



Thurrock Flexible Generation Plant

**Preliminary Environmental Information Report
VOLUME 1 – Non-Technical Summary**

Date: September 2018

Environmental Impact Assessment
Preliminary Environmental Information Report

Volume 1
Non-Technical Summary

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<http://www.thurrockpower.co.uk>

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Summary

This document summarises information in the Preliminary Environmental Information Report using non-technical language for a general audience. It describes the proposed development, the baseline environmental information gathered and preliminary consideration of environmental impacts. This document also lists the structure of the PEIR, directing readers to where more detailed information can be found.

Qualifications

This document has been prepared by Tom Dearing, a Chartered Environmentalist and full Member of the Institute of Environmental Management and Assessment, who has eight years' experience of environmental impact assessment.

It has been checked by Dan Smyth, BSc (Jt Hons), MSc, DIC Environmental Technology, a Senior Director with over 20 years' experience as an environmental specialist.

1. Project Overview

1.1 Introduction to the proposed development

- 1.1.1 Thurrock Power Ltd proposes to develop a flexible electricity generation plant on land next to Tilbury Substation in Thurrock, just north of the decommissioned Tilbury Power Station site.
- 1.1.2 The facility would have up to sixty gas engines fuelled by natural gas to generate 600 megawatts of electricity, plus batteries that can store and allow the facility to export a further 150 megawatts of electricity to the national grid when needed. Having a number of gas engines means the facility is able to start up or vary the amount of electricity it generates more quickly and efficiently than a conventional power station. This, together with the battery storage, is why it is described as a flexible generation plant.
- 1.1.3 The flexible generation plant would require a new underground gas pipe from the existing gas transmission network near East Tilbury to supply its fuel. To transmit the electricity it generates to the national grid, the facility would be connected directly by underground cable into Tilbury Substation, which is next-door to the south. No new overhead power lines are needed.
- 1.1.4 If the flexible generation plant is given development consent, construction will be in either one phase taking 12–18 months or in three phases spread over three to six years. It is then expected to operate for up to 35 years. During some stages of construction, road access for large loads would be needed. A temporary haul road will be built between St Chad's Road and Gun Hill or an existing haul route between Brentwood Road and Muckingford Road, which is used by a sand and gravel works, will be used for construction traffic.
- 1.1.5 Flexible generation plants are urgently needed to help balance the intermittent and less predictable generation from wind and solar as the UK reduces the carbon footprint of national electricity supplies. Renewable generators such as wind farms can't be switched on and off at will to meet electricity needs, since they depend on weather conditions. By starting up quickly and also using the batteries, the flexible generation plant will help National Grid respond to peaks in electricity demand, balancing the load and keeping the grid stable.

1.1.6 This location has been chosen because Tilbury Substation provides one of the best points of connection to the high-voltage transmission network around London, where there is ample capacity (even with the 'Tilbury Energy Centre' power station also proposed by RWE) due to older power stations closing down.

1.1.7 Because of its generating capacity, the proposed development is a Nationally Significant Infrastructure Project and Thurrock Power will submit an application to the Planning Inspectorate for development consent.

1.1.8 A more detailed description of the flexible generation plant is given in Section 3 starting on page 5, below.

1.2 The applicant

1.2.1 Thurrock Power is a subsidiary of Statera Energy Limited, a private British company that designs, builds and operates flexible electricity generating plant in the UK.

1.2.2 Statera Energy was established with the aim of delivering increased flexibility for the UK electricity system to assist in the transition to a low carbon economy in the expectation that renewable energy sources, such as solar and wind, will become the dominant form of generation of the future.

1.2.3 Thurrock Power will be a fully integrated developer, owner, and operator of Thurrock Flexible Generation Plant.

1.3 Project timeline and consultation

1.3.1 The application for development consent has not yet been made. The project is currently at the stage of consulting the public and organisations such as Thurrock Council, Natural England, Historic England and the Environment Agency about the development and environmental studies undertaken. The programme for consultation, decision-making and construction is expected to be as follows.

- Quarter 3 of 2018 – scoping of environmental impact assessment with response from the Planning inspectorate (completed).
- Quarter 4 of 2018 – consultation running from 16 October 2018 to 14 November 2018.
- January 2019 – submission of the application with Environmental Statement to the Planning Inspectorate.
- Quarter 2 to quarter 4 2019 – examination of the application by the Planning Inspectorate, with input from interested parties, and a decision by the Secretary of State.

- Anticipated in 2020 – potential development starts for advance works (site preparation, ecological management).
- From 2021 – main construction work starts, potentially in phases lasting from 18 months to six years in total.

1.3.2 A Statement of Community Consultation has been agreed between Thurrock Power and Thurrock Council detailing the consultation process, public exhibitions and how people can make comments about the development.

1.4 Further information

1.4.1 The purpose of this document is to provide a non-technical summary of the Preliminary Environmental Information Report (PEIR) about the proposed development.

1.4.2 At the end of this summary is a contents page for the full PEIR, which shows where to find more detailed information about particular environmental topics or impacts. A glossary and list of abbreviations is also provided at the end of this summary to explain technical terms used in the full report.

1.4.3 The Statement of Consultation and all PEIR documents, including this non-technical summary, are available to download at the Thurrock Power website: <http://www.thurrockpower.co.uk>

1.4.4 Copies of the PEIR can be requested by post, email or telephone:

Post: Freepost THURROCK POWER

Email: contact@thurrockpower.co.uk

Telephone: 0207 1860580

1.4.5 A charge may be made for paper copies.

1.4.6 Written responses on the content of this PEIR can be made through the project website or to the addresses above.

1.4.7 Following consultation and further environmental impact assessment work, the PEIR will be updated and will be incorporated in the Environmental Statement provided with the application for development consent.

2. Purpose of this Preliminary Environmental Information Report

2.1 Purpose

- 2.1.1 The purpose of the Preliminary Environmental Information Report (PEIR) is to show the emerging findings of environmental assessments and baseline information that has been gathered at the time of consultation, to enable consultees to understand the potential environmental effects of the proposed development and to help inform consultation responses.
- 2.1.2 The PEIR documents work in progress on an Environmental Impact Assessment (EIA) for the proposed development. The following sub-sections explain the EIA process and the information that can be found, in draft form, in the PEIR.

2.2 Need for EIA

- 2.2.1 Environmental Impact Assessment (EIA) is a process designed to identify and study the likely significant environmental impacts of a development. EIA is used to inform the public, decision-makers and their advisors about environmental impacts and to recommend measures that avoid, reduce or offset any significant harmful (adverse) effects. It can also recommend measures to maximise any potential beneficial effects or environmental enhancement opportunity. EIA studies the environmental baseline (the existing and future situation without the development) and how this may change if the development were to proceed.
- 2.2.2 'Environment' in this context means both the natural and human world, including elements such as natural habitats and species, air, water and land quality, places where people live, roads, footpaths and workplaces. It also includes less tangible elements such as landscape character and cultural heritage.
- 2.2.3 EIA is employed when the nature or scale of a proposed development means that it is considered to have the potential to cause significant environmental effects. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 govern what types of developments require EIA, the impacts that may need to be studied and the information to be reported.

- 2.2.4 In the case of Thurrock Flexible Generation Plant, formal consultation with the Planning Inspectorate has confirmed that EIA is required. The Planning Inspectorate has given its view on the impacts the EIA should study through a Scoping Opinion published on 20 September 2018, with inputs from its technical advisors and other interested parties.

2.3 Process of EIA

- 2.3.1 EIA is a systematic and evidence-based process with the following main stages:
- gathering information about the baseline (current and future situation without the development) from surveys, existing studies and consultation;
 - predicting how this would be changed by the proposed development (the 'impacts');
 - considering how these changes would affect 'receptors' such as people, protected species or landscapes;
 - assessing the significance of effects, based on the size of impacts and the sensitivity of receptors to the changes;
 - suggesting ways to avoid, reduce or compensate for impacts causing significant adverse effects ('mitigating' the impacts);
 - reporting any remaining ('residual') effects after mitigation; and
 - considering effects from the combination of impacts (e.g. changes in noise and air quality together) and from the proposed development cumulatively with other developments in the area.
- 2.3.2 The PEIR talks about 'impacts' and 'effects', making a distinction between these terms. Impacts are changes in the environment caused by some aspect of the proposed development's construction or operation. Effects are the consequences of an impact.
- 2.3.3 For example, construction work will cause noise that isn't currently present on the site, which is an impact. The effect of this noise might be to cause disturbance and annoyance to people in nearby residences, if it were loud enough to be noticeable and intrusive. If this effect were potentially significant, the impact could be mitigated (e.g. by limiting working hours or using an alternative construction technique) to reduce the effect. Impacts and effects can be adverse or beneficial.

2.3.4 The 'significance' of an effect is based on the magnitude of the impact together with the importance and sensitivity of the element of the environment (the 'receptor') that is affected. The size of an impact is described in a range from negligible, low, medium to high, or there may be no change (a neutral impact). Taking into account the importance and sensitivity of the receptor, the resulting effect may be described on the following scale.

- Substantial: only adverse effects are normally assigned this level of significance. They represent key factors in the decision making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity.
- Major: these beneficial or adverse effects are very important considerations and are likely to be material in the decision making process.
- Moderate: these beneficial or adverse effects may be important, but are not likely to be key decision making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- Minor: these beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision making process, but are important in enhancing the subsequent design of the development.
- Negligible: no effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

2.3.5 EIA studies and the evaluation of the significance of effects are carried out using professional guidance or standards, and with regard to legislation protecting specific elements of the environment, but also rely upon the professional judgement of the topic expert who has undertaken the assessment.

2.3.6 The EIA studies are based upon the development design as specified in Chapter 2 of Volume 2 of the PEIR and use up-to-date baseline information gathered from published sources and surveys undertaken specifically for the project. Where there is uncertainty in the assessments, which is inherent to some degree when predicting future impacts and effects, the EIA takes a conservative approach and uses 'worst-case' assumptions, erring on the side of caution with regard to adverse impacts.

2.3.7 At this stage of the project, some aspects of design are ongoing and Thurrock Power may also need to retain flexibility in the development consent on some matters. For example, the number and size of gas engines and batteries will depend on the technology provider and equipment models selected, without exceeding the total electricity generation and storage capacity applied for. Flexibility to make final decisions on the most practical gas pipeline and access road routes within the corridors of land identified for them is also needed.

2.3.8 For that reason, where flexibility is needed, maximum parameters have been defined for the assessment that would not be exceeded in the development's final design. This is referred to as a design envelope in the PEIR, and can include both physical dimensions of the development and the nature of construction and operational activities. Assessing the design envelope ensures the EIA has studied the reasonable maximum potential for impacts from these aspects of the development.

2.3.9 The EIA studies also consider potential cumulative effects that may result from the combination of impacts from the proposed development and other major developments that are proposed or have consent but have not yet been constructed. This may involve assessing the combined impact of the proposed development and other developments together (e.g. additional traffic from multiple developments on local roads) or may involve assessing impacts on new receptors introduced by other developments (e.g. new residential areas).

2.3.10 EIA is carried out at the same time as a proposed development is being designed and the public and other stakeholders are being consulted. In this way it can influence the design and respond to concerns about environmental impacts that are raised during consultation. Mitigation and enhancement measures can be included in the proposed development design, with the goal of ensuring that (a) significant adverse environmental effects are avoided and (b) advantage is taken of opportunities for beneficial effects.

3. The Proposed Development

3.1 Site location and setting

- 3.1.1 The flexible generation plant would be built on land in Thurrock immediately north of Tilbury Substation and the decommissioned Tilbury Power Station, south of the London, Tilbury and Southend Railway. It would be around 0.75 km east of Tilbury and 1.1 km north of the Thames.
- 3.1.2 Figure 3.3, overleaf, shows the development location and application boundary. Figure 3.4 shows further detail of the potential layout of the flexible generation plant main development site.
- 3.1.3 In addition to the main development site for the flexible generation plant, further land would be required for its underground gas connection, temporary construction access routes and exchange Common Land. This is also shown in Figure 3.3, with broad zones shown in some cases to allow flexibility for the final route of the gas pipeline or access road to be decided within those zones.
- 3.1.4 The main development site for the flexible generation plant, shown in Figure 3.1 and Figure 3.2, is currently open fields crossed by steel pylons carrying three high-voltage overhead power lines and is around 18.5 hectares (ha) in size. Nine and a half hectares of the site in the south is registered Common Land called Walton Common.



Note: development boundary (red dashed line) shown is approximate only

Figure 3.2: Main development site baseline photograph – looking south towards Tilbury Substation

- 3.1.5 Tilbury is approximately 750 metres west of the main development site, the village of West Tilbury is approximately 1.25 km to the north and East Tilbury village is approximately 2.1 km to the east. There is a small number of houses outside these settlements within around 600–800 metres of the main development site.
- 3.1.6 The site setting is a mixture of agricultural land with small settlements and light industry to the north and east, crossed by the railway line, but more heavily developed with the power station site, Port of Tilbury and town of Tilbury to the south and west. The landscape is generally flat, with fields typically separated by drainage ditches.
- 3.1.7 Tilbury Fort, a Scheduled Monument, is between the power station and Port of Tilbury just under 1 km south-west of the development site. Approximately 2.6 km to the west is the Thames Estuary and Marshes site designated for ecological protection and Coalhouse Fort, also a Scheduled Monument.
- 3.1.8 Substantial other development is envisaged in the area, with the proposed extension of Port of Tilbury to the west, proposed redevelopment of Tilbury Power Station to the south and the proposed Lower Thames Crossing major highway scheme to the east and north among other proposals. These three development proposals are also Nationally Significant Infrastructure Projects.



Figure 3.1: Main development site baseline photograph – looking north from Tilbury Substation.



Legend

- Development Boundary
- A - Main Development Site where the gas fired facility, battery storage facility and customer substation will be located
- B - The existing Tilbury Substation to which an electrical connection will be made
- C - Corridor for permanent access road and gas pipeline route
- D - Corridor for gas pipeline
- E - Field within which above-ground installation for connection to high-pressure gas main will be made
- F1 - Primary area within which exchange Common Land could be provided.
- F2 - Wildlife corridor
- H - Access route including minor works on public highway to accommodate HGV tracking
- I - Existing Common Land used for temporary construction haul route, laydown area and biodiversity mitigation
- J - Temporary construction haul route
- Speed restriction
- Weight restriction

Created by: MS Scale: A3@ 1:14,000 Date: 04/10/2018
 Checked by: CD Doc no: 10872-0005-18

Thurrock Flexible Generation Plant
 Development Zones



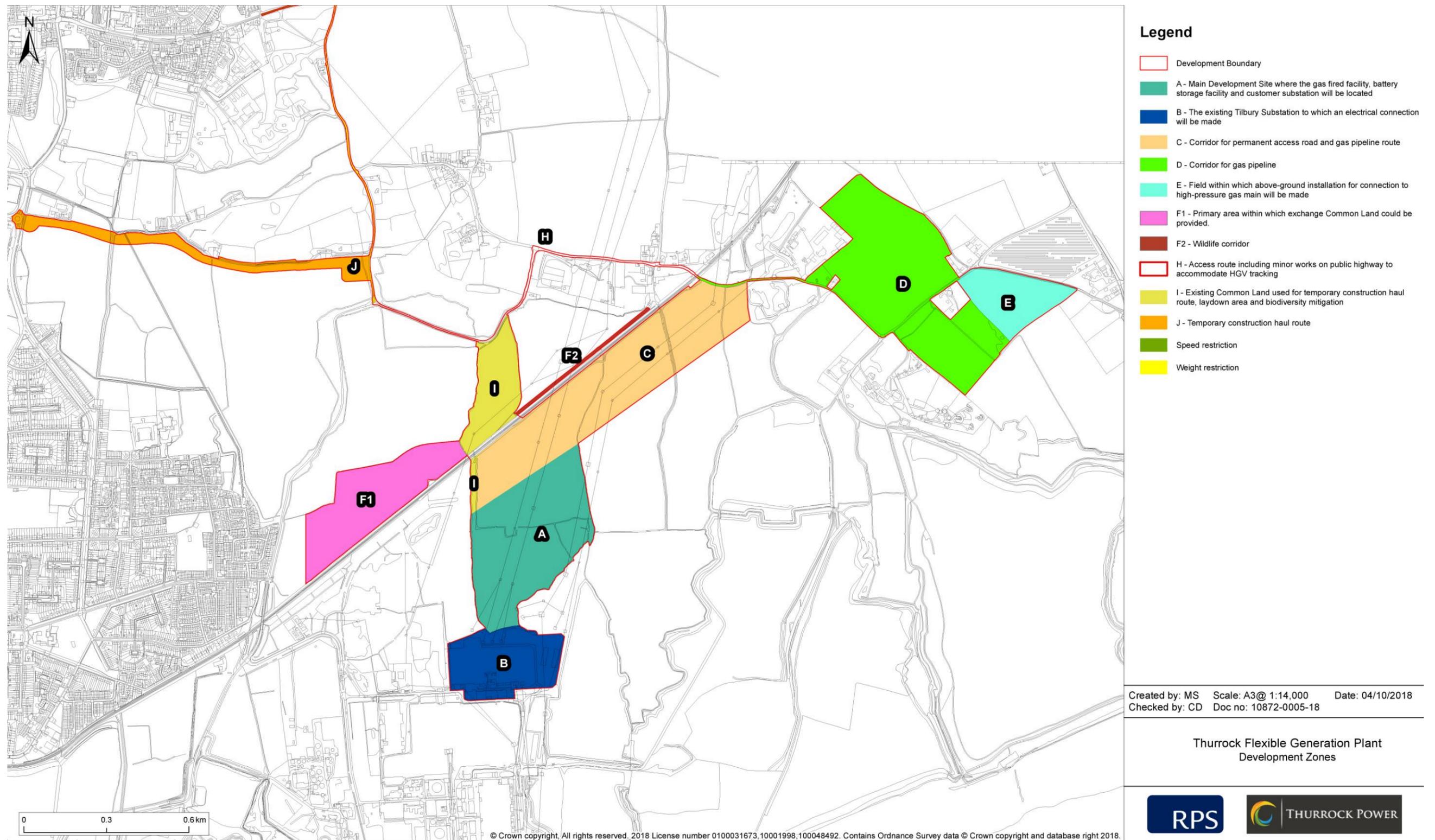


Figure 3.3: Development site location

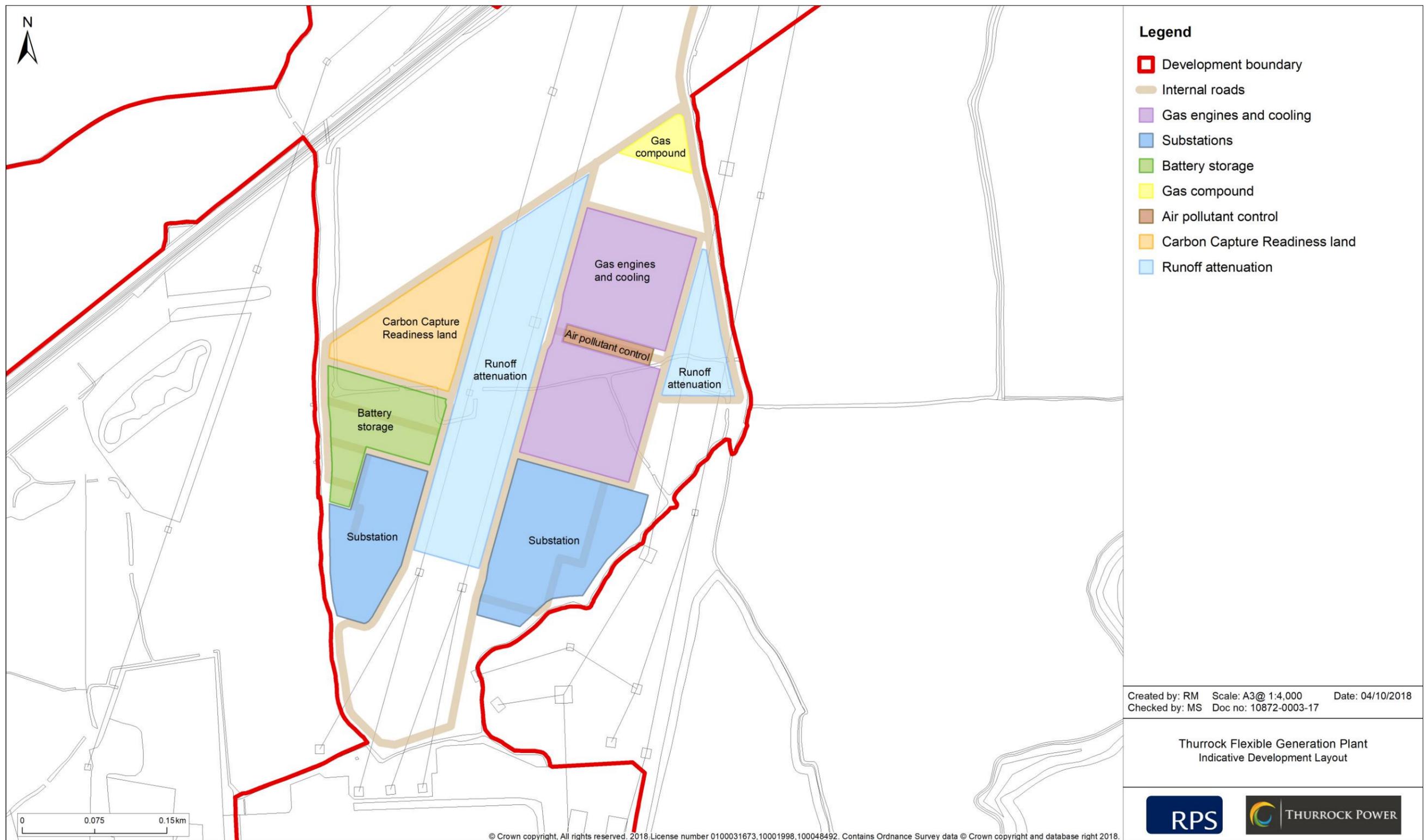


Figure 3.4: Main development site layout

3.2 The main development site

- 3.2.1 The flexible generation plant would be built on the main development site, labelled 'Zone A' on Figure 3.3, with one possible layout shown on Figure 3.4.
- 3.2.2 On the eastern side of the main development site would be up to 60 gas engines, each of which is a self-contained unit with the engine, electrical generator, cooling system and exhaust pipe. If a larger engine model chosen, there will be fewer engines to generate the 600 megawatts of power, but no more than 60 in total. The engines will be housed inside buildings up to 20 metres high or grouped into more open encasements.
- 3.2.3 Each engine would have an individual exhaust pipe but these may be grouped together into several clusters of three to five exhausts. The maximum height, whether individually or in groups, would be 40 metres.
- 3.2.4 These fast-starting engines would not run continuously, instead starting up when National Grid needs some or all of them to do so. This can be for short periods several times a day. The gas engines will help to balance the existing renewables generators on the national grid and also help support the UK's transition to an electricity supply with an even greater use of wind and solar generation. During times of low renewable electricity generation (due to weather conditions) or high demand, the gas engine generators can quickly support the grid to ensure electricity supplies are maintained, and are more efficient in doing this than conventional power stations. The maximum running time of the gas engines each year would be up to 4,000 hours (i.e. less than half the year in total).
- 3.2.5 The battery storage system on the western side of the site would have units that, like the gas engines, are self-contained systems each with battery cells, cooling and an inverter to convert the power output into alternating current used on the electricity grid. The battery systems may be housed in a building or may be in units that look similar to shipping containers stacked two high, in either case up to 10 metres tall.
- 3.2.6 Battery technology, which can import or export large amounts of electricity with no time lag, helps National Grid balance loads on the electricity grid and maintain the frequency of 50 Hz required for safe network operation. The batteries can also store spare renewable electricity generated during times of low demand (such as at night) for use later when demand is high. The batteries would be able to store four hours' worth of power at their rated output of 150 megawatts.

- 3.2.7 In the southern part of the site there would be electrical switchgear used to step-up the voltage of electricity from the batteries and gas engines to match that of the grid connection and relay it to Tilbury Substation. This electrical equipment would look similar to the existing substation that is immediately to the south. The short connection between them would use underground cables.
- 3.2.8 Also on the main development site would be internal access roads, car parking, control room and a drainage system with ponds to hold runoff during heavy rain.
- 3.2.9 An area of land is reserved within the main development site for carbon capture readiness. This means that there is space available in future on the site if infrastructure for capturing and storing carbon dioxide is developed in the UK and that becomes a feasible (or required) option for the flexible generation plant. However, such infrastructure does not yet exist and carbon capture does not form part of the current development design.
- 3.2.10 The flexible generation plant would require an Environmental Permit to operate, which is regulated by the Environment Agency. The permit will specify monitoring and reporting of emissions that must be carried out and will require Thurrock Power to use a formal Environmental Management System for the facility.

3.3 Access, gas pipeline and exchange Common Land

- 3.3.1 The other areas of land within the application boundary, shown in Figure 3.3, would be needed for building the underground gas pipe, access roads for construction and providing new Common Land and ecological habitat to compensate for the areas lost on the main development site.
- 3.3.2 The different areas of land have been labelled as zones A to J so they can be described. Zones A and B are the main development site and Tilbury Substation, which have been described above.
- 3.3.3 A permanent access road would be built south of the railway between Station Road and the flexible generation plant. This would be through Zone C. The zone is shown wider than needed for the road to allow for further design of the route around pylons and across ditches in those fields.

- 3.3.4 The first section of underground gas pipe would also be constructed through the fields in Zone C. Where it reaches Station Road, the pipe would be installed under the road or its verge for a section approximately 300–400 metres heading east. After that, it will either continue to follow Station Road to the field labelled Zone E, where it would connect to the existing high-pressure gas main, or be routed through fields to the north or south of the road, which are labelled as Zone D. The whole size of these fields are included in Zone D to allow flexibility in the exact route during further design.
- 3.3.5 For the gas connection to the existing high-pressure main in Zone E, a fenced compound approximately 50 metres square would be built with access for vehicles off Station Road. This compound would have instrument kiosks, pressure valves and pipe inspection equipment, no more than 6 metres high.
- 3.3.6 In Zone F, an agricultural field north of the railway line, new Common Land would be provided in exchange for the loss of Walton Common. This new Common Land would be next to Parsonage Common, allowing for access through to it from Cooper Shaw Road without crossing the railway.
- 3.3.7 The field in Zone F and a further corridor 10 metres wide next to the railway line would also be used for habitat enhancement. This would be designed to improve biodiversity, provide connections to existing habitats and allow protected species such as reptiles to be moved from the main development site.
- 3.3.8 Because there is a need to deliver large abnormal loads during construction, such as the gas engines and transformers used in the electrical equipment, several options for temporary construction access roads are being considered. These are needed because of practical restrictions on some sections of the public highway network that would prevent abnormal loads travelling that way, such as the bridge where Fort Road crosses the railway (which has limitations because of its strength and shape).
- 3.3.9 The main temporary route proposed is labelled Zone J. This would involve constructing a temporary haul road along the edge of fields from the A126 St Chad's Road at the Gateway Academy roundabout across to Gun Hill. The haul road would be used for large loads and other construction traffic as and when needed during the construction period, so it may be in place for up to six years. At the end of construction, Thurrock Power intends to leave the haul road in place so that there is a way to deliver an abnormal load to the flexible generation plant in the unlikely event that a component such as a transformer fails in operation and needs replacing. The haul road would be used by construction traffic only and would not be open to the public.
- 3.3.10 As a backup option, Thurrock Power could also use the temporary haul road that has been built for sand and gravel extraction works between Brentwood Road and Muckingford Road (part of which is called High House Lane). This is labelled as Zone H. Temporary traffic control such as lights and/or a speed restriction would be needed at the junction on Muckingford Road between High House Lane and Turnpike Lane.
- 3.3.11 The last leg of the access route would be on the public highway via Cooper Shaw Road, Church Road and Station Road. There would be a need for a small amount of road widening at certain spots (mainly at bends and junctions) to allow passage by abnormal loads and consent to route heavy goods vehicles through sections with current weight restrictions, which are shown in Zone H.
- 3.3.12 Where Station Road has a level crossing over the railway, next to the north end of Zone C, the overhead power lines of the railway also place practical restrictions on the size of vehicles that can cross. For this reason Thurrock Power may need to construct a temporary haul road along the edge of Parsonage Common, south from Cooper Shaw Road, and then use a tower crane to lift large items over the railway and into the main development site. If this is the case, up to one acre of Parsonage Common next to the railway would be used as a temporary storage area for items before they are lifted across the railway in batches. Parsonage Common is therefore included in the application boundary and labelled Zone I.

3.4 Construction

- 3.4.1 If development consent is granted for the flexible generation plant, work could start in 2020, subject to a final investment decision. The first stage of work would be preparation of the exchange Common Land, habitat creation and ecology management to move protected species where necessary.
- 3.4.2 It is likely that construction work proper would start in 2021. The whole of the flexible generation plant may be built in one phase, which is expected to take around 12 to 18 months. In that case, the expected programme would be as follows.
- Quarter 1 (Q1) 2021: main development site preparation and ground works, creation of construction access road(s), start of gas pipeline trenching.
 - Q2-Q3 2021: installation of gas engines, batteries and associated equipment; connection of gas supply pipeline and electricity export cables.
 - Q3-Q4 2021: commissioning and energisation; completion of landscaping and permanent access road.
 - End of Q4 2021: facility is available for operation.

- 3.4.3 Alternatively, the flexible generation plant may be built in three phases over a period of up to six years in total. If that is the case, the first phase would involve installing half of the gas engines (i.e. 300 megawatts capacity) plus the gas pipe and electricity export cables, both sized to provide the full fuel supply and electricity export capacity for the flexible generation plant. The full areas of exchange Common Land and habitat creation would also be provided in this phase.
- 3.4.4 In the second phase, the remaining gas engines and associated equipment would be built. Installing the batteries and associated equipment would be the third phase of construction.
- 3.4.5 Construction of the proposed development would be managed under a Code of Construction Practice that sets out the principles of good environmental management to be followed in order to avoid or minimise environmental impacts.
- 3.4.6 Typical construction plant to be used would include excavators, drilling rigs, graders and haulage vehicles, mobile and tower cranes, and heavy and light goods vehicles.
- 3.4.7 Normal construction working hours would be Monday to Friday 08:00–18:00 and Saturday 08:00–13:00. No Sunday, bank holiday or night working is proposed, with certain exceptions described below.
- 3.4.8 Non-noisy work such as fit-out within buildings may be done outside normal working hours where the work would not cause disturbance off-site. It is also possible that some construction activities that cannot be interrupted will be needed, such as continuous concrete pouring. In such cases 24-hour construction working could be required for limited periods, expected to be no more than 10 days per construction phase.

3.5 Decommissioning

- 3.5.1 The flexible generation plant has an initial design lifetime for operation of up to 35 years. Potential continued operation beyond that time is possible, depending on market conditions at that point. The physical plant items such as gas engines and batteries, if in continuing use, may then need to be upgraded, which would follow any necessary approvals process in place at that time.

- 3.5.2 If the flexible generation plant ceases operation, since it would mostly be built of components these can be decommissioned and dismantled without substantial demolition work being required. In this case, all above ground structures would be removed from the site, with the maximum value being recovered from materials and equipment via re-use or recycling at the time. The decision on how much of the below ground infrastructure (including concrete pads) would be retained would be agreed with the landowner and any other interested parties, accounting for decommissioning methods and timescales at the time.

3.6 Alternatives considered

- 3.6.1 Given the extent of Green Belt around London and the M25, extensive work was undertaken to consider first whether alternatives outside the Green Belt were possible and then subsequently sites within it where the impact could be minimised. Alternative options have been considered in two stages. Firstly, the operational needs of the flexible generation plant were used to consider:
- gas and electricity grid connection point selection; and
 - site selection and justification.
- 3.6.2 Any generating station must connect to the electricity grid at a suitable location. The suitability is determined by the generation scale and the available capacity to accept the new power both at the substation and along the transmission network. For a gas-fired generator, an existing gas supply where enough capacity is available and can be reserved to provide the fuel supply is also essential.
- 3.6.3 Proximity to both gas and electricity grids is the principal driver for this project's location. National and regional grid operators have been consulted to ensure that the project delivers the optimum public benefits.
- 3.6.4 A number of existing electrical substations located on the grid network around Greater London were shortlisted due to their grid capacity, proximity to gas supply and land availability and cost. These substations were tested against the following environmental and technical criteria to identify potentially available development areas in the vicinity of each substation:
- access;
 - environmental designations;
 - residential receptors;
 - land use and policy; and
 - other development proposals.

- 3.6.5 Land immediately next to Tilbury Substation was selected as the preferred connection point as it had fewer environmental and technical constraints than other options, and better conformed to the requirements for deliverability.
- 3.6.6 The second stage involved the comparison of environmental and technical issues at the selected site, to evaluate alternatives relating to:
- site arrangement and scale options;
 - design and appearance options;
 - phasing and future-proofing options; and
 - access and construction method options.
- 3.6.7 This stage sought to optimise the development site's capacity to respond to its environmental risks and opportunities through evolution of the masterplan. Iterative design options also considered land use efficiency and cost optimisation to ensure the proposed development would meet commercial and deliverability imperatives.

4. Preliminary Environmental Information

4.1 Environmental impacts studied

4.1.1 Environmental impact assessment studies are being carried out for the following topic areas, agreed with the Planning Inspectorate through the EIA scoping process.

- Landscape and visual resources
- Historic environment
- Land-use, agriculture and socio-economics
- Ecology
- Traffic and transport
- Noise and vibration
- Air quality
- Human health
- Climate change
- Hydrology and flood risk
- Geology, hydrogeology and ground conditions

4.1.2 Volume 3 of the Preliminary Environmental Information Report (PEIR) has a chapter about each of these topics. This summary describes the baseline environmental information gathered, the potential impacts being studied and preliminary conclusions about the significance of effects where those have been reached.

4.2 Landscape and visual resources

4.2.1 The character of the existing landscape is described in publications from Natural England and Thurrock Council, which divide the area into characteristic zones sharing similar features.

4.2.2 The application site lies mainly in the 'Greater Thames Estuary' national character area, which is described as a low-lying coastal landscape with open grazing pastures and drained, ploughed arable land protected from floods by sea walls, with a network of reed-fringed drainage ditches, few hedges or fences, and with tree cover a rarity. Areas of remoteness persist but the character profile also notes that urbanised areas on marsh edges are already "*subject to chaotic activity of various major developments including ports, waste disposal, marine dredging, housing regeneration, mineral extraction and prominent power stations plus numerous other industry-related activities*".

4.2.3 The main development site is in the Thurrock character area 'Tilbury Marshes', which provides a similar description to the national character area. The description notes that it is an open and exposed landscape dominated by the sky and with few settlements, but the "*influence of the urban edge of Tilbury and associated roads/industrial and port building is significant in the north and west of the area [and] the large-scale building and bulk of the Tilbury Power Station provides a dramatic contrast to the prevailing flatness of the landscape.*"

4.2.4 The application site is not within any designated (protected) landscape; the nearest is the Kent Downs Area of Outstanding Natural Beauty around 6 km to the south east.

4.2.5 The area within which the flexible generation plant could theoretically be visible was initially worked out based on the tallest part (the exhaust stacks at up to 40 m) and information on ground heights. In consultation with Thurrock Council, Gravesham Borough Council and Essex County Council, representative locations were selected for photography of the existing landscape and views. These locations included footpaths, roads and residential areas.

4.2.6 The height and shape of the completed flexible generation plant have then been considered in the assessment of visual and landscape character impact during operation, using the baseline photography from the viewpoints and 'wireline' outlines of the proposed development main buildings.

4.2.7 In the current baseline, residences on the Chadwell St. Mary – West Tilbury – East Tilbury ridgeline have views of the main development site in some cases (depending on elevation and intervening buildings or vegetation), looking across the drained marshland, existing industrial facilities and the River Thames into north Kent. From residential areas on the eastern edge of Tilbury, views south towards the main development site are generally filtered by the vegetation along the railway, but Tilbury Substation, Tilbury Power Station and the overhead power lines and towers are prominent in the existing view. Residential areas in East Tilbury generally do not have significant views of the main development site.

4.2.8 Individual farms in the area and properties along Biggin Lane and Gun Hill have closer views in some cases of areas within the application boundary that would be used for temporary construction access and construction of the gas connection.

4.2.9 Where vegetation and orientation allow, there are long views for some residential areas in Gravesham across the River Thames to the existing industrial facilities on the northern bank and beyond to the low ridgeline.

- 4.2.10 From some sections of Common Land (which is open to public access), Parsonage Common in particular, there are close views of the main development site and potential construction access routes. From some footpaths and public rights of way in the area (depending on landform and hedgerows), there are wide and open views of the Kent side of the estuary, Gravesend, Tilbury Power Station, the sewage treatment works, Tilbury Substation and the cranes and wind turbines of Tilbury docks.
- 4.2.11 From Tilbury Fort, views towards the main development site are limited due to the intervening infrastructure of the sewage treatment works and woodland planting. Views from Coalhouse Fort are again mainly restricted by vegetation, but possible in some locations from the car park and footpaths around the outer edge of the moat.
- 4.2.12 In addition to the emerging flexible generation plant structures and equipment as they are installed, plant such as cranes would be visible during construction, and the haul roads and gas pipeline trenching would also have a minor temporary impact on views and landscape character.
- 4.2.13 Full-time lighting of the flexible Generation Plant at night will not be required, as it is not normally manned in operation. Directional and motion-activated security lighting would be used. Construction lighting during winter months and motion-activated security lighting are likely to be required.
- 4.2.14 In the context of a dynamic landscape that is undergoing change, with substantial existing electricity infrastructure and other industrial development, the Flexible Generation Plant is considered to have a minor adverse effect on the Thames Estuary National Character Area and a moderate adverse effect the local character area Tilbury Marshes, neither of which is significant. The development does not lie in or adjacent to the Kent Downs Area of Outstanding Natural Beauty (AONB) and would have no impact on the special qualities of the AONB nor compromise the reasons for its designation.
- 4.2.15 Potential views of the Flexible Generation Plant in the area are complex. As the immediate landscape around this part of the River Thames is very flat, changes in topography and elements such as buildings, ships and pylons are noticeable, but also more effective as screens to views of the Flexible Generation Plant.
- 4.2.16 From the south-west, views towards flat farmland are short, curtailed by the sewage treatment works and the woodland that surrounds it, the remaining section of Tilbury B Power Station, as well as the many pylons and overhead power lines. Views from Tilbury Fort towards the proposed development will be restricted by these elements in the landscape. From Fort Road bridge and from the easternmost properties at Tilbury, the development will be seen in the context of the infrastructure and pylons in the foreground. From residences, the vegetation along the railway will help to screen views of the lower elements of the development and no significant adverse effect is predicted.
- 4.2.17 From flat farmland to the north of the railway line, views are across arable farmland crossed by pylons and overhead powerlines towards Tilbury Substation, Tilbury B Power Station and beyond to higher land in north Kent. From further north on the ridgeline, the higher elevation gives views of the drained marshland and the full extent of pylons, power lines and industrial operations to the west are revealed. While most views of the Flexible Generation Plant will not be significant from this direction, certain elevated views from directly north and close views from the access land will experience moderate to major adverse effects. While these effects are considered to be significant, they would not be unacceptable given the landscape context in which the Flexible Generation Plant would be seen.
- 4.2.18 Views west towards the Flexible Generation Plant are possible from some locations around Coalhouse Fort but due to distance and intervening vegetation these are limited and no significant effect is predicted.
- 4.2.19 From the Thames Estuary Path, also known as Two Forts Way, the views towards the proposed development are limited until the area of farmland that is being land raised is passed, travelling west along the path. For a short section the elevation and the lack of vegetation on the northern side of the path would allow views across to the Flexible Generation Plant, especially in the future situation where Tilbury B Power Station had been demolished and not replaced by Tilbury Energy Centre. The context of the view would remain that of the Tilbury Substation and extensive powerlines and the moderate effect on the view from this direction is not considered to be significant.
- 4.2.20 From Gravesend and higher land in north Kent, the development would be visible in some long views but again seen in the context of infrastructure such as the sewage treatment works and the 'wirescape' of pylons and overhead power lines, and against the backdrop of higher ground to the north, so no significant adverse effect on views is predicted.

4.2.21 Overall, significant adverse effects on landscape character are not predicted and the only significant adverse effect on visual resources would be to close views from access land to the north of the Flexible Generation Plant and from certain viewpoints on the higher ridgeline further north of that. These effects have been assessed prior to consideration of potential landscaping design to screen and minimise visual impact, which may allow for a reduction on visibility of the development particularly in closer views from the north.

4.3 Historic environment

4.3.1 A substantial amount of information about the history of the proposed development location is available from the Essex Historic Environment Record, records of Historic England, historic maps and other published histories. This information has been studied to consider potential for archaeological features of interest to be present and to understand the context of designated heritage features in the area. In addition, a geo-physical survey of the main development site was carried out to identify features below ground that could be of archaeological significance.

4.3.2 There are no recorded remains of prehistoric date within the application site, although records from the wider area and geological records indicate that there is some potential for deeply buried remains of palaeoenvironmental (prehistoric) significance.

4.3.3 There are few sites or finds of medieval date and mapping indicates that the main development site was probably marshland used for common grazing during the medieval period. While there were medieval settlements in Tilbury and Gravesham, there is no evidence for medieval settlement activity on the main development site or indeed recorded evidence for later activity, other than use as agricultural land, until the Second World War when parts of the site were used for defensive purposes.

4.3.4 During the early post-medieval period the wider area was significant in the defence of the River Thames from at least the reign of Henry VIII onwards, with forts and artillery batteries constructed at Tilbury Fort, Coalhouse Fort and Gravesend Blockhouse among other locations. These defensive structures have subsequently undergone extensive alterations through to use in the Second World War.

4.3.5 In the 19th and 20th centuries, development of the railway line, facilities for ocean liner passengers and increasing industrial use such as the Tilbury A and B power stations occurred, together with the growth and expansion of urban residential areas.

4.3.6 There are no designated heritage assets within the application site and no World Heritage Sites, Registered Battlefields or Registered Parks and Gardens in the vicinity. There are six Scheduled Monuments at 1–3 km distance, all forts, blockhouses or anti-aircraft batteries, and one Scheduled Monument that is closer, comprising earthworks at the church in West Tilbury. There are designated Conservation Areas in West and East Tilbury and in a number of areas in Gravesend. Within 1 km of the main development site are four Grade II Listed Buildings and the Church of St James, in West Tilbury, which is Grade II* listed.

4.3.7 Two avenues of potential impact due to the proposed development on the historic environment have been assessed: potential for construction work to disturb archaeological features and potential for the development to affect the setting of heritage assets, primarily due to being visible from them, or affect the overall historic landscape.

4.3.8 No significant adverse effect on archaeological features is predicted, as shallow features do not have high sensitivity and any potential deeper palaeoenvironmental features, if present, are unlikely to be significantly disturbed. A protocol for responding to unexpected archaeological finds and providing monitoring during earthworks by a qualified archaeologist, with results to be recorded and disseminated, is a commitment in the Code of Construction Practice.

4.3.9 At the great majority of designated heritage assets, where the setting would be affected by the proposed development, negligible to minor effects are predicted and these are not considered to be significant. This is based on factors including distance and the limits to visibility of the proposed development from the assets' locations, and takes into account their evidential and historical, aesthetic and communal value and sensitivity. Similarly, minor and non-significant effects are predicted for the the historic landscape overall.

4.3.10 A moderate adverse effect on Tilbury Fort is predicted, which is considered significant, albeit at the lowest end of the scale. Given the wide ranging existing built and industrial landscape in the area, the changes to the setting of the fort due to the limited views of the proposed development are considered to be slight, but the high sensitivity of the fort and the important contribution that its setting makes to its overall value are acknowledged in the prediction of a significant effect.

4.3.11 A moderate adverse effect on the Grade II* Listed Building 'Riverside Station' just west of Tilbury Fort, at the edge of the Port of Tilbury, is also predicted. This is a neo-Georgian terminal for passenger ships built by the Port of London Authority in 1924. Again, although the changes to its setting due to views of the proposed development would be slight, this potential significant impact is predicted due to its high sensitivity.

4.4 Land-use, agriculture and socio-economics

- 4.4.1 The potential impacts of the proposed development on agricultural land use, common land, recreational resources (such as footpaths) and the socio-economic impacts of job creation have been studied. Baseline information has been gathered from published agricultural land and soil data, the Register of Common Land and Village Greens, rights of way maps and labour market statistics. Further surveys of soil characteristics, agricultural land and the rights of way to supplement this existing information are ongoing at the time of producing this PEIR.
- 4.4.2 Soils in the area of the proposed development are generally clayey (classified as the 'Wallasea Soil Association'), with groundwater controlled by ditches and drainage improvements where land is in agricultural use. Some areas of soil in the gas connection compound zone and pipeline route are more loamy, underlain by sand and gravel. The land affected by the proposed development forms part of a single large arable-based family farm holding. The majority of land permanently affected comprises lower quality agricultural land, but around 1.15 ha of higher quality 'best and most versatile' agricultural land would be likely to be permanently affected.
- 4.4.3 The main development site includes all of Walton Common, which is grassland with grazing rights. Between the railway and Cooper Shaw Road, access through Parsonage Common (also grassland) may also be required during construction. These areas of common land both have rights of public access on foot for recreation.
- 4.4.4 No existing rights of way cross the proposed development site save for a short section of footpath at the northern end of High House Lane, within zone H, where it follows the existing farm track in use as a haul road there. To the south, the Thames Estuary Path runs along the shore of the Thames, with proposals by Natural England for improving this path expected later in 2018. Public footpaths connect to Turnpike Lane and Gun Hill, and the 'Coal Road' bridleway is adjacent to the field in zone D for potential gas pipeline routing (but the bridleway would not be crossed by the pipeline).
- 4.4.5 The loss of agricultural land and the impact on farm holdings are considered to be negligible to minor adverse effects, which are not significant.
- 4.4.6 Approximately 9.5 ha of common land (Walton Common) would be permanently lost and a small part of Parsonage Common may be temporarily affected during construction. However, included within the application is provision of 11.5 ha of replacement common land in zone F (with the same rights of public access and grazing). The permanent effect is therefore considered to be negligible and the temporary effect during construction minor adverse, which is not significant.

- 4.4.7 There would be no physical impact on rights of way and no significant disturbance is predicted, so there are considered to be no significant effects.
- 4.4.8 Approximately 5.6% of the workforce in Thurrock is employed in the construction sector. Unemployment in financial year 2017 was 4.5% of the economically active population, which is higher than the regional and national averages during that period.
- 4.4.9 The employment generated during construction and the 'multiplier effect' to the local economy due to construction supply-chain and worker spending are considered to have a minor beneficial socio-economic local effect overall. Given the mobility of the construction workforce in the region, it is not expected that there would be any significant adverse impact on the usual resident population of the study area. As the proposed development would require only a very small workforce in operation (likely to be largely remote-based), no significant socio-economic effect in operation is predicted.

4.5 Ecology

- 4.5.1 Information about the existing habitats and species has been gathered from the Essex and Kent Biological Records Centres and a range of site-specific surveys carried out during 2018. These have included habitat and botanical (vegetation) surveys, and further surveys for invertebrates, Great Crested Newts, reptiles, breeding and wintering birds, water vole, otter and badger where existing records, consultation with Natural England and/or the habitat surveys suggested that protected species may be present. Wintering bird surveys are ongoing at the time of this PEIR production.
- 4.5.2 Mucking Flats and Marshes Site of Special Scientific Interest and the Thames Estuary and Marshes Special Protection Area and Ramsar site, east of the proposed development, are of international importance for wintering birds and provide mudflat, lagoon and saltmarsh habitat with ecological and hydrological value. There are also number of Local Wildlife Sites in the area of the proposed development, some adjacent to the gas pipeline or construction haul road route(s), which are of interest mainly for their acid-grassland flora and invertebrate populations.

- 4.5.3 The main development site for the Flexible Generation Plant is a mixture of arable farming land (of no particular conservation value) in the north and former grazing marsh in the southern part, which is degraded and has little botanical or breeding bird value. Other land within the application boundary, to be crossed by the gas pipeline and used for temporary or permanent access road(s), is mainly farmland with either arable fields or grassland which is not considered to have significant ecological value. Ditches crossing or forming the boundaries of many of the areas of land within the application boundary provide habitat for water voles and also connect other areas of habitat in the local area. Hedgerows are relatively patchy and have limited value for connecting local habitat areas.
- 4.5.4 The main development site has populations of adder, grass snake, common lizard and slow-worm, and water voles are present in the ditches. No active badger setts were observed in the survey area. Eighteen species of birds with conservation concern are breeding within the survey area, including Cetti's Warbler, and overall the breeding bird groups are considered to be of district-level importance.
- 4.5.5 The nearby Lytag Brownfield Local Wildlife Site (outside the application boundary) has high importance for invertebrates, and while the Flexible Generation Plant site itself is not considered to have invertebrate groups of significance, it is likely to contribute to the overall diversity of invertebrate populations in the surrounding area.
- 4.5.6 The permanent loss of grassland and ditch habitat on the main development site, and consequent impacts on invertebrates, reptiles and water voles, is predicted to have a moderate adverse effect that is considered significant. The Flexible Generation Plant design has been developed to retain ditches at the boundary of the site as far as possible to reduce this impact. To further mitigate these impacts, new habitat creation is included in the application, in zone F north of the railway, which is currently an agricultural field. The habitat design will provide a net gain in grassland and no net loss of ditches, allowing for the relocation of protected species, and overall is considered to provide a minor net ecological benefit.
- 4.5.7 The impacts of temporary disturbance to species and temporary habitat loss during construction are not considered likely to be significant.
- 4.5.8 Noise and air pollutant emissions have been modelled as discussed in the sections below, which has included predicting levels in areas of sensitive habitat. Disturbance during operation and the impacts of air pollutant emissions on designated habitat sites are not predicted to be significant.

4.6 Traffic and transport

- 4.6.1 Information about traffic flows on the public road network, records of accidents, existing sustainable travel options and the status of existing road links (such as weight restrictions and any existing delay or capacity issues) has been gathered from published data and via consultation with Highways England and the local Highways Authority, Thurrock Council. In addition, inspection surveys have been made of the potential construction access routes, including land where new temporary haul roads could be constructed, to evaluate their suitability and identify any need for widening to accommodate large abnormal loads.
- 4.6.2 Potential growth in baseline traffic (without the proposed development) has been projected forward to the start of construction in 2021 using Department for Transport growth rates and information about other local development projects.
- 4.6.3 During construction, the proposed development is estimated to require on average 10 heavy goods vehicles (HGVs) per day (i.e. 20 trips in total, both ways), or a peak of 40–60 two-way HGV trips per day. On average 80 construction staff, peaking at 120, are expected to be required and it has been assumed that 75% arrive in a single car each, while others use sustainable transport such as lift-sharing. A maximum of 80 large abnormal loads would be required in total over the construction period, whether this is in one or three phases.
- 4.6.4 During operation, traffic generation would be very minor as the Flexible Generation Plant does not require a full-time workforce on site. As a maximum, five maintenance periods per year requiring travel by between six and 20 contractors daily have been considered, which would be a much lower traffic flow than the construction period.
- 4.6.5 Access routes to the main development site have been designed to provide connections to the trunk road network while avoiding built-up residential areas as far as possible. As discussed in the project description above, the routes also work around constraints on where it is possible to transport large abnormal loads.
- 4.6.6 The traffic generated by the proposed development during construction would be below the threshold in transport assessment guidance at which any significant effects are likely for the majority of sections of road assessed, even assuming all traffic follows just one of the several possible routes available.

- 4.6.7 However, Turnpike Lane and Gun Hill have existing traffic regulation orders that place a 7.5 t weight restriction on these roads, i.e. currently prohibiting larger HGVs. As these roads are proposed to be used for construction traffic, the effect of temporarily introducing HGVs has been further assessed. In addition, the increase in peak HGV flows on a short section of Linford Road between Turnpike Lane and High House Lane has triggered further assessment.
- 4.6.8 Taking into consideration highway capacity and existing traffic flows, accident records, and guidance on the levels of traffic flow that can cause delay or severance of routes used by pedestrians, no significant existing road capacity or safety issues have been identified and no significant adverse effects are predicted for drivers or other road users due to additional construction traffic generated on these road sections.
- 4.6.9 Due to the higher speed of existing traffic on Linford Road and Muckingford Road (which has a 60 mph speed limit and carriageways in both directions), a temporary speed reduction to 30 mph for the section past the junctions with High House Lane and Turnpike Lane is proposed to maintain road safety where construction traffic HGVs are crossing.
- 4.6.10 When large abnormal loads need to be delivered, the vehicles and load required will be discussed with the highway authorities and police in advance, to agree measures in each case so that the movement is undertaken safely and with minimal delay for other highway users. As this would be an infrequent event and carefully managed, no significant adverse effects are predicted.
- 4.6.11 Construction traffic overall will be controlled by measures in a Construction Traffic Management Plan, which will set enforceable requirements that construction contractors must follow for vehicle routes and safety. A Worker Travel Plan will also be developed to encourage sustainable transport use and reduce private car journeys.
- 4.6.12 Overall, no significant adverse effects due to construction traffic are predicted.
- 4.6.13 No significant effect due to the small and irregular amount of traffic generated during operation, primarily for periodic maintenance visits, is predicted as this would be much lower than construction phase traffic.

4.7 Noise and vibration

- 4.7.1 Baseline noise levels were monitored in February 2018 at seven locations that are representative of the nearest noise-sensitive receptors around the proposed development. Noise levels were measured for a week (including weekend days) and in addition, attended surveys were carried out during shorter periods in the day, evening and night-time to describe the types of sound that could be heard.
- 4.7.2 Existing background noise levels are mostly influenced by the sound of local and distant traffic, and in some locations the sound of a metal recycling facility, industrial sound from the Port of Tilbury and passing trains or the hum of railway power lines.
- 4.7.3 The main source of noise from the flexible generation plant in operation would be the gas engines themselves, their cooling fans and their exhausts. Other sources including the batteries' cooling system, gas metering equipment and substation components have also been assessed.
- 4.7.4 Designed-in mitigation measures for operational plant have been developed to reduce noise levels as far as is reasonably practical and to ensure noise levels generated would not cause a significant adverse effect at nearby receptors.
- 4.7.5 Minor adverse effects at the most-affected medium and high sensitivity receptors, Havers Lodge and St James's Church, are predicted during operation. No significant adverse effect is predicted at any residential receptors.
- 4.7.6 The flexible generation plant would have no significant traffic in operation and no significant adverse effect due to traffic-related noise.
- 4.7.7 Noise during construction (including traffic on haul roads) would be temporary and below the threshold for significant effects. Best practicable means to minimise noise during construction will be followed, as specified in the Code of Construction Practice. Due to the distance to residences, no effects from vibration during construction are predicted.

4.8 Air quality

- 4.8.1 Information about current air quality in Thurrock and Gravesham has been gathered from routine monitoring published by the borough councils plus additional monitoring from December 2017 to June 2018 at five locations around the development site.

- 4.8.2 The results of this project-specific monitoring show that background concentrations of nitrogen dioxide in the area around the development site are within the relevant health-based air quality objectives. However, both Thurrock Council and Gravesham Borough Council have designated Air Quality Management Areas due to high levels of traffic or industrial pollution in areas further from the main development site, the nearest of which is 1.8 km away.
- 4.8.3 The main air pollutant emitted by the flexible generation plant in operation would be nitrogen dioxide from the gas engine exhausts. The gas engines would comply with the emission limit for nitrogen dioxide set by the Industrial Emissions Directive. Dispersion modelling has been used to design a suitable exhaust stack height of 40 metres for dispersion of pollutants to avoid exceeding air quality standards at sensitive receptor locations.
- 4.8.4 At the majority of the representative residential and other sensitive receptor locations modelled, no significant adverse effect is predicted. For long-term average nitrogen dioxide concentrations, there are two receptor locations at Walnut Tree Farm and West Street where a moderate adverse effect is predicted. For short-term average concentrations, there are seven receptors where a moderate adverse impact is predicted. However, the total nitrogen dioxide concentration is predicted to remain within the relevant air quality objectives at all but one modelled receptor. At West Street, the annual-mean nitrogen concentration is predicted to exceed the air quality objective with or without the development.
- 4.8.5 This is a worst-case prediction with sixty individual exhaust stacks and with emissions at the Industrial Emissions Directive limit. Thurrock Power will use a process called selective catalytic reduction to treat the exhaust gas, which will reduce nitrogen dioxide emissions below that limit; and with fewer exhaust stacks, concentrations at sensitive receptors would also be lower.
- 4.8.6 The potential for nitrogen deposition, acid deposition and concentration of nitrogen oxides to affect sensitive ecological habitats has also been assessed. As stated in the ecology section, above, no significant air quality effects on designated habitats are expected to arise due to the proposed development.
- 4.8.7 The flexible generation plant would have no significant traffic in operation and no significant adverse effect on air quality due to traffic-related pollutants. Construction traffic would also be below the level where any significant adverse air quality effect is predicted. Potential dust during construction would be controlled by measures in the Code of Construction Practice and no significant adverse effect is predicted.

4.9 Human health

- 4.9.1 Environmental or socio-economic impacts of a development can have the potential to affect people's health, which has been studied using information about those impacts as described in the rest of this non-technical summary. 'Health' here means people's physical, mental and social wellbeing, rather than a narrow definition of just disease or infirmity.
- 4.9.2 Baseline information on existing health and the socio-economic factors influencing it for communities in the area of the proposed development has been gathered from NHS statistics, health profiles published by Public Health England and the Joint Strategic Needs Assessment developed by local public health teams. Thurrock district has relatively high levels of socio-economic and health deprivation compared to regional and national averages, with lower life expectancy, higher hospital admission rates and higher rates of factors such as obesity and smoking. Social indicators such as employment rates and levels of education or qualifications are lower than the regional and national averages.
- 4.9.3 The health assessment has considered environmental and social pathways through which the proposed development has the potential to influence health. These include air pollution and noise, which can affect people's physical health or their wellbeing if significant annoyance or sleep disturbance were caused, and traffic levels which can affect road safety or the routes that people walk or cycle. Any impacts on footpaths, Common Land and the amenity of the landscape that could affect recreation and exercise have been considered, as has the impact of employment generated, which is important to the social and economic factors that influence people's health and wellbeing.
- 4.9.4 No significant adverse effect on health due to changes in air quality during construction or operation is predicted. Change in exposure to air pollution at sensitive locations including residential areas, schools and healthcare facilities would be minor and not of a level to result in measurable changes in health outcomes. With appropriate mitigation as discussed above, noise during construction and operation is not predicted to lead to annoyance or sleep disturbance that could cause a significant adverse health effect.
- 4.9.5 Construction traffic flows would not be significant compared to existing road traffic and haul routes have been designed for access to main roads while avoiding residential areas such as Chadwell St Mary. No significant adverse effect on health due to road safety or creating barriers to pedestrians or cyclists is predicted.

4.9.6 Construction employment generation, estimated to average 80 full-time equivalent jobs, has the potential for a beneficial effect on health on an individual level. This can be enhanced by recruitment with training and skills development for local people in longer-term unemployment, which has been discussed by Thurrock Power with Thurrock Council.

4.9.7 The exchange Common Land provided would maintain this resource for public access, with a slight improvement to accessibility as crossing the railway is no longer needed. No adverse effect on health and wellbeing due to changes in green space available for exercise and recreation is predicted.

4.10 Climate change

4.10.1 Climate change impacts can mean any risks that climate change may pose to the flexible generation plant, the way in which climate change may influence other environmental effects (such as by increasing the stress on ecosystems impacted by the development), and the impact that the flexible generation plant itself has on climate change due to greenhouse gas emissions.

4.10.2 Climate change risks were evaluated at the EIA scoping stage and the main risk was considered to be flooding, which is described in the hydrology and flood risk summary, below.

4.10.3 The influence of climatic changes on the future baseline has been considered in each EIA topic chapter in Volume 3. In general, over the 35-year design operating lifetime of the proposed development, changes in the baseline due to climate change are not expected to significantly affect the environmental impacts predicted.

4.10.4 The emission of greenhouse gases due to burning natural gas fuel in the gas engines has been calculated based on their maximum annual running hours. The estimated greenhouse gas emissions due to the supply chain for extracting and delivering the gas have also been taken into account. Total emissions over the flexible generation plant's operating lifetime are predicted to be approximately 38 million tonnes of carbon dioxide equivalent.

4.10.5 However, building and operating the flexible generation plant would avoid the need for an equivalent amount of electricity generation capacity to be provided by a different existing or new power generators. The peak electricity supply capacity it provides and the battery storage will also play a role in enabling greater use of low-carbon renewable generation. Several scenarios for emissions sources avoided have been considered, based on government and National Grid projections about future electricity supplies and a comparison with other gas-fired flexible generation technologies.

4.10.6 Taking the avoided emissions into account, the net predicted effect of the flexible generation plant is a reduction in greenhouse gas emissions of between -11 and -22 million tonnes of carbon dioxide equivalent, i.e. a beneficial effect compared to the business-as-usual future baseline scenario without the development.

4.10.7 Greenhouse gas emissions due to construction activity and producing the materials used are estimated to be very minor compared to the operational impacts, at less than 1% of the total, and are not considered to be significant.

4.11 Hydrology and flood risk

4.11.1 The Environment Agency publishes flood risk maps for tidal and river flooding and further detailed information is available from flood modelling for the Thurrock Strategic Flood Risk Assessment and the Environment Agency's TE2100 management plan for the Thames Estuary. Information concerning the baseline status of watercourses has been gathered from the Environment Agency's catchment data, which is produced to meet the requirements of the Water Framework Directive. A walkover survey of the main development site to characterise its hydrology and visually inspect the local watercourses has also been undertaken.

4.11.2 The main development site is currently drained by a complex network of buried land drains and the development as a whole, including gas connection and access routes, crosses a number of existing field drains, ditches and irrigation channels. The majority of the surface water channels crossed are privately owned and maintained, but some are managed by the Environment Agency or Essex County Council. The drainage network ultimately discharges to the Thames, in some cases via the West Tilbury Main river.

4.11.3 West Tilbury Main has an overall moderate Water Framework Directive quality status, with moderate ecological status and good chemical status. The River Thames also has an overall moderate status, with moderate ecological status but failing chemical status.

- 4.11.4 The majority of the proposed development is located in EA Flood Zones 2 and 3a, which indicates medium to high risk of flooding prior to considering any flood defences. However, the Thames has substantial tidal flooding defences that provide a standard of protection designed to defend flood events with a 1 in 1,000 year return period. Baseline flood risk to the proposed development is therefore considered to be low. Modelling of a worst-case scenario in which tidal defences were breached indicates a possible flooding depth of between 0.5 m and 1.5 m for the main development site. The development will therefore incorporate flood resilience and/or resistance measures to ensure critical assets such as its electrical infrastructure are afforded an appropriate level of flood protection, such that no significant adverse effects due to flooding are expected.
- 4.11.5 Potential increase in flood risk due to increased runoff from the impermeable surfaces of the proposed development has been assessed taking into account a 40% climate change allowance for potential increased rainfall rates in future. Drainage design for the development will incorporate the necessary runoff attenuation and storage as recommended by the flood risk assessment to ensure no increase in runoff rates compared to the baseline and hence no increase in flood risk for off-site receptors. No significant adverse effect on flood risk is therefore predicted.
- 4.11.6 Where the gas pipeline route or construction access roads cross existing watercourses and drains, whether with open cut techniques or a trenchless (drilling) approach, there is potential to affect the flow characteristics or cause sediment to be released. Watercourse crossings will be designed in accordance with the Environmental Permitting Regulations 2016 and Drainage Board Byelaws, and undertaken with best-practice measures to prevent pollution, which is a committed measure in the Code of Construction Practice. No significant effect on watercourses or Water Framework Directive status (where applicable) is therefore predicted.
- 4.11.7 Good-practice measures for management of construction activity and safe storage of materials on site to avoid any surface water contamination from runoff are set out in the Code of Construction Practice.
- 4.11.8 In operation, potentially polluting materials such as engine lubricating oil and the chemical (either urea or ammonia) used in the air pollution control system would be stored in accordance with the Environmental Permit and regulatory requirements, including secondary containment to capture any leaks, and no significant adverse effects on surface water contamination from runoff are predicted.

4.12 Geology, hydrogeology and ground conditions

- 4.12.1 Baseline information about the condition of the ground and the underlying geology and hydrogeology (groundwater) is available from British Geological Survey mapping, Environment Agency data and pollution records, and the history of land-uses in the local area which give a guide to potential sources of contamination. In addition, a walkover survey to observe any above-ground signs or sources of contamination (such as waste or chemical storage, or signs of contamination in watercourses or the ground surface) was undertaken in 2018.
- 4.12.2 The geology of the majority of the area within the application boundary is alluvium (clay, silt, sand and peat) over sand and gravel, further finer sand, and ultimately white chalk as the lowest stratum. In the area of the gas connection to the National Transmission Network, shallower sand and gravel or head deposits (mixed with silt and clay) are present. The main development site and majority of other land within the application boundary are not within a groundwater Source Protection Zone. The gravel layer is a secondary aquifer, which may in some cases be an important source of groundwater flows to surface watercourses, and the white chalk is a principal aquifer. There is conflicting information about the baseline chemical quality of groundwater, but it may have a poor status.
- 4.12.3 The main development site has historically been in agricultural use and is not considered likely to be an existing source of any ground contaminants of concern. Aside from fly-tipping of waste on Parsonage Common, no visual evidence of existing contamination was found in the site walkover survey. Possible sources of contamination in the wider area include the current and historical operation of Tilbury Power Station and substation, various historical landfills including municipal waste and ash from the power station (which is being mined and exported for re-use) and a former brickworks in the Low Street area. However, these would not be directly affected by construction work required for the proposed development.
- 4.12.4 The potential for construction work including excavation and piling to mobilise any existing contamination and impact on human health, groundwater or surface waters is considered to be low and no significant adverse effect is predicted. Before the start of construction work, further targeted environmental sampling (in conjunction with geo-technical site investigation work that's needed for construction) would be undertaken to confirm the ground conditions. Should any unexpected ground contamination be encountered, it would be appropriately remediated (the approach to be agreed with Thurrock Council), which is a commitment of the Code of Construction Practice.

4.12.5 Good-practice measures for management of construction activity and safe storage of materials on site to avoid any ground or water contamination are set out in the Code of Construction Practice.

4.13 Decommissioning stage effects

4.13.1 As discussed above in the project description, the Flexible Generation Plant has an initial design lifetime of up to 35 years. Depending on market conditions at that time, it may then continue to operate (potentially with upgrades or replacements to equipment) or may be decommissioned.

4.13.2 For the environmental assessments, the potential impacts of both these future options have therefore been considered.

4.13.3 If the Flexible Generation Plant were to continue operating, the effects at that future time are considered unlikely to be any greater than in the initial 35 year operational period for the environmental topics studied. Any changes to equipment would be subject to regulations (for example, air pollutant emission limits) as applicable at that time.

4.13.4 The potential future evolution of baseline conditions with respect to climate change has been considered and will be updated to further consider climatic changes beyond the initial 35 year operating period when refreshed UK climate change projections are published shortly, which is expected to be during the consultation period for this PEIR.

4.13.5 If the Flexible Generation Plant were to be decommissioned, effects are considered unlikely to be any greater than in the construction phase. It is not possible to predict decommissioning and waste management methods several decades hence with certainty, but the development design is considered suitable mainly for dismantling rather than needing demolition, and the expectation of no greater effects than the construction phase is reasonable.

4.13.6 No significant adverse effects from continued operation or decommissioning after 35 years are therefore predicted.

4.14 Cumulative impacts with other developments

4.14.1 Several other major development projects are proposed in the area around Thurrock Flexible Generation Plant, including four other Nationally Significant Infrastructure Projects and several housing, mixed-use or smaller industrial developments.

4.14.2 For the environmental impact assessment, planning application records from Thurrock Council, Gravesham Borough Council and the Planning Inspectorate were searched to identify developments proposed.

4.14.3 Two main ways in which other developments could affect the impacts predicted for Thurrock Flexible Generation Plant when taken together have been considered: firstly, where impacts from another development and Thurrock Flexible Generation Plant could both affect the same receptor (not necessarily at the same time) and cause a greater effect overall; and secondly, where another development would create new sensitive receptors such as a housing estate that could be impacted by Thurrock Flexible Generation Plant if they were built.

4.14.4 Based on the planning records search, an initial long-list of possibly relevant developments was drawn up and discussed with planning officers at Thurrock Council to identify any developments that might have been missed or that are already completed. The long-list was then narrowed down to a short-list based on the scale, nature or location of the each development or other factors such as the development having needed an environmental impact assessment, that suggest significant cumulative impacts could be possible. All Nationally Significant Infrastructure Projects in the long-list were also short-listed.

4.14.5 The Port of Tilbury proposes to extend its operation to land immediately west and south-west of the Thurrock Flexible Generation Plant main development site. That project is called Tilbury2. To the south of the main development site, demolition is ongoing on the former Tilbury Power Station site and there is a proposal to build a new 2,500 megawatt gas-fired power station plus 300 megawatt open cycle gas turbine and possible battery storage on part of that land, called the Tilbury Energy Centre. To the east, the Lower Thames Crossing project proposes a new motorway crossing of the Thames and route north to the M25, with a possible link road into Tilbury just south of the railway line. On the Swanscombe peninsula on the south bank of the Thames, west of Thurrock Flexible Generation Plant, a new major leisure development is proposed called the London Resort.

4.14.6 Outline planning permission has been granted for several residential and mixed-use developments that would expand East Tilbury and Linford in the direction of Thurrock Flexible Generation Plant, and residential redevelopment of the Coward Warehousing site south of Chadwell St Mary is also consented. Early proposals for Thurrock Council's future Local Plan suggest possible zones for residential and commercial/employment development in areas east of the Thurrock Flexible Generation Plant, around the corridor of the Lower Thames Crossing project, and a review of the Green Belt land is being undertaken.

- 4.14.7 These other development projects are at various stages of the planning process with varying levels of information about their design and possible impacts available. The development consent application and Environmental Statement for Tilbury2 has been submitted and is being examined by the Planning Inspectorate. Environmental assessments for Tilbury Energy Centre, the Lower Thames Crossing and the London Resort have not yet been published and there is very limited design information available.
- 4.14.8 The currently proposed application boundary for the Lower Thames Crossing includes large amounts of land in the Thurrock area, some of which overlaps with the Thurrock Flexible Generation Plant boundary (though not the main development site) and several of the other development proposals. The road itself would occupy less space and it is understood that additional land is for purposes such as temporary construction areas, biodiversity mitigation or enhancement and runoff attenuation to control flood risk.
- 4.14.9 The potential for air quality, noise and visual impacts on the new residential receptors is not considered to be any greater than the adjacent existing residential areas and no more significant adverse cumulative impact is predicted. These new cumulative development receptors would not be adversely affected by construction traffic from Thurrock Flexible Generation Plant.
- 4.14.10 The consultation response from Tilbury2 has indicated that it is unlikely the construction phases of Tilbury2 and Thurrock Flexible Generation Plant would overlap, but it may follow quite closely in time.
- 4.14.11 The cumulative landscape character effect of Thurrock Flexible Generation Plant with Tilbury2 would be to reduce the areas of open grassland within the Tilbury Marshes landscape character area, but given the existing character of this part of the character area, the cumulative effect is not considered significant.
- 4.14.12 Views from the west and south-west would have Tilbury2 processing buildings in the foreground and the addition of Thurrock Flexible Generation Plant is not considered to have a significant cumulative effect. From the east around Coalhouse Fort the Thurrock Flexible Generation Plant stacks would be seen further from the Tilbury2 silo, container storage areas and processing buildings, and again cumulative effects would not be significant.
- 4.14.13 From the Thames Estuary Path, the separation between the Tilbury2 container storage areas and processing buildings and the Flexible Generation Plant in views means that the cumulative intensification of visual effects from this viewpoint would not be significant.
- 4.14.14 In representative views that might be obtained from elevated positions on the ridgeline north of Tilbury2 and Thurrock Flexible Generation Plant, the cumulative impact of Tilbury2 adds built development and industrial elements to the view and so intensifies the significant adverse effect predicted for Thurrock Flexible Generation Plant alone.
- 4.14.15 The published assessment of the impact of Tilbury2 on the setting of Tilbury Fort heritage asset indicates a major adverse effect prior to mitigation and a moderate adverse effect after mitigation. The cumulative impact with Thurrock Flexible Generation Plant would contribute to this effect but is not considered to increase its significance, as the primary impact is from the (much closer) Tilbury2 development.
- 4.14.16 As no significant effects on near surface remains or more deeply buried remains with palaeoenvironmental potential are predicted to be caused by Thurrock Flexible Generation Plant, no significant contribution to cumulative effects with any other developments are predicted.
- 4.14.17 No significant cumulative effect on agricultural land use or farm holdings due to the cumulative impact of Thurrock Flexible Generation Plant and Tilbury2 is predicted due to the negligible effect of the Flexible Generation Plant.
- 4.14.18 Habitat creation proposals for Tilbury2 include ponds, ditches, reptile and invertebrate habitat on land immediately adjacent to the west of the Thurrock Flexible Generation Plant main development site and south of the habitat creation and Common Land exchange proposed (on the other side of the railway). Habitat creation proposals for both schemes appear complementary, in that taken together the mitigation areas will provide for a greater area of habitat for species such as reptiles and water voles than exists in this area at present.
- 4.14.19 Tilbury2 would result in a higher impact on invertebrates in the local area due to the loss of the majority of the Lytag Brownfield Local Wildlife Site, for which offsite compensation is proposed, but it is not considered that this impact is increased by the construction of Thurrock Flexible Generation Plant so no greater cumulative effect is predicted.
- 4.14.20 The contribution of Thurrock Flexible Generation Plant construction traffic to cumulative traffic flows from developments including Tilbury2 is predicted to be negligible and no significant cumulative effects on transport due to Thurrock Flexible Generation Plant are predicted.

- 4.14.21 Any overlap in construction activity would likely be of short duration and therefore cumulative noise effects from Tilbury2 and Thurrock Flexible Generation Plant are unlikely to be significant. During operation, predicted noise levels at the most-affected receptors from the operation of Tilbury2 are considerably higher than those from Thurrock Flexible Generation Plant and a negligible cumulative effect due to the Flexible Generation Plant is predicted.
- 4.14.22 Moderate adverse cumulative air quality impacts are predicted with Tilbury2 and Thurrock Flexible Generation Plant at four receptor locations in Tilbury. However, the relevant air quality standard would not be exceeded and Thurrock Flexible Generation Plant complies with emission limits and the Environment Agency's guidance concerning when action is necessary to reduce emissions. The overall significance of effects, considering all the receptor locations assessed collectively, is considered to be minor adverse.
- 4.14.23 As set out above, no significant contribution to the cumulative effect with Tilbury2 by Thurrock Flexible Generation Plant is predicted for traffic and noise changes, and air pollutant concentrations would remain within the air quality standards set to be protective of health. No significant adverse cumulative impact on health due to Thurrock Flexible Generation Plant is therefore predicted.
- 4.14.24 No significant cumulative effect on hydrology and flood risk with Tilbury2 and Thurrock Flexible Generation Plant is predicted as each development is required to provide appropriate flood risk mitigation and safe storage of any potentially-polluting materials. No significant cumulative effect on geology, hydrogeology or ground contamination is predicted as construction areas would not overlap and Thurrock Flexible Generation Plant is not considered to represent a significant risk in terms of contaminated soil and/or groundwater.
- 4.14.25 As mentioned, much less information is available about the other Nationally Significant Infrastructure Projects since they are at an earlier stage of planning. If all of these cumulative developments were to go ahead in the form presently envisaged for them, Thurrock Flexible Generation Plant's main development site would be closely surrounded on all sides by the temporary or permanent works areas of the other projects.
- 4.14.26 Specific cumulative impacts with Thurrock Flexible Generation Plant would be for the promoters of the Lower Thames Crossing, Tilbury Energy Centre and the London Resort to assess and mitigate if necessary when they undertake environmental impact assessments to support their applications for development consent. Nevertheless, a general description of cumulative impacts that might occur is given below where possible.
- 4.14.27 The construction periods of the cumulative developments are unlikely to all be simultaneous. If Thurrock Flexible Generation Plant were built in one phase, it is quite likely that it would be completed before construction of the Lower Thames Crossing, Tilbury Energy Centre and the London Resort as they are more complex developments and less advanced in the planning process. If Thurrock Flexible Generation Plant were built in three phases over up to six years, construction overlap during later phases is more likely. Even where construction of the other cumulative developments does not overlap in time, cumulative construction impacts are still possible due to the extended period of disruption to the local area from several successive sets of construction works.
- 4.14.28 The cumulative developments are likely to have a large combined need for construction workforce, with both potential beneficial impacts due to employment opportunities and potential for adverse impacts on the capacity of local services such as accommodation and healthcare. However, Thurrock Flexible Generation Plant's construction employment needs (estimated to average around 80 full-time equivalent workers) are expected to be very minor compared to the much larger construction work likely to be required for other developments, especially the Lower Thames Crossing.
- 4.14.29 Similarly, although construction traffic estimates for the other cumulative developments are not available, given their scale and the likely need for much more civil engineering and building work (especially for the Lower Thames Crossing and London Resort) compared to Thurrock Flexible Generation Plant's installation of pre-manufactured components, it is considered likely that Thurrock Flexible Generation Plant's construction traffic generation would be a very minor contribution to cumulative impacts. Thurrock Flexible Generation Plant construction access haul roads would also route traffic away from the potential construction works of these other developments.
- 4.14.30 It is possible that the cumulative impact of the Lower Thames Crossing, Tilbury Energy Centre and Tilbury2 in operation together on traffic, noise and air quality could be significant in some locations but effects would be variable, depending for example on how the Lower Thames Crossing affects traffic flows across the existing road network (and any interaction of that with traffic impacts from the London Resort). It is not possible to predict a specific magnitude of impact but using professional judgement, the additional cumulative effect of Thurrock Flexible Generation Plant (relative to the scale of these other developments) is considered likely to be very minor.

- 4.14.31 With regard to operational noise, insufficient information is available to predict specific cumulative effects of Thurrock Flexible Generation Plant and Tilbury Energy Centre, but for Tilbury Energy Centre the developer will be required to consider the potential for significant effects from operational noise both alone and cumulatively.
- 4.14.32 Conservative assumptions have been made to estimate possible cumulative effects on air quality from Tilbury2, Tilbury Energy Centre and the Lower Thames Crossing together with Thurrock Flexible Generation Plant operational emissions. Moderate adverse impacts are predicted at ten receptor locations (considering both long- and short-term periods) but total nitrogen dioxide concentration is predicted to remain within the relevant air quality objectives. A substantial adverse impact is predicted at West Street in Gravesend, but this is the case with or without the effect of Thurrock Flexible Generation Plant.
- 4.14.33 Construction of the Lower Thames Crossing would result in greater fragmentation of populations of protected species on the north and south sides of the railway line, given that a feeder road is proposed through this area. It is expected that the Lower Thames Crossing proposals would include some measure of connectivity for aquatic species in the form of culverted channels for ditches affected, but in this scenario populations of water voles and reptiles in particular might experience additional fragmentation effects. This effect would be entirely due to the presence of the Lower Thames Crossing feeder road and the Thurrock Flexible Generation Plant would contribute no additional fragmentation effects.
- 4.14.34 Thurrock Flexible Generation Plant and the Lower Thames Crossing together would result in a larger permanent loss of arable land that may be considered functionally linked land for birds associated with the Thames Estuary and Marshes protected site. Surveys to assess whether arable land affected by Thurrock Flexible Generation Plant support birds from the Thames Estuary and Marshes site are ongoing. No significant adverse cumulative effects on designated sites of ecological protection due to air pollutant emissions are predicted.
- 4.14.35 Tilbury Energy Centre would continue the industrial character of the Tilbury Power Station site, compared to a future baseline in which demolition were completed and the site not redeveloped. In that context, cumulative landscape and visual impacts and the resulting impact on the settings of heritage assets with Thurrock Flexible Generation Plant are likely to be similar to the impact in the present-day baseline with the remaining structures of the existing power station. The Lower Thames Crossing is considered likely to be a major visual feature in the landscape, adversely affecting character and both near and distant views. Taken together, the Nationally Significant Infrastructure Project cumulative developments are likely to represent a significant intensification of the developed and industrial character of the landscape setting around Thurrock Flexible Generation Plant. Within that context, Thurrock Flexible Generation Plant is considered likely to make quite a minor contribution to overall landscape character and visual impacts, given its much lower exhaust stack and building height compared to Tilbury Energy Centre and its much smaller ground footprint compared to the other cumulative developments collectively.
- 4.14.36 Tilbury Energy Centre would continue and expand the industrial character of the Tilbury Power Station site, compared to a potential future baseline in which demolition were completed and the site not redeveloped. In the context where Tilbury Energy Centre is developed, cumulative impacts on landscape resources with Thurrock Flexible Generation Plant are not likely to be significant. The effect of Tilbury Energy Centre on visual receptors in several locations close to the facility is considered likely to be significant in its own right, based on currently available design information. The incremental cumulative impact with Thurrock Flexible Generation Plant would not increase the significance of that effect, but may intensify the industrial or built-up quality of views.
- 4.14.37 The Lower Thames Crossing is considered likely to be a major visual feature in the landscape, adversely affecting character and views including those in north Kent. Taken together, the cumulative developments are likely to represent a significant intensification of the developed and industrial character of the landscape setting around Thurrock Flexible Generation Plant. Within that context, given its considerably lower stack and building heights compared to the Tilbury Energy Centre and its significantly smaller land-take compared to the other cumulative developments collectively, overall Thurrock Flexible Generation Plant is considered to have a small incremental impact on the landscape and visual resources of the surrounding area, which would not be significant.

- 4.14.38 It is considered likely that there would be some significant effects on heritage assets from the cumulative developments, and as described above, there would be limited significant effects on heritage assets from Thurrock Flexible Generation Plant. In the context of the greater scale of the other developments, cumulative effects resulting from the combination with Thurrock Flexible Generation Plant are considered unlikely to be more significant than those created by the various other developments, which are already considered likely to be significant adverse.
- 4.14.39 As no significant effects on near surface remains or more deeply buried remains with palaeoenvironmental potential are predicted to be caused by Thurrock Flexible Generation Plant, no significant contribution to cumulative effects with any other developments are predicted.
- 4.14.40 All developments are required to consider flood risks to and from their sites, providing adequate mitigation as necessary, and to have safe storage of any potentially-polluting materials. No significant adverse cumulative effect of Thurrock Flexible Generation Plant with other developments is therefore predicted with respect to flood risk.
- 4.14.41 Thurrock Flexible Generation Plant is not predicted to cause adverse impacts due to ground contamination or on hydrogeology, and no cumulative impact with developments on other sites is therefore likely.

4.15 Conclusion

- 4.15.1 The proposed development is designed to meet a clear national need for flexible electricity generation infrastructure, with the location of the site chosen after considering environmental sensitivities and land availability in the areas around suitable connection points to the national electricity and gas grids. Although on undeveloped Common Land in the Green Belt, the selected development site is immediately adjacent to a major National Grid substation and is in a landscape with substantial current and historic industrial use, including Tilbury Power Station and the Port of Tilbury.
- 4.15.2 The development layout, construction access routes, proposal for exchange Common Land and land for habitat creation and biodiversity enhancement have been designed iteratively with input from the assessments of potential environmental impacts.

- 4.15.3 The preliminary environmental information from the assessment process shows that the only significant adverse effects predicted due to the proposed development, taking into account the designed-in mitigation, would be on views from certain points in access land and on the ridgeline to the north of the development site, and, towards the lower end of the scale for a significant effect, on the settings of Tilbury Fort and 'Riverside Station' listed building. Other environmental impacts are not predicted to have significant adverse effects.
- 4.15.4 Extensive other development is being proposed for the area around Thurrock Flexible Generation Plant, including a much larger power station, port expansion and new motorway crossing the Thames. The proposed 'Tilbury2' expansion of the Port of Tilbury has been subject to environmental impact assessment, with a decision on whether to grant consent currently being determined.
- 4.15.5 Considering cumulative environmental effects with Thurrock Flexible Generation Plant and Tilbury2, the only adverse effect where Thurrock Flexible Generation Plant would make a significant contribution is on air quality at a small number of locations in Tilbury, but this is not predicted to lead to any exceedance of air quality standards.
- 4.15.6 The proponents of other developments will have an equal duty to assess and where necessary mitigate significant cumulative impacts, and Thurrock Power is open to engagement with other developers where Thurrock Power's proposals for habitat creation or landscaping, for example, could contribute beneficially to a joined-up approach.

5. Preliminary Environmental Information Report Structure

Table 5.1: Preliminary Environmental Information Report structure.

| Volume | Document Number | Title |
|--------|-----------------|--|
| 1 | - | Non-Technical Summary |
| 2 | Chapters | |
| | - | Glossary, acronyms and units |
| | 1 | Introduction |
| | 2 | Project Description |
| | 3 | Consideration of Alternatives |
| | 4 | Environmental Impact Assessment Methodology |
| | 5 | Scoping and Consultation |
| 3 | Chapters | |
| | 6 | Landscape and Visual Resources |
| | 7 | Historic Environment |
| | 8 | Land Use, Agriculture and Socio-Economics |
| | 9 | Ecology |
| | 10 | Traffic and Transport |
| | 11 | Noise and Vibration |
| | 12 | Air Quality |
| | 13 | Human Health |
| | 14 | Climate Change |
| | 15 | Hydrology and Flood Risk |
| 4 | Chapters | |
| | 17 | Summary of Inter-Related Effects |
| | 18 | Summary of Cumulative Effects |
| | 19 | Summary of Further Mitigation, Residual Effects and Monitoring |

| Volume | Document Number | Title |
|--------|--|--|
| 5 | Appendices to Volume 2 | |
| | 2.1 | Enhancement, Mitigation and Monitoring Commitments |
| | 2.2 | Code of Construction Practice |
| | 2.3 | Accident and Emergency Management Procedures |
| | 4.1 | Cumulative Developments and Screening |
| | 4.2 | Transboundary Impacts Screening Note |
| 6 | Appendices to Volume 3 | |
| | 6.1 | Addendum to the Assessment of Landscape and Visual Resources |
| | 7.1 | Historic Environment Desk Based Assessment |
| | 7.2 | Geophysical Survey Report |
| | 9.1 | Ecological Desk Study and Survey Report |
| | 9.2 | Outline Ecological Management Plan |
| | 10.1 | Transport Assessment |
| | 11.1 | Baseline Sound Monitoring Report |
| | 11.2 | BS4142:2014 Statements of Competence |
| | 11.3 | Construction Noise Assessment Methodology and Results |
| | 11.4 | Operation Noise Assessment Methodology and Results |
| | 11.5 | Standards and Guidance Relevant to Noise and Vibration |
| | 12.1 | Assessment of Air Quality Impacts on Ecological Receptors |
| | 12.2 | Baseline Air Quality Conditions |
| | 12.3 | Stack Height Determination |
| | 12.4 | Model Inputs and Outputs |
| | 12.5 | Results of Other Scenarios |
| | 13.1 | Health Baseline |
| | 14.1 | GHG Calculations |
| | 15.1 | Flood Risk Assessment |
| 15.2 | Flood Zones and Model Data | |
| 15.3 | Surface Water Abstraction Licences, Discharge Consents and Pollution Incidents | |
| 16.1 | Phase 1 Preliminary Risk Assessment | |

6. Glossary, Units and Acronyms

Table 6.1: Preliminary Environmental Information Report glossary.

| Term | Definition |
|---|--|
| Abnormal Indivisible Loads | Loads or vehicles that exceed maximum vehicle weight, axle weight or dimensions as set out in the Road Vehicles (Construction and Use) Regulations 1986 as amended. |
| Above ground installation (AGI) | The infrastructure visible above ground at the connection point between Thurrock Flexible Generation Plant gas pipeline and Feeder 18 of the high-pressure National Transmission System. |
| Access and construction haul road corridors (zones C, H, I and J) | Areas of land within which temporary construction access road(s) and laydown and/or permanent access for the development's operational lifetime may be constructed. |
| Access Land | Land where the public have access either by legal right or by informal agreement. |
| Accident and emergency management procedures | Procedures that will be developed by Thurrock Power Ltd to minimise accident risks and respond to accidents or emergencies to protect health, safety and the environment. |
| Agri-environment scheme | A government-funded scheme to encourage farmers to manage their land in an environmentally friendly way. |
| Alluvium | Unconsolidated (not cemented together into a solid rock) soil or sediment, which has been eroded, reshaped by water in some form, and redeposited in a non-marine setting. |
| Application site | All land within the proposed Development Consent Order boundary. |
| Aquifer | A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater. |
| Auger boring | A core of soil taken for examination to a depth of 1 m with a Dutch Combination hand auger. |
| Baseline studies | Work done to determine and describe the environmental conditions against which any future changes can be measured or predicted and assessed. |
| "best and most versatile" land | The highest quality Grades 1, 2 and 3a agricultural land as determined by Defra. |
| Biodiversity Action Plan (BAP) | The UK Government's response to the Convention on Biological Diversity, which the UK signed in 1992 in Rio de Janeiro and ratified in 1994. The Convention on Biological Diversity requires signatory countries to identify, develop and enforce action plans to conserve, protect and enhance biological diversity. The UK BAP addresses this requirement. Local BAPs have been produced by many counties, to detail measures to conserve, protect and enhance local/county biological diversity. |
| Birds Directive | Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. |

| Term | Definition |
|--|--|
| Bronze Age | The time period 2,000 - 700BC. |
| Calcareous | Containing lime or being chalky. |
| Catchment Flood Management Plan | Catchment Flood Management Plans are documents produced by the Environment Agency to establish flood risk management policies which will deliver long term sustainable flood risk management across a catchment. They consider all types of inland flooding, from rivers, groundwater, surface water and tidal flooding within specific river basin district. |
| Catchments | An area that serves a watercourse with rainwater. Every part of land where the rainfall drains to a single watercourse is in the same catchment. |
| Characterisation | The process of identifying areas of similar landscape character, classifying and mapping them and describing their character. |
| Characteristics | Elements, or combinations of elements, which make a contribution to distinctive landscape character. |
| Climate change | A long term change in weather patterns, in the context of flood risk, climate change will produce more frequent severe rainfall. |
| Code of Construction Practice (CoCP) | A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes. |
| Common Land exchange and habitat enhancement areas (zones F and I) | Areas of land within which exchange Common Land and further habitat creation or enhancement for biodiversity value may be provided. |
| Common Land replacement and habitat enhancement areas (Zones F, G and I) | Areas of land within which replacement for Walton Common and further habitat creation or enhancement for biodiversity value may be provided. |
| Compensation | Measures devised to offset or compensate for residual adverse effects which cannot be prevented/avoided or further reduced. |
| Competent authority | The authority which determines the application for consent, permission, licence or other authorisation to proceed with a proposal. It is the authority that must consider the environmental information before granting any kind of authorisation. |
| Construction Environmental Management Plan (CEMP) | A document providing further detail of management measures to be employed during construction to avoid or minimise environmental impacts, following the principles and meeting the requirements set out in the CoCP. This document will be prepared by the lead construction contractor once appointed and developed through method statements for particular construction activities. |
| Construction Traffic Management Plan (CTMP) | A plan managing all construction traffic, including protocols for delivery of Abnormal Indivisible Loads to site, personnel travel, measures for road cleaning and sustainable site travel measures. |
| Consultation bodies | Any body specified in the relevant EIA Regulations which the competent authority must consult in respect of an EIA, and which also has a duty to provide a scoping opinion and information. |

| Term | Definition |
|---|--|
| Consultation Report | The Consultation Report records the consultation that has been undertaken, topics and issues raised by consultees, and how the applicant has responded. |
| Contaminant | Refers to the source of contamination (Hazard). |
| Cooling water pipe and construction haul road corridor (zone K) | The areas of land and estuary within which the buried cooling water pipeline route and intake/outfall would be located. A construction haul road from an existing third-party jetty would also be located within this corridor. The exact location of the pipe route, intake/outfall and construction haul road are flexible within this zone, subject to further constraints study and agreements with third parties prior to construction. |
| Cumulative effects | The combined effect of Thurrock Flexible Generation Plant in combination with the effects from one or more other development projects on the same receptor or resource. |
| Cumulative impact | Impacts that result from reasonably foreseeable actions of other development projects together with Thurrock Flexible Generation Plant. |
| de minimis | An amount or impact that is immaterial or small to be taken into consideration, often used in greenhouse gas accounting for very minor emission sources not appreciably affecting the total or within the bounds of other uncertainties. |
| Design envelope | A description of the range of possible elements that make up the Thurrock Flexible Generation Plant design options under consideration, as set out in detail in the project description. This envelope is used to define Thurrock Flexible Generation Plant for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach. |
| Designated landscape | Areas of landscape identified as being of importance at International, national or local levels, either defined by statute or identified in development plans or other documents. |
| Development | Any proposal that results in a change to the landscape and/or visual environment. |
| Development Consent Order (DCO) | An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP). |
| Direct effect | An effect that is directly attributable to the proposed development. |
| Discharge consents | Consent granted by the Environment Agency to discharge into watercourses, subject to conditions. |
| "Do nothing" situation | Continued change or evolution in the landscape in the absence of the proposed development. |
| Drainage Board (DB) | Drainage Boards are an integral part of water level management in the UK. Each DB is a local public authority established in areas of special drainage need in England and Wales. They have permissive powers to manage water levels within their respective drainage districts. They undertake works to reduce flood risk to people and property and manage water levels to meet local needs. |
| Drainage Strategy | A document and drawings showing the outline ('concept') design for surface water drainage for Thurrock Flexible Generation Plant. |
| Driver Delay | Delays incurred to the driver of vehicles as they move along the highway network. |

| Term | Definition |
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| Droughtiness | The assessment of the degree to which the shortage of soil water influences the range of crops which may be grown and level of yield that may be achieved. |
| Ecological Management Plan | A document detailing the management and protection of species and management or protection, enhancement or creation of habitats during the construction and operational phases of the proposed development. |
| Effect | Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria. |
| EIA Directive | European Union Directive 85/337/EEC, as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC and then codified by <u>Directive 2011/92/EU</u> of 13 December 2011 (as amended in 2014 by <u>Directive 2014/52/EU</u>). |
| EIA Regulations | The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended). |
| Elements (<i>landscape</i>) | Individual parts which make up the landscape, such as, for example, trees, hedges and buildings. |
| English Heritage | The Historic Buildings and Monuments Commission for England. Now replaced by Historic England. |
| Enhancement (<i>ecology</i>) | An ecological enhancement is the modification of a site which increases the site's capacity to support target plants or animals. |
| Enhancement (<i>landscape</i>) | Proposals that seek to improve the landscape resource and the visual amenity of the proposed development site and its wider setting, over and above its baseline condition. |
| Environmental Impact Assessment (EIA) | A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Impact Assessment (EIA) Report. |
| Environmental Impact Assessment (EIA) Report | A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations. |
| Environmental Statement (ES) | A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations. <i>see also Preliminary Environmental Information Report (PEIR)</i> |
| European conservation site | A Special Area of Conservation (SAC) or candidate SAC, a Special Protection Area (SPA) or potential SPA, a site listed as a site of community importance or a Ramsar site. |
| European Protected Species (EPS) | The animal species listed in Annex IV(a) to the Habitats Directive and the plant species listed in Annex IV(b) to the Habitats Directive. |
| Exceptions Test | The Exceptions Test ensures that development is permitted in flood risk areas only in exceptional circumstances and when strict qualifying conditions have been met. It is carried out if the Sequential Test demonstrates that a development cannot be located in areas of low flood risk. |

| Term | Definition |
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| Feature (<i>landscape</i>) | Particularly prominent or eye-catching elements in the landscape, such as tree clumps, church towers or wooded skylines, or a particular aspect of the project proposals. |
| Field drainage | Limiting the effect of flooding by maintaining surface water and land drainage systems. |
| Flood defences | A structure that is used to reduce the probability of floodwater affecting a particular area. |
| Flood Risk Assessment (FRA) | An evaluation of the baseline flood risk and effect as a result of Thurrock Flexible Generation Plant. The FRA sets out flood risk mitigation measures, as may be required. |
| Flood Zone 1 | Low Probability Land having a less than 1 in 1,000 annual probability of river or sea flooding. |
| Flood Zone 2 | Medium Probability Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. |
| Flood Zone 3a | High Probability Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. |
| Flood Zone 3b | The Functional Floodplain. This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. |
| Fluvial flooding | Fluvial flooding occurs when rivers burst their banks as a result of sustained or intense rainfall. |
| Gas connection corridor (zones C, D and E) | The areas of land within which the buried gas pipeline route and connection to the National Transmission System (see also above ground installation) would be located. The exact location of the pipe route and connection compound is flexible within these zones, subject to further constraints study and agreements with third parties prior to construction. |
| Geology | The scientific study of the origin, history and structure of the earth. |
| Geotextile | Textile matting laid under aggregate to provide coherence and stability to a temporary road surface. |
| Green Infrastructure | Networks of green spaces and watercourses and waterbodies that connect rural areas, villages, towns and cities. |
| Greenfield runoff rate | Rates of surface water runoff from a site that is undeveloped (greenfield). |
| Ground conditions | The chemical and physical characteristics of the soil at a particular location and how it has been affected by historical land uses. |
| Groundwater | All water which is below the surface of the ground in the saturated zone and in direct contact with the ground or subsoil. |

| Term | Definition |
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| Groundwater Source Protection Zone 1 (Inner protection zone) | Any pollution that can travel to the borehole within 50 days from any point within the zone is classified as being inside zone 1. This zone also has a minimum 50m protection radius around the borehole and is designed to protect against the transmission of toxic chemicals and water-borne disease. |
| Groundwater Source Protection Zone 2 (Outer protection zone) | The outer zone covers pollution that takes up to 400 days to travel to the borehole, or 25% of the total catchment area, whichever area is the biggest. This travel time is the minimum amount of time that pollutants need to be diluted, reduced in strength or delayed by the time they reach the borehole. |
| Groundwater Source Protection Zone 3 (Total catchment) | The total catchment is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole. |
| Growthed | The application of traffic growth rates to traffic flows. |
| Habitats Directive | Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. |
| Habitats Regulations Assessment (HRA) | A process which helps determine likely significant effects and (where appropriate) assesses adverse impacts on the integrity of European conservation sites and Ramsar sites. The process consists of up to four stages of assessment: screening, appropriate assessment, assessment of alternative solutions and assessment of imperative reasons of over-riding public interest (IROPI). |
| Health Determinant | The range of behavioural, biological, socio-economic and environmental factors that influence the health status of individuals or populations. |
| Heritage | The historic environment and especially valued assets and qualities, such as historic buildings and cultural traditions. |
| Highway Link | Length of highway. |
| Historic England | The Historic Buildings and Monuments Commission for England. |
| Historic Landscape Characterisation | Historic characterisation is the identification and interpretation of the historic dimension of the present-day landscape or townscape within a given area. |
| Impact | Change that is caused by an action; for example, land clearing (action) during construction which results in habitat loss (impact). |
| Indirect effects | Effects that result indirectly from the proposed project as a consequence of the direct effects, often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects. |
| Inter-related effects | Multiple effects on the same receptor arising from Thurrock Flexible Generation Plant. These occur either where a series of the same effect acts on a receptor over time to produce a potential additive effect or where a number of separate effects, such as noise and habitat loss, affect a single receptor. |
| Intertidal area | The area between mean low water and mean high water. |
| Iterative design process | The process by which project design is amended and improved by successive stages of refinement which respond to a growing understanding of environmental issues. |

| Term | Definition |
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| Key characteristics | Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place. |
| L _{A90} | Background noise level. The A-weighted sound level exceeded for 90% of the measurement duration. |
| L _{Aeq} | Noise parameter describing a sound level with the same energy content as the varying acoustic signal measured. |
| L _{Aeq,T} | L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A – weighted fluctuating sound measured over that period. |
| L _{AT} (DW) | Average 'A'-weighted downwind sound pressure level at receptor. |
| L _S | Specific sound level. |
| L _W | Overall sound power level. |
| Land cover | The surface cover of the land, usually expressed in terms of vegetation cover or lack of it. Related to but not the same as land use. |
| Land use | What land is used for, based on broad categories of functional land cover, such as urban and industrial use and the different types of agriculture and forestry. |
| Landform | The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical processes. |
| Landscape and Visual Impact Assessment | A tool used to identify and assess the likely significance of the effects of change resulting from the development both on the landscape as an environmental resource in its own right and on people's views and visual amenity. |
| Landscape character | A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse. |
| Landscape Character Areas | These are single unique areas which are the discrete geographical areas of a particular landscape type. |
| Landscape Character Assessment | The process of identifying and describing variation in the character of the landscape and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combinations of elements and features that make landscape distinctive. The process results in the production of a Landscape Character Assessment. |
| Landscape Character Types | These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes. |
| Landscape classification | A process of sorting the landscape into different types using selected criteria but without attaching relative values to different sorts of landscape. |
| Landscape effects | Effects on the landscape as a resource in its own right. |

| Term | Definition |
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| Landscape Management Plan | A document detailing the proposed landscape planting and landscape enhancement measures. |
| Landscape quality (condition) | A measure of the physical state of the landscape. It may include the extent to which a typical character is represented in individual areas, the intactness of the landscape and the condition of the individual elements. |
| Landscape receptors | Defined aspects of the landscape resource that have the potential to be affected by a proposal. |
| Landscape strategy | The overall vision and objectives for what the landscape should be like in the future. |
| Landscape value | The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons. |
| Laydown areas | Areas within the application boundary which may be used temporarily during the construction period for offloading and laydown or storage of construction materials, pre-manufactured components, or construction plant. |
| Lead Local Flood Authority | Lead Local Flood Authorities have responsibility for developing a Local Flood Risk Management Strategy for their area identifying local sources of flooding. The local strategy produced must be consistent with the national strategy. It will set out the local organisations with responsibility for flood risk in the area, partnership arrangements to ensure co-ordination between these organisations, an assessment of the flood risk, and plans and actions for managing the risk. |
| List Entry Number | Reference number for entry in National Heritage List. |
| Loam | Soil composed of sand, silt, and clay in relatively even concentration. |
| Local authority | A local authority is a body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. These include unitary authorities and county, district or borough councils. |
| Local Biodiversity Action Plan (LBAP) | Local BAPs have been produced by many counties, to detail measures to conserve, protect and enhance local/county biological diversity. |
| Local highway authority | The public organisation responsible for the maintenance of local roads and consideration of the effects of proposed development projects on the road network. |
| Local Nature Reserve | A local authority designation under the National Parks and Access to the Countryside Act 1949 (as amended), and in consultation with relevant statutory nature conservation agencies. |
| Local Wildlife Site | Defined in local and structure plans under the Town and Country Planning system. The designation is a material consideration when planning applications are being determined. |
| Lower Super Output Area | Is a geographic area within a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales. |
| Lower Thames Crossing | The proposed development by Highways England of a new road crossing of the Thames to the east of the application site with possible link road to Tilbury Port passing to the north of the main development site. |
| Magnitude | A combination of the extent, duration, frequency and reversibility of an impact/effect. |

| Term | Definition |
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| Main development site (zone A) | The area of land within which the principal built elements of the proposed development will be constructed, i.e. gas engines, batteries and substations. |
| Main rivers | The term used to describe a water course in respect of which the Environment Agency has permissive powers in relation to its management. |
| Main rivers | The term used to describe a water course in respect of which the Environment Agency has permissive powers in relation to its management. |
| Major HDDs | Over 200 m in length. |
| Measures adopted as part of the project | Enhancement, mitigation or monitoring commitment (which may include process or design measures) intended to avoid, reduce and where possible, remedy significant adverse impacts of a development. |
| Medieval | The time period AD410 - AD1540. |
| Mesolithic | The time period 10,000 - 3,500BC. |
| Minor watercourses | The term used to describe a water course owned and operated by a local Drainage Board, a Lead Local Flood Authority or a private land owner. |
| Modern | The time period 1901 onwards. |
| NATA/WebTAG Methodology | A standard national approach to undertaking assessments of major transport infrastructure projects. |
| National Nature Reserve | Designated under the National Parks and Access to the Countryside Act 1949 (as amended) and Wildlife and Countryside Act 1981 (as amended). Support examples of some of the most important natural and semi-natural ecosystems in Great Britain. Managed to conserve habitats and species within them, and to provide scientific study opportunities. |
| National Policy Statement (NPS) | A document setting out national policy against which proposals for NSIPs will be assessed and decided upon. |
| National Transmission System (NTS) and Feeder 18 | The network of high-pressure gas transmission pipes operated by National Grid Gas. Feeder 18 is the closest such pipe to the application site. |
| Nationally Significant Infrastructure Project (NSIP) | Large scale development including power generating stations which requires development consent under the Planning Act 2008. An offshore wind farm project with a capacity of more than 100 MW constitutes an NSIP. |
| Natura 2000 | A coherent European ecological network of Special Areas of Conservation and Special Protection Areas. |
| Noise sensitive receptor | A component of the natural or man-made environment that is affected by a perceived change in noise level. |
| Non-statutory consultee | Organisations that a local planning authority and/or PINS may choose to engage with (if, for example, there are planning policy reasons to do so) who are not designated in law but are likely to have an interest in a proposed development. |
| Non-statutory designated sites | Non-statutory designated sites are sites which have been designated due to their nature conservation interest, typically through the local planning process, which are usually protected by planning policies but not legally protected. |

| Term | Definition |
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| Operational assessment | The assessment of the degree to which a junction is operating within its theoretical capacity. |
| Order limits | The boundary of the DCO application within which all temporary and permanent works for the proposed development would be undertaken. |
| Ordinary watercourses | A river, stream, ditch, cut, sluice, dyke or non-public sewer that is not a designated Main river, and for which the local authority has flood risk management responsibilities and powers. |
| Parameters | A limit or boundary which defines the scope of a particular process or activity. |
| Pathway | Route for the contaminant to move/migrate to receptor(s). |
| Pedestrian Amenity | The convenience or comfort of movement on foot. |
| Pedestrian Delay | Delay incurred to pedestrians moving from one side of a road to another. |
| Perception | Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources and experiences). |
| Phase 1 Preliminary Risk Assessment | A document which assesses the potential for contamination to be present which could significantly constrain the use of the site. |
| Photomontage | A visualisation which superimposes an image of a proposed development upon a photograph or series of photographs. |
| Planning Inspectorate (PINS) | The executive agency of the Ministry of Housing, Communities and Local Government responsible for operating the planning process for NSIPs. |
| Post Medieval | The time period AD1540 to 1901. |
| Preliminary Environmental Information Report (PEIR) | The Preliminary Environmental Information Report (PEIR) presents the findings of Environmental Impact Assessment work undertaken to date concerning potential impacts of Thurrock Flexible Generation Plant. The PEIR is being published to inform pre-application consultation. |
| Principal Aquifer | These formations provide a high level of water storage and may support water supply and / or river base flow on a strategic scale. |
| Priority Habitats | UK Biodiversity Action Plan priority habitats are those identified as being the most threatened and requiring conservation action under the UK BAP. |
| Priority Species | UK Biodiversity Action Plan priority species were those that were identified as being the most threatened and requiring conservation action under the UK BAP. |
| Project Description | A description of the design envelope, construction process, activity in operation and future decommissioning options for Thurrock Flexible Generation Plant. |
| Ramsar Convention | The Convention on Wetlands of International Importance especially as Waterfowl Habitat of 2 February 1971 (as amended) which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. |
| Ramsar site | Wetlands of international importance, designated under the Ramsar Convention. |

| Term | Definition |
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| Ratio of flow to capacity (RFC) | A measure of the operational performance of one arm of a junction calculated as the number of vehicles using an arm of a junction divided by the theoretical maximum number of vehicles that are able to use the arm during a specified period. |
| Receptor | The target that could be affected by the contaminant(s). |
| Relevant planning authority | A relevant planning authority is the local authority in respect of an area within which a project is situated, as set out in Section 173 of the Planning Act 2008. relevant planning authorities may have responsibility for discharging requirements and some functions pursuant to the Development Consent Order, once made. The relevant planning authority in this case is Thurrock Council. |
| River Basin Management Plan | River Basin Management Plans describe the current state of the water environment in the river basin district. It sets out what improvements are possible by 2015 and how the actions will make a difference to the local environment - the catchments, estuaries, the coast and groundwater. |
| Roman | The time period AD43 - AD410. |
| Scope 1 | Scope 1 emissions are those released directly by the entity being assessed, e.g. from combustion of fuel at an installation. |
| Scope 2 | Scope 2 emissions are those caused indirectly by consumption of imported energy. |
| Scope 3 | Scope 3 emissions are those caused indirectly, not defined in scopes 1 or 2. |
| Scoping | The process of identifying the issues to be addressed by an EIA. It is a method of ensuring that an EIA focuses on the important issues and avoids those that are considered to be less significant. |
| Secondary A Aquifer | These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers. |
| Secondary B Aquifer | These formations are generally formed of lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. |
| Secondary Undifferentiated Aquifer | These formations have varying characteristics in different locations. |
| Section 47 consultee | Consultees identified in the Thurrock Flexible Generation Plant Statement of Community Consultation (SoCC), including the local community. Once the SoCC is finalised, the applicant has a duty under Section 47 of the Planning Act 2008 to carry out the consultation in accordance with that document. |
| Sensitivity | The extent to which a receptor can accept a change, of a particular type and scale. |
| Sequential Test | A Sequential Test aims to steer new development to areas with the lowest probability of flooding by recommending that development is not allocated if there are reasonably available sites appropriate to the proposed development in areas with a lower probability of flooding. |
| Serious personal injury accident | An accident leading to serious injuries requiring hospital treatment. |
| Severance | Real or perceived difficulties moving between one part of a community to another. |

| Term | Definition |
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| Shoreline Management Plan | A Shoreline Management Plan is a large-scale assessment of the risks associated with coastal processes and sets out a policy framework to address these risks to people and the developed, historic and natural environments. Coastal processes include tidal patterns, wave height, wave direction and the movement of beach and seabed materials. |
| Shuttle working | The use of either manual control or traffic signals to allow alternate traffic streams to pass through a length of highway where the width is reduced and insufficient to allow two vehicles to pass each other. |
| Significance | The significance of an effect combines the evaluation of the magnitude of an impact and the sensitivity of the receptor. |
| Site of Importance for Nature Conservation | Alternative title to Wildlife Site, as defined below. Defined in local and structure plans under the Town and Country Planning system. The designation is a material consideration when planning applications are being determined. |
| Site of Nature Conservation Importance | Alternative title to Wildlife Site, as defined below. Defined in local and structure plans under the Town and Country Planning system. The designation is a material consideration when planning applications are being determined. |
| Sites of Special Scientific Interest (SSSI) | Sites designated by Natural England under the Wildlife and Countryside Act 1981 (as amended) as areas of land of special interest by reason of any of their flora, fauna, or geological or physiographical features. |
| Slight accident | An accident leading to slight injuries which are defined as cuts, bruises or sprains requiring roadside attention but not normally requiring admission to hospital. |
| Soundplan | Acoustic modelling and prediction software. |
| Special Areas of Conservation | A site of Community importance designated under Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora through a statutory, administrative and/or contractual act where the necessary conservation measures are applied for the maintenance or restoration, at a favourable conservation status, of the natural habitats and/or the populations of the species for which the site is designated. |
| Special Protection Area (SPA) | An area which has been identified as being of international importance and designated under Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds for the breeding, feeding, wintering or the migration of rare and vulnerable bird species found within European Union countries. |
| Statement of Community Consultation (SoCC) | This details the approach to consultation proposed by the applicant and agreed with Thurrock Council. |
| Statutory consultee | Organisations that are required to be consulted by a local planning authority and/or PINs, and who also have with a duty to respond to that consultation within a set deadline. This includes consultees that the applicant is required to consult with, under Section 42 of the Planning Act 2008. Not all consultees will be statutory consultees (see non-statutory consultee definition). |
| Statutory designated sites | Sites which have been designated under UK and in some cases European or international legislation which protects areas identified as being of special nature conservation importance. |

| Term | Definition |
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| Strategic Flood Risk Assessment | A Strategic Flood Risk Assessment provides information on areas at risk from all sources of flooding. |
| Surface water resources | Water on the surface of the land such as in a river, lake, wetland, or ocean. |
| Surface water runoff | Surface water runoff is flow of water that occurs when excess storm water, meltwater, or other sources of water flows over a surface. |
| Susceptibility | The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences. |
| Sustainable urban Drainage Systems | A sequence of management practices and control measures designed to mimic natural drainage processes by allowing rainfall to infiltrate, and by attenuating and conveying surface water runoff slowly at peak times. |
| The Secretary of State for Business, Energy and Industrial Strategy | The ultimate decision maker with regard to Thurrock Power Ltd's application for Development Consent. |
| Thurrock Power Ltd or the applicant | The company developing Thurrock Flexible Generation Plant. Thurrock Power Ltd is a subsidiary of Statera Energy Ltd, which has developed a number of flexible generation plants around the UK. |
| Tidal (Coastal) flooding | Tidal flooding is caused by extreme tidal conditions including high tides and storm surges, overtopping local flood defences or coastal features. |
| Tilbury Energy Centre | The proposed development by RWE of a new power station on part of the Tilbury Power Station site with 2.5 GW combined cycle gas turbine and 300 MW open cycle gas turbine generating capacity plus battery storage. |
| Tilbury National Grid Substation | The existing National Grid Tilbury 275 / 400 kV substation to which Thurrock Flexible Generation Plant will connect via underground cables. |
| Tilbury Power Station | Decommissioned coal-fired power station to the south of Thurrock Flexible Generation Plant. |
| Tilbury2 | The proposed development of an extension to Tilbury Port, on land immediately west of Tilbury Power Station. |
| Time depth | Historical layering – the idea of landscape as a palimpsest, a much written over manuscript. |
| Townscape | The character and composition of the built environment including the buildings and the relationship between them, the different types of urban open space, including green spaces, and the relationship between buildings and open spaces. |
| TRACK Analysis | Computer modelling of area taken up by a moving vehicle. |
| Traffic growth rate | An estimate of the rate of change in traffic flows from one year to another year. |
| Tranquillity | A state of calm and quietude associated with peace, considered to be a significant asset of landscape (as defined in GLVIA3). |
| Transboundary | Crossing into other European Economic Association (EEA) States. |

| Term | Definition |
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| Transport Assessment | A transport assessment is a comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures will be taken to deal with the anticipated transport impacts of the scheme and to improve accessibility and safety for all modes of travel, particularly for alternatives to the car such as walking, cycling and public transport. |
| Treated Effluent | Water that has received primary, secondary or advanced treatment to reduce its pollution or health hazards and is subsequently released from a wastewater facility after treatment. |
| Trip Assignment | The routes that vehicles take between a site and other areas. |
| Trip Distribution | The proportion of vehicle trips between a site and other areas. |
| Trip Generation | The number of vehicle movements into and out of a development. |
| Trunk Road | A trunk road is a road maintained by a national government body, as distinct from the great majority of roads, which are maintained by local Highway Authorities. |
| UK Climate Projections 2009 | Climate projections expressed in terms of absolute values. A projection of the response of the climate system to emission scenarios of greenhouse gases and aerosols, or radiative forcing scenarios based upon climate model simulations and past observations. |
| Undefended Flood Zone | Environment Agency mapped river. |
| Unproductive Strata | These formations have a low permeability and have negligible significance for water supply or base flow. |
| Upper Palaeolithic | The time period 30,000 - 10,000BC. |
| Vibration | Vibration is an oscillatory motion. The magnitude of vibration can be defined in terms of displacement how far from the equilibrium something moves, velocity (how fast something moves), or acceleration (the rate of change of velocity). |
| Visual amenity | The overall pleasantness of the views people enjoy in their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area. |
| Visual effects | Effects on specific views and on the general visual amenity experienced by people. |
| Visual receptors | Individuals and/or defined groups of people who have the potential to be affected by a proposal. |
| Visualisation | A computer simulation, photomontage or other technique illustrating the predicted appearance of a development. |
| Water Quality | The physical, chemical and biological characteristics of water. |
| Wildlife Site | Local authority designation for sites of local conservation interest. Designation criteria can vary between areas, as can titles which include Local Wildlife Site, Local Nature Conservation Site, Site of Importance for Nature Conservation or Site of Nature Conservation Importance. They are defined in local and structure plans under the Town and Country Planning system and are a material consideration when planning applications are being determined. |

| Term | Definition |
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| Woodland | As described under the Phase 1 habitat survey guidelines (JNCC, 2010); vegetation dominated by trees more than 5 m high when mature, forming a distinct, although sometimes open, canopy. In accordance with Natural England's guidelines for Environmental Stewardship (Natural England, 2013, native woodland is defined as a group of trees with overlapping canopies covering at least 0.1 ha, at least half of which are native species. |
| Works areas | The areas within which all works associated with the construction, operation and decommissioning of the proposed Flexible Generation Plant are undertaken, including access, drainage and landscaping. |
| Written Scheme of Investigation (WSI) | A plan detailing the protocol for any archaeological investigation to be carried out prior to the construction of Thurrock Flexible Generation Plant, including procedures for field survey and watching briefs, as may be required. |
| Zone A | The 'main development site' immediately north of Tilbury Substation, within which the principal buildings or structures of the proposed development would be constructed. The gas engines, batteries, electrical switchgear (customer substations), runoff attenuation, control room and staff parking would be within zone A. |
| Zone B | This is the existing National Grid Tilbury Substation. The proposed development would connect to the 275 kV circuit at this substation via underground cables crossing from zone A into zone B. |
| Zone C | Zone C is a corridor of land south of the railway line in which the permanent access road and underground gas pipeline would be constructed, between Station Road and the main development in zone A. The route of the access road and gas pipeline within this corridor would be defined following detailed design. |
| Zone D | Zone D comprises a section of Station Road and two agricultural fields within which the gas pipeline would be constructed. This zone allows flexibility in the routing of the gas pipeline between zone C and zone E. The final route would be defined following detailed design. |
| Zone E | The AGI for the connection of the gas pipeline to the NTS would be constructed within zone E. The NTS 'Feeder 18' high pressure pipeline runs through this zone. The final location of the AGI within zone E would be defined following detailed design. |
| Zone F | This zone north of the railway, currently agricultural land, is the primary area in which exchange Common Land would be provided. Habitat creation / enhancement, compatible with Common Land rights, would also be provided in this zone. |
| (Zone G) | This zone letter is not used. |
| Zone H | This zone comprises sections of public highway that would need to be widened and sections of an existing private road with temporary planning permission that would be retained for the proposed development's construction period in order to provide a possible access route from Orsett Cock junction (in the north) to zone I and/or zone C that could accommodate heavy goods vehicle (HGV) traffic and abnormal loads, as an alternative to routing via zone J (see below). |

| Term | Definition |
|--------------------------------|--|
| Zone I | Up to one acre of this zone adjacent to the railway line could be used for temporary laydown during the construction period and a temporary tower crane for moving items across the railway. A temporary haul road south from Cooper's Shaw Road may also be constructed. Undisturbed areas of zone I may be used for protected species translocation and habitat creation / enhancement, compatible with existing Common Land rights. |
| Zone J | A construction haul road would be created in this zone from St Chad's Road to Gun Hill. The haul road would remain in situ for up to 15 years following the end of the construction programme in order to provide a continued access option for abnormal loads should a major component (such as transformer) of the proposed development fail in operation and require replacement. |
| Zone of Theoretical Visibility | A map, usually digitally produced, showing areas of land within which a development is theoretically visible. |

Table 6.2: Preliminary Environmental Information Report acronyms.

| Unit | Description |
|------|---|
| AA | Appropriate Assessment |
| AADT | Annual Average Daily Traffic |
| AC | Ambient Concentration |
| AGI | Above ground installation |
| AGL | Above Ground Level |
| ALC | Agricultural Land Classification |
| AONB | Area of Outstanding Natural Beauty |
| AoS | Appraisal of Sustainability (undertaken on all of the NPSs) |
| AQAL | Air Quality Assessment level |
| AQMA | Air Quality Management Area |
| AQS | Air Quality Strategy |
| ATC | Automatic Traffic Counter |
| BAP | Biodiversity Action Plan |
| BC | Borough Council |
| BEIS | Department for Business, Energy and Industrial Strategy |
| bgl | Below ground level |
| BGS | British Geological Survey |
| BS | British Standard |
| BSP | Bulk Supply Point substation |
| CC | County Council |
| CCGT | Combined cycle gas turbine |
| CCR | Carbon capture readiness |
| CCS | Carbon capture and storage |
| CEA | Cumulative Effect Assessment |
| CEMP | Construction Environmental Management Plan |
| CFMP | Catchment Flood Management Plan |
| CoCP | Code of Construction Practice |

| Unit | Description |
|-------|--|
| COMAH | Control of Major Accident Hazards |
| COPD | Chronic Obstructive Pulmonary Disorder |
| CRTN | Calculation of Road Traffic Noise |
| CSM | Conceptual Site Model |
| CSSP | Core Strategic Spatial Policy |
| CSTP | Core Strategic Thematic Policy |
| CTMP | Construction Traffic Management Plan |
| CWS | County Wildlife Site |
| DB | Drainage Board |
| DCLG | Department for Communities and Local Government |
| DCMS | Department of Digital, Culture, Media and Sport |
| DCO | Development Consent Order |
| DECC | (former) Department of Energy and Climate Change |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DfT | Department for Transport |
| DMRB | Design Manual for Roads and Bridges |
| DNO | Distribution network operator |
| EA | Environment Agency |
| ECoW | Ecological Clerk of Works |
| EEA | European Economic Association |
| EIA | Environmental impact assessment |
| EMP | Ecological Management Plan |
| END | Environmental Noise Directive |
| EPS | European Protected Species |
| EPUK | Environmental Protection UK |
| ES | Environmental Statement |
| ETS | Emission Trading Scheme |
| EWG | Expert Working Group |

| Unit | Description |
|----------|--|
| FGD | Flue Gas Desulphurisation |
| FRA | Flood Risk Assessment |
| GCN | Great crested newt (<i>in Chapter 9: Ecology</i>) |
| GCN | Guidelines for Community Noise (<i>in Chapter 11: Noise and Vibration</i>) |
| GLVIA3 | Guidelines for Landscape and Visual Impact Assessment; Third Edition (2013) |
| GSP | Grid supply point substation |
| HDD | Horizontal Directional Drilling |
| HDV | Heavy Duty Vehicle |
| HE | Highways England (<i>in Chapter 10: Transport</i>) |
| HE | Historic England (<i>in Chapter 7: Heritage</i>) |
| HGV | Heavy Goods Vehicle |
| HHRA | Human Health Risk Assessment |
| HIA | Health Impact Assessment |
| HLC | Historic Landscape Character/Characterisation |
| HRA | Habitats Regulations Assessment |
| HRAR | Habitats Regulations Assessment Report |
| HSI | Habitat Suitability Index |
| ICNIRP | International Commission on Non-Ionising Radiation Protection |
| IED | Industrial Emissions Directive |
| IPC | Infrastructure Planning Commission |
| ISO | International Organisation for Standardisation |
| JNCC | Joint Nature Conservation Committee |
| LA | Local Authority |
| LAQM | Local Air Quality Management |
| LBAP | Local Biodiversity Action Plan |
| LCA | Landscape Character Assessment |
| LCAs | Landscape Character Areas |
| LCTs | Landscape Character Types |
| LDA 1991 | Land Drainage Act 1991 |

| Unit | Description |
|-------------|---|
| LLFA | Lead Local Flood Authority |
| LNR | Local Nature Reserve |
| LOAEL | Lowest Observed Adverse Effect Level |
| LoWS or LWS | Local Wildlife Site |
| LPA | Local Planning Authority |
| LTC | Lower Thames Crossing |
| LTC | Lower Thames Crossing |
| LTP | Local Transport Plan |
| LVIA | Landscape and Visual Impact Assessment |
| MAFF | Ministry of Agriculture, Fisheries and Food |
| MCZ | Marine Conservation Zone |
| MHWS | Mean High Water Springs |
| NE | Natural England |
| NERC | Natural Environment and Rural Communities |
| NIC | National Infrastructure Commission |
| NISM | Notification of Inadequate System Margin |
| NISM | Notification of Inadequate System Margin |
| NNG | Night Noise Guidelines |
| NPPF | National Planning Policy Framework |
| NPPG | National Planning Practice Guidance |
| NPS | National Policy Statement |
| NSIP | Nationally Significant Infrastructure Project |
| NSR | Noise Sensitive Receptor |
| NTS | National Transmission System |
| NVC | National Vegetation Classification |
| OCGT | Open cycle gas turbine |
| OHL | Overhead (power) line |
| ORC | Organic Rankine cycle |
| OS | Ordnance Survey |

| Unit | Description |
|---------|---|
| PAH | Polycyclic Aromatic Hydrocarbons |
| PC | Process Contributions |
| PEA | Preliminary Ecological Appraisal |
| PEC | Predicted Environmental Concentrations |
| PEIR | Preliminary Environmental Information Report |
| PHE | Public Health England |
| PIA | Personal Injury Accident |
| PINS | Planning Inspectorate |
| PMD | Policy for Management and Development |
| PPG | Planning Practice Guidance |
| PRoW | Public Right of Way |
| PSCA | Population Size Class Assessment |
| rMCZ | recommended Marine Conservation Zone |
| SAC | Special Area of Conservation |
| SCR | Selective Catalytic Reduction |
| SM | Scheduled Monument |
| SMC | Scheduled Monument Consent |
| SOAEL | Significant Observed Adverse Effect Level |
| SoCC | Statement of Community Consultation |
| SoP | Standard of Protection |
| SoS | Secretary of State |
| SPA | Special Protection Area |
| SPD/SPG | Supplementary Planning Document/Supplementary Planning Guidance |
| SPZ | Source Protection Zone |
| SSSI | Site of Special Scientific Interest |
| TEC | Tilbury Energy Centre |
| TEMPRO | Trip End Model Presentation Programme |
| TLDF | Thurrock Local Development Framework |
| TTD | Thames Tidal Defences |

| Unit | Description |
|----------|--|
| UKBAP | UK Biodiversity Action Plan |
| UKCP09 | UK Climate Projections 2009 |
| VER | Valued Ecological Receptor |
| VOC | Volatile Organic Compounds |
| WCA 1981 | The Wildlife and Countryside Act 1981 (as amended) |
| WebTAG | Web Transport Analysis Guidance |
| WFD | Water Framework Directive |
| WHO | World Health Organisation |
| WRA 1991 | Water Resources Act 1991 |
| WRMP | Water Resource Management Plan |
| WSI | Written Scheme of Investigation |
| Zol | Zone of Influence |
| ZTV | Zone of Theoretical Visibility |

Table 6.3: Preliminary Environmental Information Report units.

| Unit | Description |
|---------------------------------|---|
| ° C | Degrees Celsius (temperature) |
| dB | Decibel (acoustic) |
| ft | Feet (distance) |
| g.s ⁻¹ | Mass emission rate |
| ha | Hectare (10,000 m ²) |
| Hz | Hertz, cycles per second (frequency) |
| Km | Kilometre (distance) |
| kV | Kilovolt (electrical potential) |
| kW, MW, GW | Kilowatt, megawatt, gigawatt (power) |
| kWh, MWh, GWh | Kilowatt-hours, megawatt-hours, gigawatt-hours (total power during a period of time) |
| MW _e | Megawatt electrical (thermal power generator electrical output) |
| MW _{th} | Megawatt thermal (thermal power generator fuel input) |
| m | Metre (distance) |
| m ² | Metres squared (area) |
| mph | Miles per hour (speed) |
| m.s ⁻¹ | Metres per second (velocity) |
| m ³ .s ⁻¹ | Volumetric flow per second |
| t | Tonne (weight) |
| tCO ₂ e | Tonnes of carbon dioxide equivalent, i.e. greenhouses gases expressed as carbon dioxide based on their global warming potential |
| µg.m ⁻³ | Micrograms per cubic metre (concentration) |
| x, y | Grid coordinates |
| " | Inches (distance) |