

Riverside Energy Park

Environmental Statement

Chapter 11: Terrestrial Biodiversity

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11 Terrestrial Biodiversity

11.1 Introduction

11.1.1 This Chapter presents the findings of the assessment of likely significant effects on terrestrial biodiversity arising from the construction, operation and decommissioning of Riverside Energy Park (REP).

11.1.2 REP has the potential to result in the following effects on terrestrial biodiversity:

- habitat loss, disturbance (including through shading) or fragmentation during site clearance and/or construction;
- noise and/or visual disturbance during site clearance, construction or operation;
- dust during site clearance and/or construction;
- hydrological effects from surface water drainage to adjacent watercourses and other habitats during construction and operation;
- lighting during construction or operation; and,
- effects as a result of emissions / deposition during operation.

11.1.3 Note that a separate Habitats Regulations Assessment (HRA) **Document Reference 6.5** has been carried out in accordance with the requirements of the Conservation of Habitats and Species Regulations 2017 to consider whether REP would or would not have any likely significant effects on European designated sites.

11.1.4 This Chapter is accompanied by an Outline Biodiversity and Landscape Mitigation Strategy (OBLMS) (**Document Reference 7.6**), the purpose of which is to set out the key measures required to avoid, mitigate and compensate for impacts and effects to terrestrial biodiversity and landscape from the construction and operation of REP. A Final Biodiversity and Landscape Mitigation Strategy (BLMS) will be secured through a DCO requirement, which will be substantially in accordance with the OBLMS. The DCO requirement will expressly provide for certain 'pre-commencement' biodiversity mitigation measures to be implemented before any works commence, including works which would fall outside the definition of 'commence' in the DCO. The OBLMS is separate to the outline Code of Construction Practice (**Document Reference 7.5**) referred to in other assessments within this Environmental Impact Assessment (EIA).

11.1.5 This Chapter has been prepared by Peter Brett Associates LLP (PBA) in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the Infrastructure EIA

Regulations 2017). A statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this Environmental Statement (ES) is provided in **Appendix A.2**.

11.2 Legislation, Policy, Guidance and Standards

Legislation

Conservation of Habitats and Species Regulations 2017

11.2.1 The Conservation of Habitats and Species Regulations transpose the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora ("The Habitats Directive") into law. The Regulations provide for:

- designation and protection of European Sites (Special Protection Areas (SPA) and Special Areas of Conservation (SAC)) including the need for 'Appropriate Assessment' of plans and proposals likely to affect those sites;
- protection of European protected species;
- adaptation of planning and other controls for the protection of European Sites;
- making it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2; and
- the avoidance of activity that may impact a European protected species or its habitat unless authorised by a European Protected Species licence issued by Natural England. Licences are not issued until after planning consent has been granted and once Natural England are satisfied that adequate measures are to be put in place to mitigate for the impact of the development.

Wildlife and Countryside Act 1981 (as amended)

11.2.2 The Act implements the Convention of European Wildlife and Natural Habitats (The Bern Convention) and the Directive 2009/147/EC 'The Birds Directive'.

11.2.3 Schedules 1 (birds) and 5 (animals) to the Act identify species of bird and other animals in relation to which Sections 1 and 9 of the Act makes killing, injury, taking and disturbance an offence. Schedule 8 to the Act lists species of plant in relation to which Section 13 of the Act makes it an offence to intentionally pick, uproot or destroy.

11.2.4 Section 14(2) of the Act makes it an offence to cause any species of animal or plant listed in Schedule 9 (Part II) of the Act to grow in the wild. Of these species, those encountered frequently in land development and regeneration projects include Japanese knotweed, giant hogweed and floating pennywort.

11.2.5 The Act further provides for notification and confirmation of Sites of Special Scientific Interest (SSSI) for their flora, fauna, geological or physiographical features. It also contains measures for the protection and management of SSSIs.

The Natural Environmental and Rural Communities Act 2006 ('NERC')

11.2.6 The NERC Act sets a duty on public bodies (including government departments) to have due regard for habitats and Species of Principal Importance for biodiversity in England when carrying out their duties.

11.2.7 Section 41 (S.41) of the 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. The list is used by decision-makers in implementing their protection duties under this Act when carrying out their functions.

11.2.8 The S.41 list includes 56 habitats and almost 1,000 Species of Principal Importance in England. Since the UN Convention on Biological Diversity (CBD) in 2010 the UK identifies these habitats and species as conservation priorities under the UK Post-2010 Biodiversity Framework (these were formerly identified as UK Biodiversity Action Plan (BAP) habitats and species, revised in 2007).

11.2.9 Paragraph 174 of the National Planning Policy Framework (NPPF, 2018) (see below) guides local planning authorities to create policies which promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species, and to pursue opportunities for securing measurable net gains for biodiversity.

National Planning Policy and Strategies

National Policy Statements

11.2.10 As outlined in **Chapter 2**, the relevant National Policy Statements (NPS) provide the primary basis for decisions by the Secretary of State on development consent applications for nationally significant infrastructure projects.

11.2.11 **Table 11.1** below identifies the relevant requirements of NPSs:

Table 11.1: Relevant requirements of NPSs

Requirement of NPS EN-1, Overarching National Policy Statement for Energy	Response within this ES
<p>Section 5.3 Biodiversity and geological conservation states that:</p> <p><i>“Where the development is subject to EIA the applicant should ensure that the ES</i></p>	<p>Effects to designated sites, along with protected habitats and species, or those that are otherwise notable such being identified as being of principal</p>

<p><i>[Environmental Statement] clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity...</i></p> <p><i>The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.”</i></p> <p>The document goes on to reiterate the Government’s biodiversity strategy with its aim to ensure:</p> <ul style="list-style-type: none"> ■ <i>“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</i> ■ <i>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.”</i> <p>The policy goes onto say:</p> <p><i>“...development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives... where significant harm cannot be avoided, then appropriate compensation measures should be sought.”</i></p>	<p>importance for the conservation of biodiversity have been fully assessed within this Chapter.</p> <p>Measures to avoid, mitigate or compensate negative ecological effects are set out in the relevant sections below.</p>
<p>Section 5.3.15 of the NPS EN-1 also refers to biodiversity within developments</p>	<p>Measures to avoid, mitigate or compensate negative ecological effects are set out in the relevant</p>

<p>stating:</p> <p><i>“Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design.”</i></p> <p>With regards to Mitigation section 5.3.18 states – <i>“The applicant should include appropriate mitigation measures as an integral part of the proposed development. In particular, the applicant should demonstrate that:</i></p> <ul style="list-style-type: none"> ■ <i>during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;</i> ■ <i>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;</i> ■ <i>habitats will, where practicable, be restored after construction works have finished; and</i> ■ <i>opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.”</i> 	<p>sections below.</p> <p>The Application Boundary has been developed in consultation with biodiversity specialists and has avoided ecological features where practicable.</p> <p>An OBLMS has been produced which outlines measures to mitigate ecological effects during construction, along with details of reinstatement of construction areas, and opportunities to provide enhancements both within and outside REP. The draft DCO (dDCO) (Document Reference 3.1) includes a requirement to secure a final BLMS which will be substantially in accordance with the OBLMS (Document Reference 7.6).</p>
<p>Requirement of NPS EN-3, Overarching National Policy Statement for Renewable Energy Infrastructure</p>	
<p>Paragraph 2.4.2 of NPS EN-3 describes the criteria for good design for energy infrastructure. It states that <i>“Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.”</i></p>	<p>Measures to mitigate impacts to biodiversity have been incorporated early in the design phase in order to minimise impacts from emissions, noise, lighting, and surface water.</p>

11.2.12 It is considered that this Chapter fully addresses the Terrestrial Biodiversity requirements of the NPSs as outlined above in **Table 11.1**.

11.2.13 A discussion on the following National, Regional and Local policy and strategies specific to this Chapter is located in **Appendix A.3**:

National Planning Policy and Strategies

- National Planning Policy Framework (2018);
- UK Post-2010 Biodiversity Framework; and
- Planning Practice Guidance.

Regional Planning Policy and Strategies including Emerging Policies and Strategies

- The London Plan (2016);
- Draft New London Plan showing Minor Suggested Changes (2018);
- Relevant Mayoral strategy and planning guidance documents; and
- London Environment Strategy (2018).

Local Planning Policy and Strategies

- Bexley Core Strategy (2012);
- London Borough of Bexley Unitary Development Plan (2004) Saved Policies (2012);
- Bexley Growth Strategy (2017);
- Dartford Borough Council Core Strategy (2011);
- Dartford Borough Council Development Policies Plan and Policies Map (2017); and
- Kent Minerals and Waste Local Plan, 2013-2030 (2016).

Terrestrial Biodiversity Guidance and Standards

11.2.14 The impact assessment element of this Chapter is guided by best practice guidance for ecological impact assessment (EclA) set out by the Chartered Institute of Ecology and Ecological Management (CIEEM, 2016). Further information regarding the assessment methodology approach is provided below in Section 11.5.

11.2.15 Ecological surveys undertaken in relation to the Proposed Development have regard for best practice relevant to that specific ecological feature (i.e. habitat,

species or species group). The approach to the surveys undertaken to inform this assessment are provided in Section 11.5.

11.3 Consultation

11.3.1 Specific key consultation responses received to date relating to terrestrial biodiversity are presented in **Table 11.2** below, along with how these have been responded to in this ES.

Table 11.2: Summary of Key Consultation Responses in Relation to Terrestrial Biodiversity

Reference	Comment	Response
SoS Scoping Opinion		
Section 4.6 – ID 2 Surveys	The Inspectorate expects full consideration to be given to the entire Application Site with regards to the undertaking of ecology surveys, and that the survey scope is agreed with the Local Planning Authorities and Natural England.	Consultation has taken place with Local Planning Authorities and Natural England to inform baseline survey scope, and surveys have been carried out within the entire Application Boundary accordingly.
Section 4.6 – ID 3 Designated Sites	The Inspectorate recommends that relevant screening distances for designated areas with respect to assessing the effects from combustion plant emissions are discussed and agreed with the EA.	Consultation with the EA identified that screening distances for statutory designated areas, with respect to assessing the effects from combustion, should be extended to 15 kilometres (km). This screening distance has been used within assessments in this EIA.
Section 4.6 – ID 4 Study Area	The ES will need to clearly set out and justify the study areas applied to each receptor and effect.	The extent of the Study Area, where this varies dependent on the ecological feature, is set out and justified within Section 11.5.
Kent County Council		
7.7	Any proposed construction work within the Littlebrook substation would need to be informed by	No survey of the Littlebrook substation is required as the

Reference	Comment	Response
	detailed, up-to-date survey information.	Electrical Connection route links into an existing building and there would be no ground disturbance or potential effects to habitats. Therefore, the need for further ecological survey within the Littlebrook substation site has been scoped out as identified within the Preliminary Environmental Information Report (PEIR).
Natural England		
2.1-2.5, 7	Natural England provided some general comments around the approach to ecological assessment with respect to the identification of potential effects and proposed assessment methodology.	The approach to ecological assessment is appropriate and compliant with current best practice and has been discussed and agreed with Natural England (see Section 11.5).
2.7 – Biodiversity Net Gain	Natural England highlight the requirement to conserve biodiversity and provide net gain where possible, as part of the Proposed Development.	The scheme design has been informed by the ecological baseline and scale of ecological impacts, delivering a policy compliant scheme. The Applicant is entering into an agreement with the Environment Bank to provide off site compensation and biodiversity net gain, further details of which are provide in the OBLMS (Document Reference 7.6).
3 – Green	The development resides within	Existing green

Reference	Comment	Response
Infrastructure	the Ridgeway Link which forms a green link between Crossness Sewage Treatment Works, Thamesmead and Plumstead; and is a key gateway from the west into the rich network of green open spaces and waterways in Thamesmead and Erith Marshes. As such there will be green infrastructure and green space requirements for the development.	infrastructure and green space adjacent to the site has been considered within the assessment. Ecologists have worked in close consultation with architects and other technical disciplines to determine opportunities for habitat creation and enhancement described in this Chapter.
5 – Air Quality	The assessment should take account of the risks of air pollution and how these can be managed or reduced.	The EIA includes an air quality assessment with respect to nearby designated areas and the scheme design has been informed accordingly.
6 – Climate Change Adaptation	The ES should give consideration of biodiversity and the effects of climate change, and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained.	The assessment considers impacts on terrestrial biodiversity from future climate change scenarios, see Section 11.7 .
The Environment Agency		
Lighting	The development will have to clearly demonstrate that there is no change from the existing lighting on site, particularly in relation to the adjacent nature reserve and the River Thames, which is subject to considerable amounts of change and possible in-combination affects from other developments.	The EIA considers lighting impacts on important ecological features (see Section 11.8), with the design responding to mitigate impacts, as required.
Thames Defences	The development must be set back to allow embankment raising to take place. This is so	The Proposed Development takes this into account. See also

Reference	Comment	Response
	that no encroachment takes place and the tidal Thames habitats can be protected and enhanced where feasible to do so.	Chapter 12.
Biodiversity Net Gain	The development must consider how it can deliver a net gain for ecology, to achieve further mitigation for its proximity to the adjacent nature reserve, but also on the River Thames.	The scheme design has been informed by the ecological baseline and scale of ecological impacts, delivering a policy compliant scheme. An indicative biodiversity metric calculation has been undertaken by the Environment Bank to enable a biodiversity balance to be determined and to provide evidence of overall net gain in accordance with policy and consultee comments. The final metric and confirmation of net gain requirements will be included in the final BLMS.
Proximity to nature conservation sites at risk from emissions to air	The proposed energy from waste plant is within 2 km of Sites of Special Scientific Interest (SSSI) the closest one being the Inner Thames Marshes. Detailed consideration will need to be given to the proposal if the critical levels for pollutants such as ammonia, nitrogen oxides or sulphur dioxide, or critical loads for acidification or eutrophication are exceeded or close to the threshold. These operations may require consideration of additional pollution prevention and control	The EIA includes an air quality assessment, informed by modelling, with respect to designated areas within the zone of influence (ZOI) of REP, and the scheme design has been informed accordingly.

Reference	Comment	Response
	methods as well as the height and location of major emission points.	

Reference	Comment	Response
S42 Consultation Response		
London Borough of Bexley		
Terrestrial Biodiversity	With reference to paragraph 11.5.8 and 11.5.9, the inclusion of bat surveys in the scope is recommended.	Bats surveys have been scoped out of baseline data collection (see Section 11.9.8), although measures to minimise impacts to commuting and foraging bats are included within the OBMLS (Document Reference 7.6). This approach was set out in the PEIR and has been agreed with LBB (email from LBB Planning Officer 26/09/2018).
Terrestrial Biodiversity	It should be recognised that SINC's identified on page 21-24 in table 11.5, are of varying grades ranging from metropolitan, borough (grade I and grade II), and local importance for nature conservation.	SINC's have been valued within the ES in accordance with their varying levels of ecological importance.
Terrestrial Biodiversity	The impact on aquatic biodiversity also needs to be considered. The River Thames and tidal estuaries are designated as a SINC. The requirement for a fish survey should be considered within the scope. Natural England, London Wildlife Trust, Environment Agency and the Zoological Society of London should be consulted [in relation to fish surveys]. Advice set out in the Zoological Society of London (ZSL) 'Conservation of Tidal Thames Fish through the Planning Process' guidance document should be	Following changes to the design there will be no direct impacts to the River Thames or aquatic biodiversity. The requirement for a full marine biodiversity assessment has been scoped out, and no fish surveys will be required to inform the EIA. This was set out in <i>REP: removal of river works and amend scope of EIA Technical Note</i> (circulated to consultees on 23 rd March 2018) and agreed with LBB (email

Reference	Comment	Response
	considered.	from LBB Planning Officer 26/09/2018).
Terrestrial Biodiversity	Where opportunities to incorporate biodiversity improvements in and around the development exist, these will be encouraged by the London Borough of Bexley, especially where this can secure measurable net gains for biodiversity.	The scheme design has been informed by the ecological baseline and scale of ecological impacts, delivering a policy compliant scheme. An indicative biodiversity metric calculation has been undertaken by the Environment Bank to enable a biodiversity balance to be determined and to provide evidence of overall net gain in accordance with policy and consultee comments. The final metric and confirmation of net gain requirements will be included in the final BLMS.
Terrestrial Biodiversity	Where possible, wildlife crossing points should be designed into the scheme along the highway network; at locations near to existing wildlife corridors and nature conservation sites, such as the ditch network. These crossing points or eco-passages can be in the form of different types of underpass (tunnels and culverts).	The scope of construction work within the highway network involves excavation of a temporary trench approximately 0.45 m wide, laying of cables and backfilling, using temporary traffic management to control vehicle movements. Retrofitting of wildlife crossing points laterally across the highway network would involve design and consultation beyond the scope of current works.
Kent County Council		

Reference	Comment	Response
Terrestrial Biodiversity	There will be a need for a method statement to be produced and implemented and it will need to set out the precautionary ecological mitigation and the proposed habitat re-creation works.	An OBLMS (Document Reference 7.6) has been produced which outlines all ecological mitigation measures, including habitat re-creation and biodiversity offsetting. The DCO (Document Reference 3.1) includes a requirement to secure a final BLMS which will be substantially in accordance with the OBLMS (Document Reference 7.6).
Environment Agency		
Terrestrial Biodiversity	Any dredging of the intertidal foreshore should be avoided.	Following changes to the design at the pre-application stage there will be no direct impacts to the River Thames or aquatic biodiversity. No dredging would be required.
Terrestrial Biodiversity	...this location has been identified as an opportunity to eventually replace the rock armour on the riverbank with something more wildlife friendly e.g. timber terraces of saltmarsh. The works must not preclude the ability for this to be delivered at a later date and ideally we would like to see some of this delivered as part of the development, in line with planning policies to enhance biodiversity.	Construction of REP will not preclude access to the flood embankment or River Thames. The location and detail of ecological enhancements required to deliver a net gain are being developed.
Terrestrial Biodiversity	The REP will be located immediately next to the Crossness Local Nature Reserve/Erith Marshes Local Wildlife Site. Any increase in	Impacts to Crossness LNR and Erith Marshes SINC have been assessed within the ES and mitigation

Reference	Comment	Response
	light, noise, development in the buffer or impact on the nature reserve will need to be mitigated for.	established within an OBLMS (Document Reference 7.6).

Reference	Comment	Response
Bexley Natural Environment Forum		
3	<p>...the Cory/Borax fields, for which outline planning permission has been granted for large data centres, has been identified as of at least regional importance for invertebrates as well as nesting by red-listed birds. ...proposed laydown areas (construction compounds) are indeed to be on the west side of Norman Road, in the open mosaic areas that were previously home to the old electric substation. This area also backs onto Norman Road Field where Kestrels breed and disturbance should be considered.</p>	<p>Effects to habitats and species within the Data Centre fields and the Main Construction Compound have been fully considered within the ES.</p>
6	<p>Our preferred route for the electrical cabling out to Littlebrook Power Station is the one that would avoid digging up the footpath across the LNR.</p>	<p>The preferred route of the Electrical Connection is from the REP site is down Norman Road. However, if the route down Norman Route is not determined feasible, there is a possibility that the alternative route along the bridleway through the Crossness Local Nature Reserve (LNR) may be selected. Therefore, both options are assessed separately, with appropriate mitigation measures identified accordingly.</p>
7	<p>We are concerned about the deposition of nitrates etc. on the Crossness LNR and sites over the river such as at Rainham Marshes.</p>	<p>A full assessment of impacts from emissions to designated areas has been undertaken (see Chapter 7).</p>

Reference	Comment	Response
Minor Refinements, Statutory Consultation		
Ingrebourne Valley Limited		
	<p>This supplementary area [part of the Electrical Connection Route] intersects the permitted reptile receptor area located to the south of Joyce Green. This receptor site is currently in place and in use. This has been approved with Kent County Council, Natural England and the Environment Agency.</p>	<p>The final route of the Electrical Connection route in this area is not yet known. Where possible, impacts to the reptile receptor site will be avoided. If impacts to the receptor site are necessary during installation, a package of mitigation will be agreed with all stakeholders with further detail provided in the OBLMS (Document Reference 7.6).</p>
Minor Refinements, Non-Statutory Consultation		
London Borough of Bexley		
18/01743/SCREEN	<p>The adjusted boundary effects potentially sensitive ecological areas, including SINC and areas not designated as SINC but with ecological potential, including areas that may be used by birds, bats, water voles and other protected species and habitats.</p>	<p>All areas of the Electrical Connection Route including SINC have been assessed within the ES and mitigation established within an OBLMS (Document Reference 7.6).</p>
18/01743/SCREEN	<p>The applicant should consider the mitigation hierarchy when considering development....in addition, enhancements to support net gains for biodiversity as required by planning policy including the NPPF.</p>	<p>The principles of the mitigation hierarchy have been adopted and used when developing measures to address impacts on ecological receptors.</p>

11.3.2 A meeting was held with Natural England's Sustainable Development Advisor on the 22nd March 2018, to provide an overview of the Proposed Development and to provide an opportunity for initial discussion of Natural England's Scoping Responses. A further meeting was held on 26th June 2018 to discuss emerging survey results and other relevant technical studies (e.g. noise modelling, air quality modelling etc), along with approaches to appropriate mitigation, compensation and enhancement with respect to terrestrial biodiversity. Agreement was reached on the scope of surveys being undertaken to inform the baseline. Consultation with Natural England has been ongoing throughout the process, and a Statement of Common Ground is in preparation.

11.4 Reasonable Worst Case Parameters Used for Assessment

11.4.1 The reasonable worst-case scenario for assessment takes account of the maximum REP design parameters and conservative construction programme, such that assessments are worst case. This assessment also includes all Electrical Connection route options from the REP site to the Electrical Connection Point at the Littlebrook Substation.

11.4.2 The reasonable worst case assumes permanent loss of habitats within the REP site, excluding the flood embankment and the surface water attenuation pond to the east of the existing RRRF facility. Temporary impacts to the flood embankment and the pond may arise through temporary construction works such as installation of services or surface water drainage systems, however they will be reinstated following construction where required. Temporary impacts to these habitats are also assessed within the ES.

11.4.3 The Proposed Development does not include any works to the existing jetty or within the River Thames.

11.4.4 The preferred route of the Electrical Connection from the REP site is down Norman Road (Option 1A, see **Figure 5.2 a & b**) utilising the existing carriageway and footpath. However, if the route down Norman Route is not determined feasible, there is a possibility that the alternative route along the bridleway through the Crossness Local Nature Reserve (LNR) may be selected (Option 1 see **Figure 5.2 a & b**). Therefore, both options are assessed separately.

11.4.5 Although the Electrical Connection Route options are located largely within roads and adjacent footpaths, some areas of semi-natural habitat are present. The reasonable worst case acknowledges that only one Connection Route option will be used and acknowledges that not all semi-natural habitats will be temporarily disturbed during construction. However, the ecological effects that would be associated with temporary disturbance of any of the habitats and species within the Connection Route are considered in the Assessment.

11.4.6 The ecological effects arising from other technical issues relevant to the terrestrial biodiversity assessment, for example, changes in air quality (see **Chapter 7**), noise (see **Chapter 8**) or hydrology (see **Chapter 12**) as a result

of the Proposed Development have also been taken into consideration in the reasonable worst-case scenario, based on the results of modelling completed by other specialists in those areas where required, and in the light of consultation responses from consultees.

11.5 Assessment Methodology and Significance Criteria

Study Area

11.5.1 Both the construction and operation of REP have the potential to have direct and indirect effects to terrestrial biodiversity, referred to as “*ecological features*”. The mobility of some ecological features, and the outputs from REP (e.g. in airborne emissions), is such that impacts have the potential to cause ecological effects beyond the immediate vicinity of the REP site. For the purposes of this assessment, REP has been split into the following distinct areas as described in **Chapter 3**:

- The REP site, the Main Temporary Construction Compound, and the Data Centre site; and
- The Electrical Connection route options and the Cable Route Temporary Construction Compounds.

11.5.2 It should be noted that an extant planning permission is in place for the Data Centre site (15/02926/OUTM), and this assessment only deals with the expected electrical connection between the Data Centre and the REP site.

11.5.3 The study area, also known as the ecological Zone of Influence (ZOI), is defined as the area within 2 km of the Application Boundary in relation to designated areas and protected / notable habitats and species. When assessing air quality impacts to internationally or nationally designated areas, this has been extended to include the area within 15 km of the stack.

11.5.4 The assessment of direct impacts from REP is limited to ecological features within the Application Boundary as no land outside would be directly disturbed. However, the construction, operation and decommissioning of REP has the potential to result in indirect impacts on some ecological features, which are considered in this Chapter, including as a result of dust and other changes to air quality and chemical deposition rates, in the wider area. The significance of these more distant potential impacts relating to airborne deposition are considered with reference to internationally and nationally statutory designated sites within 15 km of the stack and with reference to non-statutory nature conservation areas within 2 km of stack, in accordance with good practice guidance (e.g. CIEEM, 2017), and taking account of feedback from consultees.

11.5.5 The study areas considered for protected or otherwise notable ecological features which may be affected by REP as a result of their mobility, are described in the rationale provided for the approach to field surveys below.

Baseline Data Collection

Desk Study

- 11.5.6 Existing data in relation to REP and the wider study area have been obtained in order to secure a better understanding of the ecological context of REP. Biological records in relation to statutory and non-statutory nature conservation sites within 2 km of REP were obtained from Greenspace Information for Greater London (GiGL) and Kent and Medway Biological Records Centre (KMBRC) in April 2018. Sites of Special Scientific Interest (SSSIs) designated for geological interest have been excluded from the Terrestrial Biodiversity assessment.
- 11.5.7 Records and other information in relation to protected and notable species were also obtained from GiGL and KMBRC up to 2 km from the Application Boundary in April 2018. On-line resources, including data available through the Multi Agency Geographic Information for the Countryside website (www.magic.gov.uk - MAGIC), JNCC and Natural England websites complemented information obtained from GiGL and KMBRC.
- 11.5.8 Wetland Bird Data (Core Count Data) was sourced from the British Trust for Ornithology (BTO) for the section of the River Thames adjacent to the REP site (monthly data covering the most recent five-year period (to 2010/11 winter season)).
- 11.5.9 In addition, species data was provided by Thames Water for Crossness LNR covering the period 2016-2018, and ecological field surveys undertaken to inform the planning application for the Data Centre site (15/02926/OUTM) were also reviewed.

Field Surveys

- 11.5.10 The ecological surveys described below have been undertaken to inform this assessment. The scope of survey work undertaken has been established through consultation with statutory consultees.
- Extended Phase 1 habitat survey – the Application Site was initially surveyed in December 2017, updated as amendments to the Application Boundary were provided and through the spring and summer 2018. The Phase 1 habitat survey was also extended to include part of the Crossness Local Nature Reserve to the south of the REP site (although see 11.5.8 below). The study area can be viewed on **Figures 11.3a-d**. Survey work was undertaken in accordance with standard methodology (JNCC, 2010) extended to include consideration of potential for, or evidence of, protected or otherwise notable ecological features (CIEEM, 2017);
 - Badger survey – a badger survey of the REP site, the Main Temporary Construction Compound, the Data Centre site and Electrical Connection

route options including Cable Route Temporary Construction Compounds was undertaken concurrently with the extended Phase 1 habitat surveys;

- Bat survey - a Preliminary Roost Appraisal of trees and structures within the REP site, the Main Temporary Construction Compound, the Data Centre site and Electrical Connection route options was undertaken as part of the extended Phase 1 habitat surveys;
- Wintering bird survey - to gather baseline information on the use of intertidal areas adjacent to the REP site and along the nearby south bank of the River Thames by over-wintering waterbirds, a field survey was undertaken by PBA between October 2017 and March 2018. Surveys were carried out monthly, with low and high tide counts taking place in each month of survey. This recorded the numbers of waterbird species within a series of counting compartments covering the shoreline to the north of the REP site as well as further west and east (shoreline compartments). Waterbirds using the open water toward the centre of the River Thames itself (offshore compartments) were also recorded for context and additional information. Counting compartments in relation to the Application Boundary are shown in **Figure 11.4**.
- Terrestrial invertebrate scoping survey and further targeted surveys between April and September 2018 including targeted habitats within, or representative of, the REP site, Main Temporary Construction Compound, Data Centre site and Connection Route options (**Figure 11.8**);
- Breeding bird survey (undertaken in April, May and June 2018) based on the Common Bird Census (CBC) technique. The surveys covered the REP site, the Main Temporary Construction Compounds, the Data Centre and the section of the Electrical Connection route (Route 1, **Figure 5.2a**) heading south-west from the REP site through Crossness LNR as far as the A2016/Eastern Way;
- Reptile survey (undertaken from late March to June 2018, inclusive), involving presence / absence surveys in accordance with standard best practice (Froglife, 1999) focusing on areas known to support suitable habitat for reptiles including the REP site, the Main Temporary Construction Compounds, the Data Centre site and the section of the Electrical Connection route 1 heading south-west from the REP site through Crossness LNR as far as the A2016/Eastern Way (**Figure 5.2a**);
- Water vole survey (mid-April to mid-June 2018 and July to September 2018) in accordance with current guidance (i.e. 2016 Water Vole Mitigation Handbook) focusing on areas of REP known to support suitable habitat including ditches/waterbodies within the areas surrounding the REP site, the Main Temporary Construction Compound, the Data Centre site, the section of the Electrical Connection route 1 heading south-west from the REP site through Crossness LNR as far as the A2016/Eastern

Way, and the Electrical Connection Route 1A along Norman Road (**Figure 11.7**); and,

- Botanical survey (undertaken 14 June 2018) including the open mosaic habitat and species-rich grassland within the REP site. As this habitat type does not fall clearly within National Vegetation Classification categories, the species were recorded with reference to standard nomenclature (i.e. Stace).

11.5.11 After submission of the PEIR in June 2018, the Application Boundary was increased to include minor amendments and refinements of the Electrical Connection route options and the Cable Route Temporary Construction Compounds in July 2018. Given these areas were added to the Application Boundary later in the process, the implications of these minor amendments and refinements are considered in the Assumptions and Limitations (See Section 11.6 below), and with respect to determination of baseline conditions and subsequent assessment.

11.5.12 Further survey work pertaining to great crested newts (GCN) *Triturus cristatus* has been scoped out for the purpose of the ES from the REP site, the Main Temporary Construction Compounds, and the Data Centre (and the land within ZOI for this species). REP does not fall within the area of LBB where GCN should be considered within planning applications (LBB, 2011), indicating they are known to be absent from this location, although it should be noted that this does not apply to the eastern end of the Electrical Connection route options within Kent.

11.5.13 No GCN records, and only three records of amphibian species of conservation concern were provided during the desk study (2 km search area from REP); namely common toad, common frog and palmate newt. Although a number of ponds are known to occur in close proximity to REP (e.g. in Crossness LNR to the south of the REP site), the lack of records of GCN from within 2 km of REP suggests this species is absent from the area. Especially given the history of recent developments surrounding the REP site (including RRRF itself), for which detailed survey work would have previously been carried out. The Thames Water Biodiversity Team Manager (Crossness LNR site manager) has confirmed there are no records of GCN within the site (email dated 02/08/2018). For these reasons, it is considered appropriate to scope out GCN survey from the baseline survey work from these areas; this approach has been agreed by LBB.

11.5.14 In relation to the Electrical Connection route options and the Cable Route Temporary Construction Compounds, the sections of the route between Crayford Way and Joyce Green Lane were added to the Application Boundary in July 2018, as described above. Whilst these areas also have no specific records for GCN within the ZOI for this species, they do include habitats that are suitable for GCN. Habitats in these areas are also suitable for reptile and water vole. Given these areas were added to the Application Boundary outside the optimum period of appropriate survey for these species; this is taken into

account in our Assumptions and Limitations (See **Section 11.6** below) and subsequent Assessment.

- 11.5.15 Further survey work for bats beyond the Preliminary Roost Appraisal undertaken concurrently with the extended Phase 1 habitat survey has been scoped out. The REP site represents poor quality bat foraging/commuting habitat given the predominance of open habitat (including large areas of unvegetated habitat such as hard-standing and bare ground or species-poor amenity grassland). The Electrical Connection route options similarly do not represent high quality bat foraging/commuting habitat; for the most part being dominated by the existing road network and heavily modified habitats such as amenity grassland and small areas of ornamental shrubs.
- 11.5.16 It is possible that bats may move across REP on occasion as part of wider foraging / commuting areas, although nearby areas such as the margins of the River Thames / Thames Path or the adjacent Crossness Nature Reserve and horse-grazed pasture south of the REP site are likely to be more attractive to bats than the habitats within the REP site itself (confirmed by Crossness Nature Reserve and LBB through consultation). In addition, buildings and other structures within REP were not found to have features suitable for use by roosting bats and trees present within REP are typically small or young and lacking features suitable for use by roosting bats. For these reasons, further surveys for bats have been scoped out from the baseline survey work. This has been agreed with LBB. Potential indirect impacts on bats using habitats around the REP site have been considered within the assessment.
- 11.5.17 Full methodologies for surveys described above are provided within **Appendices 11.1-11.6**. All survey work has been, and will be, undertaken with regard for best practice survey guidance and feedback from consultees.

Assessment

- 11.5.18 The ecological assessment for REP has been undertaken in accordance with guidance set out in the Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (2018) ('the CIEEM Guidelines'). The CIEEM Guidelines state that "*EclA is a process of identifying, quantifying and evaluating the potential effects of development-related or other proposed actions on habitats, species and ecosystems*". It requires an assessment of likely significant effects on important ecological features, and as such, does not require consideration of effects on every species or habitat that may be present within REP or the wider Study Area.
- 11.5.19 In order to determine whether there are likely to be significant effects, it is first necessary to identify whether an ecological feature is 'important', and therefore whether an effect upon it could be significant, and thus, material in decision-making. To achieve this, where possible, animal species and their populations will be valued on the basis of a combination of their rarity, status and distribution, using contextual information where it exists. Habitats and

plant communities are evaluated against existing selection criteria, wherever possible (such as those developed to aid the designation of SSSIs or non-statutory designated areas).

11.5.20 The ecological assessment examines effects on important ecological features with reference to the extent, magnitude, duration, timing, frequency, and reversibility of the impacts. For each ecological feature within the relevant study area, the baseline is identified and evaluated. For each important ecological feature, relevant impacts (during construction or operation) are then characterised; effects defined taking into account embedded mitigation and their significance assessed; any further mitigation identified and residual impacts reported. This exercise is carried out for each phase of the Proposed Development and taking into account additional potential influences of climate change.

Determining the Importance of Ecological Features

11.5.21 The importance of each ecological feature within the study area is determined having regard to a number of contributory factors relating to conservation value. The CIEEM Guidelines recognise that determining importance is a complex process, which is a matter of professional judgement guided by the importance and relevance of a number of factors. These include designation and legislative protection as well as biodiversity value, potential value and secondary/supporting value. Consideration of each ecological feature having regard to these factors allows their importance to be determined, with reference to the geographic context set out below:

- International and European;
- National;
- Regional (South of England);
- County/Metropolitan (Greater London or Kent); and
- Local (London Borough of Bexley (LBB) and Dartford Borough Council (DBC)).

11.5.22 Once the importance of each ecological feature that will potentially be affected by REP has been established, those features that are deemed to be 'ecologically important', and therefore require full consideration in the impact assessment, will be determined. These features are those that are important within a 'Local' context or above. This approach allows exclusion of those ecological features that are of less than 'Local' importance. Ecological features considered to be of less than local importance will be considered within an appendix to the main assessment (where appropriate) where legislative issues, rather than ecological importance, may require consideration in project design or implementation.

Establishing Potential Effects from Air Quality, Noise, Shadow, Lighting and Surface Water Management

- 11.5.23 Modelling of the emissions from the stack, as a result of the operation of REP, has been undertaken as described in **Chapter 7**. Critical loads (to be used as standards for the assessment of significance) have been obtained from the Air Pollution Information System (APIS).
- 11.5.24 Baseline noise monitoring has been undertaken and modelling of predicted noise levels during construction and operation has been conducted, see **Chapter 8**. Changes in noise levels, as a result of construction and operation of REP, have been assessed to determine the likelihood of significant ecological effects.
- 11.5.25 Modelling of shading impacts to adjacent designated areas and habitats from the Main REP Building have been modelled by the Applicant using interactive three-dimensional graphics. Shading has been modelled for summer solstice, winter solstice, and spring and autumn equinox, with projections produced 2 hours after sunrise, at midday, and 2 hours before sunset.
- 11.5.26 An Outline Lighting Strategy has been produced which establishes the minimum lighting levels required to construct and operate a safe, secure and energy efficient development, assesses the potential effects of exterior lighting required for REP on light sensitive receptors, and establishes design objectives for the lighting design to minimise the effects or obtrusive light to within guideline levels.
- 11.5.27 A surface water management strategy has been designed (see **Chapter 12**) such that the rate of surface water run-off leaving the site and entering the adjacent watercourse network is limited to the 1 in 100-year greenfield rate of 35.3 l/s. Surface water storage would be provided by a below ground tanked system with capacity to cater for a 1 in 100-year plus climate change (40% increase in rainfall intensity) event.

Determining Significance

- 11.5.28 The CIEEM Guidelines (CIEEM, 2018) state that an effect should be determined as being significant when it “*either supports or undermines biodiversity conservation objectives for important ecological features*”. It relates to the weight that should be afforded to effects when decisions are made, and to the consequences, in terms of legislation, policy and/or development control. Therefore, a significant negative effect on a feature of importance at one level would be likely to trigger related planning policies and, if permissible at all, generate the need for development control mechanisms, such as planning conditions or legal obligations, as described in those policies. In determining significance, consideration is given to aspects of the structure and function of designated areas and habitats, the conservation status of species, and the likely resilience of ecological features to change.

- 11.5.29 An effect on an important ecological feature may be significant at the same geographic scale at which the feature is determined to be important, or at a lesser geographical scale, depending on the characterisation of the impact. By way of example, limited impacts on a woodland of county importance might be assessed as being significant at a local level of importance. This methodology supports an evidence-based approach and supersedes and replaces the previously used matrix-based assessment methodologies (CIEEM, 2016).
- 11.5.30 Whilst the approach outlined above expresses the significance of ecological effects with reference to a geographic frame of reference, as advocated in the CIEEM Guidelines; within **Section 11.12 Residual Effects** significance is also expressed using the generic significance criteria used for other topics. This approach has been taken in order to allow integration with the assessment of all environmental impacts in other chapters.
- 11.5.31 The generic criteria used are based on an expression of severity, to describe the significance of environmental impacts. For ease of reference, **Table 11.3** below provides a means of relating the two approaches and is provided in order to allow this Chapter to be integrated into the wider ES, without compromising the CIEEM best practice approach.

Table 11.3: Significance Criteria

Effect Significance Level	Criteria	CIEEM Geographical Criteria
Substantial	Only adverse effects are assigned this level of significance as they represent key factors in the decision-making process. These effects are generally, but not exclusively associated with sites and features of international, national or regional importance. A change at a regional or district scale site or feature may also enter this category.	Ecological impacts assessed as being significant at National or higher geographical scales and that have triggered a response in development control terms are considered to represent impacts that overall within this assessment are of severe significance.
Major	These effects are likely to be important considerations at a local or district scale but, if adverse, are potential concerns to the project and may become key factors in the decision-making process.	Ecological impacts assessed as being significant at the Regional scales and that have triggered a response in development control terms are considered to represent impacts that overall within this assessment are of major significance.

Moderate	These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.	Ecological impacts assessed as being significant at the County/Metropolitan scale, and that have triggered a response in development control terms, will be considered to represent impacts that overall within this assessment are of moderate significance.
Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process. Nevertheless, they are of relevance in enhancing the subsequent design of the project and consideration of mitigation or compensation measures.	Ecological impacts assessed as being significant at the Local scale, and that have triggered a response in development control terms, will be considered to represent impacts that overall within this assessment are of minor significance.
Negligible	No effect or effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error.	Ecological impacts that have been assessed as Not Significant at any geographic level.

Cumulative Assessment

11.5.32 **Chapter 4** sets out the methodology used to identify ‘Other Developments’ which were considered to have the potential for likely significant cumulative effects with REP (see **Appendix A.4**). Available information on each scheme or allocation identified as having potential for cumulative effects on terrestrial biodiversity was reviewed. If no residual effects were identified, the scheme or allocation was screened out on the basis that there would be no mechanism for significant effects cumulatively with REP. Where residual effects to a receptor were identified, the potential for cumulative effects with REP were assessed. These are discussed in **Section 11.10**.

11.6 Assumptions and Limitations

11.6.1 This ecological assessment is limited by virtue of the fact that the ecological baseline data for some areas of the Electrical Connection route options is not yet complete. This is primarily due to evolution of the scheme design accompanied by seasonal restrictions associated with ecological survey. However, it is considered that existing baseline data for these areas, along with ecological interpretation based on published knowledge and professional experience is sufficient to value the ecological baseline and predict potential

effects at this stage. This assertion is based on the data collected to date, and the habitats present within the Application Boundary.

11.6.2 Data supplied by records centres provides useful baseline information on the species that have been recorded within a local area and details of sites with nature conservation designations. This data often includes surveys undertaken by third parties on an ‘ad hoc’ basis so may be incomplete. Absence of species records may not therefore indicate absence of that species from an area. However, despite these limitations, sourcing existing ecological data is a useful component part of the Ecological Assessment process and has been considered carefully in this Assessment.

11.6.3 Limitations to species specific surveys can be found in the relevant technical reports in **Appendix G.1-G.5**.

11.7 Baseline Conditions and Receptors

Designated Areas

11.7.1 A site check completed using data on the government MAGIC database identified one international statutory designated site within 15 km of the stack (with allowance for siting anywhere within the limits of deviation for the stack): Epping Forest SAC. Details of this SAC can be viewed in **Table 11.4**.

Table 11.4: International Statutory Designated Sites within 15 km of the stack.

Site Name	Approximate Distance and Bearing from stack	Description
Epping Forest SAC	12.13 km to the NW	Habitats that are a primary reason for selection of this site are acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrublayer (<i>Quercion robori-petraeae</i> or <i>Ilici-Fagenion</i>). Epping Forest represents Atlantic acidophilous beech forests in the north-eastern part of the habitat’s UK range. Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a range of rare species, including the moss <i>Zygodon forsteri</i> . The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and dead-wood invertebrates. Also present as a qualifying feature (but not a primary reason for selection) are wet and dry heathlands.

11.7.2 Fourteen nationally designated areas have been identified within 15 km of the stack and are described in **Appendix G.7**. This includes only those SSSIs

designated for their biological interest, geological SSSIs have been considered within **Chapter 13**. SSSIs designated for their biological interest within 2 km of REP are described in **Table 11.5** below.

Table 11.5: SSSIs within 2 km of REP

Site Name	Distance from REP	Description
Inner Thames Marshes SSSI	1.38 km from REP	An area of wetland and grazing marsh bordering the upper reaches of the Thames Estuary, supporting a range of birds, plants and insects.
West Thurrock Lagoon and Marshes SSSI	1.24 km from Littlebrook Substation	An area of lagoon, marshes and intertidal mudflats known to be of importance to wintering waders and wildfowl. This site is known to contain a high-tide roost attracting nationally important numbers of waders and large numbers of other species.

11.7.3 **Figure 11.1** shows the location of the International and National Statutory Designated Sites within 15 km of the stack. **Figure 11.2** shows the location of all statutory designated sites within 2 km of REP.

11.7.4 The desk study reports completed by GIGL and KMBRC also confirm the presence of three statutory designated LNRs within 2 km of REP. **Figure 11.2** shows the location of the LNRs in relation to REP, obtained from MAGIC.

11.7.5 With regards to non-statutory designated sites, GIGL and KMBRC confirmed the following within 2 km of REP: 38 Sites of Importance for Nature Conservation (SINCs; GiGL data), two Local Wildlife Sites (LWS; KMBRC data) and one Roadside Nature Reserve (RsNR; KMBRC data). The biological interest of these sites is summarised in **Appendix G.7**, and the locations can be viewed in **Appendix G.7**.

Habitats

11.7.6 A description of the habitats recorded within the Application Boundary is provided below with reference to plans including target notes (TN) (**Figures 11.3a-d**). For clarity, the description has been split into two sections; the first covering the REP site, Main Temporary Construction Compounds and the Data Centre site, with the second summarising habitats within the Electrical Connection route options and Cable Route Temporary Construction Compounds. Full descriptions of habitats can be found in **Appendix G.6**.

The REP site, Main Temporary Construction Compound, and Data Centre site

- 11.7.7 The western and southern parts of the REP site are characterised by artificial habitats including bare ground and hard-standing. These areas are currently in use for storage (shipping containers), temporary offices and vehicle parking and are largely unvegetated. Similar hard-standing is also present toward the north of the REP site (close to the river frontage) with shipping containers being stored within a fenced area. A car-park and associated road/pavement infrastructure (all also hard-standing) is present toward the centre of the REP site, with an access road heading south and a vehicle ramp leading up to the upper section of RRRF and adjacent jetty area. Small areas of short-mown amenity grassland are present as road verges/roundabouts close to RRRF. These are dominated by red fescue (*Festuca rubra*); likely sown as part of a seed mix. Herb species include ribwort plantain (*Plantago lanceolata*), white clover (*Trifolium repens*) and creeping buttercup (*Ranunculus repens*) among others. Small warehouse/office buildings (pre-fabricated structures) are present in the south-western part of the REP site. The existing RRRF building is present to the east of REP (excluded from the Application Boundary).
- 11.7.8 The central/western part of the REP site accommodates an area of mixed species-rich grassland and ephemeral/short-perennial vegetation present as a mosaic habitat with loose aggregate/rubble and earth/aggregate bunds present adding structural diversity (TN 1). This area was specifically created as 'open mosaic habitat' and seeded with a species-rich grassland mix as part of the RRRF development. As such, much of the habitat structure has evidently been designed to benefit invertebrate species, with a large number of insect 'boxes' or 'bug hotels' present on wooden posts within the area. A pole-mounted barn owl box is present towards the western edge of this area (TN 2), although there is no evidence of current use by barn owls.
- 11.7.9 This habitat type (although more typically as species-rich neutral grassland) continues around the northern edge of the REP site and to the east of RRRF. Other species noted here and on the edges of the adjacent Thames Path include a small (presumably self-seeded) false-acacia tree (*Robinia pseudoacacia*) with young growth of giant hogweed (*Heracleum mantegazzianum*) (TN 3) also evident close to the river banks. North-east of RRRF a shallow depression is present acting as a wetland area (TN 4), now dominated by common reed. This extends south (to the east of RRRF) along a ditch on the eastern boundary with amenity grassland adjacent to the ditch (to the west) before the main access road and security building/gatehouse.
- 11.7.10 South of the REP site, within the Application Boundary, an area of semi-improved grassland is present as a verge along Norman Road. This links to two larger, open land parcels both characterised by a mosaic of species-poor grassland and tall ruderal vegetation (TN 5). These areas have the appearance of overgrown storage yards or otherwise previously cleared or developed land. More open parts of this area contain ephemeral/short-perennial vegetation growing on otherwise bare ground. This habitat type is

also present further south along Norman Road (to the west) within the Main Temporary Construction Compound (TN 6) as open vegetation on bare ground. Habitats within these land parcels along Norman Road meet the criteria for the priority habitat type 'open mosaic habitat on previously developed land'.

- 11.7.11 GiGL and KMBRC provided records of a variety of plant species of conservation concern (including some nationally rare species) from within the search area. This includes some records from close proximity (or within) REP, such as greater pond sedge (*Carex riparia*), common cudweed (*Filago vulgaris*), dittander (*Lepidium latifolium*), Borrer's saltmarsh-grass (*Puccinellia fasciculata*), marsh sow-thistle (*Sonchus palustris*) and brookweed (*Samolus valerandi*).
- 11.7.12 In addition, recent (<10 year old) records of the specially protected plants pennyroyal (*Mentha pulegium*) and Jersey cudweed (*Gnaphalium luteoalbum*) were supplied by KMBRC, with older records of other protected plants also supplied by both GiGL and KMBRC. None of these records pertain to REP itself but indicate that these (and other) plants may occur locally where suitable conditions exist.

Electrical Connection Route options and Cable Route Temporary Construction Compounds

- 11.7.13 Electrical Connection route option 1 heads south-west from the REP site through a narrow area of species-poor grassland associated with horse-grazed fields. It then crosses a wide section of wet ditch south of a small pumping station. At this point the ditch is open in character and largely lacking vegetation, although it becomes increasingly vegetated with common reed and bulrush (*Typha latifolia*) further south.
- 11.7.14 This Electrical Connection route option follows the course of a bridleway heading south through Crossness LNR (TN 7); a ditch runs parallel to the bridleway. This bridleway comprises a mixture of bare ground (track) overgrown with species-poor grassland characterised by perennial rye-grass (*Lolium perenne*), creeping bent (*Agrostis stolonifera*) and cock's-foot with species such as hogweed (*Heracleum sphondylium*), common nettle (*Urtica dioica*), creeping cinquefoil (*Potentilla reptans*) and false oat-grass on the edges.
- 11.7.15 At the southern end of the bridleway the route passes through a narrow belt of woodland alongside the A2016/Eastern Way. This is dominated by ash with shrub species including hawthorn (*Crataegus monogyna*) and elder (*Sambucus nigra*) below. An ephemeral area of pooling water is located within this woodland close to the route. This has open water with common reed and bulrush on the margins. At this point the Electrical Connection route option 1 joins the existing road network.
- 11.7.16 The Electrical Connection route options would be positioned on the existing road network for the majority of their length. The road network is largely

unvegetated and dominated by artificial hard surfacing (the roads themselves plus associated pavements). Narrow verges of short amenity grassland are present in places, including in some of the central reservations on wider sections of road. These are typically characterised by grass species associated with seeded mixtures or heavily managed swards such as perennial rye-grass and red fescue, with self-seeded herb species tolerant of regular cutting such as ribwort plantain, dandelion (*Taraxacum officinale* agg.) and yarrow also present in many areas.

- 11.7.17 Taller 'screening' vegetation comprising scattered broadleaved trees and introduced shrubs are also present in some places, particularly around the central part of the Electrical Connection route. These include a mixture of ornamental species such as bay laurel (*Laurus nobilis*), cherry laurel (*Prunus laurocerasus*), cotoneaster species (*Cotoneaster* sp.), viburnum (*Viburnum* sp.), firethorn (*Pyracantha* sp.), Oregon grape (*Mahonia aquifolium*) and hebe (*Hebe* spp.) along with trees such as cherry (*Prunus* spp.), hazel (*Corylus avellana*) and hornbeam (*Carpinus betulus*). Self-seeded or invading species such as bramble and wild clematis (*Clematis vitalba*) are also present in places. Individual or groups of standard planted trees and small shrubs also occur in association with, or adjacent to, amenity grassland verges in a few locations and on some roundabouts. Species recorded include hawthorn, silver birch (*Betula pendula*), field maple (*Acer campestre*), hornbeam, common lime (*Tilia x europaea*), Norway maple (*Acer platanoides*) and London plane (*Platanus x hispanica*).
- 11.7.18 Sections of wet ditch are present adjacent to north-western parts of the Electrical Connection route options (Electrical Connection route option 1 and route 1A). These generally appear to have poor water quality. There is a large balancing pond to the west of Electrical Connection route 2A at ~1 km chainage marker (see **Figure 5.2**) (part of the Ocado premises) which supports areas of reed. Moving a little further south-east from here, the route passes adjacent to an established church yard (between 2-2.5 km for Electrical Connection route 1 and 1.5-2 km for route 2A) which likely has some well-established grassland, although this sits outside the proposed Electrical Connection route itself, so will not be directly affected. At the point where the route passes Slade Green rail station (5.5 km at Electrical Connection route option 2A) it evidently crosses the railway. Habitats comprise introduced shrubs including a cotoneaster species.
- 11.7.19 Moving toward the eastern / south-eastern end of the Electrical Connection route options where the route along the road passes through the Dartford Marshes area and crosses the River Cray and River Darent, vegetation on the road margins contains sections of dense scrub comprising species such as hawthorn, blackthorn (*Prunus spinosa*), sea-buckthorn (*Hippophae rhamnoides*), field maple, cherry and bramble. Areas of more open (scattered) scrub and small trees in conjunction with semi-improved and species-poor semi-improved grassland and mixed ruderal species such as mugwort, melilot, common mallow (*Malva sylvestris*) and Alexanders (*Smyrniolus atrum*) are also present close to the River Darent.

- 11.7.20 In the area where the Electrical Connection route crosses the River Darent, the road is situated on a flyover, with the river below being wide and evidently partially tidal with some exposed mud banks around low tide/low flow and scattered common reed growing in-channel and on parts of the margins (TN 8). The river banks are characterised by unmanaged grassland dominated by species such as false oat-grass and creeping bent.
- 11.7.21 To the east of the River Darent, habitats are typical of the Habitat of Principal Importance 'coastal and floodplain grazing marsh', comprises a low-lying mosaic of semi-improved rough grassland, marshy grassland and pockets of swamp (TN 9).
- 11.7.22 The Electrical Connection route option 2B (0 - 0.5 km on **Figure 5.2**) passes across an area which appears to be in use as an informal footpath, comprising bare ground, scattered and denser scrub to the north and bare ground to the south. The proposed Electrical Connection route itself follows the line of the informal footpath, which comprises a gravel path with species-poor grassland either side. However, dense scrub is present to the north of the route which has the potential to support nesting birds and the ecotone between these habitats has the potential to support good numbers of reptiles. The land south of the footpath is open land evidently recently part of a construction site, although works appear to have ceased (possibly temporarily) or it may have been a construction compound. The ground is very disturbed and rutted with a lot of bare ground and partially re-vegetated with rough grassland (Yorkshire fog, false oat grass, etc.) and some ruderal species (e.g. goat's-rue and Alexanders). At the eastern end of the open land the route enters the active building area/new housing (around the 0.5 km marker for Electrical Connection route option 2B, **Figure 5.2**) and then follows surfaced roadways again.
- 11.7.23 Records of notable plant species from the 2 km search area around the Application Boundary were supplied as part of the desk study. The Electrical Connection route options generally pass through areas of existing road infrastructure/paved areas or associated verges which are highly modified and typically lacking botanical diversity. As such, much of the land within the Electrical Connection route is unlikely to support botanical interest or protected or otherwise notable species.

Species

Bats

- 11.7.24 No features suitable for bat roosts have been identified within the REP site, Main Construction Compound, or Electrical Connection routes. Desk study data suggests the assemblage of bat species within the surrounding area is made up of relatively common species of bat including common pipistrelle, soprano pipistrelle, and noctule. Records were also received of Leisler's bat which is a scarce species in the UK although the southeast is a stronghold.

Records were also received of Nathusius' pipistrelle, another scarce species in the UK.

11.7.25 The River Thames corridor and habitats within the Crossness LNR are likely to be used by commuting and foraging bats which will feed on the abundance of invertebrates within these semi-natural habitats. The mosaic of grassland, wetland and open habitats within the REP site are less optimal for foraging bats than surrounding areas but may also be used sporadically for foraging bats or by bats passing through the REP site.

Breeding Birds

11.7.26 In total 35 species of bird with confirmed, probable or possible status as breeders within the survey area or immediate surroundings were recorded in 2018. The survey revealed the bird community associated with the area was dominated by common species of bird that are widespread in the types of habitats present locally. However, species of conservation concern were recorded such as linnet, skylark, lapwing, and reed bunting, and the specially protected Cetti's warbler using ditches and wetland areas locally and on the margins of the REP site. Full surveys results can be viewed in **Appendix G.1**.

11.7.27 It has been identified through consultation that there are kestrel breeding within fields to the west of Norman Road. It is understood the specially protected little ringed plover has historically been recorded within the REP Site, however this species was not recorded during surveys in 2018.

Reptiles

11.7.28 Surveys during 2018 have identified the presence of three species of reptile (grass snakes, slow worms and common lizards) within the survey area. The survey results indicate that low population of all three species are present, with the majority of reptiles concentrated in suitable habitat along the bridleway within Crossness LNR.

11.7.29 No reptiles were found within the REP Site; however, single counts of all three reptile species identified in 2018 were recorded within rough grassland paddocks west of Norman Road to the south of the REP Site (see **Figure 11.6**). Full surveys results can be viewed in **Appendix G.2**.

11.7.30 Responses to consultation indicate that reptiles are known to be present within Joyce Green Quarry adjacent to the southern section of the Electrical Connection route along University Way. A low population of grass snake and common lizard are present, and it is planned that in spring 2019 reptiles will be moved to a receptor site in the south of the Quarry adjacent to (and overlapping) the Electrical Connection route (TN 10).

Terrestrial Invertebrates

11.7.31 A total of 152 species of invertebrate were recorded during the surveys in 2018. These included one Red Data Book and 11 Nationally Notable

(Nationally Scarce) species. However, the conservation status of many invertebrate species was assigned over 20 years ago and an assessment of the conservation status of some of the species recorded during the survey based on more modern records would suggest that a more realistic assessment of the various species recorded would contain no Red Data Book species and around 6 Nationally Notable species.

11.7.32 Invertebrates from a range of species groups were recorded, with Hymenoptera (bees, wasps and ants) making the biggest contribution to the species list. A number of uncommon species typically associated with the "Thames Gateway" area were recorded, including the shrill carder bee *Bombus sylvarum* and the brown-banded carder bee *Bombus humilis*. The overall species list was also influenced by the aquatic habitats of the nearby Crossness LNR, as evidenced by the range of dragonfly and damselfly species recorded and the presence of species such as the large soldierfly *Stratiomys singularior*. The majority of the uncommon species recorded during the survey were mobile species recorded across several or all of the survey sections. Full surveys results can be viewed in **Appendix G.3**.

Water Voles

11.7.33 The water vole surveys undertaken in April and August 2018 confirmed the presence of this species within Crossness LNR, and within the boundary ditches of the REP site, the Main Temporary Construction Compound, and the Data Centres (see **Figure 11.7**). No water voles were recorded within the ditch and pond at the east of the REP site. The survey results indicate that a low population of water voles is present with the majority of water vole evidence concentrated in Crossness LNR. Full surveys results can be viewed in **Appendix G.4**.

11.7.34 River and ditch habitats within the southern section of the Electrical Connection route around the River Cray and River Darent have potential to support water vole. Information received from Ingrebourne Valley Ltd. during consultation suggests water voles are present within Joyce Green Quarry (TN 11) and therefore are assumed to be present within suitable adjacent habitats with the Application Boundary.

Wintering Birds

11.7.35 A total of 34 waterbird species were recorded using the survey area across all survey visits combined. The parts of the survey area contained within compartments 3 and 2 (see **Figure 11.4**) were found to be of the greatest apparent importance to birds within the context of this section of the River Thames (south bank). Within these compartments, the channel associated with the sewage outfall and adjacent intertidal areas (compartment 3) and the base of the retaining wall/river bank defence and adjacent mudflats (compartment 2) were recorded to be regularly in use by a range of waterbird species.

11.7.36 In terms of species, numbers of shoveler (*Anas clypeata*) exceeding the national threshold of importance were recorded on one occasion, confirming that significant numbers of this species can make use of this stretch of the Thames on occasion. Numbers of common sandpiper (*Actitis hypoleucos*) also exceeded the national threshold (of 1 bird), but this is well below the minimum qualifying threshold of 50 individuals for SSSI (with this species also being numerous and widespread on passage). Other species with both regular occurrence and sometimes large flock sizes (albeit below national or international thresholds) included black-tailed godwit (*Limosa lapponica*), dunlin (*Calidris alpina*), gadwall (*Anas strepera*), lapwing (*Vanellus vanellus*), redshank (*Tringa tetanus*), shelduck (*Tadorna tadorna*) and teal (*Anas crecca*). Full surveys results can be viewed in **Appendix G.5**.

Invasive Species

11.7.37 The invasive non-native plants three-cornered garlic (*Allium triquetrum*) and giant hogweed (*Heracleum mantegazzianum*) were both recorded growing within the grassland on the bank within the REP site (TN 3). Japanese knotweed (*Fallopia japonica*) (TN 12) and Himalayan balsam (*Impatiens glandulifera*) (TN 13) were both recorded within habitats along the Electrical Connection route. Cotoneaster sp. is also present within introduced shrub areas along the Electrical Connection route. All these species are listed on Schedule 9 of the Wildlife and Countryside Act (WCA) 1981 (as amended).

Importance of ecological receptors

11.7.38 All of the ecological features present or considered likely to be present within the Study Area of the Proposed Development have been assigned a value of conservation importance, according to the geographic criteria outlined in Section 11.5. The conservation importance of each ecological feature, along with the rationale for valuation is provided in **Table 11.6** below, taking into account the Assumptions and Limitations described in **Section 11.6**.

Table 11.6: Importance of ecological receptors

Ecological Feature(s)	Conservation Importance	Rationale for Valuation
Epping Forest SAC	International	Area is designated under European legislation
SSSIs	National	These areas are designated under UK legislation.
LNRs	Up to County/Metropolitan	LNRs are areas of nature conservation value managed for educational objectives as well as nature conservation.
SINCs (Site of Metropolitan Importance in London, Local	County/Metropolitan	SINCs listed as Site of Metropolitan Importance contain the best examples

Ecological Feature(s)	Conservation Importance	Rationale for Valuation
Wildlife Sites in Kent)		of London’s habitats, or rare assemblages or important populations of species. Similarly, SINCs are now identified in Kent as Local Wildlife Sites.
Sites of Borough or Local Importance	Local	These are locally designated wildlife areas of lower value than Sites of County/ Metropolitan Importance.
Habitats, including open mosaic on previously developed land, semi-improved neutral grassland, open water, swamp, scrub and broadleaved semi-natural woodland.	Local	Open mosaic habitat is listed as a Habitat of Principal Importance for the Conservation of Biodiversity in England. Given the urban setting of REP with industrial areas in abundance in the wider area, it is likely that open mosaic habitats on previously developed land is not uncommon within the local area. Other habitats are also of ecological value but will be relatively widespread in the local area.
Bats	Local	Desk study data suggests the assemblage of bat species associated with REP and the surrounding area is made up of common species of bat.
Breeding birds	Local	The bird community associated with REP and surrounding area is dominated by common species that are widespread in the types of habitats present locally.
Reptiles	Local	Low populations of common species have been identified which are considered to be of local conservation importance.

Ecological Feature(s)	Conservation Importance	Rationale for Valuation
Terrestrial invertebrates	Local	The assemblage of invertebrate species were typical of the habitats present and the geographical location of the survey area.
Water voles	Local	A low population of water voles has been identified which is considered to be of local conservation importance.
Wintering waterbirds	County	Waterbirds are a qualifying feature of the River Thames SINC, a site of Metropolitan/County value. However the assemblage of species and numbers of waterbirds recorded during the surveys, whilst of interest, are not exceptional and would be expected within similar habitats elsewhere within the Thames Estuary.

11.7.39 Other habitats within the Application Boundary including tall ruderal, short ephemeral/perennial, poor semi-improved grassland, amenity grassland, and ornamental planting are not considered to be important ecological features.

11.7.40 Invasive plant species are also not considered important ecological features, although due to the need to prevent spreading these species in the wild, safe systems of work in relation to them are included in the OBLMS (**Document Reference 7.6**).

Baseline Evolution

11.7.41 Given that construction is targeted to commence in 2021, it is unlikely that the ecological baseline of the REP site and Electrical Connection route options will change significantly between that set out in the baseline section above and commencement of construction. Whilst ecological resources are not static, the habitats within the Application Boundary and study area are considered unlikely to change significantly within that timeframe, particularly given the dominance of hardstanding and tarmac within the Application Boundary.

11.7.42 Changes in rainfall through climate change (such as 40% increase in rainfall intensity) have been predicted (**Documents Reference 5.2**), however given

the short timeframe this is unlikely to be noticeable prior to construction. During operation, changes to habitats and species in areas adjacent to REP are possible as a result of climate change, however the near absence of semi-natural habitats within REP indicate changes within the Application Boundary are unlikely. Any habitats created by REP as described within the OBLMS will be designed to be resilient to climate change and agreed with relevant stakeholders. For these reasons it is not anticipated that the effects of climate change would result in new or different significant effects to those identified in this Chapter.

11.7.43 **Appendix A.4** provides a full list of schemes which have been identified as being likely to be constructed prior to the construction of the Proposed Development. Where relevant, these schemes therefore form part of the 'future baseline' scenario and have been taken account of in the assessment of likely significant impacts from the Proposed Development (construction and operation) presented in Section 14.9.

11.8 Embedded Mitigation

11.8.1 Embedded mitigation measures which have been taken into account during the ecological assessment are set out below:

- REP is focussed on previously developed land and hardstanding/tarmacked areas, thereby limiting disturbance to ecologically sensitive areas;
- Impacts to watercourses along the Electrical Connection route will be minimised through the use of trenchless installation techniques;
- Impacts to water voles in the ditches adjacent to Norman Road will be avoided by ensuring an offset of at least 5 m from the top of ditch bank;
- Noise effects during construction will be mitigated through several measures (see **Chapter 8**) in line with BS 5228. Operational effects will be mitigated through selection of integrated plant with low noise outputs;
- Impacts through airborne emissions have been minimised through stack sensitivity analysis completed to provide an optimised stack height to adequately disperse emissions, and through adherence to requirements of the Industrial Emissions Directive (IED), emerging Best Available Techniques Reference Document (BREF) and the Medium Combustion Plant Directive, see **Chapter 7**;
- An Outline Lighting Strategy (see **Chapter 15**) has been produced which establishes the minimum lighting levels required to construct and operate a safe, secure and energy efficient development, assesses the potential effects of exterior lighting required for REP on light sensitive receptors, and establishes design objectives for the lighting design to minimise the effects or obtrusive light to within guideline levels;

- A surface water management strategy has been designed such that the rate of surface water run-off leaving the site and entering the adjacent watercourse network is limited to the 1 in 100-year greenfield rate of 35.3l/s, see **Chapter 12**. Surface water storage will be provided by a below ground tanked system with capacity to cater for a 1 in 100-year plus climate change (40% increase in rainfall intensity) event. There will be no degradation in water quality. In accordance with planning policy requirements, surface water run-off from the REP site will therefore be managed in a sustainable manner and the strategy will deliver 'betterment' when reviewed within the context of the existing (pre-development) surface water run-off regime; and,
- An OBLMS (**Document Reference 7.6**) has been produced which sets out the principles of all measures to minimise impacts to designated areas, habitats and species discussed below. This includes consideration of noise, lighting, and pollutant impacts, as a result of spillages or leaks from equipment during construction and decommissioning. A Final BLMS will be secured through a DCO Requirement, which will be substantially in accordance with the OBLMS. The DCO Requirement will expressly provide for certain 'pre-commencement' biodiversity mitigation measures to be implemented before any works commence, including works which would fall outside the definition of 'commence' in the DCO (**Document Reference 3.1**).

11.9 Assessment of Likely Effects

The REP Site, Main Temporary Construction Compounds and Data Centre site

Construction/Decommissioning

Designated Areas

- 11.9.1 The footprint of the REP Site, Main Temporary Construction Compounds and Data Centre site does not directly affect any designated area, therefore there will be no significant effects on designated areas in terms of direct land take. However, there is the potential for indirect effects, through noise and visual disturbance, dust generation and pollution during construction and decommissioning on designated areas. During the construction and decommissioning phases, indirect effects are most likely to be relevant for those designated areas adjacent to the REP site: i.e. Crossness LNR, Belvedere Dykes SINC, River Thames and Tidal Tributaries SINC, and Erith Marshes SINC.
- 11.9.2 Protection and appropriate working measures will be required during construction and decommissioning to protect the habitats and species within these nearby designated areas from significant indirect adverse effects. This includes consideration of noise, lighting, and pollutant impacts as a result of spillages or leaks from equipment during construction and decommissioning. All such issues are addressed within the OBLMS (**Document Reference 7.6**),

which will consider amongst other issues, timing of works to address noise issues, construction lighting and good practice construction methods. Impacts will not undermine the conservation objectives of these sites and therefore the effects on the designated areas of County/Metropolitan importance and **Local** importance are **Not Significant**.

Habitats

11.9.3 The proposed construction work will result in the loss of some existing habitats within the REP site, the Main Temporary Construction Compound, and the Data Centre site. This will include habitat considered to be 'open mosaic habitat on previously developed sites' along with temporary disturbance of semi-improved grassland, both of **Local** conservation importance.

11.9.4 Whilst there will be no permanent habitat loss to the wetland area at the northeast of the REP site, or the grassland along the flood bank, temporary impacts may arise through installation of services or connection of surface water management features. These activities could result in temporary loss or disturbance to semi-improved grassland, reedbed, and standing water and species which it supports, of **Local** conservation importance.

11.9.5 The loss or temporary disturbance of habitats of Local ecological importance within the REP site, Data Centre site, and Main Temporary Construction Compound will be compensated through provision of an area of open mosaic habitat on the flood bank, as well as a financial contribution to the Environment Bank with a legal agreement for a contribution towards the enhancement of habitats outside the Application Boundary (see **Section 11.11**). In light of these compensation measures which will be delivered through legal agreement, effects on these habitats of **Local** conservation importance will be **Not Significant**.

11.9.6 Bare ground and hardstanding is not considered an important ecological feature and its loss is **Not Significant**.

Species

11.9.7 No bat roosts have been identified within the REP site or the Main Construction Compound, or adjacent areas which could be affected during construction. The River Thames corridor and habitats within the Crossness LNR are likely to be used by commuting and foraging bats which will feed on the abundance of invertebrates within these semi-natural habitats. The mosaic of grassland, wetland and open habitats within the REP site are less optimal for foraging bats than surrounding areas, but may also be used sporadically for foraging bats or by bats passing through the REP site. Loss of habitats used sporadically by foraging bats is not considered to be significant. Construction of REP will not sever any obvious commuting routes, habitats links for bats moving through the wider landscape will be maintained. Impacts to commuting or foraging bats could occur through disturbance from lighting

during construction, however measures to minimise these impacts are included within the OBLMS (**Document Reference 7.6**).

11.9.8 Construction could result in the permanent and temporary loss of habitats used by breeding birds, direct killing or injury of birds, damage/destruction of active nests, and noise and visual disturbance to the breeding bird assemblage of **Local** conservation importance. Suitable alternative breeding habitat is present adjacent to these areas, and standard measures to avoid impacts to breeding birds from construction activities, and to enhance retained habitats where required, will be included within the OBLMS.

11.9.9 Prior to construction the barn owl box within the REP site will be inspected by a licenced barn owl surveyor and relocated to a suitable location nearby where it will not be subject to construction disturbance. If evidence of barn owl is recorded, the box will be relocated outside of breeding season.

11.9.10 Noise levels have been monitored and modelled with respect to existing and predicted noise levels during construction of REP in relation to a location within Crossness LNR, to indicate how noise impacts could affect breeding birds (see **Table 11.7** below). The results show that noise levels will increase during the daytime hours during construction of REP. Construction will generally not take place at night and no night-time increases are anticipated. However, it should be noted that there may be some discrete construction events at night, such as slip form concrete pouring.

Table 11.7: Noise assessment within Crossness LNR indicating existing baseline and construction noise levels.

Location	Description	Baseline LAeq, T*		Construction LAeq, T	
		Daytime	Night-time	Daytime	Night-time
3	Crossness LNR	52	47	62	-

11.9.11 The elevated noise levels may cause some displacement of breeding birds in the vicinity of the REP site during construction, given the abundance of alternative habitats in the surrounding area, and their temporary nature, these effects to the identified breeding bird assemblage of **Local** conservation importance will be **Not Significant**.

11.9.12 It should be noted that there may be some very irregular construction activities, as described in **Chapter 8** which may elevate construction noise levels above those stated above. Due to the irregularity of these events, no effects above those described above are anticipated.

11.9.13 Construction activities will result in the loss and temporary disturbance to habitats used by invertebrates. As discussed in the Habitats section above, the loss or temporary disturbance of habitats of value to invertebrates will be compensated through a financial contribution to the Environment Bank with a legal agreement for contribution towards enhancement of habitats outside the

Application Boundary (see Section 11.11). In light of these compensation measures which will be delivered through legal agreement, effects on invertebrates of **Local** conservation importance will be **Not Significant**.

11.9.14 Construction activities may cause the temporary loss of habitats used by low numbers of reptiles within the Main Construction Compounds and Data Centre site, and potentially killing and/or injury of reptiles. Suitable alternative terrestrial habitat is present adjacent to these areas, and standard measures to avoid impacts to reptiles from construction activities, and to enhance retained habitats where required, will be included within the OBLMS. Construction effects to reptiles of **Local** conservation importance will be **Not Significant**.

11.9.15 As discussed in the embedded mitigation section, impacts to water voles will be avoided through ensuring a 5m offset of all construction work from ditches which support water vole. Therefore, no impacts to these species are anticipated.

Wintering Birds

11.9.16 Potential impacts on passage (spring/autumn) or over-wintering waterbird species could include disturbance of birds using intertidal areas adjacent to the REP site as a result of noise, lighting and other activity during the construction or decommissioning phase. However, the areas immediately adjacent to the REP site (compartments 4 and 5 – see **Figure 11.4**) were found to be unexceptional in terms of the numbers (and variety) of waterbirds they supported (in terms of regular use). These areas did not show any patterns of use that suggested they are of particular value to waterbirds over and above similar sections of the shoreline in the local area.

11.9.17 Areas of the shoreline nearby, particularly the sewage outfall within compartment 3, have been found to be of importance to local waterbird populations. However, this feature is located approximately 300 m from the REP site (to the west) at its closest point. There is also a retaining wall along the riverside edge of the Thames Path which provides some screening of this area from the lower-lying land beyond (where the REP site is situated). Disturbance of waterbirds using the outfall as a result of visual stimuli at ground level (e.g. construction staff or vehicle movements) is therefore unlikely to occur. However, construction and decommissioning of the new facility would involve some works at height (e.g. using cranes and other lifting equipment), with the structure itself anticipated to be visible from the adjacent shoreline (as per RRRF), see **Chapter 9**. In practice, given the distances to the REP site and existing levels of human activity in the area, it is possible that birds are, or would be, habituated to, or tolerant of, activity nearby. However, disturbance during some periods of highly intensive activity cannot be ruled out if this were to occur when passage/overwintering birds are present (i.e. September to March inclusive). This is more likely to be a risk during activities resulting in increased noise levels, particularly sudden loud percussive noises such as associated with piling, for example.

11.9.18 Noise levels have been monitored and modelled with respect to existing and predicted noise levels during construction of REP in relation to two representative ecological receptors on the River Thames to indicate how noise impacts could affect overwintering birds (see **Table 11.8** below). The results show that noise levels would increase during the daytime hours during construction of REP. The majority of construction would not take place at night and therefore no regular night-time increases in noise levels are anticipated. However, it should be noted that there may be some discrete construction events at night, such as slip form concrete pouring. However, any increase in noise levels at night from these activities are likely to be lower than the modelled daytime levels.

Table 11.8: Noise assessment at three ecological receptors indicating existing baseline and construction noise levels.

Location	Description	Baseline LAeq, T*		Construction LAeq, T	
		Daytime	Night-time	Daytime*	Night-time
1	River Thames foreshore	55	47	57	-
2	River Thames foreshore	54	49	68	-

* The total encompassing sound (in decibels) in a given situation at a given time, usually composed of a sound from many sources both distant and near

11.9.19 Studies have shown that noise impacts below 70dB have low to moderate effects on estuarine birds (Institute of Estuarine & Coastal Studies, 2009). Irregular noise (e.g. piling) in the range 50-70dB will result in moderate effects, with birds showing responses such as head turning, scanning behaviour, reduced feeding, and movement to alternative areas nearby. Regular noise (e.g. generators, vehicle movements) in the range 50-70dB will result in moderate to low effects, with either no effect or those similar to above. None of the predicted noise increases are above 70dB which could result in a high response effect. Given noise levels will stay in a similar range (50-70dB) to the existing baseline resulting in low-moderate effects, will remain below 70dB, will be of temporary duration during construction, and will impact intertidal areas of limited value to overwintering waterbirds, effects to overwintering waterbirds of **County/Metropolitan** importance will be **Not Significant**.

11.9.20 It should be noted that there may some very irregular construction activities, as described in **Chapter 8** which may elevate construction noise levels above those stated above. Due to the irregularity of these events, no effects above those described above are anticipated.

Operation/Maintenance

Designated Areas

11.9.21 As described in **Chapter 7**, emissions from the stack can lead to deposition of compounds with the potential to adversely affect designated areas. Deposition

of nitrogen oxides (NO_x), sulphur dioxide (SO₂), ammonia (NH₃), hydrogen fluoride (HF), nitrogen (N), total acid, nitrogen acid, and sulphur acid has been calculated from the maximum predicted concentration using the approach in Environment Agency guidance AQTAG06. Detailed modelling has been carried out to predict the process contribution (PC) and Predicted Environmental Concentration (PECs) of relevant pollutants from the stack location to 14 statutory International and National designated areas within 15 km of the stack, and seven non-statutory designated areas within 2 km of stack.

- 11.9.22 The predicted deposition has been compared against the relevant critical loads for the most ecologically sensitive habitats within the designated areas. Where the critical level or load is already exceeded as a result of the baseline concentrations or deposition rates, then the additional contribution from the process should be less than 1% for SACs and SSSIs, or 100% for local sites (LNRs and SINCs), otherwise the additional contribution is potentially significant.
- 11.9.23 All of the PCs from the ERF are less than 1% of the critical loads (or 100% for LNRs and SINCs), or the PECs do not exceed the critical level, apart from two receptor locations for predicted annual average oxides of nitrogen concentrations: the PC is 2.8% and 2.1% of the critical load at Inner Thames Marshes/Rainham Marshes LNR and Ingrebourne Marshes SSSI respectively. Baseline NO_x levels at these two sites currently exceeds annual targets, although the PC from REP is not the causal factor of this exceedance, and only forms a small component of the total concentrations. Whilst the PC is above the threshold for potential significance, the annual mean NO_x critical load is primarily related to the potential for impacts of nutrient nitrogen deposition (apis.ac.uk, 2018).
- 11.9.24 In the case of the Inner Thames Marshes/Rainham Marshes, whilst the nutrient nitrogen deposition PC of 2.2% is over the 1% threshold, the PEC does not exceed the critical load, therefore effects on the conservation objectives of this area of National importance will be Not Significant.
- 11.9.25 The updated predicted PC for nitrogen deposition at Ingrebourne Marshes SSSI is 2.3% of the critical load. Ingrebourne Marshes SSSI currently exceeds annual targets for both NO_x (114%) and nitrogen (115%) deposition, although the predicted PCs from REP would not provide the causal factor for this exceedance and would only form a small component of the total baseline concentrations (PECs). Whilst the NO_x PC is above the threshold for potential significance, this reflects the annual mean NO_x concentrations (i.e. in the air) whereas the determining factor which could potentially affect habitats is the nutrient nitrogen deposition.
- 11.9.26 The 1% threshold for identification of potentially significant impacts to SSSIs has been used in the REP ES Chapter 11 for consistency with the Air Quality chapter which also uses this threshold, in line with Environment Agency (EA) Guidance (EA guidance AQTAG06). The EA guidance AQTAG06 uses the 1%

level as a low threshold that can be applied generically to all SSSIs to identify potential significant impacts, irrespective of the sensitivity of the habitats or species for which they are designated. This is supported by the Institute of Air Quality Management's Position Statement, as follows:

“The use of the 1% threshold in the context of habitats should be used only to screen out impacts that will have an insignificant effect, and it should not be used as a threshold above which damage is implied and is therefore used to conclude that a significant effect is likely. It is instead an indication that there may be potential for a significant effect, but this requires evaluation by a qualified ecologist and with full consideration of the habitat's circumstances.”

11.9.27 During consultation prior to the submission of the REP Development Consent Order application, Natural England indicated that it considers a 10% threshold as appropriate for identifying potentially significant impacts to SSSI (email from Natural England Advisor, 1 October 2018). This is over 4 times the predicted PC of NO_x and nitrogen deposition from REP to Ingrebourne Marshes SSSI. Therefore, whilst the EA's 1% threshold is a useful guide for screening out potentially significant impacts, a PC above this does not necessarily equate to a significant impact on an ecological habitat.

11.9.28 One of the strongest effects of NO_x emissions across the UK is through their contribution to total nitrogen deposition (apis.ac.uk, 2018) and therefore measures of NO_x emissions and nitrogen deposition are intrinsically linked. Nitrogen is a nutrient required by all plants to grow, however excessive nitrogen can have negative impacts to plants and habitats by altering the biochemistry of the plants, or through stimulating the growth of competitive plant species which can reduce species diversity within an ecological habitat (apis.ac.uk, 2018).

11.9.29 Ingrebourne Marshes SSSI is principally a wetland site, supporting one of the most diverse and coherent areas of freshwater marshland in London. The condition assessment for the SSSI (Condition of SSSI Units for Site Ingrebourne Marshes SSSI) concludes that the majority of the SSSI is in 'favourable condition'. However, some areas of the SSSI or 'units' are in 'unfavourable condition', largely due to the presence of invasive species and inappropriate management. The condition assessment does not state that SSSI units in unfavourable condition are adversely affected by, eutrophication, or the prevalence of nutrient loving plants (such as some graminaceous species). This suggests that the conservation status of the habitats for which the SSSI is designated is not being adversely affected by the elevated levels of nitrogen which it receives at present.

11.9.30 Freshwater systems are typically 'phosphorus limited' meaning that phosphorus is generally scarce and will inhibit the growth of plants even in the presence of abundant nitrogen. Therefore, provided phosphorus concentrations remain low, the predicted minor increase in nitrogen deposition at Ingrebourne Marshes SSSI as a result of the operation of REP is unlikely to give rise to effects. This is supported by APIS which suggests that 'grazing

marshes may be less sensitive to atmospheric deposition [of nitrogen]' than other wetland systems.

- 11.9.31 The total acid deposition PC from the ERF is less than 1% of the critical load (100% for LNRs and SINC), or the PECs do not exceed the critical load, at all of the designated area receptors.
- 11.9.32 Separate to this assessment of outputs from the stack, contour plots of the PCs for hourly mean NO₂, annual mean NO_x and daily mean NO_x concentrations have been modelled specifically for the predicted values from the operation of the Anaerobic Digestion Plant (see details in **Chapter 7**). The contour plots indicate that the effects of the anaerobic digestion emissions are limited to the immediate vicinity of the REP site and are not cumulative with the emissions from the ERF. This includes a small area of the Crossness LNR and Erith Marshes SINC which is predicted to have hourly mean NO₂ concentrations above 10% of the assessment level. This could result in changes to the habitats through an increase in dominant grass species with a subsequent reduction in broadleaved species. However older marshes, such as this, are less sensitive to nitrogen deposition than new or evolving habitats (apis.ac.uk, 2018) and the areas of the LNR/SINC affected are limited to marginal habitats in the immediate vicinity of the REP site (see **Figures 7.9 and 7.10**). Habitats likely to be affected are not of high botanical diversity consisting of tall ruderal, semi-improved grassland, and scrub. Therefore, predicted effects through nitrogen deposition to these designated areas of **County/Metropolitan** conservation importance are **Not Significant**.
- 11.9.33 Impacts to designated areas from shading of the REP building have been modelled using interactive three-dimensional graphics (**Figure 11.11**). The results indicate that marginal areas of Crossness LNR and Erith Marshes SINC would be subject to some shading, in particular after dawn during the period March to September. The affected areas are small in size and as the sun moves through the sky will be shaded for only a short duration each day. Whilst there is potential for some minor changes in the botanical assemblage in these areas as a result of shading, this is considered to be unlikely. Therefore, effects from shading to Crossness LNR of **County/Metropolitan** importance, and Erith Marshes SINC of **Local** conservation importance, will be **Not Significant**.
- 11.9.34 Light spill from the REP site could affect adjacent designated areas adjacent including Crossness LNR, Belvedere Dykes SINC, River Thames and Tidal Tributaries SINC, and Erith Marshes SINC. The Outline Lighting Strategy sets out the approach for lighting design which has been prepared in consultation with an ecologist in accordance with standard guidance to ensure effects to designated areas from light spill are avoided or minimised. A Full Lighting Design will be a DCO Requirement and will be in accordance with the Outline Lighting Strategy. Therefore, effects from lighting on these sites of **County/Metropolitan and Local** conservation importance are **Not Significant**.

11.9.35 Development of the REP site will give rise to an increase in the impermeable area within the catchment of the Great Breach Dyke which has hydrological connectivity to Crossness LNR and Erith Marshes SINC. In the absence of mitigation, this will result in increased surface water run-off from the REP site. Full details regarding the proposed surface water drainage strategy for the REP site are set out in the document titled 'Drainage Design Strategy (February 2018)' prepared by Doran Consulting Limited on behalf of Hitachi Zosen Inova, a copy of which is presented in **Document Reference 5.2**. The surface water management strategy has been designed such that the rate of surface water run-off leaving the site and entering the adjacent watercourse network is limited to the 1 in 100-year greenfield rate of 35.3 l/s. Surface water storage will be provided by a below ground tanked system with capacity to cater for a 1 in 100-year plus climate change (40% increase in rainfall intensity) event. In accordance with planning policy requirements, surface water run-off from the REP site will therefore be managed in a sustainable manner and the strategy will deliver 'betterment' when reviewed within the context of the existing (pre-development) surface water run-off regime. Therefore, effects from run-off on these areas of **County/Metropolitan and Local** conservation importance are **Not Significant**.

Habitats

11.9.36 Changes to habitats could occur as a result of emissions from the stack. Those habitats of conservation value are considered within the designated areas section above. Remaining habitats are not important ecological features and any effects will be **Not Significant**.

Wintering Birds

11.9.37 Potential impacts on passage (spring/autumn) or over-wintering waterbird species could include:

- Displacement of birds using areas adjacent to the REP site as a result of the physical presence of the new facility (e.g. overshadowing or other ambient light effects such as glare resulting from the presence of highly reflective materials).
- Disturbance of birds using areas adjacent to the REP site as a result of operational activity (i.e. activity associated with the operation REP) and lighting. This would include potential new or increased shipping movements using the existing jetty.

11.9.38 The areas immediately adjacent to the REP site (compartments 4 and 5) were found to be unexceptional in terms of the numbers (and variety) of waterbirds they supported (in terms of regular use). These areas did not show any patterns of use that suggested they are of particular value to waterbirds over and above similar sections of the shoreline in the local area. The risk of disturbance of waterbirds using these areas, to the extent that it may become significant in terms of local distribution or at a population level, is therefore low.

- 11.9.39 During the operational phase, disturbance or displacement of waterbirds as a result of activity on the REP site is unlikely to occur as the majority of works will take place within the new facility itself, with external operational areas likely being screened from the River Thames via the existing retaining wall and the lower ground levels (i.e. there is no direct line of sight between the shoreline and the REP site). External activities at height on the Main REP Building structure (i.e. areas that may be visible from the shoreline) are not anticipated. The greatest potential for disturbance or displacement of waterbirds during the operational phase may arise from increased river traffic on the nearby section of the River Thames. However, as this will use the existing jetty (servicing RRRF) it is likely that waterbirds in the local area are already habituated to activity in this area. In addition, the River Thames at this point is a busy shipping corridor, so the potential for birds to be significantly affected by changes in shipping patterns is very low.
- 11.9.40 Noise levels have been monitored and modelled with respect to existing and predicted noise levels during operation of REP at two locations on the River Thames to indicate how noise impacts could affect overwintering birds (see **Table 11.9** below). The results show minor increases Location 2 of 3-4 dB during daytime operation and 6-8 dB during night-time operation, with no change at Location 1.

Table 11.9: Noise assessment at ecological receptors indicating existing baseline and operational noise levels.

Location	Description	Baseline LAeq, T*		Operation LAeq, T	
		Daytime	Night-time	Daytime	Night-time
1	River Thames foreshore	55	47	55	47
2	River Thames foreshore	54	49	58	57

* The totally encompassing sound (in decibels) in a given situation at a given time, usually composed of a sound from many sources both distant and near

11.9.41 Studies have shown that noise impacts below 70 dB have low to moderate effects on estuarine birds (Institute of Estuarine & Coastal Studies, 2009). Irregular noise in the range 50-70 dB will result in moderate effects, with birds showing responses such as head turning, scanning behaviour, reduced feeding, and movement to alternative areas nearby. Regular noise in the range 50-70 dB will result in moderate to low effects, with either no effect or those similar to above. The existing noise levels already in this noise range are likely to induce a low-moderate effect. None of the predicted noise increases are above 70 dB which could result in a high response effect. Given small increases in noise levels, with operational noise effects remaining in a similar range to existing levels, effects to overwintering birds of **Local** conservation importance will be **Not Significant**.

Other Species

11.9.42 Impacts to commuting or foraging bats in habitats adjacent to REP could occur during operation through disturbance from lighting. However, any increases in light spill are considered to be **Minor** relative to the existing background levels of light spill from RRRF. The Outline Lighting Strategy sets out the approach for lighting design and has incorporated specialist ecological advice and follows standard guidance to ensure effects to designated areas from light spill are avoided or minimised. Therefore impacts from lighting on commuting and foraging bats of **Local** conservation importance will be **Not Significant**.

11.9.43 Noise levels have been monitored and modelled with respect to existing and predicted noise levels during operation of REP within Crossness LNR to indicate how noise impacts could affect breeding birds (see **Table 11.10** below). The results show minor increases of 3 dB during daytime operation and 6 dB during night-time operation. These modest increases on the breeding bird population of **Local** importance will be **Not Significant**.

Table 11.10: Noise assessment at Crossness LNR indicating existing baseline and operational noise levels.

Location	Description	Baseline LAeq, T*		Operation LAeq, T	
		Daytime	Night-time	Daytime	Night-time
3	Crossness LNR	52	47	55	53

11.9.44 Operational impacts to other species or species groups such as reptiles, invertebrates or water voles are unlikely but could occur from pollution incidents or other unplanned events were they likely to occur. However, the REP site will be managed in accordance with measures set out in the environmental permit and pollution incidents are considered unlikely.

The Electrical Connection and the Cable Route Temporary Construction Compounds

Construction/Decommissioning

11.9.45 Several Electrical Connection route options are included in the application boundary. Selection of a final single Electrical Connection route will be confirmed after further detailed investigation has been conducted with UKPN. The preferred route, as explained above, takes account of UKPN's statutory obligations under the Electricity Act (to develop an efficient, co-ordinated and economical system) as well as the responses received from statutory consultation. Subject to confirming that the preferred route (route 1A – route 1, **Figure 1.3**) is deliverable, it is the Applicant's intention that only a single route to the Connection Point will ultimately be granted within the final REP DCO.

11.9.46 The Electrical Connection would comprise a trefoil of cables (3 cables laid together to comprise a single 3-phase circuit), buried in a cable trench typically 450 mm wide and with 900 mm cover (except where there is potential for trenchless installation or a localised deeper trench to be required to pass below a specific constraint) when laid under highway footways and carriageways, with jointing pits approximately every 500 m along the route. To provide 900 mm typical cover, with c. 160 mm diameter ducts and 50 mm duct bedding, the excavation required would typically be 1.2 m deep. The proposed cable route (and backup alternatives) generally follow existing carriageway routes, although some sections do fall outside existing carriageways.

11.9.47 At Littlebrook substation the connection point will be fitted to existing gas insulated switchgear (GIS) which has already been constructed. Works around the substation will consist of the installation and connection of 132 kV cables, however no external building works would be required.

Designated Areas

- 11.9.48 The northern section of Electrical Connection route option 1 (chainage 0 – 0.5 km **Figure 5.2 a & b**) runs from the south western corner of the REP site down an existing bridleway to join the A2016 Eastern Way. The alternative option 1A is the preferred option, however an assessment of option 1 is included below for completeness.
- 11.9.49 The bridleway falls within the Crossness LNR and Erith Marshes SINC (Crossness LNR covers part of the same area designated as Erith Marshes SINC). This will result in short-term temporary habitat loss along the line of the bridleway, as well as disturbance to species within and adjacent the working area. Habitats affected include tall ruderal and scattered scrub which are not considered to be key habitats to the LNR and SINC which are designated for the presence grazing marsh and associated habitats. In addition, habitats along the bridleway are likely to have been subject to historical disturbance, and assuming suitable reinstatement will quickly re-establish following installation of the Electrical Connection. Measures to minimise impacts from installation will be set out within the OBLMS (**Document Reference 7.6**). Therefore, effects to these designated areas of **County/Metropolitan** and **Local** conservation importance will be **Not Significant**.
- 11.9.50 Electrical Connection route option 1a will also affect marginal areas of Crossness LNR and Erith Marshes SINC adjacent to Norman Road. Installation will result in short-term and temporary loss and disturbance of semi-improved grassland. Habitats adjacent to Norman Road are likely to have been subject to historical disturbance, will quickly re-establish following installation of the installation of the Electrical Connection and suitable reinstatement. Measures to minimise impacts from installation will be set out within the OBLMS (**Document Reference 7.6**). Therefore, effects to these designated areas of **County/Metropolitan** and **Local** conservation importance will be **Not Significant**.
- 11.9.51 Electrical Connection route option 1a will also affect Belvedere Dykes SINC adjacent to Norman Road. This site is designated for reedbed and wet ditch habitats, which may be subject to temporary habitat loss and disturbance during installation. The extent of habitat loss and disturbance will be small (tens of square meters), and habitats will re-establish quickly following installation. Measures to minimise impacts from installation will be set out within the OBLMS (**Document Reference 7.6**). Therefore, effects to this designated area of **Local** conservation importance will be **Not Significant**.
- 11.9.52 Towards the southern end of Electrical Connection route option 1 where it crosses the River Cray and the River Darent, the Application Boundary includes land outside the highway carriageway required for installation including launch and receptor sites for trenchless installation techniques. This includes land within River Cray SINC, and Dartford Marshes LWS. Installation of the Electrical Connection will result in short-term temporary impacts through

habitat loss and disturbance. Habitats adjacent to the A206 are likely to have been subject to historical disturbance and would re-establish following installation and reinstatement. Measures to minimise impacts from installation will be set out within the OBLMS (**Document Reference 7.6**). Therefore, effects to these designated areas of **County/Metropolitan** conservation importance will be **Not Significant**.

11.9.53 There is the potential for indirect effects from installation of the Electrical Connection route options on designated areas. During construction, indirect effects are most likely to be relevant for those designated areas within the immediate ZOI of the Electrical Connection route e.g. Crossness LNR, Erith Marshes SINC, and Belvedere Dykes SINC as described above, but also, Land at Larnar Road, Erith SINC, Slade Green Recreation Ground SINC, Railsides from Bexleyheath to Slade Green Triangle SINC, Dartford Marshes SINC and River Cray SINC. Potential indirect effects could arise from construction noise, lighting and pollutant impacts as a result of spillages or leaks from equipment during construction. All such issues are addressed within the OBLMS (**Document Reference 7.6**) and therefore effects to these designated areas of **Local** and **County/Metropolitan** conservation importance will be **Not Significant**.

Habitats

11.9.54 The habitats within the footprint of the Electrical Connection route options are for the most part largely dominated by existing roads and hardstanding which do not contain important ecological features.

11.9.55 Impacts to habitats within designated sites are described above. Outside designated sites, habitats affected may include semi-improved grassland and marshy grassland, broadleaved woodland (stands of young non-native trees on road verges), scrub, and amenity grassland. Areas of habitat affected will be small in size, and where areas have been included in the Application Boundary on either side of the carriageway, only one side will eventually be used for installation. Impacts will be short-term and temporary, and habitats will be re-instated post construction, including replanting of any trees removed. Measures to minimise impacts to habitats are set out in the OBLMS. Effects to habitats of Local ecological importance within the Electrical Connection route will be compensated through a financial contribution to the Environment Bank with a legal agreement for contribution towards enhancement of habitats outside the Application Boundary (see Section 11.11). In light of these compensation measures which will be delivered through legal agreement, effects on these habitats of **Local** conservation importance will be **Not Significant**.

11.9.56 Care will be taken to avoid disturbance to any non-native invasive species during this work. If this is not possible, the non-native invasive plant will be disposed of appropriately and care taken during the work not to spread the plant further.

Species

- 11.9.57 Impacts on commuting and foraging bats may occur from temporary lighting during construction, in particular within or adjacent Crossness LNR where there is an abundance of suitable bat foraging habitat. Impacts will be mitigated through sensitive working methods detailed within the OBLMS (**Document Reference 7.6**). Existing background light levels at remaining areas within or adjacent to roads are likely to be high and therefore additional light from construction activities will not elevate these significantly above existing levels.
- 11.9.58 Impacts to breeding birds could arise through temporary loss of habitat and destruction of nests during clearance of vegetation. Habitat loss will be temporary and affect only small areas of potential nesting habitat which is unlikely to significantly affect the local bird population. Habitats will be reinstated following construction. Assuming standard precautionary methods of vegetation clearance as detailed in the OBLMS (**Document Reference 7.6**) are followed, there will be no destruction of active nests, and effects to breeding birds of **Local** conservation importance will be **Not Significant**.
- 11.9.59 GCNs could be affected if present, and only where suitable terrestrial habitats are present, as no ponds will be affected by the installation of the Electrical Connection route. Suitable terrestrial GCN habitat may be affected in a number of areas along the connection route:
- Along the A2016 adjacent to Erith Railway Station and Erith Recreation Ground. Habitats here include mown highway verge and areas of landscape planting isolated by busy roads, with no pond identified within 500m. GCN are considered likely to be absent; and,
 - Along the A206 between the junction with Crayford Way and Joyce Green Lane. Habitats affected include grassland and scrub which are connected to large areas of semi-natural habitats including wetland, woodland, ponds and ditches. The citation for the River Cray SINC mentions records of GCN at Foots Cray, approximately 5km from the Electrical Connection. No records of GCN were identified during a review of a planning application (KCC/DA/0321/2017) for Joyce Green Quarry (adjacent to these areas).
- 11.9.60 It is therefore possible GCN could be present within the Electrical Connection route and could be affected by its installation. If present, impacts could arise through temporary habitat loss, although impacts would be small-scale and temporary. The Outline Biodiversity Mitigation Strategy will set out the approach to appropriate mitigation for potential impacts on this species including, where appropriate securing licenses to allow derogation from the legislation that otherwise provides protection to GCN. Therefore, any effects to GCN of **Local** conservation importance will be **Not Significant**.
- 11.9.61 If the Electrical Connection route option through Crossness LNR is chosen, construction activities may cause the temporary loss of habitats used by low numbers of reptiles, and potentially killing and/or injury of reptiles. Suitable

alternative terrestrial habitat is present adjacent to the working area, and standard measures to avoid impacts to reptiles from construction activities, and to enhance retained habitats where required, will be included within the OBLMS (**Document Reference 7.6**).

- 11.9.62 Reptiles are known to be present within the Joyce Green Quarry site (KCC/DA/0321/2017) adjacent to the southern section of the Electrical Connection route along University Way, and could potential be present in other suitable habitats within the Electrical Connection route. The area potentially required for the Electrical Connection route overlaps with an area within the Joyce Green Quarry site currently being used as a reptile receptor site. Impacts to reptiles could arise through temporary habitat loss, and incidental killing and injury during construction. The reptile receptor site is enclosed by reptile fencing meaning it has a finite area, and so temporary loss of habitat within this area could significantly reduce the area of habitat available to reptiles. Reptiles in other habitats along the Electrical Connection route could be subject to killing and injury. The resulting effects to this reptile population of **Local** conservation importance will be **Significant** at a **local** scale.
- 11.9.63 Although not the preferred Electrical Connection route option, installation of the Electrical Connection route option 1 through Crossness LNR has potential to affect water voles which are known to be present within ditches on either side of the bridle way. Impacts could arise through damage or destruction of burrows and killing or injury of individual water voles. If this option is chosen, impacts will be mitigated through trapping and temporarily relocating any water voles present to a suitable receptor site, to be relocated to the ditches following installation of the Electrical Connection. Further detail will be provided in the Full BLMS. This would be undertaken under a conservation licence obtained from Natural England. Therefore, any effects to water voles of **Local** conservation importance will be **Not Significant**.
- 11.9.64 Impacts to water voles from option 1A along Norman Road (water voles known to be present in adjacent ditch) will be avoided by ensuring an offset of at least 5 m from the top of ditch bank.
- 11.9.65 Potential impacts on passage (spring/autumn) or over-wintering waterbird species associated with the intertidal areas adjacent to the REP site as a result of the creation of the Electrical Connection route is considered unlikely due to the limited nature of the connection route works and the separation of the intertidal areas used by birds and the connection route locations. Any effects to passage or overwintering waterbirds of **County/Metropolitan** conservation importance will be **Not Significant**.
- 11.9.66 At the end of its operational life, it is currently anticipated that the ducting for the Electrical Connection will be left in situ, such that there will be no decommissioning works and therefore no effect.

Operation/Maintenance

11.9.67 The operation of the Electrical Connection is not anticipated to give rise to significant adverse effects to the environment. The Electrical Connection comprises an underground trefoil of cables, and thus potential impacts are associated within the construction phase only.

Summary of Assessment

Construction/Decommissioning

11.9.68 It is not anticipated that construction and decommissioning of REP, Main Temporary Construction Compounds, the Electrical Connection and the Cable Route Temporary Construction Compounds together, would result in an increase in significance of effects from those described in the section above. This is because, for the purposes of this assessment, the construction and decommissioning activities within the Application Boundary are likely to be over 40 years apart and taken together are not expected to have an additive effect that is greater than the sum of its parts. In addition, the mitigation and compensation measures described in the sections above are anticipated to be effective, such that there remains no significant residual impact (other than to reptiles of **Local** conservation importance) when considering the Proposed Development as a whole.

Operation/Maintenance

11.9.69 The operation of the Electrical Connection is not anticipated to give rise to significant adverse effects to the environment. The operation of REP and Electrical Connection together will not result in an increase in significance of effects on terrestrial biodiversity features, when compared to the predicted operational effects of REP itself, taking into account the mitigation described in the Operation section described above.

11.10 Cumulative Assessment

Construction/Decommissioning

11.10.1 Construction and decommissioning of REP could occur simultaneously with other projects located in the vicinity of REP. The 'other developments' with the most potential for simultaneous construction effects are identified in **Chapter 4** and **Appendix A.4**. The table identifies 'other developments' where the potential for cumulative biodiversity effects have been identified. These are summarised below.

11.10.2 For construction, a 2 km Zone of Influence from the Application Boundary has been used. This is considered appropriate for the scale of project, the presence of potential impact pathways, and the sensitivity of surrounding ecological receptors.

11.10.3 Construction phase mitigation measures will be employed during the construction of REP and other developments, as such significant adverse cumulative construction effects are not anticipated to be likely.

Designated Sites

11.10.4 The only other development identified with potential cumulative effects on designated sites is Thamesmead Industrial Estate extension. Both REP and Land at the Eastern Thamesmead Industrial Estate Extension (10/00063/OUTEA) are likely to result in loss and disturbance of habitats within Erith Marshes SINC. Impacts from both schemes are on marginal areas, or habitats of lower ecological value, therefore cumulative impacts are unlikely to be significant to this designated area of **Local** importance.

Habitats

11.10.5 No effects to habitats of ecological value from 'other developments' have been identified, other than those described in the designated sites section above. As no impacts from other developments have been identified, there can be no cumulative effects with REP.

Species

11.10.6 An extant planning permission is in place for development of a Data Centre at land west of Norman Road. This development falls within the Application Boundary of REP. Potential impacts to reptiles and common breeding birds from construction of the Data Centre have been identified. Construction work for both schemes are anticipated to be covered by a CoCP or BLMS which would set out measures to avoid or mitigate construction impacts to reptiles and breeding birds. In light of this, along with the temporary nature of the works associated to REP in this area (possible installation of electrical connection between Norman Road and Data Centre), effects are anticipated to be **Not Significant**.

11.10.7 A number of other developments (**Appendix A.4**, Scheme IDs: 10, 15, 76, 212, 213) identify potential for loss of habitat used by nesting birds, reptiles, and water voles. Given that only small areas of habitat used by nesting birds, reptiles, and water voles will be affected by REP, and the temporary nature of impacts from the Electrical Connection route, no significant cumulative effects with other developments have been identified.

11.10.8 It is assumed for the purposes of this assessment that the REP generating equipment would be removed once the plant had ceased operations permanently. Any decommissioning phase is assumed to be of a similar or shorter duration to construction, and therefore environmental effects are considered to be of a similar level to those during the construction phase.

11.10.9 REP has been designed to be CHP enabled, meaning that there is the ability to supply waste heat generated from the combustion process to a local heat off-taker. It is acknowledged that any future supply of waste heat to (e.g.

district heat network scheme for a local residential area) could result in impacts to the local environment. However, given the nature of any such scheme (likely to consist mainly of a network of buried pipes) any impacts would be limited to the temporary construction phase which is unlikely to overlap with construction of REP. Given that the network would most likely serve the local Thamesmead/Peabody area, impacts would likely be restricted to existing brownfield urbanised land (e.g. burying pipes in roads). Such temporary impacts would be subject to a separate planning application which is anticipated to be bound by a Code of Construction Practice or similar best practice working methods. It is therefore considered highly unlikely that there would be any likelihood of significant cumulative effects during the construction phase.

Operation/Maintenance

- 11.10.10 The operation of REP could occur simultaneously with ‘other developments’ located in the vicinity of REP. The ‘other developments’ with the most potential for simultaneous operational effects are identified in **Chapter 4** and **Appendix A.4**.
- 11.10.11 For assessing cumulative operational effects, a 2 km zone of influence from the Application Boundary has been used, extended to 15 km where required, when assessing effects to SACs/SPAs/Ramsar sites which could be affected by cumulative air quality impacts.
- 11.10.12 The stated distances are considered appropriate for the scale of project, the presence of potential impact pathways, and the sensitivity of surrounding ecological receptors. In addition, the stated distances are recommended by DEFRA and the EA for assessment of air quality impacts on environmental receptors in relation to environmental permitting.
- 11.10.13 Operational phase mitigation measures (see **Section 11.8**) have been incorporated into the design, with the aim of avoiding significant adverse cumulative operational effects.

Designated Sites

- 11.10.14 The air quality modelling includes baseline emissions such as those from the existing Riverside Resource Recovery Facility, and the cumulative assessment does not identify significant point source emissions.
- 11.10.15 For these reasons, adverse effects to the conservation objectives of Ingrebourne Marshes SSSI from levels of nutrient deposition are Not Significant.
- 11.10.16 The only two sites which have the potential for cumulative effects on designated sites are a mortar and screed batching plant, at Land off Ferry Lane New Salamons Estate and Thamesmead Industrial Estate extension.

- 11.10.17 Both REP and the operation of mortar and screed batching plant, at Land off Ferry Lane New Salamons Estate (P2036.19) have potential to generate operational effects through air quality impacts. This could provide cumulative operational effects to designated sites, in particular Inner Thames Marshes SSSI and Rainham Marshes LNR which are downwind of both sites. However, the main impacts of the Mortar and Screed Batching Plant would be dust emissions. Operational emissions of particulate matter from REP are insignificant even in proximity to REP, and at 1.5 km away there will be no cumulative effects.
- 11.10.18 Land at The Eastern Thamesmead Industrial Estate Extension (10/00063/OUTEA) could affect the hydrological regime of Erith Marshes SINC through surface water run-off. Effects of surface water run-off from REP will be managed through provision of a surface water storage system. To ensure legal compliance and meet planning policy the Thamesmead development will also include sustainable management of surface water. No significant cumulative effects from these two schemes on Erith Marshes SINC are anticipated.

Habitats

- 11.10.19 The only identified operational impacts to habitats from REP are from deposition of emissions from the stack, although these have been assessed as not significant. No other schemes have been identified which effect habitats through emissions, and therefore no significant cumulative effects to habitats are anticipated.

Species

- 11.10.20 Cumulative operational effects to bats could arise from displacement by lighting from the ERF and the nearby consented data centre. However, as set out the Outline Lighting Strategy (**Chapter 15**), lighting within REP will be designed with reference to current best practice for bats and lighting, and therefore no cumulative effects are anticipated.

11.11 Further Mitigation and Enhancement

Construction/Decommissioning

- 11.11.1 The loss of habitats of ecological value within the REP site will be compensated through provision of an area of open mosaic habitat on the flood bank within the REP site, as well as a financial contribution to the Environment Bank with a legal agreement for contribution towards enhancement of habitats outside the Application Boundary. This has been, and will be, informed using a biodiversity metric to quantify the potential habitat losses and gains as a result of REP, in order to determine the extent of off-site compensatory measures required to achieve the aim of net biodiversity gain, in accordance with local and national policy. The process for securing the net biodiversity gain is set out below:

- An OBLMS (**Document Reference 7.6**) has been prepared and submitted with the application and includes the following:
 - a set of principles and parameters that will be applied when replacing/creating habitats;
 - an obligation to provide a final biodiversity metric valuation at the detailed design stage; and,
 - obligations in respect of monitoring and reporting on offsetting.
- A DCO requirement will be to secure and implement a final BMLS which will be substantially in accordance with the OBLMS.
- A legal agreement between the Applicant and Environment Bank will be entered into requiring Environment Bank to secure the offsetting in accordance with the OBLMS (**Document Reference 7.6**) – to be funded by the Applicant (this will include the final biodiversity metric and any reasonable administration costs). A copy of the agreement will be provided during the examination process.

Operation/Maintenance

11.11.2 Ecologically beneficial management measures for retained and reinstated habitats within REP will be set out in the BLMS, to be secured as a DCO requirement. This will also include any ongoing management requirements required through agreement with the Environment Bank.

11.12 Residual Effects and Monitoring

Construction/Decommissioning

11.12.1 The policy and legislation described in **Section 11.2** provides a framework for delivery of a development which will avoid, mitigate or compensate for significant impacts on terrestrial biodiversity and to provide for biodiversity gains where possible.

11.12.2 In accordance with the CIEEM guidance, **Significant** residual ecological effects have been identified to reptiles of **Local** conservation importance through construction impacts of the Electrical Connection Route to a reptile receptor site at Joyce Green Quarry. In EIA terms this equates to a **Minor** negative effect on this receptor which is **Not Significant** (see **Table 11.3**).

11.12.3 Taking into account further mitigation and enhancement measures described in Section 11.11 above, in particular the contribution to the Environment Bank, and production of an OBLMS (**Document Reference 7.6**), all other residual effects from REP on terrestrial biodiversity are **Not Significant**.

Operation/Maintenance

11.12.4 Operation will result in adverse ecological effects to Crossness LNR and Erith Marshes SINC through NO_x deposition from the Anaerobic Digestion Plant. The areas effected can be viewed on **Figures 7.9 and 7.10**. The contour plots indicate that the effects of the anaerobic digestion emissions are limited to the immediate vicinity of the REP site and are not cumulative with the emissions from the ERF. The areas affected are limited to those in the immediate vicinity of the Anaerobic Digestion Plant, and effects to habitat composition are anticipated to be **Minor**. Therefore predicted effects through nitrogen deposition to these designated areas of **County/Metropolitan** conservation importance are **Not Significant**.

Summary of Residual Effects

Table 11.11: Summary of Residual Effects

	Receptor Name and Description	Potential Mitigation	Assessment of Residual Effects*
The REP DCO			
Construction / decommissioning	Replies – receptor site within Joyce Green Quarry	Effects to reptiles will be avoided or mitigated where possible through standard sensitive working methods, as set out in the OBLMS.	Significant residual ecological effects have been identified to reptiles of Local conservation importance. In EIA terms this equates to a Minor negative effect on this receptor which is Not Significant (see Table 11.3)

*The Assessment of Residual Effects column defines residual effects at the relevant geographic scale, in accordance with CIEEM EclA methodology terminology. The significance level given in (parentheses) is the conversion of the EclA terminology to that used for other EIA topics, for ease of comparison – and as described in Table 11.3.

11.13 Summary and Conclusion

11.13.1 Baseline ecological data has been collected during the period 2017-2018 to inform this assessment of likely significant effects on terrestrial biodiversity receptors. A number of important ecological features have been identified within the study area including: designated areas, notable habitats and notable and protected species.

11.13.2 Measures have been embedded within the design or will be delivered as Requirements through the DCO consenting process.

- 11.13.3 A full assessment of effects from construction and operation of REP, taking into consideration the embedded mitigation, has been undertaken against the ecological baseline established through ecological survey. A separate Habitats Regulations Assessment (**Document Reference 6.5**) has been carried out in accordance with the requirements of the Conservation of Habitats and Species Regulations 2017 to consider whether REP would or would not have any likely significant effects on European designated sites.
- 11.13.4 This assessment considers the results of modelling of emissions from the stack during operation, noise monitoring and modelling, and other predicted environmental changes such as surface water drainage and shading which have the potential to have ecological effects. Effects of the scheme alone are considered, in addition to the potential for cumulative effects. Consideration is also given to additional potential influences of climate change.
- 11.13.5 Effects have been assessed using CIEEM criteria for significance (see **Section 11.5**). Within **Section 11.12 Residual Effects** and the paragraphs below, significance is also expressed in parenthesis using the generic significance criteria used for other topics (see **Table 11.3**). This approach has been taken in order to allow integration with the assessment of all environmental impacts in other chapters.
- 11.13.6 Considering effects during construction, residual adverse effects, significant at a Local scale (equivalent to a **Minor** effect which is Not Significant, see **Table 11.3**) have been identified to reptiles from construction of the Electrical Connection route within the Joyce Green Quarry site. It may be possible to avoid this impact by restricting the extent of construction footprint in this area, or by choosing an alternative route, resulting in effects that would not be significant at the Local scale. However the residual effect is defined in this Chapter based on the reasonable worst-case parameters defined for the assessment.
- 11.13.7 In relation to operational effects, adverse ecological effects to Crossness LNR and Erith SINC through nitrogen deposition have been identified, however the areas affected are limited to those in the immediate vicinity of the REP site and are minor in nature, and therefore predicted effects through nitrogen deposition to these designated areas of **County/Metropolitan** conservation importance are **Not Significant**.
- 11.13.8 The decommissioning phase at the REP site is assumed to be, at worst, of a similar scale and duration to construction (minus the commissioning activities), and therefore effects to terrestrial biodiversity are considered to be of a similar level to those during the construction phase. If the Electrical Connection route is decommissioned then ducting would be left in-situ, cabling may be removed, or disconnected (made safe) and left in-situ.
- 11.13.9 Measures have been embedded within the scheme to avoid, mitigate or compensate for adverse effects on terrestrial biodiversity and to provide for biodiversity gains where possible. Impacts to habitats within the REP site will

be compensated through alternative habitat provision within the REP site, and a financial contribution to the Environment Bank with a legal agreement for contribution towards enhancement of habitats outside the Application Boundary.

11.14 References

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