded during the bird surveys undertaken in 2018. The 2017 Tilbury2 bird survey results indicated the presence of one territory in the part of the Lytag Brownfield LWS covered by the breeding bird survey in 2018. While it is possible that a nightingale territory might have been present in this area in 2018, it was considered that as there is no habitat for potential breeding nightingales (areas of dense scrub) within the Thurrock Flexible Generation Plant application boundary and therefore it was not considered necessary to undertake targeted surveys for nightingale.
September 2018	Port of Tilbury London Limited – Scoping Opinion	Chapter 10 of Appendix D concludes that badger activity is limited and assesses impacts on that basis. However the Thurrock Flexible Generation Plant proponents should be aware that an artificial sett has now been constructed within the adjacent parcel of land (under planning consent 18/00448/FUL) and the badger assessment provided within the EIA should be updated to reflect this.	Impacts on badgers are assessed in Section 4.
September 2018	Port of Tilbury London Limited – Scoping Opinion	The Tilbury2 ecology surveys identified bat activity within the Thurrock Flexible Generation Plant main development site. It is therefore considered inappropriate to scope bats out of the EIA process, given that there may be impacts associated with direct loss and illumination of features used by bats for foraging/commuting.	The development would not result in the severance of major linear habitat features such as hedgerows, tree lines or woodland and therefore there is very little potential for the proposed development to affect any existing commuting routes. Some bat surveys have been undertaken in 2019 and are reported in Volume 6 Appendix 9.2: Third Party Survey Reports. Bats have been included in the assessment for potential loss of foraging habitat (Section 4)
September 2018	Port of Tilbury London Limited – Scoping Opinion	At para 3.37 and Figure 2 of the main scoping report, areas F and G are identified as offering replacement common land and could therefore be subject to heavy grazing. It is unclear how this would be compatible with establishing the reptile mitigation uses for this land as proposed at Chapter 7 of Appendix D, nor with the proposals for scrub planting for birds as described at Chapter 8 of Appendix D.	It is no longer proposed to provide mitigation for common land and ecological mitigation on the same area of land.
September 2018	Thurrock Council – Scoping Opinion	The land north of the railway identified as exchange land for the loss of Walton's Common has the potential to provide important biodiversity mitigation with scope to incorporate additional invertebrate habitat features. It is hoped that there will be dialogue between representatives of the adjoining proposed developments to see if there can be improved linkages between the various onsite mitigation schemes to maximise their connectivity.	The applicant is willing to explore opportunities for joint development of measures across the various proposed developments, in conjunction with developers of other sites. However, as the other proposed developments are significantly larger, the applicant would expect others to lead any joint strategy.
December 2018	Essex County Council – Section 42 response	This Council notes however that cumulative impacts on wintering birds on functionally linked land and arable land affected by Thurrock Flexible Generation Plant may support birds from the SPA. There is therefore the potential for effects to occur alone and in-combination in relation to the cumulative losses of this habitat and this will be assessed following surveys of wintering birds that are currently ongoing and will be reported in the final HRA report.	Surveys of terrestrial wintering birds on potentially functionally linked land were carried out from Sept 18 – March 19 and are reported in Volume 6 Appendix 9.1: Ecological Desk Study and Survey Report. No significant numbers of wintering birds associated with the SPA were recorded and it is therefore concluded that farmland in and adjacent to Zones A, C, D, E and F does not comprise functionally linked land. A review of previous surveys undertaken of the intertidal zone has concluded that this area is not used by significant numbers of birds associated with the SPA. Further surveys of the foreshore and terrestrial habitat adjacent to the causeway (Zone G) are being undertaken from September 2019-March 2020. The Applicant does not consider the ongoing surveys were strictly necessary given the existing information, but they provide additional comfort as to the position.
December 2018	Essex County Council – Section 42 response	This Council recommends that the final HRA document is also updated to be compliant with the recent CJEU ruling Holohan C46117 which imposes more detailed requirements on the Competent Authority.	This ruling has been taken into account when finalising the HRAR (application document A5.2.)

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December 2018	Essex County Council – Section 42 response	This Council is pleased to see that the PEIR contains information in relation to how it meets the requirements of NPS EN-1 policy on decision making (and mitigation) eg The Secretary of State should have regard to the Government's biodiversity strategy, which includes aims to ensure a halting, and if possible a reversal, of declines in Priority Habitats and Species, with wild species and habitats as part of healthy, functioning ecosystems. However "inform the mitigation strategies to help protect and, where practicable, restore Priority Habitats and Species and the conservation of biodiversity" is not considered sufficient to ensure a "halting of declines" which may require measurable net gains within the project to achieve this. Clarification in the Environmental Statement produced relating to Priority s41 Habitats and Species likely to be present and affected by the development, would therefore be recommended.	The project has committed to achieving Biodiversity Net Gain, and the results of a BNG assessment is provided in Volume 6, Appendix 9.3. The mitigation strategy summarised in the ES and OEMP is considered to deliver appropriate gains for biodiversity including S41 habitats and species where these are affected by the development proposals.
December 2018	Essex County Council – Section 42 response	This Council agrees with PINS scoping opinion comment that the applicant has scoped out bat surveys despite paragraph 8.89 of the Scoping Report, which states that these habitats may be of value to foraging and commuting bats. Five species were identified in the desk study in the PEIR and it is noted that Bats will now be included in the assessment for potential loss of foraging habitat (Section 4) and NE have been consulted on this issue but as of the date of this report, a response is awaited. This Council recommends bat surveys particularly for Nathusius' Pipistrelle during the Autumn migration and use of the National Nathusius Pipistrelle Project results may be useful to the development.	Bat activity transect surveys were undertaken in 2019 (Volume 6, Appendix 9.2: Third Party Survey Reports), which confirmed that the habitats on site are not used by significant numbers of foraging or commuting bats.
December 2018	Essex County Council – Section 42 response	We note that an Outline Ecological Management Plan has been prepared and is linked to the Code of Construction Practice (CoCP). We would urge that the ecology and landscape matters are cross referenced with final lighting strategy and recommend a combined long-term Landscape and Ecological Management Plan (LEMP) as a Requirement of the DCO. Mitigation and Compensation should be prepared and that management of any offsite compensatory habitat will be contained in the LEMP which is referenced in 6.3.1 of the Outline EMP.	Illustrative landscaping proposals are shown in application document A2.9 and incorporated into the draft ecological mitigation shown in Figure 4.1 in this chapter. The proposals are focused on providing hedge and verge along the permanent access road in zone C and screening planting at the southern edge of zone E and around the gas connection compound in zone D3. These proposals are modest in scale relative to the habitat creation detailed on the OEMP, and management of landscaping will form part of the detailed Ecological Management Plan to be produced (building on the OEMP) as a DCO Requirement. No full-time external lighting is required in normal operation, as detailed in Volume 2, Chapter 2.
December 2018	Essex County Council – Section 42 response	Reptile habitat creation in Zone F will provide greater area than permanently lost, with translocation of animals from the works area on the basis of providing a like-for-like replacement of habitat on an area basis. It is important to ensure that the carrying capacity of any on site or offsite receptor sites (regardless of area size) must be demonstrated and additional sites identified should more animals be captured than the estimates indicate may be present.	Evolution of site design since the PEIR has enabled the project to retain boundary ditches of Zone A plus a minimum of 5m buffer, as well as an area of existing grassland to the south of Zone A. Given that the majority of the grassland is mown for hay on an annual basis, it is considered that the carrying capacity of the main area of grassland affected by construction will be low. Measures to enhance the retained grassland area in Zone A are now proposed in the OEMP, and this combined with the retention of boundary ditches is considered suitable to accept any reptiles translocated from the construction area.
December 2018	Essex County Council – Section 42 response	It is not clear if any of the hedgerows were considered to meet the trigger for Important hedgerows - >100 passes of bats other than Barbastelle - under the Hedgerow Regulations. Where sections of these hedgerows are temporarily removed, it would be necessary to provide hazel hurdles to ensure connectivity for foraging Barbastelle bats until the new hedge reaches a sufficient height to provide this functionality.	Bat activity transect surveys were undertaken in 2019 (Volume 6, Appendix 9.2: Third Party Survey Reports), which confirmed that the habitats on site are not used by significant numbers of foraging or commuting bats.

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December 2018	Essex County Council – Section 42 response	This paragraph states that “for breeding birds..... the mitigation area (Zone F) [now Zone E] which is an arable field (10.72 ha) again of little potential value for breeding birds.” This is misleading given that linnet and skylark was recorded in Zone A (para 4.1 39).	The presence of linnet and skylark in Zone A does not provide any indication that Zone E is also of value for birds, given that the two linnet territories recorded in Zone A were associated with the ditch boundary on the edge of Walton Common and the skylark territory was associated with Walton Common grassland and hence not recorded within the arable land in Zone A. Our mitigation strategy is predicated on the fact that intensively-managed arable fields such as Zones E and F are of less value to breeding birds than grassland such as Walton Common and Parsonage Common, and therefore the reversion of arable land to grassland (proposed for both Zone E and F) will provide a net benefit for breeding farmland species including linnet and skylark compared to the baseline situation.
December 2018	Essex County Council – Section 42 response	This paragraph states that “a total of 40 breeding territories were recorded in Zone A, including Cetti’s warbler and the BoCC red listed species cuckoo, house sparrow, linnet, skylark, song thrush, yellowhammer and yellow wagtail” and that “The development of Zone A would result in a decline in the number of territories within the study area.” The aim of the mitigation proposed appears is to avoid the loss of species to the overall breeding bird assemblage in the survey area. However this is considered likely to lead to residual loss of territories for Priority species and this impact will require additional consideration to ensure the NPS- EN-1 policy “to ensure a halting, and if possible a reversal, of declines in Priority Habitats and Species”. Other mitigation measures should be reviewed and enable the SoS to meet their s40 NERC duty regardless that the impacts would not be significant in EIA terms.	The mitigation strategy has evolved since the PEIR, and there is now an extensive restoration of arable land to grassland in Zone E (as Common Land replacement but which also has some biodiversity benefit) and a separate habitat restoration exercise proposed for Zone F (specifically for biodiversity). Assessment of the impact on breeding birds (paragraph 4.1.49 onward) concludes that the impact on breeding birds taking mitigation into account is minor beneficial.
November 2018	Kent County Council – Section 42 response	... the construction/operational phases of the proposed development have the potential to impact on the designated sites within Kent. A Habitats Regulations Assessment (HRA) has been submitted as part of the application; however, KCC highlights that the HRA has not fully considered all of the designated sites within 15km of the proposed development site. The Medway Estuary and Marshes Special Protection Area (SPA) and Ramsar site is shown on Figure 1 of the HRA Report as being within 15km of the proposed development site. However, the HRA does not assess the impact of the proposed development on the designated site, nor does it set out how it has reached the conclusion that the designated site does not need to be assessed as part of the HRA. Therefore, KCC considers that the HRA is incomplete, and there is a need for a revised HRA to be produced as part of the Development Consent Order (DCO) application.	The HRAR (application document A5.2) submitted with the DCO application includes assessment of impacts on all European Sites within 15 km.
November 2018	Environment Agency – Section 42 response	We note that Water Framework Directive Assessment has been scoped out due to the absence of impacts on the Thames. However, how the Directive applies to the alteration of the drainage ditches needs consideration in the ecological chapter to ensure no deterioration in ecological potential. The design and long-term management of the mitigation ditches needs to be described in any Ecological Management Plan.	WFD assessment is provided in Volume 6, Appendix 17.3: Water Framework Directive Assessment. Details of ditch creation and management will be provided in the detailed EMP to be produced prior to commencement.
November 2018	Environment Agency – Section 42 response	There is an absence of information on eels, a priority species, covered by the Eel Regulations 2009. The ditch network, although remote from the Thames, has linkage which could have led eels to colonise some of the wetter ditches. We suggest an electro-fishing survey of eels at the appropriate time of year (April-October) to determine presence and absence. Any enhancements should consider the presence of eels if present.	An assessment of the potential of the ditch network to support Eels has been carried out (Volume 6, Appendix 9.2: Third Party Survey Reports). This concluded that there was no requirement to undertake further surveys for Eels.
November 2018	Environment Agency – Section 42 response	The Ecology Chapter states that 9.4% of the ditches on the application site are to be permanently lost due to development. Given the presence of water voles within the ditches, mitigation is required to prevent a loss of protected species habitat. The proposed creation of 510 m of ditch provides an offset for the 476 m to be lost. As acknowledged, water voles will need to be translocated to the new ditches when the habitat is ready under licence from Natural England.	Mitigation for loss of ditches is provided. However, it should be noted that Water Vole surveys carried out in September 2019 indicated that the majority of the ditch system was dry and therefore few water vole signs were present. Mitigation for Water Voles is still proposed on the precautionary assumption that the animals would return if water levels increase in 2020/2021, but if this pattern of decline continues there may be less translocation of animals required. A licence would be obtained should this be necessary.

Date	Consultee and type of response	Points raised	How and where addressed
November 2018	Environment Agency – Section 42 response	The Outline Ecological Management Plan (OEMP) will need to be developed further to provide assurances over the design and construction measures for the mitigatory habitats, particularly for water voles (and possibly eels). The long-term management needs to be considered in the OEMP.	Full details of ditch creation and management will be provided in the detailed EMP to be produced prior to commencement. As noted above, Eels are not considered to be a constraint (Volume 6, Appendix 9.2: Third Party Survey Reports.)
November 2018	Environment Agency – Section 42 response	Mammal ledges will need to be incorporated into all culverts to allow the passage of water voles. The design of these should be incorporated into the OEMP.	Culverts with mammal ledges will be provided where permanent infrastructure crosses ditched. Full details of culverts will be provided in the detailed LEMP.
November 2018	Natural England – Section 42 response	We now understand that the option of a cooling pipe will not be progressed through the NSIP process, and we provide our comments on this basis. Accordingly, likely significant effects to the Thames Estuary & Marshes SPA / Ramsar site are much reduced, however we have highlighted in our EIA scoping response that impacts to functionally linked land (FLL) should remain scoped into the HRA with survey and assessment undertaken accordingly. The current draft HRA does not include possible impacts to FLL, and so we recommend that this is updated. We understand that some over-wintering bird surveys are underway in order to explore whether, and if so the degree to which, the application site (or adjoining land which may be disturbed) holds a functional linkage to the SPA / Ramsar site.	Surveys of terrestrial wintering birds on potentially functionally linked land were carried out from Sept 18 – March 19 and are reported in Volume 6 Appendix 9.1: Ecological Desk Study and Survey Report. No significant numbers of wintering birds associated with the SPA were recorded and it is therefore concluded that farmland in and adjacent to Zones A, C, D, E and F does not comprise functionally linked land. A review of previous surveys undertaken of the intertidal zone has concluded that this area is not used by significant numbers of birds associated with the SPA. Further surveys of the foreshore and terrestrial habitat adjacent to the causeway (Zone G) are being undertaken from September 2019-March 2020. The Applicant does not consider the ongoing surveys were strictly necessary given the existing information, but they provide additional comfort as to the position.
November 2018	Natural England – Section 42 response	It is also unclear to us whether the HRA has taken a precautionary approach where data is outstanding. For example surveys for over-wintering birds are ongoing, to explore whether any functionally linked land is likely to be significantly affected. The final submitted HRA should make this clearer, adopting a precautionary approach where uncertainty remains.	Surveys of terrestrial wintering birds on potentially functionally linked land were carried out from Sept 18 – March 19 and are reported in Volume 6 Appendix 9.1: Ecological Desk Study and Survey Report. No significant numbers of wintering birds associated with the SPA were recorded and it is therefore concluded that farmland in and adjacent to Zones A, C, D, E and F does not comprise functionally linked land. A review of previous surveys undertaken of the intertidal zone has concluded that this area is not used by significant numbers of birds associated with the SPA. Further surveys of the foreshore and terrestrial habitat adjacent to the causeway (Zone G) are being undertaken from September 2019-March 2020. The Applicant does not consider the ongoing surveys were strictly necessary given the existing information, but they provide additional comfort as to the position.
November 2018	Natural England – Section 42 response	We note that the AA conclusion of “no adverse effect on site integrity” is dependent upon a site-wide drainage strategy that has yet to be completed. Whilst such a document might well include necessary and appropriate safeguards, it is premature at this stage for the AA to conclude as it has without the drainage strategy in place. We recommend that the AA is updated in due course once the drainage strategy is in place (and any other necessary accompanying documents), prior to its submission with the DCO application.	A Conceptual Drainage Strategy for the site has been produced (application document A7.3). This includes all the necessary principles with respect to surface water management to ensure that the AA can reach a conclusion of no adverse effect on integrity.
November 2018	Natural England – Section 42 response	Further justification should be provided for the cumulative effects assessment for Canvey Wick SSSI, where at paragraph 1.4.18 the justification for no significant effect for NOx deposition is provided for saltmarsh habitats, which are not found at Canvey Wick SSSI. A rationale referencing correct habitat types should be provided.	The use of the saltmarsh habitat was a drafting error. The key invertebrate interest of the SSSI is sustained by the low-nutrient status of the underlying sands/gravels imported to the site during construction of the former oil refinery. Although APIS does not provide a critical load for such a site, it is likely to be similar to the more species-rich grasslands. Therefore, a critical load of 10 kgN.ha ⁻¹ .yr ⁻¹ has been used for this site.

Date	Consultee and type of response	Points raised	How and where addressed
November 2018	Natural England – Section 42 response	The new NPPF requires development proposals to demonstrate that projects can deliver environmental net gain. For example, paragraph 170 requires that “Planning policies and decisions should contribute to and enhance the natural and local environment by... minimising impacts on and providing net gains for biodiversity”. The principle of environmental and biodiversity net gain is also increasingly featuring in the more up to date National Policy Statements, which we recognise are the primary policy documents for NSIP projects (nevertheless the revised NPPF should be recognised as holding weight as a relevant policy reference).	The project has committed to delivering Biodiversity Net Gain. The net gain assessment is provided in Volume 6, Appendix 9.3.
November 2018	Natural England – Section 42 response	Natural England regards the Thurrock Flexible Generation Plant as having opportunities to contribute towards strategic biodiversity net gain objectives in the Tilbury area. The proposal is located within the context of other NSIP development with which we have also sought net gain objectives, particularly with respect to nationally important invertebrate assemblages. These include the Port of Tilbury NSIP, the recently frozen Tilbury Energy Centre NSIP, and the Lower Thames Crossing NSIP. We suggest that the Thurrock Flexible Generation Plant could also seek to complement the nature conservation priority outcomes of these projects on its land holding and also within adjacent replacement common land, as opportunities arise. We would be happy to discuss this further with the applicant in due course.	The applicant is willing to explore opportunities for joint development of measures across the various proposed developments, in conjunction with developers of other sites. However, as the other proposed developments are significantly larger, the applicant would expect others to lead any joint strategy.
January 2019	Thurrock District Council – Section 42 response	The reports detail the proposed mitigation measures for the various species and habitats that would be affected by the proposals. In some cases the assessment concludes that the residual effects of the mitigation could be beneficial (albeit at a minor level). The assessment does not however identify measures that could deliver biodiversity net gain as supported in the NPPF 2018. Opportunities to deliver such gains should be detailed in the emerging ES.	The project has committed to delivering Biodiversity Net Gain. The net gain assessment is provided in Volume 6, Appendix 9.3.
November 2019	Essex Field Club – Section 42 response to updated proposals	<p>As we have previously explained, unfortunately the desktop study described in Appendix 9.1 of the Ecological Desk Study and Surveys document completely fails to fulfil its purpose as a desk study and the Consultation on Project Changes does not alter this situation. Paragraph 2.1.1 states that Ecological records within a 2 km radius of Zones A-J (as shown on Figure 1.1) were requested from the Essex Wildlife Trust Biological Records Centre and the Kent and Medway Biological Records Centre.</p> <p>This means the desk study and desk study species data shown in Appendix 9.1 remains completely inadequate, not fit-for-purpose and fails to fulfil any useful purpose. The utter failure of this is evidenced in Table 3.4: Summary of protected and notable invertebrate species recorded within 2 km of the Phase 1 survey area, where only "<i>Several insect species with some rarity / conservation status have been recorded within 2 km of the Phase 1 survey area</i>" are presented, when there should be a massively greater number. The idea stated in the Ecology chapter paragraph 2.2.1 that information on ecology and nature conservation within the desk study search area was collected through a "<i>detailed desktop review of existing datasets</i>" is quite evidently hopelessly inaccurate. It means that the fundamental basis of everything that has been presented to date on ecology and especially invertebrates is hardly worth the paper it is written on.</p>	<p>The desk study has been updated with data obtained from the Essex Field Club (see Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report)</p> <p>Results from this additional desk study have not made any difference to the scope of surveys that were carried out, and therefore we strongly reject this statement.</p> <p>Had the EFC data been available at PEIR stage, the scope of surveys, including invertebrates, would not have changed, because the potential invertebrate interest of the site was recognised independently of the data search, and an invertebrate scoping survey was commissioned. Having reference to the EFC dataset would not have changed this conclusion, nor would it have changed the conclusion of the invertebrate survey report as this was carried out by a specialist with full knowledge of the importance of the Lytag Brownfield LWS for invertebrates,</p>

Date	Consultee and type of response	Points raised	How and where addressed
November 2019	Essex Field Club – Section 42 response to updated proposals	<p>Paragraph 2.2.7 states that in order to inform the assessment, the site-specific surveys did not include invertebrates. The extent of land outlined in figure 2.2. for the invertebrate scoping survey is stated in paragraph 2.4 to appraise the invertebrate habitats present on the Main Site (Zone A) and to assess whether the proposed development would have an impact on invertebrate ecology, yet figure 2.2 appears to make clear that this only included Zone A and did not include any other areas involved. It is difficult to see how this can assess whether the proposed development would have an impact on invertebrate ecology.</p> <p>There is also no report provided of the invertebrate scoping survey, so we have no information on which to judge its effectiveness for even the scoping survey for this single zone. The idea presented in paragraph 2.4.5 that the baseline ecological surveys are therefore considered to be appropriate to inform a robust impact assessment of the Thurrock Flexible Generation Plant does not stand up to scrutiny.</p> <p>Until the invertebrate scoping survey report and details and reports of surveys undertaken since the 2018 consultation are made available and full details of offsite mitigation proposals are made, then an informed and adequate consultation response remains impossible.</p>	<p>Zone A is the only area subject to extensive permanent impacts from habitat loss, and it is therefore entirely appropriate that the scoping report did not consider arable land of minimal conservation value outside of the construction site</p> <p>The invertebrate scoping survey was carried out by a specialist and their conclusion was that detailed surveys of Zone A were not required. Contrary to the statement that “there is no report provided of the invertebrate survey” the relevant sections of the scoping survey of Zone A is incorporated in Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report</p> <p>A further scoping survey of the adjacent Zone G grassland (and another area of land no longer included in the Project Design) was carried out by the same specialist when Zone G was added to the project boundary. Again, this scoping survey concluded that no further survey was required. This is provided in constraint (Volume 6, Appendix 9.2: Third Party Survey Reports.)</p> <p>In addition, reference was made to surveys undertaken for the adjacent Tilbury2 site when considering potential effects on grassland at the south of Zone G.</p> <p>The baseline and assessment of effects on invertebrates is therefore considered to be sufficiently robust.</p>
November 2019	Essex Field Club – Section 42 response to updated proposals	<p>The Tilbury Power plans add to the cumulative loss of nationally important invertebrate habitat areas on Tilbury Power Station land for Tilbury 2, excavation of the majority of the adjacent ashfields on the east side, the loss of the extensive Goshems Farm habitats to 'restoration' and the Lower Thames Crossing route to suggest there will be a large scale destruction of the nationally important invertebrate fauna of the Tilbury area and the possible extinction of the regional metapopulations of a number of the Priority species currently present. This cumulative impact on the landscape is not recognised in Chapter 18: Summary of Cumulative Effects, which therefore does not actually address cumulative effects at all: the <i>Adverse impact to Lytag Brownfield Local Wildlife Site</i> uses Tilbury2 port expansion and the Lower Thames Crossing to suggest that “No cumulative impact as the Local Wildlife Site effect is entirely due to these two developments, and hence the Thurrock Flexible Generation Plant would not contribute to the cumulative effect”. This ignores the cumulative effect of the Tilbury Power proposals on populations surviving at the wider surrounding landscape level. In the same way the “Adverse impact of cumulative projects resulting in greater fragmentation of populations of protected species” is stated to be entirely due to the presence of the Lower Thames Crossing link road and the Thurrock Flexible Generation Plant would not contribute additional fragmentation effects. This again ignores the cumulative effect of the Tilbury Power proposals on populations surviving at the wider surrounding landscape level. So how is Chapter 18: Summary of Cumulative Effects addressing cumulative effects?</p>	<p>The cumulative assessment on invertebrates has been updated and is now presented in Volume 4: Cumulative Environmental Assessment</p> <p>Chapter 21: Onshore Ecology. As a result of this updated assessment some additional mitigation has been proposed to address fragmentation and temporary habitat loss during construction.</p>
November 2019	Essex Field Club – Section 42 response to updated proposals	<p>The impact of Zone G corridor for causeway and temporary haul road has not been considered at all, despite the presence here of a known nationally important invertebrate fauna of the ashfield area certainly still extant in 2018.</p>	<p>There are two options for the access road in Zone G. Both options cross grassland north of the sea wall and then follow existing roads north. The first option then runs between the area currently being land-raised and the substation, and therefore does not affect any ashfield habitat.</p> <p>The second option crosses land which is consented for PFA extraction, land-raising and restoration to grassland, and therefore any impacts on the ashfields occur in association with this project and not Thurrock Flexible Generation Plant.</p> <p>Some impacts occur on the coastal grassland strip where the causeway access track crosses grassland between the sea wall and the RWE site. The overall mitigation strategy proposed for invertebrates is considered sufficient to mitigate for habitat losses.</p>

Date	Consultee and type of response	Points raised	How and where addressed
November 2019	Essex Field Club – Section 42 response to updated proposals	<p>We are pleased to see that part of the field (F2) between West Tilbury Hall LoWS / Hall Hill and Parsonage Common adjacent to Cooper Shaw Road has been included as habitat compensation and enhancement land, together with the smaller section (F1) to improve continuity with the proposed new Common Land (E) on former arable. However the use of arable land as Common Land replacement will require a high degree of work to create compensation habitat that could in any way provide significant biodiversity compensation or biodiversity gain. Such habitat creation would take a good many years before it could make a valuable contribution to the invertebrate ecology of the wider landscape.</p> <p>Nature conservation land and bee banks both need the use of nutrient-poor substrate to allow the development and long term survival of species-rich communities. The suggested bee banks should use nutrient-poor substrate and the proposed replacement Common Land and habitat compensation areas should have all the topsoil stripped, and removed off site.</p>	<p>It is intended to use some of the won topsoil to create south-facing banks but low nutrient substrate will also be used, to provide a range of conditions and habitats that benefit a wide range of species including invertebrates. Refer to OEMP (application document A8.7).</p>
November 2019	Essex Field Club – Section 42 response to updated proposals	<p>We remain of the view that a much better alternative or addition for off-site compensation land would be the field on the north side of the nationally important Broom Hill LoWS (Th 38), which would create a valuable landscape area between Hob Hill and Turnpike Lane.</p>	<p>This field was not available for consideration for inclusion as off-site compensation.</p>

2. Assessment Approach

2.1 Guidance and standards

2.1.1 The assessment of ecological value and determination of effect significance has been undertaken with reference to CIEEM Guidelines for Ecological Impact Assessment (2019).

2.2 Baseline studies

Desktop study

2.2.1 Information on ecology and nature conservation within the desk study search area was collected through a detailed desktop review of existing datasets.

2.2.2 The Natural England GIS dataset of statutory designated sites was consulted for boundary shapefile information on statutory designated sites within 2 km of the Thurrock Flexible Generation Plant. A search was made for details of Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar Sites, National Nature Reserves (NNRs), Sites of Special Scientific Interest (SSSIs), Local Nature Reserves (LNRs) and Marine Conservation Zones (MCZs / rMCZz).

2.2.3 The Joint Nature Conservation Committee (JNCC) website (<http://www.jncc.defra.gov.uk>) was consulted to obtain citations and information on designated features of SACs, SPAs and Ramsar Sites. SSSI citations were obtained from the Natural England website (<https://designatedsites.naturalengland.org.uk>).

2.2.4 Data sources contacted for information are summarised in Table 2.1 below.

2.2.5 For the designated sites desk study, the initial identification of sites that might be affected used a search area of 2 km from the Thurrock Flexible Generation Plant.

2.2.6 For the protected species data search, a search area of 2 km from the Thurrock Flexible Generation Plant was used for all species.

Table 2.1: Summary of key desktop sources.

Title	Month	Year	Summary of responses
Essex and Kent Biological Records Centres (BRC)	September	2018	Essex & Kent BRCs provided data on protected species and LWSs within the search area.
Essex and Kent Biological Records Centres	August	2019	Essex & Kent BRCs provided data on protected species and LWSs within the search area.

Title	Month	Year	Summary of responses
Essex Field Club	August	2019	Essex Field Club provided data on protected species within the search area.

Site specific surveys

2.2.7 In order to inform the assessment, the site-specific surveys listed in in Table 2.2 have been undertaken, as discussed with Natural England and the local authority.

Species not included in the surveys

2.2.8 Based on information from the desk study, Phase 1 habitat survey, invertebrate scoping survey and consultations with Natural England, it was determined that no surveys were required for the following groups or species: invertebrates, white-clawed crayfish, dormouse and roosting bats.

Table 2.2: Summary of site-specific surveys undertaken.

Title	Extent of survey	Overview of survey	Survey provider	Year	Reference to further information
Phase 1 habitat survey	Thurrock Flexible Generation Plant site area and various other areas previously considered for inclusion in the site boundary but subsequently dropped (Figure 2.2)	A Phase 1 habitat survey to identify habitats present within the survey area and the potential value of these habitats for protected or otherwise notable species. Findings of the survey informed the need for more detailed surveys.	RPS	2018 and 2019	Volume 6, Appendix 9.1: Ecological desk study and survey report
Invasive plant species subject to legal control	Thurrock Flexible Generation Plant site area	During the various field surveys carried out, evidence of any invasive plant species subject to legal control was recorded.	RPS	2018	Invasive species protocol is summarised in the CoCP (application document A8.6).
Additional vegetation survey	Zone A	A more detailed assessment of plant communities present in Zone A and other similar grassland areas was undertaken in order to inform habitat creation proposals	RPS	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Invertebrate scoping survey	Zone A	A walkover survey to assess the potential of Zone A to support invertebrate communities of conservation interest	Colin Plant Associates	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Eel habitat assessment survey	Zones A and C	An inspection of the ditches present in Zones A and C was undertaken to assess whether they were suitable to support Eels.	Ecus	2019	Volume 6, Appendix 9.2: Third Party Survey Reports
Great Crested Newt (GCN) eDNA survey	Ponds and ditch as shown on Figure 2.3.	eDNA samples taken from ditches around Zone A, a pond adjacent to Zone A and another pond north east of Zone A.	RPS and Cherryfield Ecology	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Reptile survey	Zones A, C, G	Standard refugia survey comprising seven checks of refugia placed in accessible areas of habitat considered suitable for reptiles within the survey area.	RPS Cherryfield Ecology	2018 2019	Volume 6, Appendix 9.1: Ecological desk study and survey report and Volume 6, Appendix 9.2: Third Party Survey Reports.
Breeding bird survey	Thurrock Flexible Generation Plant site area and various other areas previously considered for inclusion in the site boundary but subsequently dropped, and excluding the majority of Zone G (Figure 2.4)	A five-visit territory mapping survey to map locations of territories of all bird species present in the survey area was undertaken in 2018. A survey Zone E and land south of Zone A (part of Zone G) focusing on Cetti's Warbler was undertaken in June 2019.	RPS	2018 / 2019	Volume 6, Appendix 9.1: Ecological desk study and survey report
Wintering bird survey (terrestrial)	Thurrock Flexible Generation Plant site and adjacent farmland considered to be potentially functionally linked land	Two survey visits per month (one at high and one at low tide) were undertaken between September 2018 and March 2019	RPS	2018/2019	Volume 6, Appendix 9.1: Ecological desk study and survey report
Wintering bird survey (intertidal)	Intertidal part of Thurrock Flexible Generation Plant Zone G and adjacent foreshore	Two survey visits per month (one at high and one at low tide) were undertaken between September 2019 and March 2020	RPS	2019/20	Volume 6, Appendix 9.4: Foreshore Wintering Bird Surveys 2019-20
Water Vole/otter survey	Ditches as shown on Figure 2.6	Two survey visits to ditches within the survey area to map signs indicating presence of water voles and otters were undertaken in 2018. Further surveys were undertaken in 2019.	RPS	2018 / 2019	Volume 6, Appendix 9.1: Ecological desk study and survey report
Badger survey	Thurrock Flexible Generation Plant site area and various other areas previously considered for inclusion in the site boundary but subsequently dropped	A walkover survey to map signs of badger presence including setts and latrines	RPS	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report

Title	Extent of survey	Overview of survey	Survey provider	Year	Reference to further information
Foraging / commuting bats	Zones A and C	Activity surveys to assess levels of bat activity	Cherryfield Ecology	2019	Volume 6, Appendix 9.2: Third Party Survey Reports

2.3 Study area

- 2.3.1 For this chapter a study area of the Thurrock Flexible Generation Plant boundary (plus a 2 km buffer) was used for the data search. A study area of Zone A plus a 15 km buffer was used to assess sites for atmospheric emission effects (refer to Volume 6, Appendix 12.1: Assessment of Air Quality Impacts on Ecological Receptors).
- 2.3.2 For field surveys, the evolving nature of the design during the 2018 and 2019 survey seasons meant that some areas were included in surveys for some groups that are no longer part of the application boundary. Conversely, some areas added late in the assessment process that are within the application boundary were not covered by all of the detailed species surveys. The study areas for Phase 1 habitat and species surveys are shown on Figure 2.2 - Figure 2.6.

2.4 Uncertainties and/or data limitations

- 2.4.1 Due to the evolving nature of the design during the 2018 and 2019 survey season, not all site zones were surveyed in detail for all of the species groups listed in Table 2.2.
- 2.4.2 For terrestrial species, this is not considered to materially affect the ability of the assessment process to quantify the effects of Thurrock Flexible Generation Plant, for the reasons outlined below.
- 2.4.3 For breeding birds, the causeway access track area (Zone G) was not covered in the 2018 survey. Three surveys of Zone E and the section of Zone G adjacent to Zone A were undertaken in June 2019.
- 2.4.4 For reptiles, zones not covered comprise the mitigation area (Zone F). Zone F is an arable field with no potential to support reptiles. Reptile potential exists in the ditches and field margins but these would not be directly affected by any common land exchange works.
- 2.4.5 Partial surveys of Zone G were undertaken in September 2019. Access to the section of Zone G immediately adjacent to Zone A was not available, so for the purposes of this assessment it is assumed, given that habitat here is suitable for reptiles, that they are present
- 2.4.6 Because the causeway option (Zone G) was not added to the scheme until spring 2019, it was not possible to undertake wintering bird surveys of the foreshore in the area of the proposed causeway in the winter of 2018/2019. Surveys of this area were been commissioned and were undertaken between September 2019 – March 2020, and reported in Volume 6, Appendix 9.4: Foreshore Wintering Bird Surveys 2019-20.

- 2.4.7 For this ES, understanding of the usage of the foreshore by wintering birds was supplemented by a review of existing data collected or assessed by Tilbury2 and RWE. These include surveys undertaken in 2016/17 and 2017/18, and in conjunction with the 2019/20 surveys undertaken by RPS are considered to be a suitable data set to support the assessment of the potential effects of the causeway on wintering birds.
- 2.4.8 Bat activity surveys were undertaken around Zone A where any potential impacts on foraging or commuting bats would be concentrated. Bat surveys were not undertaken for the other zones but based on the results obtained from the 2019 bat surveys it is not considered that this presents a constraint to the assessment of impacts on bats.
- 2.4.9 The baseline ecological surveys are therefore considered to be appropriate to inform a robust impact assessment of the Thurrock Flexible Generation Plant.
- 2.4.10 Any updates of surveys needed to finalise details of mitigation proposals for protected species will be carried out prior to commencement.

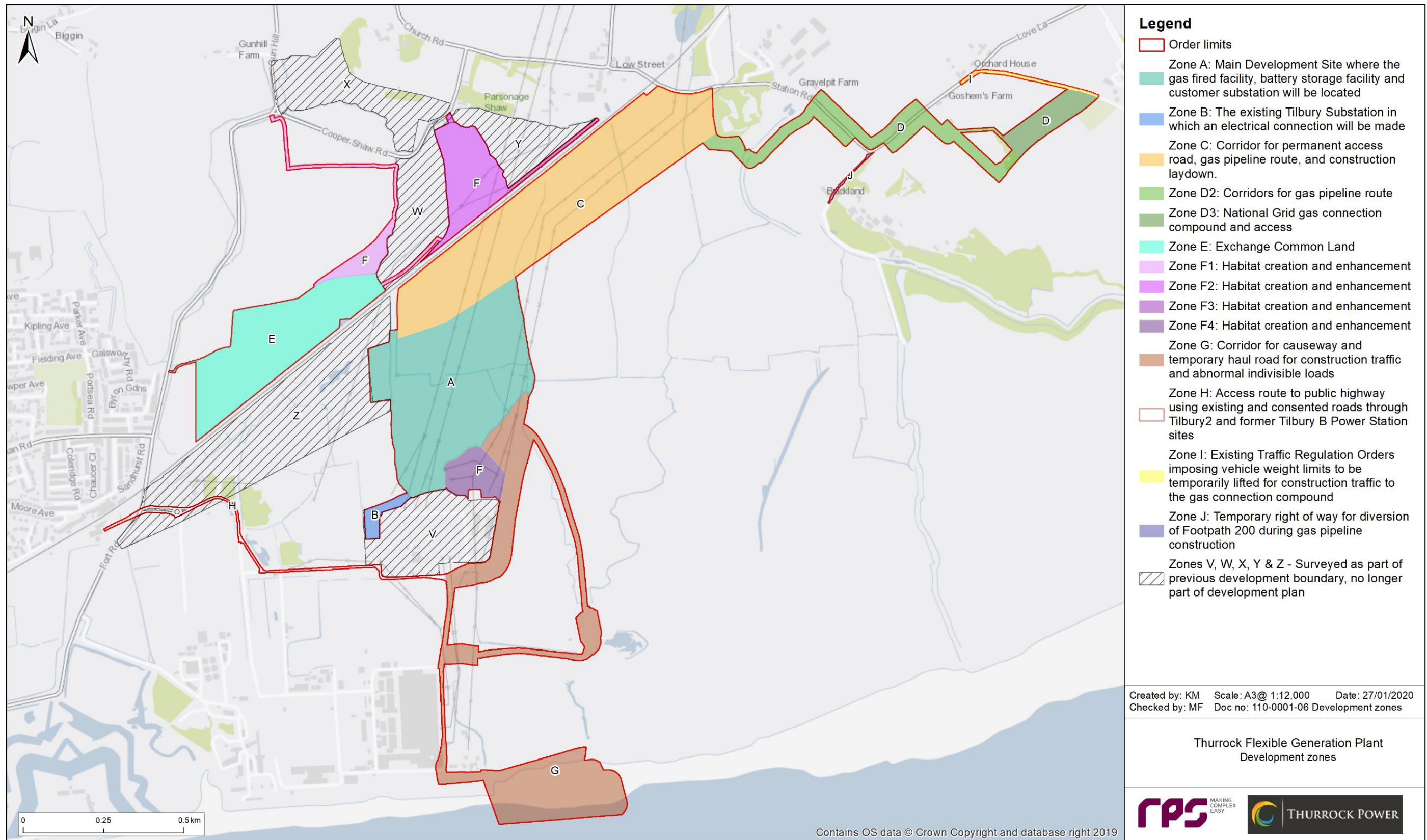


Figure 2.1: Thurrock Flexible Generation Plant Development Zones.

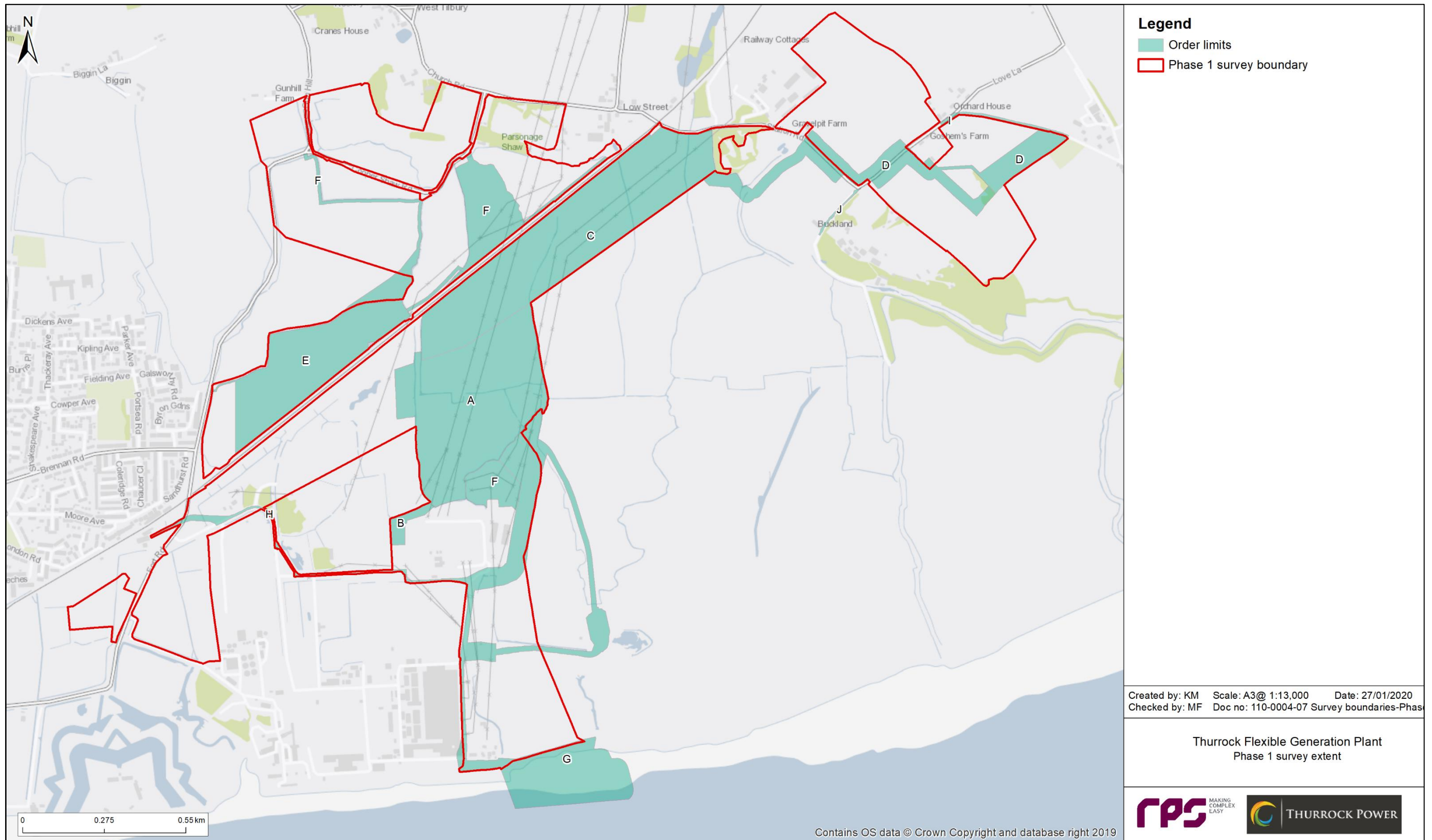


Figure 2.2: Phase 1 study area.

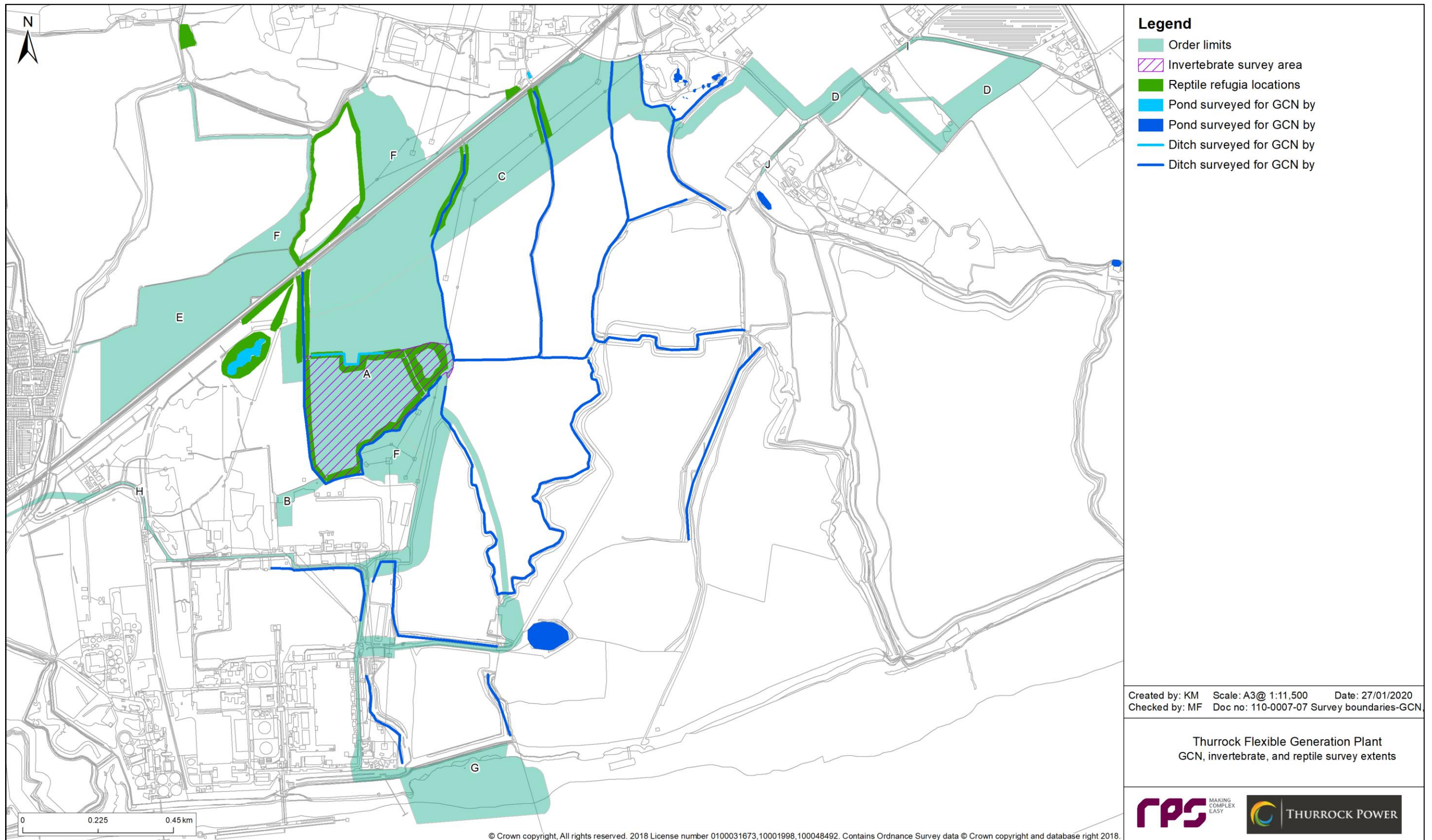


Figure 2.3: Invertebrate, great crested newt and reptile survey areas.

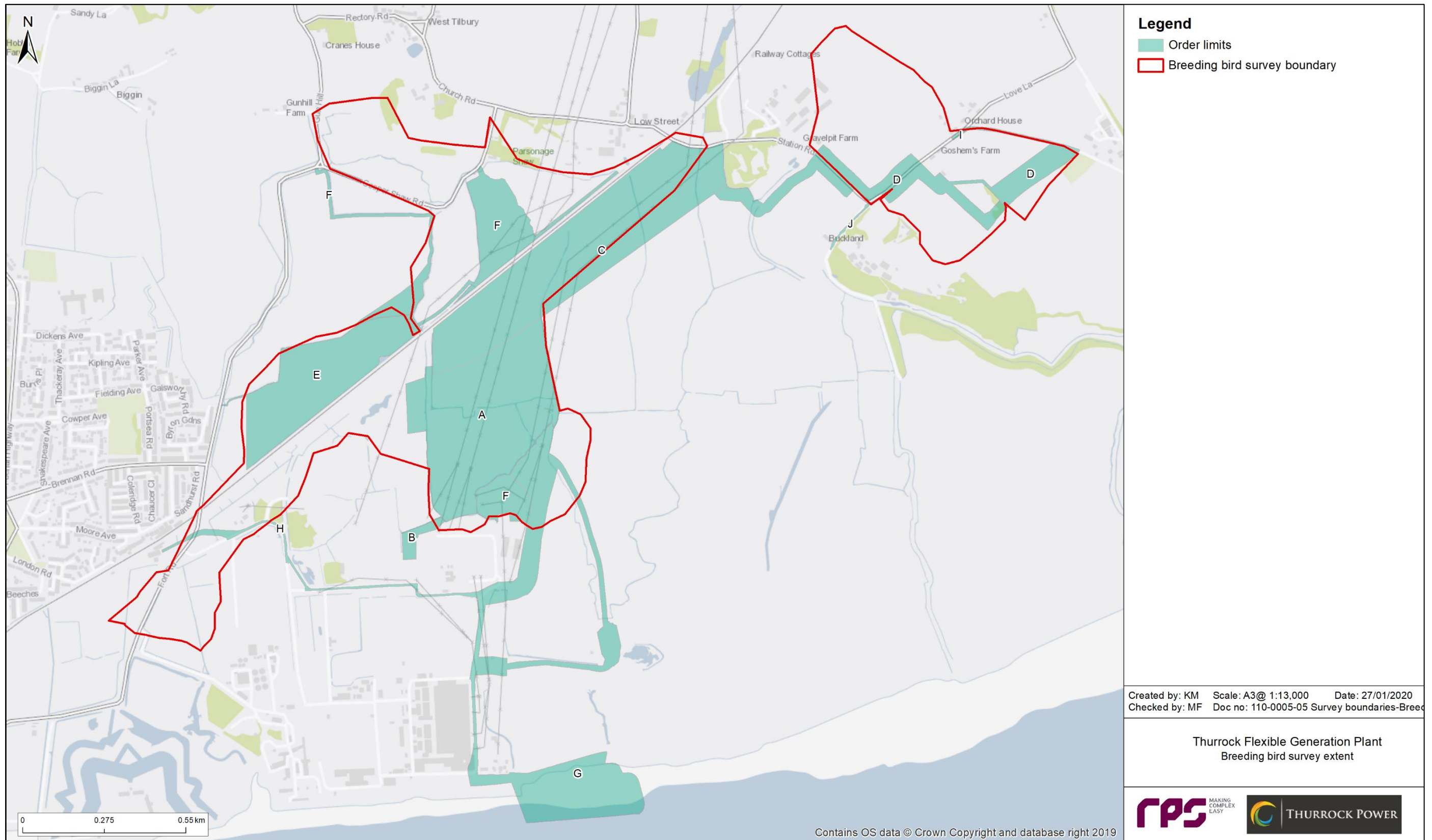


Figure 2.4: Breeding bird survey area.

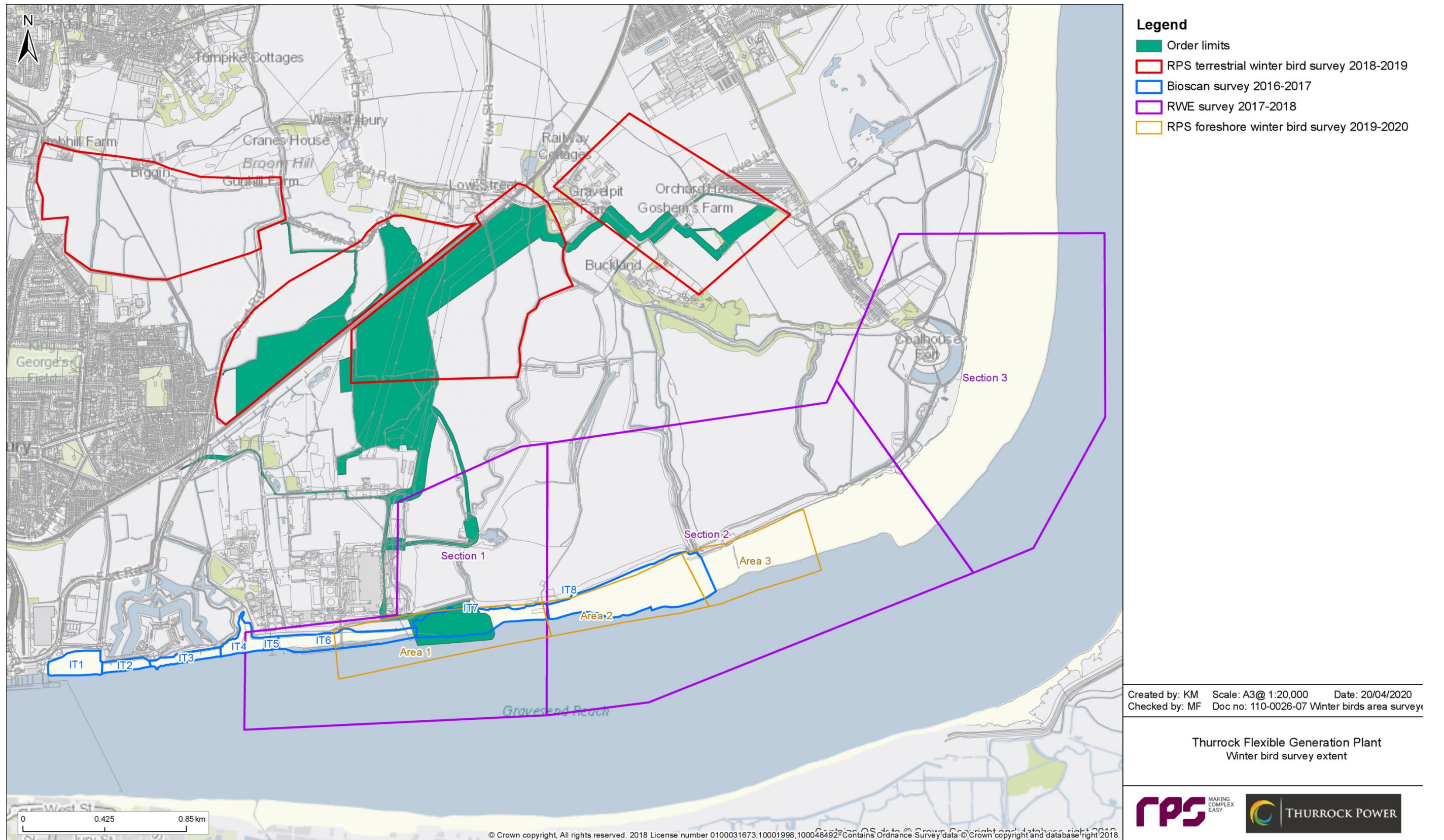


Figure 2.5: Wintering bird survey area.

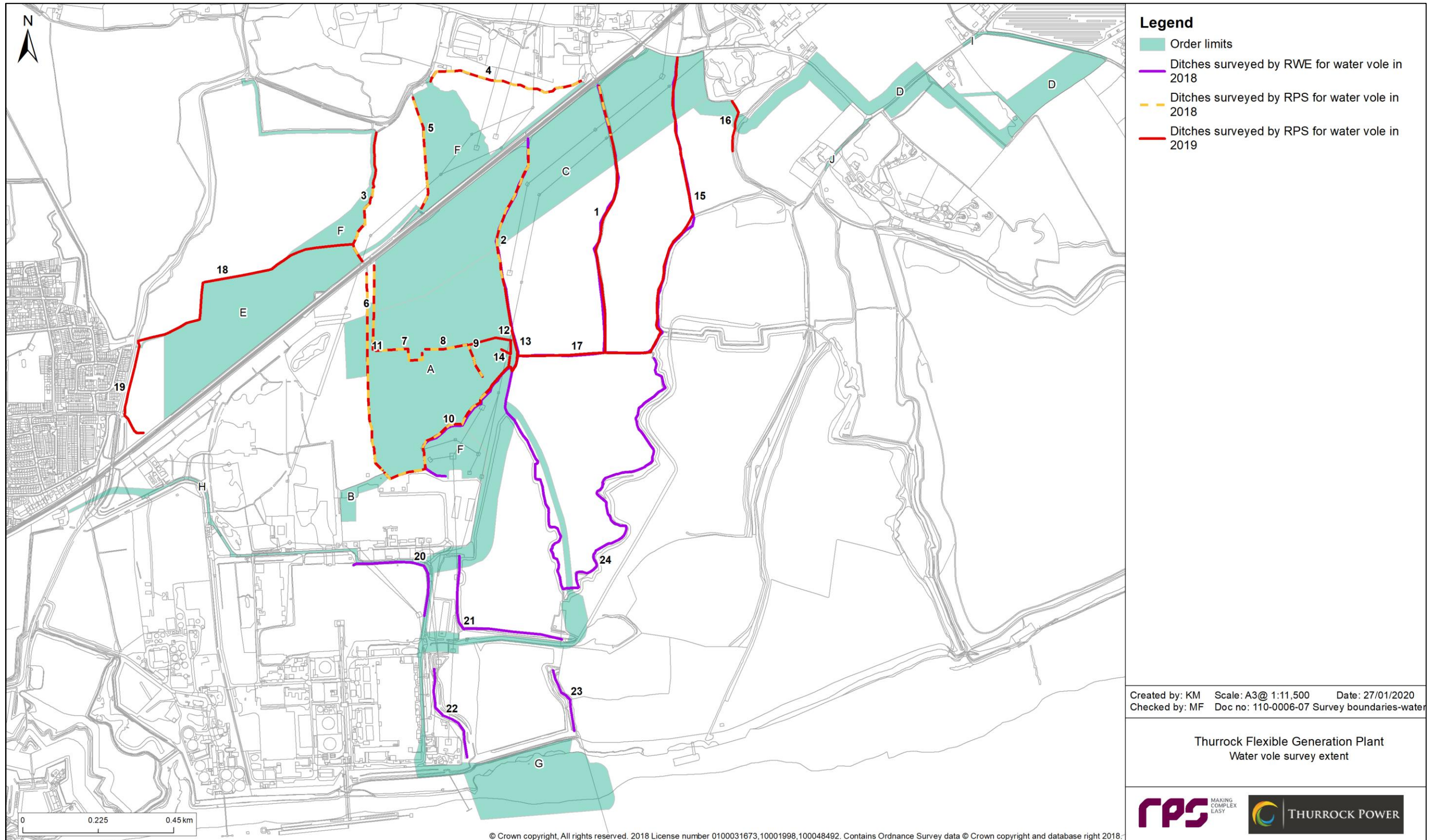


Figure 2.6: Water vole survey area.

2.5 Impact assessment criteria

2.5.1 The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact. This section describes the criteria applied in this chapter to characterise the magnitude of potential impacts and sensitivity of receptors. The terms used to define magnitude and sensitivity are based on those used in the DMRB methodology, which is described in further detail in Volume 2, Chapter 4: Environmental Impact Assessment Methodology.

2.5.2 The likely impacts of the Thurrock Flexible Generation Plant are determined through understanding how each Important Ecological Feature (IEF) would be affected by all of the temporary and permanent elements that make up the full design of the Thurrock Flexible Generation Plant. In this assessment, the following have been taken into account:

- type of impact - positive or negative;
- extent or spatial scope of the impact;
- reversibility of impact - whether the impact is naturally reversible or reversible through mitigation measures;
- timing and frequency of the impact, in relation to ecological changes; and
- likely duration of the impact - short-term (< 1 year), medium-term (< 5 years) or long-term (5 or more years).

2.5.3 The criteria for defining impact magnitude in this chapter are outlined in Table 2.3. In this table, 'integrity' for sites is defined as the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or the levels of populations of the species for which it is classified.

Table 2.3: Criteria for magnitude of impact.

Magnitude of impact	Definition used in this chapter
Major	The impact is likely to have an adverse effect on the integrity of a site IEF or the conservation status of a species or species assemblage IEF (adverse)
	The impact is likely to cause a large scale or major improvement, extensive restoration or enhancement, or a major improvement of the conservation status of an IEF (beneficial)
Moderate	The impact adversely affects an IEF but is unlikely to adversely affect its integrity or conservation status (adverse)
	The impact is likely to be of benefit to an IEF, or improve its conservation status (beneficial)

Magnitude of impact	Definition used in this chapter
Minor	The impact adversely affects an IEF but would not adversely affect its integrity or conservation status (adverse) The impact is likely to be of minor benefit to an IEF (beneficial)
Negligible	There would be minimal effect on the IEF (adverse) There would be minimal benefit to the IEF (beneficial)
No change	There would be no detectable change from the baseline condition of the IEF.

2.5.4 The criteria for defining receptor sensitivity in this chapter are outlined in Table 2.4.

2.5.5 Sensitivity takes into account the value of an IEF as well as vulnerability and recoverability. Therefore, while value is usually the primary consideration when determining sensitivity, professional judgment is also used to determine how sensitive an IEF may be to impacts when these other factors are considered.

Table 2.4: Criteria for receptor sensitivity.

Sensitivity	Definition used in this chapter
Very High	Habitats or species that form part of the cited interest within an internationally protected site, such as those designated under the Habitats Directive (e.g. SACs) or other international convention (e.g. Ramsar site). A feature (e.g. habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in an international/national context, such that the site is likely to be designated as a site of European importance (e.g. SAC).
High	Habitats or species that form part of the cited interest within a nationally designated site, such as an SSSI or an NNR. A feature (e.g. habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in a national context for which the site could potentially be designated as a SSSI. Presence of UKBAP habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected.
Medium	A feature (e.g. habitat or population), which is either unique or sufficiently unusual to be considered as being of nature conservation value from a county to regional level. Habitats or species that form part of the cited interest of an LNR, or some local-level designated sites, such as a LWS, also referred to as a non-statutory Site of Importance for Nature Conservation or the equivalent, e.g. Ancient Woodland designation. Presence of LBAP habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected.

Sensitivity	Definition used in this chapter
Low	A feature of importance at district level. A feature (e.g. habitat or population) that is of nature conservation value in a local context only, with insufficient value to merit a formal nature conservation designation.
Negligible	A feature of importance at local level. Commonplace feature of little or no significance. Loss of such a feature would not be seen as detrimental to the ecology of the area.

2.5.6 The significance of the effect upon ecology is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The particular method employed for this assessment is presented in Table 2.5. Where a range of significance of effect is presented in Table 2.5, the final assessment for each effect is based upon expert judgement.

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

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

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

2.6 Maximum design envelope parameters for assessment

2.6.1 The maximum design envelope parameters identified in Table 2.6 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These parameters have been identified based on the overview description of the development provided in Volume 2, Chapter 2: Project Description, including all potential development options where these are under consideration by the applicant.

2.6.2 Effects of greater adverse significance are not predicted to arise should any other development scenario within the project design envelope be taken forward in the final design scheme.

2.7 Impacts scoped out of the assessment

2.7.1 On the basis of the baseline environment and the project description outlined in Volume 2, Chapter 2: Project Description, a number of impacts are scoped out of the assessment for ecology and nature conservation. These impacts are outlined, together with a justification for scoping them out, in Table 2.7.

2.7.2 The impacts listed in Table 2.7 have either been scoped out of the assessment for ecology, or discussions regarding the potential to scope out impacts are ongoing at this stage.

Table 2.6: Maximum design envelope parameters assessed.

Potential impact	Maximum design scenario	Justification
Construction		
<p>Potential permanent loss of habitats:</p> <ul style="list-style-type: none"> Semi-improved grassland; ditches; and hedgerows <p>Potential permanent loss of habitats for:</p> <ul style="list-style-type: none"> invertebrates; reptiles; breeding birds; wintering birds; badgers; bats; and water voles 	<p>Main development site (Zone A) loss of habitats up to 20 ha in total</p> <p>Above ground installation for NTS connection (Zone D3) loss of habitats up to 0.25 ha in total</p> <p>Permanent access road within Zone C loss of habitats up to 1.5 ha in total</p> <p>Permanent access road within Zone G loss of habitats up to up to 1 ha in total</p>	<p>The dimensions of the permanent construction works listed represent the upper limit of potential permanent habitat loss.</p>
<p>Potential temporary loss of habitats:</p> <ul style="list-style-type: none"> Ditches; and hedgerows <p>Potential temporary loss of habitat or disturbance due to construction works for:</p> <ul style="list-style-type: none"> GCN; reptiles; breeding birds; wintering birds (on terrestrial functionally linked land and on the foreshore); bats; and water voles 	<p>Gas pipeline construction: 23 m wide working corridor within limits of deviation for gas pipe route options shown in Works Plans.</p> <p>Zone C and G access road temporary working width for construction: 20 m</p> <p>Up to 2 ha used for laydown or temporary construction compounds in Zone C.</p> <p>Piling is required for foundations on the main development site (Zone A) and may use impact/driven or vibratory techniques</p>	<p>Impact piling for foundations on Zone A represent the maximum amount of disturbance from noise and vibration during construction.</p>
	<p>Construction programme up to six years total including potential construction and use of haul roads in winter or summer periods</p>	<p>The construction programme represents the maximum design scenario as it is the longest period over which impacts from construction could occur and would have the greatest potential for impact to wintering or breeding birds.</p>
	<p>Causeway construction and barge delivery numbers and frequency as specified in Volume 2, Chapter 2 Project Description. Barge deliveries may occur during winter or summer period.</p>	<p>The construction programme and frequency of barge movements represents the maximum design scenario as it is the longest period over which impacts from construction could occur and would have the greatest potential for impact to wintering or breeding birds.</p>
<p>Potential for airborne pollutants due to construction works to adversely impact designated sites and habitats</p>	<p>Construction dust risk and construction traffic air pollutant impact maximum design scenario as specified in Volume 3, Chapter 12: Air Quality</p>	<p>The maximum design scenario parameters for air pollutant emissions have been specified for that assessment</p>
<p>Potential for runoff pollutants due to construction works to adversely impact designated sites and habitats, water voles or reptiles</p>	<p>Construction drainage and water quality impact maximum design scenario as specified in Volume 3, Chapter 15: Hydrology and Flood Risk</p>	<p>The maximum design scenario parameters for water pollutant emissions have been specified for that assessment</p>
Operation and maintenance		
<p>Potential for air pollutant emissions to adversely impact designated sites and habitats</p>	<p>Gas engines' air pollutant impact maximum design scenario as specified in Volume 3, Chapter 12: Air Quality</p>	<p>The maximum design scenario parameters for air pollutant emissions have been specified for that assessment</p>
<p>Potential for surface runoff pollutants to adversely impact designated sites and habitats</p>	<p>Permanent drainage and water quality impact maximum design scenario as specified in Volume 3, Chapter 15: Hydrology and Flood Risk</p>	<p>The maximum design scenario parameters for air pollutant emissions have been specified for that assessment</p>
<p>Potential for operational activity to cause disturbance to breeding and wintering birds</p>	<p>Operational noise and maintenance access impact maximum design scenarios as specified in Volume 3, Chapter 11: Noise and Vibration and Chapter 10: Traffic and Transport respectively.</p>	<p>The maximum design scenario parameters for operational noise and traffic have been specified for those assessments</p>

Potential impact	Maximum design scenario	Justification
Decommissioning		
Permanent loss of habitat and potential impact of air pollutant, water pollutant or noise emissions on designated sites, habitats or species	Ongoing operation of all or part of Thurrock Flexible Generation Plant after 35 years	Greatest long-term impact on these receptors
Temporary loss of habitat. Potential for air or water pollutant emissions or disturbance to impact species or designated sites	Decommissioning and deconstruction of Thurrock Flexible Generation Plant with works no greater than specified for construction period No temporary loss of habitat due to removal of gas pipe	Reasonable maximum scenario for decommissioning impacts. It is not expected that buried pipeline assets would be removed.

Table 2.7: Impacts not covered in the assessment.

Potential impact	Justification
Construction phase	
Land take within designated sites	The development does not involve loss of any habitat within any currently designated sites. Walton Common (Zone A) is being considered for designation as a LWS but it is not considered that this designation, if it occurred, would materially affect the significance of the conclusions presented in the ES or the proposed mitigation for habitat loss in Zone A.
All impacts on white-clawed crayfish	Ditches on site were not considered suitable for this species.
All impacts on fish	Ditches on site are not considered suitable for significant fish populations or movements. Designed-in mitigation ensures potential fish passage through the drainage network, if it occurs, would not be impeded.
All impacts on Dormouse	Dormouse are not present within the study area
All impacts on Otter	Surveys and desk study have confirmed otter are not present within the study area
Impacts on wintering SPA birds on terrestrial habitat	Surveys confirmed no significant numbers of wintering birds associated with the SPA are found in terrestrial habitats within or adjacent to areas of permanent land-take.
Impacts on hedgerows from permanent habitat loss	No significant hedgerows occur in areas of permanent habitat loss.
Operation phase	
Habitat loss within designated sites	Operation will not involve works within designated sites.
Habitat loss for species IEFs	Operation will not involve loss of habitat used by species IEFs.
Habitat fragmentation for species IEFs	Operation will not involve loss of habitat used by species IEFs and hence no fragmentation effects would occur.
Any impacts from habitat loss	All permanent and temporary habitat losses occur during construction. Impacts of habitat loss (including impacts of species arising from habitat loss) are assessed in the construction phase. No additional impacts from habitat loss will occur during operation.
Decommissioning phase	
Habitat loss within designated sites	Decommissioning will not involve works within designated sites.

2.8 Measures adopted as part of Thurrock Flexible Generation Plant

- 2.8.1 A number of measures have been designed in to the Thurrock Flexible Generation Plant to reduce the potential for impacts on ecology. These are listed in Table 2.8 below.

Table 2.8: Designed-in measures.

Measures adopted as part of Thurrock Flexible Generation Plant	Justification
Design measures	
The Thurrock Flexible Generation Plant has been developed to avoid designated sites and other ecologically sensitive habitats wherever practicable.	To minimise loss of habitats of conservation interest.
Other IEF features such as watercourses (ditches) have been retained (e.g. around the Main Site in Zone A) where it has been practicable to do so.	
Where practicable, areas identified as containing protected species have been protected by providing an appropriate buffer from construction and operation works. The width of these buffer zones will be developed in accordance with standard industry requirement and best practice guidance and are expected to be applied for nesting birds and water vole colonies.	To reduce impacts on protected or otherwise notable species.
Pre-construction measures	
<p>Pre-construction surveys, informed by existing data for protected species, will be carried out to identify potential changes in baseline conditions. These surveys will be undertaken within 12 months prior to the commencement of construction works. Surveys may need to be undertaken over several months in order to collate sufficient data to inform a licence application and any associated mitigation strategy.</p> <p>Should the 12-month survey/activity period lapse between pre-construction surveys and the commencement of works, the need to repeat surveys will be assessed by an appropriately experienced ecologist. Should surveys confirm a change in baseline conditions, which result in the need for a protected species licence, a licence will be obtained prior to the commencement of licensable works.</p>	To provide up to date information to ensure compliance with legal requirements and, where relevant, trigger the implementation of mitigation measures set out in the CoCP (application document A8.6) and OEMP (application document A8.7).
Where reptile habitat is required to be cleared for construction, a detailed method statement will be developed in order to help ensure the protection of these species. The method statement will include detailed pre-construction measures designed to ensure that impacts on reptiles are minimised, through relocation of animals from the works area and an adjacent buffer zone and post-construction habitat reinstatement. The method statement will include post-construction habitat restoration and management requirements.	To help ensure the protection of reptiles.
Where trees, hedgerows or scrub, of potential value to nesting birds, are required to be cleared for construction, clearance will be undertaken outside of the bird breeding season (14 February to 31 August inclusive) to prevent disturbance to nesting birds where possible. However, if this is not practicable, habitat will be surveyed prior to clearance. No habitat containing an active nest will be removed or disturbed, and measures will be set in place to protect the nest until young have fully fledged and left the nest. Measures may include the establishment of 5 m wide buffer zones in which heavy vehicles will not be tracked and the storage of vehicles, equipment, machinery and soil storage will be prohibited. Works in the buffer zone will be delayed until the Ecological Clerk of Works (ECoW) has confirmed young have fully fledged and left the nest.	To help ensure the protection of breeding birds and their young.
A pre-construction badger survey of the works area and 30 m buffer zone will be undertaken in order to locate any potential new active setts that could cause a constraint to construction. If mitigation cannot be carried out to protect any setts as required under legislation, then a Natural England licence to close or disturb the sett may be required and will be obtained prior to the commencement of works as necessary.	To help ensure the protection of badgers.
Construction measures	
Site induction and toolbox talks will include mitigation requirements included in this chapter and in the OEMP (application document A8.7).	To help ensure adherence to the ecology mitigation strategy and protection of habitats and species of nature conservation interest.
Appropriate dust control measures will be implemented on site, as far as practicable, that no significant off-site dust effects will occur.	
Night working will be avoided where practicable. However, it may be necessary to carry out works during night time hours and where night working is unavoidable, light fixtures will be directed away from habitat of value to protected or otherwise notable species, in order to minimise likely disturbance effects of light spillage.	To minimise the disturbance impacts of light spill on protected or otherwise notable species.
Construction of the causeway and dredge pocket in the intertidal zone is not proposed between November to March inclusive unless further evidence supports a conclusion that potentially significant effects on the SPA integrity due to construction during this period would not occur.	To minimise disturbance on wintering Avocet and other wintering birds using the foreshore in the vicinity of the Zone G causeway during construction of the causeway.
An ECoW will be present on site to oversee enabling works and construction where necessary. The ECoW will be a suitably experienced professional ecologist. The ECoW will review results of protected species surveys prior to the commencement of works and will contribute to all relevant construction method statements.	To ensure works are carried out in accordance with the CoCP and comply with international and national legislation.

Measures adopted as part of Thurrock Flexible Generation Plant	Justification
Measures will be implemented to prevent the pollution of watercourses and will be based on the measures within the Outline CoCP (application document A8.6). The measures will include the provision of a pollution incident response plan.	To minimise the potential for pollution incidents to affect habitats.
Temporary habitat losses adjacent to Low Street Pit LWS where GCN are present primarily affects arable land of low or no value to GCN. If practicable, works could be timed to avoid the active GCN season, but if not a GCN licence may need to be applied for to include temporary fencing to exclude GCN from the works area within the vicinity of GCN ponds.	To minimise the potential impacts on GCN
Progressive and careful habitat clearance works such as the gradual strimming of above-ground vegetation such as brambles, rough grass and scrub, will be undertaken in select areas prior to construction, to deter reptiles from the working area where alternative habitat is available to them. Uprooting of vegetation of potential value to hibernating reptiles will be undertaken prior to the commencement of the hibernation period (November to March) to deter reptiles from hibernating in the area.	To minimise the potential impacts on reptiles.
A biosecurity protocol will be implemented to minimise risk of spreading invasive species. The main risks are associated with transfer of aquatic plants or animals (including vectors for disease) between watercourses or waterbodies. Where working in or near water, control measures will be implemented. These are documented in the CoCP (application document A8.6) and include: <ul style="list-style-type: none"> Ensuring vehicle tyres and wheel arches are cleared of mud, plants and other organic material before moving from one watercourse to another; Leaving removed material on site; and Cleaning boots and disinfecting (away from waterbodies to prevent potential pollutant incidents) all equipment that might come into contact with water. Appropriate measures will also be adopted when working in the vicinity of invasive terrestrial plants, if any are found. Where necessary, works will be supervised by the ECoW. Known locations of invasive plant species will be marked on site and vehicle movements restricted in the vicinity of these locations. Any spoil containing or likely to contain invasive plant material to be stored separately from non-contaminated spoil, and treated as appropriate, with control measures adopted.	To minimise the potential risk of spreading disease and invasive species.
Taking into account the mobile nature of water voles, pre-construction surveys will be undertaken to confirm the presence/absence of water voles along all watercourses of potential value to water voles. A Natural England licence would be obtained for works that affect water vole habitat. Method statements will include pre-construction measures to deter water voles from the working area and an adequate buffer zone (i.e. up to 15 m where favourable habitat is present). Measures could potentially include: <ul style="list-style-type: none"> Removal of vegetation from channel and bank-side vegetative cover, up to a minimum of 1.5 m inland from the top of the bank between mid-February and early April; The potential capture and translocation of water voles from working areas by an appropriately qualified and experienced ecologist; A destructive search of water vole burrows within the working corridor under the watching brief of an appropriately qualified and experienced ecologist; and Measures to protect sections of watercourses and ditches which will not be directly impacted. Works will be conducted in accordance with Natural England guidance, which states that “for summer works, vegetation removal should be carried out for a two-week period prior to development. Winter works should either carry out the mitigation in September and maintain unsuitable habitat until the works commence, or in the event of an emergency, trapping and vole proof fencing may have to be employed” (Arnott, 2001). Works will also take into account best practice guidelines published in Strachan <i>et al.</i> (2011).	To minimise the potential impacts on water voles.
Post-construction measures	
Reinstatement of temporarily damaged or cleared terrestrial habitat will be carried out as soon as practicable. Habitat reinstatement will involve the replacement of stripped soils and the planting of native hedgerows, shrubs and trees, typical of the local area and of local provenance where possible. Habitat reinstatement will be undertaken in accordance with a pre-approved Landscape Management Plan. The scheme will include the retention and/or replacement of habitats of nature conservation value wherever practicable. All hedgerows affected by clearance for construction of the gas pipeline will be replanted with an appropriate mix of native species. Temporary artificial hedgerows will be installed to bridge the gaps until the replacement planting has matured sufficiently to restore hedgerow connectivity	To minimise the period of time that habitats and species will be affected.
Operation and maintenance measures	
Thurrock Flexible Generation Plant access road to be unlit, and the Thurrock Flexible Generation Plant itself to be unlit externally in normal operation except for motion-sensitive security lighting which will be directional to minimise light spillage.	To minimise disturbance impacts on species
Measures will be adopted during the operation of Thurrock Flexible Generation to prevent the pollution of the environment.	To protect retained habitats and species.
Habitats will be managed in accordance with the OEMP (application document A8.7).	To ensure the success of habitat/landscaping proposals.

Measures adopted as part of Thurrock Flexible Generation Plant	Justification
<i>Decommissioning measures</i>	
Measures to be adopted during decommissioning will be similar to those adopted during construction and will incorporate best practice guidance available at that time. These will be implemented through a decommissioning plan.	To minimise likely impacts on habitats and species of ecological or conservation interest.

3. Baseline environment

3.1 Current baseline

3.1.1 The sections below describe the current baseline as derived from the desk study and surveys undertaken in 2018 and 2019. It is not considered likely that the baseline would change significantly between 2019 and the start of construction (2021) or operation (2022, or later) in terms of the broad spread of habitats and species present on site.

3.1.2 However, it is possible that the distribution of mobile species such as breeding birds, reptiles, water voles and badgers may change between those dates, and therefore additional pre-commencement surveys would be undertaken to assess any changes in distribution. The proposed mitigation plans as set out in the OEMP (application document A8.7) would be amended accordingly, but the nature of the mitigation measures required is unlikely to change.

Designated sites

3.1.3 There are three statutory designated sites for nature conservation value within 2 km of the Thurrock Flexible Generation Plant application boundary (Table 3.1). The Thames Estuary and Marshes SPA / Ramsar is located 1.03 km east from Zone D3. Mucking Flats & Marshes SSSI is located 0.77 km east from Zone D3. Linford Wood LNR is located 1.94 km north of Zone C.

3.1.4 For the purposes of the assessment of air quality impacts on internationally designated sites, the search area was extended to 15 km from Zone A. Refer to Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors for full details of the assessment of atmospheric emissions on designated sites.

3.1.5 Eight non-statutory Local Wildlife Sites (LWSs) are located within the 2 km search radius of the site (Table 3.1).

3.1.6 Two sites are located immediately adjacent to the Thurrock Flexible Generation Plant application boundary: Low Street Pit LWS is located adjacent to the proposed gas pipeline connection (Zone D). Goshem's Farm LWS is located adjacent to one of the options for the causeway access road (Zone G).

3.1.7 Three LWSs (Lytag Brownfield LWS, Tilbury Centre LWS and Tilbury Marshes LWS) are within 30-70m of the application boundary, but not directly affected by construction.

Table 3.1: Designated sites within 2 km of the Thurrock Flexible Generation Plant.

Site name	Type	Approx. area (ha)	Interest Features	Distance from site (km)
Statutory Sites				
Mucking Flats and Marshes	SSSI	312.7	Nationally and internationally important numbers of wintering wildfowl and waders occur on an extensive stretch of mudflats, saltmarsh, and sea wall grassland. Saltmarshes provide important high tide roosts and have a high invertebrate interest. The site's value is enhanced by its proximity to two SSSI sites across the Thames in Kent.	0.77
Thames Estuary and Marshes	Ramsar	5589	The site supports internationally important numbers of wintering waterfowl, on a complex of mudflats, lagoons and saltmarshes. The saltmarsh areas comprise internationally important diverse assemblages of wetland plants and invertebrates. The site is also noted for its hydrological functions, including shoreline stabilisation.	1.02
Thames Estuary and Marshes	SPA	4838.9	The estuary and adjacent grazing marsh support important assemblages of wintering water birds and is also important in spring and autumn migration periods	1.02
Linford Wood	LNR	3.46	The woodland provides habitat for birds, including refuge for migrant birds in spring and autumn.	1.95
Non-statutory Sites				
Low Street Pit	LWS	3.5	Site lies on regionally important Thames terrace gravels, supports diverse invertebrate fauna.	0.00
Goshems Farm	LWS	74	Site supports populations of Stinking Goosefoot (<i>Chenopodium vulvaria</i>), and UKBAP species Hornet Robberfly (<i>Asilus crabroniformis</i>)	0.00
Lytag Brownfield	LWS	12.4	Site supports populations of all four Essex reptile species and an important invertebrate assemblage of up to national interest on open mosaic brownfield habitats.	0.03
Tilbury Centre	LWS	2.8	Site comprises a complex mosaic of habitats, supporting important invertebrates and BAP bumblebee <i>Bombus humilis</i> foraging habitat.	0.03
Tilbury Marshes	LWS	39.8	Grazing marsh supports a number of nationally scarce plants, area also includes important habitat for invertebrates	0.07
West Tilbury Hall	LWS	2.5	Locally important grassland flora includes 2 locally rare species, and supports the nationally scarce bee <i>Osimia bicolor</i>	0.19
West Tilbury Church	LWS	0.5	Area of ancient grassland supporting nationally restricted flora.	0.22
Broom Hill	LWS	11.3	Site is of interest for ancient acid-grassland flora, and invertebrate fauna is of exceptional important. Seven nationally rare and 39 nationally scarce species have been recorded.	0.31

Site name	Type	Approx. area (ha)	Interest Features	Distance from site (km)
Restored Canal & Grazing Marsh, Higham	LWS	58.6	Recently established reedbeds and coastal grazing marsh.	0.90

3.1.8 It is not considered that the operation or construction of the proposed development would generally have adverse impacts on LWS sites more than 200 m away. Institute of Air Quality Management (IAQM) guidance suggests that impacts of dust on ecological receptors during construction are unlikely beyond 50 m from the source (IAQM, 2014), and lighting and noise effects are not considered likely to be significant beyond 200 m based on the assessments undertaken for the ES.

3.1.9 For operational effects, air quality assessments have been carried out on all internationally important statutory sites within 15 km, nationally important sites within 10 km and LWSs within 2 km which support habitats considered potentially susceptible to impacts from atmospheric emissions (refer to Volume 6, Appendix 12.1: Assessment of Air Quality Impacts on Ecological Receptors for full details of the assessment of atmospheric emissions on designated sites). Sites with a downstream hydrological connection have been assessed for potential impacts from surface water run-off during construction and operation.

Habitats

3.1.10 Full descriptions of the Phase 1 survey results are provided in Volume 6, Appendix 9.1: Ecological desk study and survey report. A table showing areas of the habitat types present in each zone is provided in Table 3.2. A table showing lengths of linear habitats present in each zone is provided in Table 3.3.

3.1.11 Due to changes in the development design and Order Limits subsequent to the Phase 1 surveys, additional survey zones (outside the development as now proposed) are referenced here.

3.1.12 A brief summary is provided below:

- Zone A: The northern section comprises approximately 7.3 ha of arable land of no particular conservation interest and 1.1 ha of improved grassland. The southern section comprises 10.8 ha of semi-improved grassland (Walton Common) which is relict grazing marsh that does not meet the criteria for the Priority Habitat Coastal & Floodplain Grazing Marsh due to its relatively degraded nature and lack of botanical and breeding wetland bird interest in the associated ditches. The site is

currently managed by mowing and no grazing is undertaken. Zone A contains approximately 2 km of ditches. This includes c. 475 m of an internal ditch (that is not retained), and 1.4 km of perimeter ditch, c846 m of perimeter ditch that is retained, and a further 554 m of perimeter ditch within Carbon Capture Readiness (CCR) land which will be retained unless CCR technology is installed on the site in future.

- Zone B: Connection to the existing Tilbury substation and as such predominantly comprises buildings and hard standing.
- Zone C: Predominantly arable land (23.5 ha) crossed in three places by north-south ditches with strips of associated tall ruderal riparian habitat.
- Zone D: 8.34 ha in total, which predominantly comprises arable (3.9 ha) and improved grassland (3.7 ha) which are not considered to be of particular conservation interest. Hedgerows of length 900 m are present on field boundaries.
- Zone E: Predominantly an arable field 10.3 ha in size, with boundary ditches and grassland strips for field margins.
- Zones F1-F3: Predominantly arable fields 7.2 ha in size, with boundary ditches and grassland strips for field margins.
- Zone F4: Semi-improved grassland with encroaching scrub and tall ruderal 2.18 ha in size
- Zone G: Causeway and access track. For a description of habitats south of the sea wall refer to Volume 3, Chapter 17: Marine Environment. North of the sea wall, Zone D is 9.33 ha in size, comprising bare ground / hard standing (2.62 ha), arable (1.04 ha), poor semi-improved grassland (1.16 ha) and semi-improved grassland (3.73 ha) with additional areas of scrub and tall ruderal. The access road runs across an area of semi-improved grassland north of the sea wall, and then utilises an existing road north to the substation. There are two options for the track; one option runs adjacent to the substation into Zone A through an area of semi-improved grassland and scrub. The other option runs along an existing track then turns north across an area of land which is currently being restored under a consent for land-raising, then across an arable field before crossing an area of Semi-improved grassland with encroaching scrub into Zone A.
- Zone H: Access route to public highway using existing and consented roads through Tilbury2 and former Tilbury B Power Station sites
- Zones I & J: Existing roads and bare ground.
- Zone W: Poor semi-improved grassland originally no longer included in the application boundary.
- Zone X: Arable originally considered as possible mitigation land but no longer included in the application boundary.
- Zone Y: An arable field with ditches along the boundaries, included in surveys as an initial candidate for mitigation land but subsequently dropped.

- Zone Z: Mixed habitats including the Lytag Brownfield LWS, comprising scrub, grassland and open mosaic brownfield habitat. This land is outside the proposed development boundary but was included in the original bird survey. A large pond is present here which was constructed as part of a mitigation package for another development which did not proceed. This area is now a construction site for the Tilbury2 development.

3.1.13 In terms of habitats of value that are included as IEFs for the purposes of impact assessment, the following habitats are considered to have value at greater than site level.

- Semi-improved and poor semi-improved grassland (Zones A and G): These grassland areas are not considered to have particularly high intrinsic value. Although the Zone A grassland is relict grazing marsh it is not considered to meet the criteria for that UK Biodiversity Action Plan (BAP) habitat type and is therefore considered to be of district value. The Zone G grassland is considered to be of parish value.
- Ditches: Drainage ditches are present within or on the boundaries of the majority of zones described above. The ditches are considered to be of district value, for the protected and other species they support, and for the ecological habitat connectivity they provide.
- Hedgerows: There are no significant hedgerows within the parts of the Thurrock Flexible Generation Plant where permanent infrastructure will be constructed. Hedgerows are present on the verges of Station Road and on field boundaries within Zone D. Overall the hedgerows are not considered to be of more than district value although they are UKBAP habitat.

3.1.14 No other habitat types are considered to be of importance at more than the site level.

Table 3.2: Approximate areas of habitat types within the Thurrock Flexible Generation Plant application site.

Habitat type	Development Zone (ha)										Total	
	A	B	C	D	E	F	G	H	I	J		
Semi-natural broadleaved woodland				0.14		0.04		0.18				0.35
Dense scrub			0.05	0.10	0.10	0.05	0.61					0.91
Neutral semi-improved grassland	10.77	0.00		0.00		2.18	3.78					16.74
Improved grassland	1.10			3.68		0.24						5.02
Poor semi-improved grassland				0.07	1.25	0.06	1.17	0.24				2.79
Tall ruderal	0.21		0.97	0.08		0.03						1.29
Marginal vegetation (reed bed)				0.00			0.08					0.08
Standing water (ditches)	0.67	0.04	0.28	0.03		0.05	0.05					1.11
Hard standing		0.69	0.00	0.22		0.00	1.92	0.78	0.23	0.12		3.95
Arable	7.38		21.61	4.00	10.27	7.20	1.04					51.50
Buildings				0.01		0.00						0.01
Bare ground			0.60	0.02		0.00	0.71		0.14			1.46
Total	20.13	0.73	23.52	8.34	11.62	9.84	9.34	1.20	0.37	0.12		85.20

Table 3.3: Linear habitat features within the Thurrock Flexible Generation Plant application site.

Habitat type	Development Zone (lengths in km)										Total
	A	B	C	D	E	F	G	H	I	J	
Ditches	2.01	0.02	0.54	0.09	0.72	0.34	0.26	0.05	0.00		4.03
Intact species rich hedge				0.74					0.81		1.55
Intact species poor hedge				0.16	0.40			0.19			0.75
Defunct species rich hedge					0.00						0.00

Species

- 3.1.15 For full information on baseline ecological surveys, refer to Volume 6, Appendix 9.1: Ecological desk study and survey report. The sections below summarise the key species groups taken forward for impact assessment.

Invertebrates

- 3.1.16 An invertebrate scoping assessment of the grassland within Zone A and the Zone G grassland adjacent to Zone A where most permanent habitat loss occurs concluded that the site is unlikely to support an invertebrate assemblage of particular significance. At the time the surveys were undertaken it was acknowledged that the proximity of Zones A and G to the adjacent Lytag Brownfield LWS (which is known to be of considerable importance for invertebrate populations) meant that they were likely to contribute to the overall diversity of invertebrate populations in the surrounding area. However, Tilbury2 has now been consented and started construction, and the Tilbury2 development will result in the destruction of the majority of the Lytag Brownfield LWS. As a consequence, Zones A and G will no longer play as much of a role in supporting populations of species associated with the LWS. The invertebrate population of Zones A/G are considered to be of no more than district importance but are included in the impact assessment because of their potential contribution to the maintenance of remnant invertebrate assemblages in the adjacent offsite Tilbury2 ecological mitigation area and wider Thurrock district.

Great Crested Newts

- 3.1.17 No evidence of GCN presence in ditches on site were recorded during surveys in 2018. However, a 2018 GCN survey of ponds in Low Street Pit LWS (adjacent to Zones C and D) by RWE found a low population (max count 7 adults) of GCN associated with nine ponds within the LWS. This GCN population is considered to be of District importance.

Reptiles

- 3.1.18 The site as a whole supports populations of adder, grass snake, common lizard and slow-worm. All four species were present in Zone A and are considered likely to be present in the adjacent section of Zone G, which was not accessible for survey in September 2019. Populations of Common Lizard and Slow-worm are present in grassland crossed by the causeway access road immediately north of the sea wall in Zone G. Populations of reptiles were recorded associated with ditches in Zone C, although habitat loss in these areas is relatively small. All four reptile species are UKBAP listed, and given the presence of four species, the reptile assemblage is considered to be of county importance.

Breeding birds

- 3.1.19 A total of 28 species were confirmed as breeding within the survey area. A further 15 species were considered to be probably / possibly breeding within the survey area – records for these species were not wholly indicative of behaviour that could allow confirmation of breeding on site.
- 3.1.20 One confirmed breeding species, Cetti's warbler, is listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Five pairs of this species were recorded in 2018, four on Zone Z (outside the Thurrock Flexible Generation Plant Order Limits) and one in Zone A. In 2019 the distribution was similar (three pairs in Zone Z but two pairs were recorded in Zones W and V (also outside the Thurrock Flexible Generation Plant Order Limits). One pair was noted in F4 south of the main construction area.
- 3.1.21 Of the 43 species considered to be breeding or possibly breeding on site, 18 had some status as species of conservation concern. Ten species are listed as a priority species in the UK BAP, nine species are listed as Species of Principal Importance under Section 41 of the NERC Act, two species are listed on the Local BAP, nine species are included on the Birds of Conservation Concern (BoCC) Red List and six species are included on the BoCC Amber List.
- 3.1.22 The breeding bird assemblage is considered to be of district importance.

Wintering birds

- 3.1.23 Surveys of terrestrial land potentially considered to be functionally linked land with respect to the adjacent South Thames Estuary and Marshes SPA were undertaken. These surveys found no evidence that species associated with the SPA were present on fields within or adjacent to the Site, and no significant populations of terrestrial wintering birds were identified. Terrestrial wintering birds are therefore not considered further in this chapter.
- 3.1.24 A series of bird surveys of the foreshore in and around Zone G have been reviewed in Volume 6, Appendix 9.1 (Bioscan 2016/17; RWE 2017/18). The data from these sources indicated sporadic to occasional use by low numbers of SPA species in the intertidal area of Zone G in the vicinity of the proposed causeway. Higher aggregations of waders and wildfowl were recorded outside and to the east of the survey area and further east within the SPA itself.
- 3.1.25 The surveys undertaken by RPS in 2019-2020 found that while winter populations of many species were very low, larger numbers of some species were found compared to the surveys undertaken between 2016-2018.

3.1.26 Volume 6, Appendix 9.4 presents the data from the 2019-20 surveys. It evaluates them in relation to national population estimates and, where appropriate, in relation to numbers of birds listed on the citation for the Thames Estuary and Marshes and in relation to latest population estimates for species in the Thames Estuary (population estimates for the SPA citation, a five year mean from 1993-1998).

3.1.27 Based on this additional survey and evaluation it is concluded that the overall assemblage of wintering birds present within the survey area is of no more than district importance.

3.1.28 In terms of individual species potentially affected by construction and use of the Zone G causeway, the review of the numbers recorded presented in Volume 6, Appendix 9.4 concludes that significant impacts were unlikely to occur on species with the potential exception of Avocet, the population of which species occurring in the likely zone of influence of the Zone G causeway is also considered to be of district importance.

Water Voles

3.1.29 In 2018, Water Voles were recorded in numerous ditches across the site including in areas where water vole habitat will be affected in Zones A and C. Surveys in 2019, carried out in June and September, found that by September the majority of the surveyed ditches no longer held water, and water voles were absent from the ditches in Zones A and C. It is not known at this stage whether this trend will persist or whether water voles will re-establish from offsite population reservoirs if the ditches refill with water in 2020. For the purposes of this assessment a precautionary approach has been adopted, and status and effects on Water Voles have been assessed based on the 2018 survey results. However, if water voles remain absent from the development area at the time of construction, no mitigation would be necessary. Water voles are a protected and UKBAP species, and the water vole population on site is considered to be of county importance based on the 2018 survey results.

Bats

3.1.30 Activity surveys for bats in Zones A and C were undertaken in 2019. Very little bat foraging activity was observed, and only three species (Common and Soprano Pipistrelle and Noctule) were recorded. There are no potential roost sites that would be affected, or major linear habitat features likely to represent significant flightlines in the areas affected by permanent habitat loss in Zones A and C. Hedgerows along Station Road may be affected by temporary crossings for installation of the gas pipeline, and mitigation measures are proposed accordingly. Foraging bats are considered to be of parish importance only.

Badgers

3.1.31 Occasional signs indicating presence of badgers were observed during surveys but no active setts are currently known to occur within 30 m of the site. An artificial badger sett has been recently constructed with Zone Z as part of ecological mitigation works for Tilbury2, outside the red line, since the original surveys were undertaken, but little evidence of badger activity within the application boundary has been recorded. Badgers are therefore considered to be of parish importance.

Important Ecological Features

3.1.32 Important Ecological Features (IEFs) are sites, habitats and species of ecological or nature conservation importance that could be significantly affected by a project. Sites, habitats or species identified during the desk study or survey work that are not considered likely to be affected are not considered further in this chapter.

3.1.33 In assigning a level of importance to a site, habitat or species population or assemblage, its distribution and status (including a consideration of trends based on available historical records) have been considered. Rarity is considered because of its relationship with threat and vulnerability, and the need to conserve representative areas of habitats and genetic diversity of species populations, although rarity in itself is not necessarily an indicator of value. A species that is rare and declining is assigned a higher level of importance than one that is rare but known to be stable.

3.1.34 The valuation of sites also takes full account of existing value systems such as SSSI and LWS designations.

3.1.35 In accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM, 2019) guidelines the value of habitats takes into account published selection criteria, which include:

- size (extent);
- diversity;
- naturalness;
- rarity;
- fragility;
- typicalness, and recorded history;
- position in an ecological or geographical unit;
- current condition; and
- potential importance.

3.1.36 Criteria for the valuation of habitats and plant communities include Annex III of the Habitats Directive, guidelines for the selection of biological SSSIs and criteria used by local planning authorities and the Wildlife Trusts for the selection of local sites.

- 3.1.37 Populations of species are valued on the basis of their size, recognised status (such as recognised through published lists of species of conservation concern, and designation of BAP status) and legal protection status. For example, bird populations exceeding 1% of published information on biogeographic populations are considered to be of international importance, those exceeding 1% of published data for national populations are considered to be of national importance, etc.
- 3.1.38 In assigning values to species populations, it is important to take into account the status of the species in terms of any legal protection to which it is subject. However, it is also important to consider other factors such as its distribution, rarity, population trends, and the size of the population which would be affected. Thus, for example, whilst the great crested newt is protected under the Habitats Directive, and therefore conservation of the species is of significance at the international level, this does not mean that every population of great crested newt is internationally important and thus of very high value. It is important to consider the particular population in its context. Thus, in assigning values to species the geographic scale at which they are important has been considered. The assessments of value rely on the professional opinion and judgement of experienced ecologists.
- 3.1.39 Due regard has also been paid to the legal protection afforded to such species in the development of mitigation and compensation measures to be implemented during construction and operation of the Thurrock Flexible Generation Plant. For European Protected Species (EPS) there is a requirement that the scheme should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range, i.e. to maintain favourable conservation status, the scheme should not affect the long-term availability of sufficient habitat required by the population, the long-term viability of the population, or the long-term natural range of the species.
- 3.1.40 Various criteria can be used to evaluate the importance of species assemblages, such as SSSI selection criteria.
- 3.1.41 Assessing feature values requires consideration of both existing and future predicted baseline conditions, and therefore the description and valuation of ecological features takes account of any likely changes. This includes known trends in the population size or distribution of species, likely changes to the extent of habitats, and the effects of other proposed developments or land use changes.
- 3.1.42 A summary of the IEFs which are taken forward to the impact assessment in Section 4 is provided in Table 3.4 below.

- 3.1.43 Locations of key ecological constraints are shown on Figure 3.1. This figure includes Water Vole records from 2018 and 2019 and therefore represents the precautionary assumption that Water Voles will return to these ditches following their recorded absence from the majority of the survey area in September 2019.

Table 3.4: Summary of IEFs identified for assessment.

IEF	Covering legislation and guidance	Level of Importance
Thames Estuary and Marshes SPA	Conservation Regulations 2017. This site supports breeding and wintering bird populations of European importance of the several species listed on Annex I of the Directive. The area qualifies under Article 4.2 of the Directive by regularly supporting at least 20,000 waterfowl.	International
Thames Estuary and Marshes Ramsar	Conservation Regulations 2017. The site meets four criteria of Ramsar (criterion 1, 2, 5 and 6).	International
Mucking Flats & Marshes SSSI	Wildlife & Countryside Act 1981 (and as amended). Supports UKBAP Priority habitats and species.	National
Broom Hill LWS	Considered in local authority policies under the domestic planning regime with applications made to local authorities.	County
Mucking Heath LWS		
Low Street Pit LWS		
Lytag Brownfield LWS		
West Tilbury Hall LWS		
Semi-improved grassland	Included primarily because of presence of reptiles	District (Zone A/G)
Ditches	Included primarily because of presence of water voles	District
Hedgerows	The Hedgerow Regulations 1997 protect "important" hedgerows from removal. Native species hedgerows are a Priority Habitat of the UKBAP.	Parish
Invertebrate assemblage	Considered in local authority policies under the domestic planning regime with applications made to local authorities.	District
GCN	Protected under the Conservation Regulations 2017 and is a UKBAP species	District
Reptiles	All common UK reptile species (adder, grass snake, common lizard and slow-worm) are protected through part of Section 9 (1 and 5) of the Wildlife & Countryside Act 1981 (as amended) and are UKBAP species.	County
Breeding birds	Several breeding bird species recorded during the surveys are protected under the Wildlife & Countryside Act 1981 (as amended) and/or are Priority Species of the UK BAP and are listed in the Essex LBAP.	District

IEF	Covering legislation and guidance	Level of Importance
Wintering birds (foreshore)	<p>Several species recorded in surveys undertaken in 2016-2018 by third parties and in 2019-2020 form part of the wintering bird populations of European importance within the adjacent SPA.</p> <p>The overall wintering bird assemblage is considered to be of District importance.</p> <p>Individual bird species are not considered to be of more than local importance with the exception of Avocet, which is considered to be of District importance and is a qualifying feature of the Thames Estuary & Marshes SPA</p>	District
Water Voles	Water voles are protected under Schedule 5 of the WCA 1981. The species is also a listed on the UKBAP and Essex BAP.	County (<i>assuming population recovers to 2018 levels from absence recorded in September 2019</i>)
Bats	All bat species are protected through inclusion in the Conservation Regulations 2017. Noctule, soprano pipistrelle and brown long-eared bats are UK BAP Priority Species.	Parish
Badgers	Protection of Badgers Act 1992	Parish

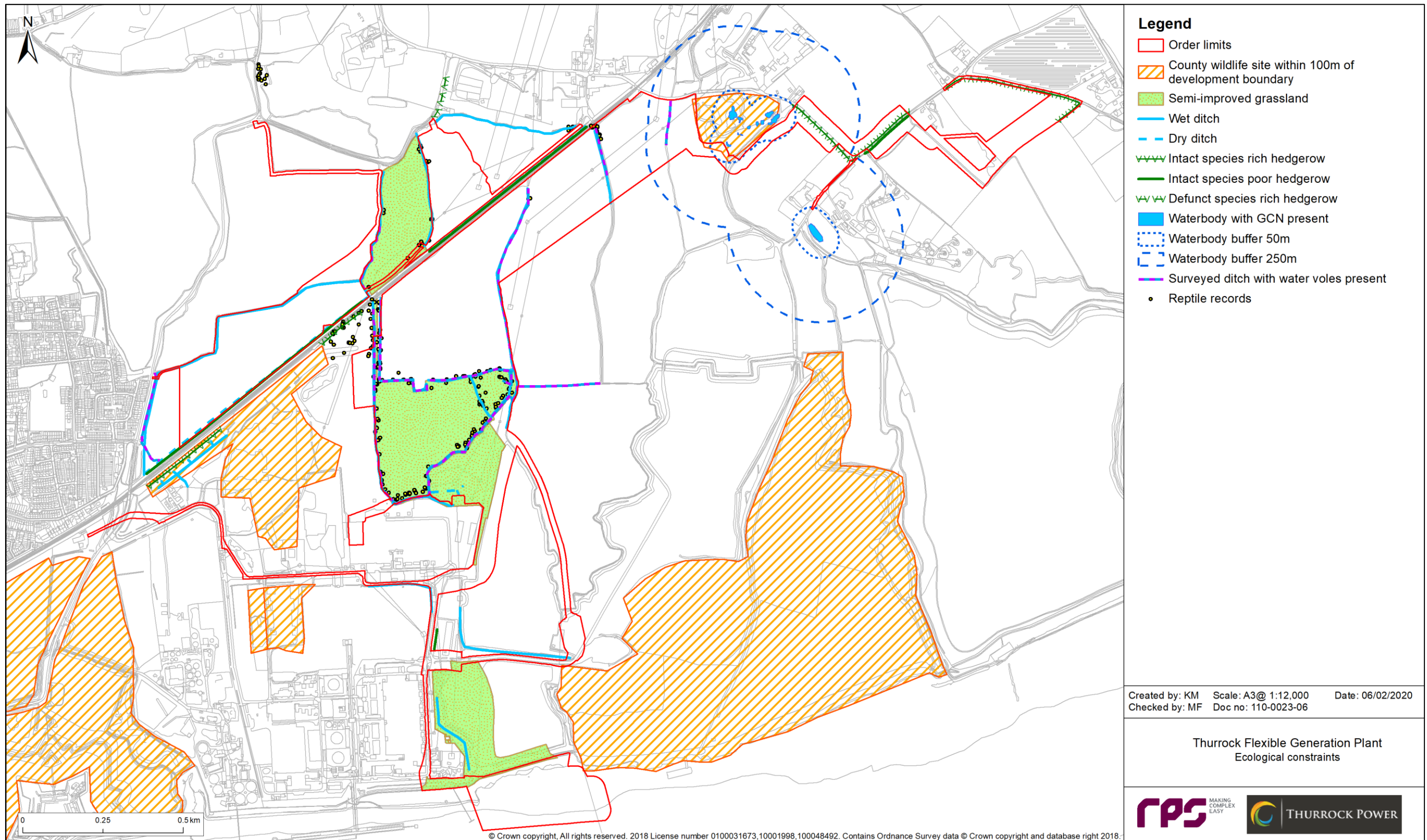


Figure 3.1: Ecological constraints.

3.2 Future baseline

3.2.1 The following sections consider known trends in distribution or abundance in species present in the study area for the Thurrock Flexible Generation Plant. It is considered that land use and management are likely to be the key predictors of species distributions over the lifetime of the scheme, given that the majority of habitats affected by the works are arable and grassland farmland habitats.

- Reptiles: Most common species of reptile (grass snake, slow worm and common lizard) are widespread across England but considered to be in decline as a result of habitat loss and the effects of habitat fragmentation. Adder is less widespread due to its more restricted habitat requirements but is also decreasing.
- Breeding farmland birds: the British Trust for Ornithology (BTO) breeding farmland bird index has declined by 56% since 1970. This pattern of long-term decline has been apparent for many years. The rate of decline in recent years is not as steep as previously, but in general farmland birds remain in decline across the UK.
- Water voles: Water vole populations are in major decline; the species used to be found in nearly every waterway in England, Scotland and Wales but are now thought to have been lost in up to 90% of these sites. Threats include habitat loss and fragmentation, water pollution and predation by American mink in the last 30 years.
- Badgers: Estimates suggest that badger populations nationally are increasing. The potential impact of the badger cull for Tuberculosis control may reduce populations in areas where the cull is implemented.

Climate change

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

3.2.3 Climate change affects biodiversity in many ways. Impacts on species include changes in distribution and abundance, the timing of seasonal events and habitat use and, as a consequence, there are likely to be changes in the composition of plant and animal communities. Habitats and ecosystems are also likely to change in character.

3.2.4 Assessing the impacts of climate change on terrestrial and freshwater biodiversity is difficult as plants and animals are influenced by other pressures, such as atmospheric pollution and land use, and different factors can work in combination to bring about change. However, changes are beginning to be observed across a range of species and habitats in the UK that have been related to climate change. Morecroft & Speakman (2015) summarise 17 technical papers produced by leading experts on the impacts of climate change on habitats and species in the UK. They conclude that there is strong evidence that climate change is affecting UK biodiversity. Impacts are expected to increase as the magnitude of climate change increases.

3.2.5 The distributions of many species are shifting northwards, including some species which have colonised the UK from mainland Europe. There are also examples of species distributions shifting to higher altitudes. Observed changes in distributions differ between species, and some of this difference is likely to be explained by effects of habitat fragmentation on dispersal ability for some species more than others.

3.2.6 Species populations and habitats have been affected by variations in rainfall and extreme weather events, particularly drought. Projected changes in these variables as a result of climate change could have a major impact on biodiversity and ecosystems. Some habitats are particularly sensitive to climate change, with the habitats most likely to be affected being montane habitats (from temperature rises), wetlands (from changes in hydrological processes and availability of water) and coastal habitats (from sea-level rise).

3.2.7 While the responses of species and habitats can be hard to predict with any great degree of certainty as there is much that is not known about habitats, their response to changing conditions and interactions between climate change and changes in management, some qualitative observations of potential climate change impacts on habitats and species that occur in the vicinity of the Thurrock Flexible Generation Plant are outlined below, summarised from Morecroft & Speakman (2015):

- Wetlands: Reduction in summer rainfall would adversely affect many wetland habitats. Lowland fens are particularly likely to be under increasing threat in south east England. Human-induced impacts from drainage and use of fertilisers have had a greater impact than climate change on freshwater ecology to date.
- Grasslands: Some grasslands are likely to be very sensitive to changes in rainfall, particularly those that are associated with waterlogged conditions for part or all of the year. An increase in summer droughts could lead to a decline in distinctive wet grassland communities, including water meadows and rush pastures.

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

- Herpetofauna: Common lizards, smooth newts and adders are projected to lose suitable climatic conditions across England under many climate change scenarios, but may expand their range in Scotland.
- Wintering birds: a number of wintering wildfowl and wader species have declined significantly in their abundance in the UK as they migrate shorter distances in the non-breeding season and many have shifted north-eastwards to new feeding grounds.
- Mammals: Reduced water flow in watercourses would adversely affect water voles. Milder winters could result in increasing populations of some species such as badgers as a result of increasing food availability and an earlier onset of spring.

3.2.8 Whilst there may be some changes in the longer term, land management is likely to have a greater influence on biodiversity over much of the study area within the timescale of Thurrock Flexible Generation Plant construction, which is when the majority of effects from the project would occur. The IEF most likely to be affected by climate change over the operational lifetime of the project is water vole, if climate change results in longer dry periods leading to reduction of habitat availability if watercourses and ditches dry up more often.

4. Assessment of Effects

4.1 Construction phase

Permanent loss of grassland

Magnitude of impact

4.1.1 Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of up to 7.7 ha of semi-improved grassland, of a total area within Zone A of 10.7 ha. The 3.0 ha retained is adjacent to boundary ditches and includes 2.3 ha of retained grassland in the south of Zone A. Within Zone A there is therefore approximately a 72% loss of semi-improved grassland. Other losses of semi-improved grassland occur in Zone G for construction of the causeway access track, where there is an estimated loss of up to 1.1 ha. Approximately 2.2 ha of grassland is retained in Zone F4 adjacent to Zone A.

4.1.2 The impact is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **major**.

Sensitivity of the receptor

4.1.3 The semi-natural grassland is considered to be of district value. It is relatively homogenous and therefore not of particularly high quality in terms of overall species diversity.

4.1.4 The receptor is therefore considered to be of medium vulnerability, high recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

4.1.5 Overall, it is predicted that the **major** impact on the **medium** sensitivity receptor would result in a **moderate** adverse effect, which is significant in EIA terms.

Further mitigation or enhancement

4.1.6 In order to mitigate the effect on semi-natural grassland, mitigation comprising creation of replacement habitat is proposed.

4.1.7 The proposed mitigation comprises grassland creation in Zones E, F1 and F2. The area of grassland created in Zone E is approximately 10 ha, with an additional 5.8ha of grassland proposed for Zones F1-3.

4.1.8 Zone E grassland comprises Exchange Common Land and therefore its primary function is for common land mitigation rather than biodiversity mitigation. However, the conversion of Zone E from arable to semi-improved grassland also functions as like-for-like replacement for grassland lost for construction within Walton Common. Zones F1-F3 comprise land specifically intended to provide ecological mitigation. Overall therefore, a total of 15.8ha of grassland will be created to mitigate for the loss of 7.7 ha and hence there will be a net gain of grassland area of c. 8.1 ha.

4.1.9 In addition, the grassland in Zones F1 and F2 will be designed and managed to provide a more heterogenous grassland habitat than currently occurs (refer to the OEMP, application document A8.7, for outline habitat creation proposals and Figure 4.1).

Residual effect

4.1.10 The residual impact following further mitigation is predicted to be moderate beneficial, leading to a **moderate** beneficial significance of effect, which is significant in EIA terms.

Permanent loss of ditches

Magnitude of impact

4.1.11 Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of approximately 570 m of ditch habitat. Approximately 1.6 km of ditch on the boundaries of Zone A are retained. Losses in Zone A therefore comprise approximately 26% of the total Zone A ditch resource.

4.1.12 In addition, the construction of the site access road in Zone C will cross two ditches but would only result in the loss of c. 19 m of ditch.

4.1.13 The impact is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **major**.

Sensitivity of the receptor

4.1.14 Ditch habitat is considered to be of district value. It is a habitat type that is relatively straightforward to create in a relatively short period of time.

4.1.15 The receptor is therefore considered to be of low vulnerability, high recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

4.1.16 Overall, it is predicted that the **major** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

- 4.1.17 Although the effect on ditches is not significant in EIA terms, mitigation for loss of ditches is proposed primarily because of potential impacts on water voles that are present (assessed later in this section), but also because ditches are considered to be a habitat which increases diversity of a range of associated species such as invertebrates.
- 4.1.18 The proposed mitigation comprises ditch restoration (around Zone A) and ditch creation in Zones E and F. The length of proposed ditch in Zones F1 and F2 is approximately 976 m, and which exceeds the length of permanent losses in Zone A and Zone C. Therefore, there will be a net gain of ditch habitat of approximately 390 m. Refer to the OEMP (application document A8.7) for outline habitat creation proposals and Figure 4.1.

Residual effect

- 4.1.19 The residual impact and effect following further mitigation is predicted to be **minor beneficial**, which is not significant in EIA terms.

Permanent loss of invertebrate habitat

Magnitude of impact

- 4.1.20 The main area of permanent habitat with potential to affect invertebrate populations is within Zone A where approximately 7.7 ha of semi-improved grassland and approximately 569 m of ditch would be lost. While approximately 3.0 ha of grassland and 1.6 km of boundary ditches would be retained and enhanced in Zone A, the capacity of Zone A to support invertebrate populations would be reduced. Further loss of grassland habitat occurs in Zone G north of the sea wall.
- 4.1.21 The Zone A habitat itself is not considered likely to be of significant invertebrate interest in isolation. It was recognised that its proximity to the adjacent Lytag Brownfield LWS, which supports a nationally important invertebrate assemblage, means that Zone A may have contributed to the maintenance of these assemblages by providing additional habitat particularly for flying insects including bees and wasps. However, the construction of Tilbury2, currently under way, will result in the loss of the majority of the Lytag Brownfield site and as a result the capacity of Zone A grassland to contribute to overall invertebrate assemblages of conservation interest will be much reduced, and hence impacts on invertebrates from construction are lower than if Tilbury2 was not going ahead.

- 4.1.22 The impact on the invertebrate community present in Zone A/G is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

- 4.1.23 Zone A is unlikely to independently support an invertebrate assemblage of more than district interest. The receptor is considered to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

- 4.1.24 Overall, it is predicted that the **minor** impact on the **medium** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

- 4.1.25 Although mitigation for invertebrates is not required in ES terms, habitat creation will be undertaken that will benefit invertebrates.
- 4.1.26 The area of grassland created in Zone E is approximately 10 ha, with an additional 5.8 ha in Zones F1-3. Zone E grassland comprises replacement common land and therefore its primary function is for common land mitigation rather than biodiversity mitigation. However, the conversion of Zone E from arable to semi-improved grassland also functions as like-for-like replacement for grassland lost for construction. Zones F1-F3 comprise land specifically intended to provide ecological mitigation. Overall therefore, a total of 15.8 ha of grassland will be created to mitigate for the loss of 7.7 ha and hence there will be a net gain of grassland area of c. 8.1 ha.
- 4.1.27 In addition, the grassland in Zones F1-F3 will be designed and managed to provide a more heterogenous grassland habitat than currently occurs (refer to the OEMP, application document A8.7, for outline habitat creation proposals and Figure 4.1). Furthermore, additional habitat features such as bee banks, log piles and rubble mounds will be provided which will improve habitat diversity for invertebrates (see the OEMP, application document A8.7, for outline proposals and Figure 4.1).

Residual effect

- 4.1.28 The residual impact following further mitigation is predicted to be minor beneficial, leading to a **minor** beneficial significance of effect, which is not significant in EIA terms.

Permanent loss of GCN habitat

Magnitude of impact

4.1.29 GCN are present in ponds in Low Street Pit LWS, adjacent to Zones C and D. Permanent habitat loss for construction of the access road in Zone C predominantly comprises arable land. Arable land is not considered to be suitable for foraging or hibernating GCN, and therefore the loss of habitat in itself is not considered to be significant. Depending on the timing of works there is some potential for GCN to enter the construction site although the arable land between the LWS and the construction area is likely to reduce the chances of GCN being present in this area.

4.1.30 The impact is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

4.1.31 The receptor is therefore considered to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

4.1.32 Overall, it is predicted that the **minor** impact on the **medium** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

4.1.33 Although habitat losses are not significant, depending on the timing of works mitigation measures may be necessary to avoid mortality of GCN during construction of the access road. This may comprise erection of exclusion fencing under Natural England licence to prevent GCN from accessing the construction site. No additional mitigation for loss of arable land is required.

Residual effect

4.1.34 The residual impact following mitigation is predicted to be **neutral**, leading to a **negligible** significance of effect, which is not significant in EIA terms.

Permanent loss of reptile habitat

Magnitude of impact

4.1.35 Some reptile habitat would be affected by access road construction in Zone C. This area is predominantly arable land of no value to reptiles, but reptiles were recorded in vegetation associated with two ditches that cross the field. Adders and common lizards were recorded in these locations.

4.1.36 The main area of permanent habitat loss is within Zone A, with some additional loss in Zone G where the causeway access road will be constructed. While 3.0 ha of grassland and boundary ditches will be retained, the ditch and associated vegetation on the north boundary of Walton Common which runs through the centre of Zone A would be lost, along with 7.7 ha of existing grassland in Zone A and a maximum of up to 0.17 ha in Zone G.

4.1.37 It is likely that reptile populations in Zone A are concentrated in the margins and ditches where annual hay meadow management by mowing is not carried out, but they are likely to use the entirety of the Zone A grassland to some extent in the period where the sward is tall enough to provide cover up to the time of the hay cut, albeit it is expected that the density of reptiles in the managed part of grassland will be lower than in the unmanaged margins. When the sward has been cut, the hay meadow area is likely to be unsuitable for reptiles until the sward regenerates. Therefore, the loss of grassland and ditch habitat within Zone A represents a substantial loss of habitat for reptile populations.

4.1.38 The impact is predicted to be of district spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **major**.

Sensitivity of the receptor

4.1.39 Four reptile species are present in Zones A/G and two were recorded in Zone C. Clearance of habitat in the absence of mitigation would likely cause death or injury to reptiles and would significantly reduce the distribution and abundance of reptiles in the study area.

4.1.40 The receptor is therefore considered to be of medium vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

4.1.41 Overall, it is predicted that the **major** impact on the **medium** sensitivity receptor would result in a **moderate** adverse effect, which is significant in EIA terms.

Further mitigation or enhancement

- 4.1.42 In order to mitigate for the effect on reptiles, mitigation is proposed that would comprise trapping and translocation of reptiles from areas of permanent habitat loss in Zone A and displacement from areas of permanent habitat loss in Zones C and G, combined with creation of additional habitat in Zones F1-3 (plus Zone E albeit this area would not be managed specifically for reptiles).
- 4.1.43 Reptiles will be translocated from the area of permanent habitat loss in Zone A into the 3 ha of retained Zone A grassland. Fencing will be erected to prevent reptiles returning into the construction area. The carrying capacity of the retained grassland will be enhanced via the installation of refugia such as log piles and rubble mounds. In addition, the carrying capacity of the grassland in Zone F4 will also be increased by cutting of dense stands of tall ruderal and scrub, to increase the open grassland area adjacent to Zone A.
- 4.1.44 As a longer-term measure, habitat creation for reptiles (including creation of grassland, scrub, south-facing earth banks, ditches and a pond) will also be undertaken in Zones F1-3. Zones F1-F3 comprise approximately 6.4 ha of habitat adjacent to Parsonage Common (where reptiles are also present) and also includes a 10 m strip north of the railway line east of Zone F2 which will provide habitat connectivity for reptiles along the railway line and therefore provide additional robustness by ensuring that populations are less susceptible to fragmentation effects.
- 4.1.45 Approximately 10 ha of grassland will also be created in Zone E. Zone E provides like-for-like replacement of Common Land, and will therefore be potentially subject to the same management regime (annual hay cut) as is currently applied to Zone A. While Zone E will not be managed specifically for reptiles, they would be able to utilise Zone E in the same way as in Zone A currently, i.e. during the period where the sward height is suitable to provide cover for foraging).
- 4.1.46 Furthermore, additional habitat features for reptiles such as log piles, rubble mounds and hibernacula will be provided in Zones F1 and F2 and the grassland and scrub habitat provided will be more heterogenous than the existing Zone A grassland and managed in a more sympathetic manner for reptiles.
- 4.1.47 Finally, retained ditches and grassland in Zones A and G will be managed to improve habitat quality for reptiles (see the OEMP, application document A8.7, for outline proposals and Figure 4.1).

Residual effect

- 4.1.48 The residual impact following further mitigation is predicted to be minor beneficial, leading to a **minor** beneficial significance of effect, which is not significant in EIA terms.

Permanent loss of breeding bird habitat

Magnitude of impact

- 4.1.49 Minor permanent losses of breeding bird habitat will occur in Zone C for access road construction. This area is predominantly arable land of low value for breeding birds. The main area of permanent habitat loss is within Zone A where approximately 7.2 ha of arable land and 7.7 ha of grassland will be lost. A further 0.17 ha of permanent habitat loss would occur in Zone G.
- 4.1.50 The restoration of Zone E and Zones F1 and F2 from arable land to grassland and other habitats would result in the loss of approximately 16.4 ha of arable land but there would be a net benefit to breeding birds overall in these Zones and hence the loss of arable land is not in itself considered to be significant.
- 4.1.51 A total of 40 breeding territories were recorded in Zone A, including Cetti's warbler and the BoCC red listed species cuckoo, house sparrow, linnet, skylark, song thrush, yellowhammer and yellow wagtail. Habitat for species associated with the boundary hedgerows and 3 ha grassland in Zone A, including one Cetti's warbler territory, will be retained but the development of Zone A would result in a decline in the number of territories within the study area.
- 4.1.52 In the context of the breeding bird survey area, 40 territories represents 11% of the 353 territories recorded during the survey. There were no species recorded in Zone A that were not also recorded elsewhere in the survey area and therefore the loss of territories within Zone A is not likely to result in the loss of species to the overall breeding bird assemblage in the survey area.
- 4.1.53 The impact is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

- 4.1.54 Some breeding territories would be retained in the margins of Zone A and within the retained area of grassland to the south of Zone A (3 ha). Potential breeding habitat in the form of sustainable drainage features (attenuation basin of 0.9ha and other soft landscaping) would also be provided within Zone A as part of the designed-in measures for the Thurrock Flexible Generation Plant. The majority of grassland in Zone G is not directly affected by construction.
- 4.1.55 The receptor is therefore considered to be of low vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

4.1.56 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

4.1.57 Although the effect on breeding birds is not significant in EIA terms, mitigation for loss of habitat is proposed primarily because of impacts on other species present within Zone A, such as reptiles and water voles.

4.1.58 The area of grassland created in Zone E is approximately 10 ha, with an additional 6.5 of grassland, scrub and other habitats including a pond and reedbed ha in Zones F1-3. Grassland management will also be undertaken in Zone F4 to improve the condition of this habitat.

4.1.59 Zone E grassland comprises replacement common land and therefore its primary function is for common land mitigation rather than biodiversity mitigation. However, the conversion of Zone E from arable to semi-improved grassland also functions as like-for-like replacement for grassland lost for construction and is therefore potentially available for breeding birds to the same extent that Zone A currently is. Zones F1 and F2 comprise land specifically intended to provide ecological mitigation. Overall therefore, a total of 15.8 ha of grassland will be created to mitigate for the loss of 7.7 ha and hence there will be a net gain of grassland area of c. 8.1 ha, plus further habitat creation of scrub and other habitats suitable for breeding birds such as Cetti's Warbler in Zones F1 and F2..

4.1.60 In addition, there will be a net gain of ditch habitat of approximately 390 m when ditch creation on Zone F1/F2 is taken into account.

4.1.61 Therefore, there will be a greater area of semi-natural grassland and other habitats such as scrub and ditches on site compared to the current baseline. In addition, the Zone F grassland will be designed and managed to provide a more heterogenous grassland habitat than currently occurs.

4.1.62 Furthermore, a 10 m strip of scrub and grassland habitat will be provided north of the railway line (Zone F3).

4.1.63 Taken together, the above measures are considered to provide an overall net gain for breeding birds in terms of the numbers of breeding territories present compared to the baseline, and in particular for Cetti's warbler which nests in scrubby habitats near water. The habitat creation proposals should provide for a significant increase in the number of Cetti's warbler territories within the study area which could have an impact of **moderate** beneficial magnitude on the conservation status of this species in particular in the local area and an impact of **minor** beneficial magnitude on the breeding bird assemblage as a whole (refer to the OEMP, application document A8.7, for outline habitat creation proposals and Figure 4.1).

Residual effect

4.1.64 The residual effect following further mitigation is predicted to be **minor** beneficial for the overall breeding bird assemblage, which is not significant in EIA terms.

Permanent loss of wintering bird habitat

Magnitude of impact

4.1.65 Assessment of the impacts of construction on habitats in the intertidal zone are provided in Volume 3, Chapter 17: Marine Environment. There will be a permanent loss of c 610m² of saltmarsh habitat and 0.47 ha of intertidal mudflat. To put this in context, 0.47 ha is approximately 0.01% of the size of the Thames Estuary and Marshes SPA.

4.1.66 The assessment of the utilisation of this area by wintering birds in the 2019-20 winter period (Volume 6, Appendix 9.4) determined that the area is not generally in use by significant numbers of most species of birds, although Avocets were recorded in or in the vicinity of the dredge pocket between November and March with peak counts of 44 and 42 birds obtained in November and December. The peak count of 44 Avocet represents approximately 0.5% of the estimated UK winter population of 9,500, and approximately 1.4% of the current estimated winter population of Avocet of 3,255 in the Thames Estuary (5 year mean 14/15-18/19)..

4.1.67 Furthermore, an Outline Saltmarsh Enhancement and Maintenance Plan (Application document A8.10) has been produced which outlines proposals to manage sediment accretion post-construction of the causeway as mitigation for direct loss of saltmarsh. The direct loss of circa 610 m² of saltmarsh would therefore be replaced in the longer term with new saltmarsh elevations on the mudflat up to an area of about 1.1-1.3 ha, i.e. an area of circa 18 times the direct loss.

4.1.68 However, surveys indicate that the area over which saltmarsh accretion is expected to occur is only minimally used by wintering birds including Avocets. Given the large amount of mudflat habitat available within and outside the SPA, and the relatively small area of this habitat affected by permanent habitat loss, it is considered that the maximum number of birds likely to be displaced would be able to find alternative foraging habitat reasonably close by.

4.1.69 As such, the effect of permanent habitat loss is not considered to be significant.

4.1.70 It is considered that the replacement of mudflat with saltmarsh via this process would produce an overall benefit in terms of habitats given the relative scarcity of saltmarsh compared to mudflat in the vicinity of Zone G.

4.1.71 The impact of habitat loss is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **negligible**.

Sensitivity of the receptor

4.1.72 The receptor is considered to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

4.1.73 Overall, it is predicted that the **negligible** impact on the **medium** sensitivity receptor would result in a **negligible** adverse effect, which is not significant in EIA terms.

Permanent loss of water vole habitat

4.1.74 Surveys in 2019, carried out in June and September, found that by September the majority of the surveyed ditches no longer held water, and water voles were absent from the ditches in Zones A and C. It is not known at this stage whether this trend will persist or whether water voles will re-establish from offsite population reservoirs if the ditches refill with water in 2020. For the purposes of this assessment a precautionary approach has been adopted, and status and effects on Water Voles have been assessed based on the 2018 survey results. However, if water voles remain absent from the development area at the time of construction, no impacts would occur and no mitigation would be necessary.

Magnitude of impact

4.1.75 Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of approximately 569 m of ditch habitat which is known to support water voles. Approximately 1.6 km of ditch on the boundaries of Zone A would be retained. Losses in Zone A therefore comprise approximately 26% of the total Zone A ditch resource. In addition, the construction of the site access road in Zone C will cross two ditches and would result in the loss of c 19 m of ditch.

4.1.76 The impact is predicted to be of district spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **major**.

Sensitivity of the receptor

4.1.77 Water voles are considered to be of county value. Water voles are known to be declining on a national level due to habitat loss and predation from mink.

4.1.78 The receptor is therefore considered to be of high vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

4.1.79 Overall, it is predicted that the **major** impact on the **medium** sensitivity receptor would result in a **moderate** adverse effect, which is significant in EIA terms.

Further mitigation or enhancement

4.1.80 In order to mitigate for the loss of water vole habitat, proposed mitigation comprises improvement of retained boundary ditches, via vegetation clearance and silt removal to provide deeper water and better bankside conditions, and creation of new ditches to provide an overall net gain of ditch habitat.

4.1.81 Water Voles will be trapped and translocated from ditches to be lost in Zone A into approximately 317 m of new ditches created to the south of Zone A.

4.1.82 The length of proposed ditch in Zones F1-F2 is approximately 976 m, which when combined with the new Zone A mitigation ditches provides a net gain of approximately 707 m. In addition the attenuation basin and drainage ditches to be created within Zone A will potentially be available for colonisation by Water Voles. The basin is designed to retain water in the centre of the basin for as long as is practicable but because this feature depends on surface water run-off (and hence rainfall) for its water source, it is not possible to guarantee permanent water retention. Therefore, there will be a net gain of water vole habitat. Refer to the OEMP, application document A8.7, for outline habitat creation proposals and Figure 4.1.

Residual effect

- 4.1.83 The residual impact and effect following further mitigation is predicted to be **minor beneficial**, which is not significant in EIA terms.

Permanent loss of bat habitat

Magnitude of impact

- 4.1.84 Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of approximately 7.7 ha of grassland. Bat activity surveys indicated very low levels of use of habitats in Zones A and C by bats. As the boundary features and 3.0 ha of grassland in Zone A are retained it is not considered that the ability of bats to commute across the site would be significantly affected. There will be losses of arable land in Zone C which is not likely to be used by foraging bats to any significant extent.

- 4.1.85 The impact is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

- 4.1.86 The receptor is considered to be of low vulnerability, high recoverability and parish value. The sensitivity of the receptor is, therefore, considered to be **low**.

Significance of effect

- 4.1.87 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

- 4.1.88 Although the effect on bats is not significant in EIA terms, mitigation for loss of habitat is proposed primarily because of impacts on other species present within Zone A, such as reptiles and water voles.
- 4.1.89 The area of grassland created in Zone E is approximately 10 ha, with an additional 6.3 ha of grassland and other habitats in Zones F1-3.

- 4.1.90 Zone E grassland comprises replacement common land and therefore its primary function is for common land mitigation rather than biodiversity mitigation. However, the conversion of Zone E from arable to semi-improved grassland also functions as like-for-like replacement for grassland lost for construction. Zones F1 and F2 comprise land specifically intended to provide ecological mitigation. Overall therefore, a total of 15.8 ha of grassland will be created to mitigate for the loss of 7.7 ha and hence there will be a net gain of grassland area of c. 8.1 ha, plus further habitat creation of scrub and other habitats suitable for foraging bats.

- 4.1.91 Therefore, there will be a greater area of semi-natural grassland and scrub on site compared to the current baseline. In addition, the grassland will be designed and managed to provide a more heterogenous grassland habitat than currently occurs and this will provide increased foraging opportunities for bats compared to the existing conditions.

- 4.1.92 Furthermore, a 10 m strip of scrub and grassland habitat will be provided north of the railway line (Zone F3), which will ensure connectivity of habitat for foraging or commuting bats in this area.

- 4.1.93 Taken together, the above measures are considered likely to provide an overall net gain for foraging bats of **minor** beneficial magnitude (refer to the OEMP, application document A8.7, for outline habitat creation proposals and Figure 4.1).

Residual effect

- 4.1.94 The residual impact and effect following further mitigation is predicted to be **minor beneficial**, which is not significant in EIA terms.

Permanent loss of badger habitat

Magnitude of impact

- 4.1.95** Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of approximately 7.7 ha of grassland which, although currently not used to a great extent by foraging badgers, may become of more importance in the future if badgers establish in an artificial sett constructed west of the site on Tilbury2 ecological mitigation land. The majority of potential badger foraging habitat within the Thurrock Flexible Generation Plant application boundary is not permanently affected.

- 4.1.96 The impact is predicted to be of district spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

4.1.97 The receptor is considered to be of low vulnerability, high recoverability and parish value. The sensitivity of the receptor is, therefore, considered to be **low**.

Significance of effect

4.1.98 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **negligible** adverse effect, which is not significant in EIA terms.

Temporary loss of ditches

4.1.99 Horizontal Directional Drilling (HDD) will be employed for installation of the gas pipeline underneath ditches across Zones C and D. There should therefore be no impact from construction of the pipeline.

4.1.100 A 20 m working width of ditch for both ditch crossings in Zone C would be required for the construction of the access road, approximately 10 m of which would be temporary. The total maximum temporary loss is therefore estimated at approximately 20 m.

4.1.101 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

4.1.102 Ditch habitat is considered to be of district value. It is a habitat type that is relatively straightforward to create in a relatively short period of time.

4.1.103 The receptor is therefore considered to be of low vulnerability, high recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

4.1.104 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

4.1.105 Although the temporary effect on ditches is not significant in EIA terms, mitigation for temporary loss of ditches is proposed primarily because of impacts on water voles that are present.

4.1.106 The proposed mitigation comprises ditch restoration following construction. Ditches will be restored to their previous condition and either planted with appropriate native species or allowed to develop by natural colonisation. Therefore, there will be no additional net loss of ditch habitat beyond that already assessed for permanent loss. Refer to the OEMP, application document A8.7, for outline habitat restoration proposals.

Residual effect

4.1.107 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

Temporary loss of hedgerows

4.1.108 Installation of the gas pipeline in Zone D will require temporary loss of hedgerow in two locations where the pipeline crosses Station Road.

4.1.109 The maximum amount of hedgerow loss for pipeline installation two lengths of 15 m, 30 m in total. The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

4.1.110 Hedgerow habitat is considered to be of parish value. It is a habitat type that is relatively straightforward to create in a relatively short period of time.

4.1.111 The receptor is therefore considered to be of low vulnerability, high recoverability and parish value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

4.1.112 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

4.1.113 Although the temporary effect on hedgerows is not significant in EIA terms, mitigation for temporary loss of hedgerows is proposed primarily because of potential impacts on commuting bats, as a precautionary approach.

4.1.114 All hedgerows affected by clearance for construction of the gas pipeline will be replanted with an appropriate mix of native species.

Residual effect

4.1.115 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

Temporary loss of GCN habitat

Magnitude of impact

4.1.116 The installation of the gas pipeline in Zone D adjacent to Low Street Pit LWS where GCN are present will result in temporary losses of arable land which is not significant habitat for GCN. HDD will be employed under the ditch and hedgerow corridor running south from Low Street Pit LWS to avoid losses of habitat likely to support GCN in this location. Temporary habitat loss is therefore not considered to be significant but depending on timing of works, mitigation may be required to prevent GCN from entering the construction area.

4.1.117 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

4.1.118 The receptor is therefore considered to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

4.1.119 Overall, it is predicted that the **minor** impact on the **medium** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

4.1.120 Although habitat losses are not significant, depending on the timing of works mitigation measures may be necessary to avoid mortality of GCN during installation of the pipeline. This may comprise erection of exclusion fencing under Natural England licence to prevent GCN from accessing the construction site. No additional mitigation for loss of arable land is required.

Residual effect

4.1.121 The residual impact following mitigation is predicted to be **neutral**, leading to a **negligible** significance of effect, which is not significant in EIA terms.

Temporary loss of reptile habitat

Magnitude of impact

4.1.122 Minor losses of reptile habitat may occur in locations where the access road crosses field boundaries in Zone C. A 20 m working width per crossing would be required for the construction of the access road, approximately 10 m of which would be temporary. The total temporary loss therefore estimated at approximately 20 m linear length. Further temporary loss would occur north of the sea wall in Zone G.

4.1.123 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

4.1.124 Clearance of habitat in the absence of mitigation would likely cause death or injury to reptiles.

4.1.125 The receptor is therefore considered to be of medium vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore considered to be **medium**.

Significance of effect

4.1.126 Overall, it is predicted that a **minor** impact on the **medium** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

4.1.127 Although not significant in EIA terms, mitigation comprising relocation of reptiles from the construction area and restoration of habitat following construction is proposed. See the OEMP (application document A8.7) for proposals.

Residual effect

4.1.128 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

Temporary loss of wintering bird habitat

Magnitude of impact

4.1.129 Assessment of the impacts of construction on habitats in the intertidal zone are provided in Volume 3, Chapter 17: Marine Environment. There will be a temporary loss of up to 0.67 ha of intertidal mudflat for dredging for the vessel grounding pocket to facilitate delivery of the engines to the site along the Zone G causeway and access track. The dredging pocket will need to be maintained for the duration of the period over which the engines are delivered to the site. Once deliveries are complete, the dredging pocket will recover following cessation of dredging, with infilling of the dredge pocket by natural sediment transport, with full recovery expected within 2 years.

4.1.130 The barge pocket will be dredged and kept open for the duration of the period required for all of the barge deliveries to occur. The worst case assumption for this is that the phases occur in two consecutive years. It is likely that the dredge pocket will take up to two years to recharge, and therefore the mudflat habitat lost for the dredge pocket will be unavailable to Avocets for four years in the worst case.

4.1.131 In context, 0.67 ha is approximately 0.013% of the size of the Thames Estuary and Marshes SPA. The assessment of the utilisation of this area by wintering birds in the 2019-20 winter period (Volume 6, Appendix 9.4) determined that the area is not generally in use by significant numbers of most species of birds, although Avocets were recorded in or in the vicinity of the dredge pocket between November and March with peak counts of 44 and 42 birds obtained in November and December. The peak count of 44 Avocet represents approximately 0.5% of the estimated UK winter population of 9,500, and approximately 1.4% of the current estimated winter population of Avocet of 3,255 in the Thames Estuary (5 year mean 14/15-18/19).

4.1.132 Given the large amount of mudflat habitat available within and outside the SPA, and the relatively small area affected by temporary habitat loss, the small number of displaced birds would be able to find alternative foraging habitat reasonably close by in other parts of the estuary. There is therefore not predicted to be any decline in the wintering Avocet population associated with the SPA as a result of loss of a very small proportion of available mudflat.

4.1.133 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **negligible**.

Sensitivity of the receptor

4.1.134 The receptor is considered to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

4.1.135 Overall, it is predicted that the **negligible** impact on the **medium** sensitivity receptor would result in a **negligible** adverse effect, which is not significant in EIA terms.

Temporary loss of water vole habitat

Magnitude of impact

4.1.136 Although HDD will be employed for installation of the gas pipeline underneath ditches across Zones C and D, a further 20 m working width of ditch crossing would be required for the construction of the access road, approximately 10 m of which would be temporary. The total temporary loss therefore estimated at approximately 20 m.

4.1.137 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

4.1.138 Water voles are considered to be of county value. Water voles are known to be declining on a national level due to habitat loss and predation from mink.

4.1.139 The receptor is therefore considered to be of high vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

4.1.140 Overall, it is predicted that the **minor** impact on the **medium** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

4.1.141 Although the temporary effect on water vole habitat is not significant in EIA terms, mitigation for temporary loss of ditches is proposed primarily because of the potential for impacts on water voles that are present.

4.1.142 The proposed mitigation comprises ditch restoration following construction. Ditches will be restored to their previous condition and either planted with appropriate native species or allowed to develop by natural colonisation. Therefore, there will be no additional net loss of ditch habitat beyond that already assessed for permanent loss. Refer to the OEMP (application document A8.7) for outline habitat restoration proposals.

Residual effect

4.1.143 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

Temporary loss of bat habitat

Magnitude of impact

4.1.144 Installation of the gas pipeline in Zone D requires temporary losses of hedgerows where the pipeline crosses Station Road in two locations. Each crossing would require temporary loss of 15 m of hedgerow. Loss of hedgerow could affect commuting bats by breaking flightlines.

4.1.145 Replacement planting would be provided once installation is complete but there would be a temporary gap in the hedgerow while replacement planting matures sufficiently to restore hedgerow connectivity (between 5-7 years).

4.1.146 Hedgerows run on both sides along Station Road, and it would not be necessary to remove hedgerows on both sides of the road in both locations. Therefore connectivity for bats would not be entirely severed as would happen if it was necessary to remove hedgerows on both sides of the road.

4.1.147 The impact is therefore predicted to be of local spatial extent, medium term duration, continuous and irreversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

4.1.148 The receptor is considered to be of low vulnerability, high recoverability and parish value. The sensitivity of the receptor is, therefore, considered to be **low**.

Significance of effect

4.1.149 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Further mitigation or enhancement

4.1.150 Although the effect on bats is not significant in EIA terms, mitigation for temporary loss of habitat is proposed as a precautionary measure because bat survey information for these hedgerows is not available.

4.1.151 Mitigation would comprise the installation of temporary artificial hedgerows bridging the gaps until the replacement planting has matured sufficiently to restore hedgerow connectivity (refer to the OEMP, application document A8.7, for proposals).

4.1.152 This would ensure that the impact on commuting bats would be **no change**.

Residual effect

4.1.153 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

Airborne pollutant effects on designated sites

Magnitude of impact

4.1.154 Construction could have some impact on sensitive habitats within designated sites in the vicinity of the works area as a result of potential airborne pollutants, primarily dust generation. IAQM guidance suggests that impacts of dust on ecological receptors are unlikely beyond 50 m from the source (IAQM, 2014). Potential air quality impacts, particularly from dust deposition, are therefore most likely to occur on designated sites within 50 m of activities likely to give rise to dust generation, although effective dust control measures will reduce this distance.

4.1.155 Designated sites within 50 m of any of the works area are:

- Lytag Brownfield LWS: south of Zones F1-3 (habitat creation land) on the other side of the railway line. Most of this site will be lost as a result of Tilbury2 construction.
- Low Street Pit LWS: adjacent to Zones C and D adjacent to the gas pipe connection corridor.
- Goshems Farm LWS: adjacent to one of the options for the causeway access track in Zone G.
- Tilbury Centre LWS: 30 from Zone H, an existing road proposed for HGV access.

4.1.156 As set out in Volume 3, Chapter 12: Air Quality and Table 2.8, measures will be implemented through the CoCP (application document A8.6) to control pollutants in order to minimise the potential for, and likely impacts of, airborne pollutants on sensitive habitats within designated sites. The IAQM guidance states that with good dust management and mitigation practices implemented, the residual effects will normally be reduced to a level that is "not significant".

4.1.157 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is, therefore, considered to be **negligible**.

Sensitivity of receptor

4.1.158 LWS sites are considered to be medium vulnerability, moderate recoverability and county value. The sensitivity of the receptor is, therefore, considered to be **medium**.

Significance of the effects

4.1.159 Overall, it is predicted that the **negligible** impact on the **medium** sensitivity receptor would result in a **negligible** adverse effect, which is not significant in EIA terms.

Airborne pollutant effects on habitats

Magnitude of impact

- 4.1.160 Construction could have some impact on sensitive habitats in the vicinity of the works area as a result of potential airborne pollutants, primarily dust generation. The main potentially sensitive habitats are hedgerows, semi-improved grassland and ditches.
- 4.1.161 As set out in Volume 3, Chapter 12: Air Quality, measures will be implemented through the CoCP (application document A8.6) to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats.
- 4.1.162 These will include the establishment of a buffer zone between the works area and adjacent habitats. IAQM guidance suggests that impacts of dust on ecological receptors in the absence of mitigation are unlikely beyond 50 m from the source. However, smaller buffer areas are appropriate where effective dust control measures are in place, as would be the case given the controls set out in the CoCP (application document A8.6). The IAQM guidance states that with good dust management and mitigation practices implemented, the residual effects will normally be reduced to a level that is "not significant".
- 4.1.163 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is, therefore, considered to be **negligible**.

Sensitivity of receptor

- 4.1.164 Habitats are deemed to be of medium vulnerability, moderate recoverability and up to district value. The sensitivity of the receptor is, therefore, considered to be **medium**.

Significance of the effects

- 4.1.165 Overall, it is predicted that the **negligible** impact on the **medium** sensitivity receptor would result in a **negligible** adverse effect, which is not significant in EIA terms.

Runoff pollutant effects on designated sites during construction

Magnitude of impact

- 4.1.166 Construction activities could have some impact on sensitive habitats within designated sites in the vicinity of the works area as a result of potential runoff of pollutants, particularly silt or other pollutant deposition into ditches watercourses where there is a hydrological connection to designated sites.

- 4.1.167 Construction works that directly affect or are close to ditches would occur in Zone A (main construction site), and in Zones C (where ditch crossings will be required for gas pipeline, access road and haul road construction) and G (access track construction). Habitat creation works will also be undertaken in Zones E and F although boundary ditches will not be directly affected apart from where new ditches will be created that tie in to the existing ditch network.

- 4.1.168 Many of the ditches in these areas were observed to be dry in the latter periods of the 2018 and 2019 survey seasons. It is expected that surface water entering the ditch network ultimately runs south and into the River Thames, although the length of the ditch network prior to the Thames is such that any silt reaching the ditch network would be likely to settle out prior to entering the river where dilution effects would greatly reduce any remaining runoff before reaching the Thames Estuary and Marshes SPA/Ramsar.

- 4.1.169 Measures will be adopted to minimise the risk of runoff reaching watercourses. Further details of pollution control measures are provided in Volume 3, Chapter 15: Hydrology and Flood Risk and in the CoCP (application document A8.6).

- 4.1.170 Therefore, the risk of surface water runoff having any significant effect on designated sites is considered to be low.

- 4.1.171 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. Given the control measures proposed, the magnitude is considered to be **negligible**.

Sensitivity of receptor

- 4.1.172 The receptor is considered to be of medium vulnerability, medium recoverability and international value. The sensitivity of the receptor is therefore considered to be **high**.

Significance of effect

- 4.1.173 Overall, it is predicted that the **negligible** impact on the **high** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

Runoff pollutant effects on habitats during construction

Magnitude of impact

- 4.1.174 Construction could have some impact on sensitive habitats in the vicinity of the works area as a result of potential runoff of pollutants, particularly silt or other pollutant deposition into ditches.

- 4.1.175 The main potentially sensitive habitats are hedgerows, semi-improved grassland and ditches.

4.1.176 Measures will be implemented through the CoCP (application document A8.6) to control pollutants in order to minimise the potential for, and likely impacts of, runoff of pollutants on sensitive habitats.

4.1.177 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. Given the control measures in place, the magnitude is considered to be **negligible**.

Sensitivity of receptor

4.1.178 Habitats are deemed to be of up to medium vulnerability, moderate recoverability and up to district value. The sensitivity of the receptor is, therefore, considered to be **medium**.

Significance of the effects

4.1.179 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

Noise, lighting and visual disturbance effects on breeding and wintering birds during construction works in terrestrial habitats

4.1.180 Some noise, lighting and visual disturbance will result from construction traffic access along Zone G (access track for engine delivery), Zone C (construction of access road and gas pipeline) and Zone D (construction of gas pipeline), but the main area where construction activities are concentrated would be Zone A and this is where impacts from noise are likely to be highest.

4.1.181 The construction activity that would give rise to the largest potential noise effect is percussive piling, if employed in Zone A.

4.1.182 A review of studies on impacts of piling noise on birds (e.g. Cutts *et al.* 2009; Cutts *et al.* 2013; Owens, 1997; Postlethwaite & Stephenson 2012; Smit & Visser 1993; Wright *et al.* 2010) has resulted in the following thresholds for assessment of impact magnitude:

Table 4.1: Piling noise criteria for birds.

Noise Level Range, dB LAmax F	Magnitude of impact
≤ 65	Negligible
> 65 to ≤ 75	Minor
> 75 to ≤ 85	Moderate
> 85	Major

4.1.183 Noise contour modelling for percussive piling has been carried out (Volume 3, Chapter 11: Noise and Vibration), and this indicates that noise levels from piling would reduce to approximately 65 dBA at around 200 m from the source of piling noise in Zone A, and to 60 dBA at around 450 m from the source. There would therefore be no significant increase in noise levels at the Thames Estuary and Marshes SPA / Ramsar site.

4.1.184 The southern tip of Zone A is approximately 900 m from the sea wall at the shortest distance (immediately south). Noise levels from piling at this point would be 45-50 dBA, well below the 65 dBA threshold. There would therefore be no impact on the low numbers of wintering birds that are designated features of the SPA which occasionally forage in the intertidal zone outside of the SPA boundary from piling within Zone A. Surveys confirmed that the arable lands within the potential piling noise impact zone are not used by wintering birds associated with the SPA.

4.1.185 It is not therefore considered that there would be significant effects from Zone A construction noise on Thames Estuary and Marshes SPA / Ramsar site or any breeding or wintering birds within it or that are using the foreshore south of Zone A.

4.1.186 Percussive piling is likely to cause some disturbance to birds within the local area. Populations of wintering birds recorded within the potential effect zone are not of conservation significance and are therefore not assessed.

4.1.187 Predicted noise contours for piling suggest that noise levels would be above 85 dBA (major impact) up to approximately 87 m from the piling operations, between 85-75 dBA (moderate impact) from 87 m to 305 m and between 65-75 dBA (minor impact) around 652 m from the piling source. A major impact in the context of impacts on birds constitutes a startle response that involves flying out of the impact area. Depending on the duration of the piling operations, there is likely to be some disturbance and potentially temporary reduction in breeding numbers in the vicinity of the piling operations, and this could occur in three out of six years assuming a six year three phase construction programme. In the context of the breeding populations in the wider area, it is not considered that this would affect the overall breeding assemblage in the medium-long term. Noise and disturbance from other construction activities including lighting would have a smaller effect radius.

4.1.188 The impact on breeding birds from construction noise is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **minor**.

Sensitivity of receptor

4.1.189 Breeding birds are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is, therefore, considered to be **medium**.

Significance of the effects

4.1.190 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be minor. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Noise, lighting and visual disturbance effects on wintering foreshore birds during construction and use of the Zone G causeway

4.1.191 Construction of the causeway and its subsequent use would result in additional noise and disturbance effects on wintering birds using the intertidal zone in the vicinity of the Zone G causeway.

4.1.192 A designed-in mitigation measure is that construction of the causeway in the intertidal zone will not take place between November to March inclusive unless alternative mitigation measures or evidence showing there would be no likely significant effects is agreed with Natural England. November-March are the months when the largest numbers of wintering birds were generally recorded during surveys compared to September and October (no Avocets were recorded in the vicinity of the causeway during those two months), and therefore there would be no significant disturbance impacts on the overall wintering bird assemblage from construction of the causeway.

4.1.193 The assessment of the utilisation of the foreshore in the vicinity of the causeway area by wintering birds in the 2019-20 winter period (Volume 6, Appendix 9.4) determined that the area is not generally in use by significant numbers of most species of birds, although Avocets were recorded in or in the vicinity of the barge docking area between November and March with peak counts of 44 and 42 birds obtained in November and December. The peak count of 44 Avocet represents approximately 0.5% of the estimated UK winter population of 9,500, and approximately 1.4% of the current estimated winter population of Avocet of 3,255 in the Thames Estuary (five year mean 14/15-18/19).

4.1.194 A total of up to sixty barge deliveries for gas engines and other large components will use the causeway. This will result in a total of 120 barge movements to and from the causeway. The barges will dock on the causeway at high tide, when the mudflats are covered and hence no Avocets will be present. The barges will also depart at high tide and therefore again no disturbance impacts would occur as a result of the barge movements.

4.1.195 Any disturbance events will therefore occur at low tide when the engines are unloaded. The sequence of events for each unloading will comprise:

- 1) A crane will lift out a section of the sea wall and, depending on barge model, may also move down to the causeway to lower the barge unloading ramp.
- 2) The loaded self-propelled transporter vehicle from the barge will move the engine to beyond the sea wall and up to the main development site. An empty transporter will move down the causeway onto the barge.
- 3) The barge front will be closed and the mobile crane will then move back up the causeway and replace the sea wall gate.

4.1.196 These operations will take approximately 1-2 hours to complete. This is the period within which disturbance impacts on Avocets might occur; birds would be displaced, probably moving eastwards to mudflats closer to the SPA.

4.1.197 The barge deliveries may occur in one phase or in two separate phases of 30 deliveries each. Based on the winter months when Avocets were present during the survey, the worst case scenario to consider in terms of concentrated disturbance events would be for each set of 30 movements to occur in two consecutive November – March periods.

4.1.198 It is expected that the deliveries would be between 1-3 days apart, and therefore each phase of 30 deliveries could last for 1-3 months. Therefore disturbance events are of relatively short duration and intermittent with up to two days between each event. Even if deliveries are one day apart, that only directly affects every other tidal cycle, and Avocets would have the opportunity to feed on the mudflats at night.

4.1.199 Clearly, if timing allows, deliveries could be undertaken outside of the period when Avocets are present (November – March inclusive), in which case no disturbance events would occur. However, this would be a highly onerous restriction on use of the causeway, as the delivery period depends on the charter availability of a suitable ro-ro barge, port facilities for the abnormal load trans-shipment, and the applicant's construction programme.

4.1.200 If deliveries occur inside that period, some displacement of birds to areas of alternative habitat will be expected. Over the course of a 6 hour period (3 hours each side of low tide), disturbance events would occur for 1-2 hours, i.e. between 17-30% of a tidal cycle. Birds could return to feed when the disturbance events have ceased.

4.1.201 Given the large amount of mudflat habitat available within and outside the SPA, and the relatively small area likely to be affected by disturbance, it is considered that the small number of displaced birds would be able to find alternative foraging habitat reasonably close by in other parts of the estuary.

4.1.202 The impact on wintering birds from disturbance during barge deliveries is predicted to be of local spatial extent, short-medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **minor**.

Sensitivity of receptor

4.1.203 The receptor is considered to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

4.1.204 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Lighting effects on bats during construction

4.1.205 Some lighting disturbance will result from construction traffic access in Zones G and C (construction of access roads and gas pipeline) and Zone D (construction of gas pipeline), but the main area where construction activities would be concentrated would be Zone A.

4.1.206 Measures adopted as part of the project would include the use of directional lighting during construction, in areas where construction lighting is required, to minimise the level of disturbance from light spillage on foraging bats. These measures are set out in the CoCP (application document A8.6).

4.1.207 The impact is predicted to be of local spatial extent, medium term duration, intermittent and reversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore considered to be **negligible**.

Sensitivity of receptor

4.1.208 The receptor is considered to be of medium vulnerability, high recoverability and parish value. The sensitivity of the receptor is, therefore, considered to be **medium**.

Significance of the effects

4.1.209 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** adverse significance, which is not significant in EIA terms.

Future monitoring

4.1.210 Table 4.2 below outlines the proposed monitoring commitments for ecology and nature conservation during construction. These will be implemented through the CoCP (application document A8.6) and the OEMP (application document A8.7).

Table 4.2: Construction phase monitoring commitments.

Environmental effect	Monitoring commitment
Loss of habitats	As outlined in the OEMP (application document A8.7), an assessment of success of creation and restoration of habitats, comprising visits in years 1, 3 and 5 after creation, will be undertaken to identify any planting failures that require reinstatement or other remedial works.
Potential disturbance to protected species	As outlined in the OEMP (application document A8.7) and CoCP (application document A8.6), pre-construction surveys will be undertaken for protected species. The aim of the surveys is to provide up to date species data (particularly relevant for “mobile” species such as badgers) and to confirm the details of the mitigation measures to be implemented. Monitoring of intertidal wintering birds will be undertaken in the vicinity of the the Zone G causeway if construction and / or barge deliveries overlap with wintering bird season (September – March).
Impacts on protected species	Monitoring will be undertaken to assess the success of habitat creation and translocation mitigation measures and will comprise a schedule of surveys for protected species over a five-year period following translocation.

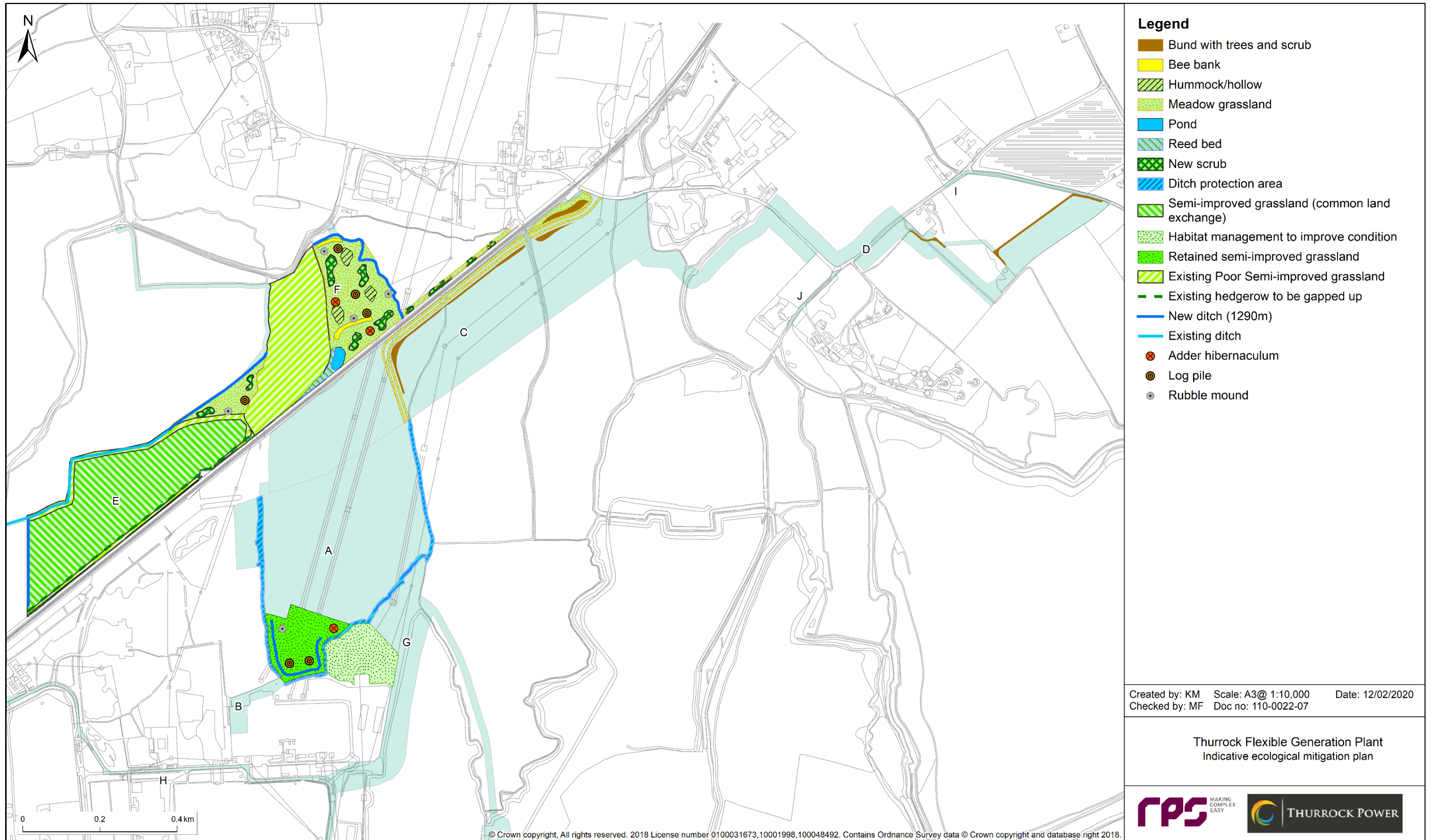


Figure 4.1 Indicative ecological mitigation proposals.

4.2 Operational and maintenance phase

Effects of atmospheric emissions on designated sites

Magnitude of impact

4.2.1 Modelling of atmospheric emissions at designated sites up to 15 km from Zone A has been carried out, and the likely effects on habitats and species within these designated sites have been assessed and are reported in Volume 3, Chapter 12: Air Quality and Volume 6, Appendix 12.1: Assessment of Air Quality Impacts on Ecological Receptors.

4.2.2 This assessment concluded that significant impacts on designated sites from aerial emissions are not predicted to occur.

4.2.3 The impact is predicted to be of up to county spatial extent, long term duration, continuous and irreversible. Given the results of the assessment of potential impacts, the magnitude is considered to be **negligible**.

Sensitivity of receptor

4.2.4 Sites and habitats are deemed to be of up to high vulnerability, low recoverability and up to international value. The sensitivity of the receptor is, therefore, considered to be up to **very high**.

Significance of the effects

4.2.5 Overall, the sensitivity of the receptor is considered to be up to **very high** and the magnitude is deemed to be **negligible**. The effect will, therefore, be **negligible to minor adverse** significance, which is not significant in EIA terms.

Surface water effects on designated sites and habitats during operation

Magnitude of impact

4.2.6 The surface water drainage design for the site will involve discharge of surface water into the ditch network following progress through on-site sustainable drainage features. Designed-in mitigation includes the use of oil interceptors to ensure that any accidental discharges of pollutants are captured on site.

4.2.7 Surface water would therefore be discharged to the drainage network within water quality parameters that would not result in adverse impacts on downstream sites or habitats.

4.2.8 The impact is predicted to be of local spatial extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptors directly. Given the control measures in place, the magnitude is considered to be **no change**.

Sensitivity of receptor

4.2.9 Sites and habitats are deemed to be of up to high vulnerability, moderate recoverability and up to international value. The sensitivity of the receptor is, therefore, considered to be **high**.

Significance of the effects

4.2.10 Overall, the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **negligible**. The effect will, therefore, be **no change**, which is not significant in EIA terms.

Noise and lighting effects on breeding birds during operation

Magnitude of impact

4.2.11 Noise modelling for the operational phase of the proposed development indicates that predicted noise levels at the boundary of Zone A will be in range of 50-60 dBA. This is below the threshold of a minor impact as per the definitions in Table 4.1. Given that the noise source will be continuous it is considered likely that birds adjacent to the site would habituate to the noise in any case.

4.2.12 There is no permanent lighting proposed for the access road, and the Thurrock Flexible Generation Plant will be unlit at night except for motion-sensitive security lighting. There would therefore be little effect from lighting on birds in the surrounding area.

4.2.13 Therefore, the impact is predicted to be of local spatial extent, long term duration, continuous and irreversible. It is predicted that the impact will affect the receptors directly. The magnitude is considered to be **negligible**.

Sensitivity of receptor

4.2.14 Breeding birds are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is, therefore, considered to be **medium**.

Significance of the effects

4.2.15 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be **negligible adverse** significance, which is not significant in EIA terms.

Noise and lighting effects on wintering birds during operation

- 4.2.16 There is no permanent lighting proposed for the access road, and the Thurrock Flexible Generation Plant will be unlit at night except for motion-sensitive security lighting. There would therefore be little effect from lighting on birds in the surrounding area, and no potential for impacts on birds associated with the SPA.

Noise and lighting effects on bats during operation

Magnitude of impact

- 4.2.17 There is no permanent lighting proposed for the access road, and the Thurrock Flexible Generation Plant will be unlit at night except for motion-sensitive security lighting. There should therefore be little effect from lighting on bats in the surrounding area.
- 4.2.18 Therefore, the impact is predicted to be of local spatial extent, long term duration, continuous and irreversible. It is predicted that the impact will affect the receptors directly. The magnitude is considered to be **negligible**.

Sensitivity of receptor

- 4.2.19 The receptor is considered to be of medium vulnerability, high recoverability and parish value. The sensitivity of the receptor is, therefore, considered to be **medium**.

Significance of the effects

- 4.2.20 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be **negligible adverse** significance, which is not significant in EIA terms.

Future monitoring

- 4.2.21 No additional ecology and nature conservation monitoring during the operational phase is proposed beyond that identified in Table 4.2 where the 5-year monitoring period stipulated therein overlaps with the operational phase.

4.3 Decommissioning phase

- 4.3.1 If the Thurrock Flexible Generation Plant continues to operate after 35 years, impacts would be no greater than those for operational assessment as described above.

- 4.3.2 If the Thurrock Flexible Generation Plant is decommissioned and deconstructed after 35 years, taking into account the time delay between construction and decommissioning and the commitment to reinstatement of habitats temporarily lost due to construction, for the purpose of this assessment it is assumed that ecological baseline conditions during decommissioning will be similar to those assessed for construction in terms of the species likely to be present and the ecological value of those populations or assemblages. Species distributions and numbers may change due to natural population fluctuations, but any changes in distribution would need to be determined by surveys prior to decommissioning.

- 4.3.3 It is assumed that consultation would be undertaken with Natural England and the local planning authority prior to the commencement of decommissioning, to determine the exact nature of the decommissioning plan, and applicable regulations would be followed to minimise environmental effects. It is presumed that no additional hedgerow or tree clearance will be required.

- 4.3.4 Works will be undertaken in accordance with best practice guidelines and legislative requirements which apply at the time.

Potential for decommissioning to affect designated sites

Magnitude of impact

- 4.3.5 Impacts from decommissioning would be concentrated on Zone A and associated access roads in Zone C, and on the removal of the causeway and access road in Zone G. The gas pipeline would remain *in situ* but the above ground structure in Zone D3 would be removed. The causeway would also not be decommissioned.

- 4.3.6 There little potential for direct or indirect impacts on designated sites from decommissioning infrastructure in Zone A and C but what impacts may occur would be from airborne or runoff pollution during decommissioning works.

- 4.3.7 A decommissioning plan will be produced to set out measures to be taken to minimise impacts prior to the commencement of works.

- 4.3.8 The impact is predicted to be of local spatial extent, short term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. With pollution control measures in place, the magnitude is considered to be **negligible**.

Sensitivity of receptor

- 4.3.9 Designated sites within the vicinity of the decommissioning works are deemed to be of up to medium vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

- 4.3.10 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms.

Decommissioning effects on habitats

Magnitude of impact

- 4.3.11 It is assumed that no additional hedgerow or ditch loss on the boundaries of or outside Zone A would be required for decommissioning works. However, there is potential for some impacts from airborne or runoff pollution during decommissioning works to affect habitats in the vicinity of the works area.
- 4.3.12 A decommissioning plan will be produced to set out measures to be taken to minimise impacts prior to the commencement of works.
- 4.3.13 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. With pollution control measures in place, the magnitude is considered to be **negligible adverse**.

Sensitivity of receptor

- 4.3.14 Habitats are deemed to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

- 4.3.15 Overall, the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms.

Potential for decommissioning to affect species

Magnitude of impact

- 4.3.16 Decommissioning has the potential to affect species, primarily through disturbance in adjacent areas, but measures may also need to be put in place to protect water voles, reptiles and breeding birds if they have colonised soft landscape features such as sustainable drainage features in Zone A.

- 4.3.17 A decommissioning plan will be produced to set out measures to be taken to minimise impacts prior to the commencement of works. This would include a survey of the Thurrock Flexible Generation Plant site to determine whether any protected species have colonised them, and mitigation strategies would be developed accordingly if this proves to the case.

- 4.3.18 It is highly unlikely that populations of protected species would occur at levels of significance above their current value, which for species recorded in the vicinity of Zone A is district to county level.

- 4.3.19 Impacts from decommissioning are predicted to be of local spatial extent, short term duration, and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of receptor

- 4.3.20 Species are deemed to be of medium vulnerability, medium recoverability and district or county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

- 4.3.21 Overall, the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

- 4.3.22 Overall, impacts from decommissioning would be considerably lower than impacts from construction.

Future monitoring

- 4.3.23 No ecology and nature conservation monitoring is considered necessary other than the species surveys that would be undertaken to inform the decommissioning plan and any subsequent follow-up monitoring where translocations of protected species have been undertaken.

4.4 Transboundary effects

- 4.4.1 A screening of the potential for transboundary impacts has been carried out and is presented in Volume 6, Appendix 4.1: Transboundary Impacts Screening Note. This screening exercise identified that there is no potential for significant transboundary effects with regard to ecology from Thurrock Flexible Generation Plant upon the interests of other EEA States.

4.5 Cumulative effects

- 4.5.1 Cumulative effects are those arising from impacts of the proposed development in combination with impacts of other proposed or consented development projects that are not yet built or operational. An assessment of cumulative effects for onshore ecology has been made and is reported in Volume 4, Chapter 22.

4.6 Inter-related effects

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

Project lifetime effects

- 4.6.2 Assessment of the potential for effects via multiple environmental or social pathways to interact, spatially and temporally, to create a greater inter-related effect on a receptor than is predicted for each pathway (in its respective topic chapter) individually.

Receptor-led effects

- 4.6.3 Assessment of the potential for effects via multiple environmental or social pathways to interact, spatially and temporally, to create a greater inter-related effect on a receptor than is predicted for each pathway (in its respective topic chapter) individually.

5. Conclusion and Summary

- 5.1.1 A summary of the effects assessed in this chapter is provided in Table 5.1.
- 5.1.2 Effects of the construction, operation and decommissioning of Thurrock Flexible Generation Plant have been assessed. Effects of the construction and use of the Zone G causeway on wintering birds were assessed as not being of significance in EIA terms.
- 5.1.3 Most adverse effects occur during the construction phase and are associated with the loss of grassland and ditch habitat in Zone A for construction of the main site, and on the species which use this grassland, namely invertebrates, reptiles, breeding birds and water voles. Effects of habitat loss in the absence of further mitigation were assessed as moderate adverse for grassland, reptiles and water voles.
- 5.1.4 Additional mitigation is provided, comprising translocation of animals, and habitat creation in Zone E and Zones F1-3 and habitat enhancements in Zone A (retained ditches and grassland) and Zone F4, which provides an overall net gain in grassland and ditches as well as provision of other habitats including scrub. The habitat creation in Zones E and F1-3 maintain and improve habitat connectivity north of the railway line north of Zone A. Once the mitigation measures are implemented, Thurrock Flexible Generation Plant would have an overall minor benefit for ecology.
- 5.1.5 An initial Biodiversity Net Gain assessment (Volume 6, Appendix 9.3) has been produced which indicates that the development as currently designed achieves a net gain of just under 10%. The Net Gain assessment will be refined and reiterated as the design progresses (e.g. when the option for causeway access track is decided, and as detailed landscaping designs are produced prior to construction).
- 5.1.6 Other impacts include temporary disturbance of species during construction and operation and temporary habitat losses associated with construction of construction access tracks and gas pipeline but these are not considered likely to be significant.
- 5.1.7 Atmospheric emissions during operation on designated sites have been assessed and found not to be significant.

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

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Construction							
Permanent loss of grassland	Minimising grassland loss where practicable	Major	Medium	Moderate adverse (significant in EIA terms)	Grassland creation in Zones E and F to provide greater area than permanently lost	Moderate beneficial (significant in EIA terms)	Vegetation monitoring to assess success of habitat creation
Permanent loss of ditches	Retention of ditches where practicable e.g. Zone A boundaries	Major	Low	Minor adverse (not significant in EIA terms)	Ditch creation in Zone F to provide net gain of ditches	Minor beneficial (not significant in EIA terms)	Vegetation monitoring to assess success of habitat creation
Permanent loss of invertebrate habitat	Minimising grassland loss where practicable	Minor	Medium	Minor adverse (not significant)	Invertebrate habitat creation in Zone F to provide greater area than permanently lost	Minor beneficial (not significant)	Habitat condition monitoring to assess success of habitat creation
Permanent loss of GCN habitat	If practicable, works could be timed to avoid the active GCN season, but if not a GCN licence may need to be applied for to include temporary fencing to exclude GCN from the works area within the vicinity of GCN ponds.	Minor	Medium	Minor adverse (not significant in EIA terms)	Fencing to exclude GCN from temporary works areas	No change (not significant in EIA terms)	Monitoring of GCN ponds if required by licence application
Permanent loss of reptile habitat	Minimising habitat loss where practicable	Major	Medium	Moderate adverse (significant in EIA terms)	Reptile habitat creation in Zone F to provide greater area than permanently lost, translocation from works area	Minor beneficial (not significant in EIA terms)	Reptile population monitoring
Permanent loss of breeding bird habitat	Minimising habitat loss where practicable	Minor	Low	Minor adverse (not significant in EIA terms)	Habitat creation in Zone F to provide greater area than permanently lost, particularly for Cetti's warbler	Minor beneficial (not significant in EIA terms)	Bird population monitoring
Permanent loss of intertidal wintering bird habitat	Minimising habitat loss where practicable	Negligible	Medium	Negligible adverse (not significant in EIA terms)	Although saltmarsh creation not required to mitigate loss of habitat for birds, c1.1-1.3 ha of saltmarsh will be created through long-term sediment accretion on mudflats. Overall neutral effect.	Negligible adverse (not significant in EIA terms)	Habitat condition monitoring to assess success of habitat creation

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Permanent loss of water vole habitat	Minimising habitat loss where practicable	Major	Medium	Moderate adverse (significant in EIA terms)	Water vole habitat creation in Zone F to provide net gain ditch habitat, enhancement of retained ditches and translocation from works area (if required)	Minor beneficial (not significant in EIA terms)	Water vole population monitoring
Permanent loss of bat foraging habitat	Minimising habitat loss where practicable	Minor	Low	Minor adverse (not significant in EIA terms)	Habitat creation in Zones E and F to provide greater area than permanently lost	Minor beneficial (not significant in EIA terms)	n/a
Permanent loss of badger habitat	Minimising habitat loss where practicable	Minor	Low	Negligible adverse (not significant in EIA terms)	Habitat creation in Zones E and F to provide greater area than permanently lost	Minor beneficial (not significant in EIA terms)	n/a
Temporary loss of grassland	Minimising habitat loss where practicable	Minor	Low	Negligible adverse (not significant in EIA terms)	Grassland creation in Zone F to provide overall net gain in area	Minor beneficial (not significant in EIA terms)	Habitat condition monitoring to assess success of habitat creation
Temporary loss of ditches	Minimising habitat loss where practicable	Minor	Low	Minor adverse (not significant in EIA terms)	Restoration of ditch habitat	No change (not significant in EIA terms)	Habitat condition monitoring to assess success of habitat creation
Temporary loss of hedgerows	Retention of hedgerows where practicable	Minor	Low	Minor adverse (not significant in EIA terms)	Provision of replacement planting	No change (not significant in EIA terms)	Habitat condition monitoring to assess success of habitat creation
Temporary loss of reptile habitat	Minimising habitat loss where practicable	Minor	Medium	Minor adverse (not significant in EIA terms)	Translocation of reptiles and habitat restoration	No change (not significant in EIA terms)	Reptile population monitoring
Temporary loss of intertidal wintering bird habitat	Minimising habitat loss where practicable	Negligible	Medium	Negligible adverse (not significant in EIA terms)	n/a	Negligible adverse (not significant in EIA terms)	Monitoring of wintering birds during causeway use if barge deliveries overlap with wintering bird season
Temporary loss of water vole habitat	Minimising habitat loss where practicable	Minor	Medium	Minor adverse (not significant in EIA terms)	Habitat restoration post-construction	No change (not significant in EIA terms)	Water vole population monitoring
Temporary loss of bat habitat	Minimising habitat loss where practicable	Minor	Low	Minor adverse (not significant in EIA terms)	Replacement planting of hedgerows and installation of artificial hedgerows to close gaps while replacement planting matures	No change (not significant in EIA terms)	n/a

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Airborne pollutant effects on designated sites	Measures to reduce dust generation and other emissions during construction as set out in CoCP	Negligible	Medium	Negligible adverse (not significant in EIA terms)	n/a	Negligible adverse (not significant in EIA terms)	n/a
Airborne pollutant effects on habitat sites	Measures to reduce dust generation and other emissions during construction as set out in CoCP	Negligible	Medium	Negligible adverse (not significant in EIA terms)	n/a	Negligible adverse (not significant in EIA terms)	n/a
Runoff pollutant effects on designated sites	Measures to manage discharges to surface water as set out in CoCP	Negligible	High	Minor adverse (not significant in EIA terms)	n/a	Minor adverse (not significant in EIA terms)	n/a
Runoff pollutant effects on habitats	Measures to manage discharges to surface water as set out in CoCP	Negligible	Medium	Negligible adverse (not significant in EIA terms)	n/a	Negligible adverse (not significant in EIA terms)	n/a
Noise, lighting and visual disturbance effects on breeding and wintering birds from construction in terrestrial zones	Measures to minimise noise and lighting as set out in CoCP	Minor	Medium	Minor adverse (not significant in EIA terms)	n/a	Minor adverse (not significant in EIA terms)	n/a
Noise, lighting and visual disturbance effects on wintering intertidal birds from construction and use of the Zone G causeway in the intertidal zone	Measures to minimise noise and lighting as set out in CoCP	Minor	Medium	Minor adverse (not significant in EIA terms)	n/a	Minor adverse (not significant in EIA terms)	Monitoring of wintering birds during causeway use if barge deliveries overlap with wintering bird season
Lighting effects on foraging bats	Measures to minimise lighting as set out in CoCP	Negligible	Medium	Negligible adverse (not significant in EIA terms)	n/a	Negligible adverse (not significant in EIA terms)	n/a
Permanent loss of grassland	Minimising grassland loss where practicable	Major	Medium	Moderate adverse (significant in EIA terms)	Grassland creation in Zones E and F to provide greater area than permanently lost	Moderate beneficial (significant in EIA terms)	Vegetation monitoring to assess success of habitat creation
Operation							
Aerial emissions on designated sites during operation	Refer to Volume 3, Chapter 12: Air quality	Negligible	Medium – Very high	Negligible – Minor adverse (not significant in EIA terms)	n/a	Negligible – Minor adverse (not significant in EIA terms)	n/a
Surface water effects on designated sites and habitats during operation	Refer to Volume 3, Chapter 15: Hydrology and flood risk	No change	High	No change (not significant in EIA terms)	n/a	No change (not significant in EIA terms)	n/a
Noise and lighting effects on breeding birds during operation	Access road unlit. Use of directional security lighting to minimise light spillage.	Negligible	Medium	Negligible adverse (not significant in EIA terms)	n/a	Negligible adverse (not significant in EIA terms)	n/a

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Noise and lighting effects on wintering birds during operation	Access road unlit. Use of directional security lighting to minimise light spillage.	No change	Medium (intertidal birds)	No change (not significant in EIA terms)	n/a	No change (not significant in EIA terms)	n/a
Lighting effects on bats during operation	Access road unlit. Use of directional security lighting to minimise light spillage.	Negligible	Medium	Negligible adverse (not significant in EIA terms)	n/a	Negligible adverse (not significant in EIA terms)	n/a
Decommissioning							
Impacts on designated sites	To be provided in Decommissioning Plan	Negligible	Medium	Negligible adverse (not significant in EIA terms)	n/a	Negligible adverse (not significant in EIA terms)	n/a
Impacts on habitats	To be provided in Decommissioning Plan	Negligible	Medium	Negligible adverse (not significant in EIA terms)	n/a	Negligible adverse (not significant in EIA terms)	Monitoring requirement for habitats to be determined at decommissioning stage
Impacts on species	To be provided in Decommissioning Plan	Minor	Medium	Minor adverse (not significant in EIA terms)	n/a	Minor adverse (not significant in EIA terms)	Monitoring requirement for species to be determined at decommissioning stage

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